

# Cisco UCS Integrated Infrastructure for Big Data with Hortonworks Data Platform

With Optional Tiered Storage Extension

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Building Architectures to Solve Business Problems

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## About the Authors

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# **Cisco UCS Integrated Infrastructure for Big Data with Hortonworks Data Platform**

## Audience

This document describes the architecture and deployment procedures for Hortonworks Data Platform (HDP 2.2) on a 64 Cisco UCS C240 M4 node cluster along with 4 archival node (Cisco UCS C3160) based on Cisco UCS Integrated Infrastructure 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 HDP 2.2 on Cisco UCS Integrated Infrastructure for Big Data.

# Introduction

Hadoop has become a strategic data platform embraced by mainstream enterprises as it offers the fastest path for businesses to unlock value in big data while maximizing existing investments. The Hortonworks Data Platform (HDP) is a 100% open source distribution of Apache Hadoop that is truly enterprise grade having been built, tested and hardened with enterprise rigor. The combination of HDP and Cisco UCS provides industry-leading platform for Hadoop based applications.

# **Cisco UCS Integrated Infrastructure for Big Data with Tiered Storage**

The Cisco UCS solution for Hortonworks is based on Cisco UCS Integrated Infrastructure 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:



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## **Cisco UCS 6200 Series Fabric Interconnects**

Cisco UCS 6200 Series Fabric Interconnects provide high-bandwidth, low-latency connectivity for servers, with integrated, unified management provided for all connected devices by Cisco UCS Manager. Deployed in redundant pairs, Cisco fabric interconnects offer the full active-active redundancy, performance, and exceptional scalability needed to support the large number of nodes that are typical in clusters serving big data applications. Cisco UCS Manager enables rapid and consistent server configuration using service profiles, automating ongoing system maintenance activities such as firmware updates across the entire cluster as a single operation. Cisco UCS Manager also offers advanced monitoring with options to raise alarms and send notifications about the health of the entire cluster.

#### Figure 1 Cisco UCS 6296UP 96-Port Fabric Interconnect



## **Cisco UCS C-Series Rack Mount Servers**

Cisco UCS C-Series Rack Mount C220 M4 High-Density Rack servers (Small Form Factor Disk Drive Model) and Cisco UCS C240 M4 High-Density Rack servers (Small Form Factor Disk Drive Model) are enterprise-class systems that support a wide range of computing, I/O, and storage-capacity demands in compact designs. Cisco UCS C-Series Rack-Mount Servers are based on Intel Xeon E5-2600 v3 product family and 12-Gbps SAS throughput, delivering significant performance and efficiency gains over the previous generation of servers. The servers use dual Intel Xeon processor E5-2600 v3 series CPUs and support up to 768 GB of main memory (128 or 256 GB is typical for big data applications) and a range of disk drive and SSD options. 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-optimized option, along with 4 Gigabit Ethernet LAN-on-motherboard (LOM) ports. Cisco UCS virtual interface cards 1227 (VICs) designed for the M4 generation of Cisco UCS C-Series Rack Servers are optimized for high-bandwidth and low-latency cluster connectivity, with support for up to 256 virtual devices that are configured on demand through Cisco UCS Manager.





### **Cisco UCS C3160 Rack Server**

Cisco UCS C3160 Rack Server is an advanced, modular rack server with extremely high storage density. Based on the Intel Xeon processor E5-2600 v2 series, it offers up to 360 TB of local storage in a compact 4-rack-unit (4RU) form factor. Because all its hard-disk drives are individually hot-swappable, and with its built-in enterprise-class Redundant Array of Independent Disks (RAID) redundancy, the Cisco UCS C3160 helps you achieve the highest levels of data availability. The Cisco UCS C3160 is ideal for Snapshots, active archiving, compliance, media storage, and distributed file systems for scenarios in which high storage capacity is important. Cisco UCS virtual interface cards 1227 (VICs) designed for the M4 generation of Cisco UCS C-Series Rack Servers and C3160 are optimized for high-bandwidth and low-latency cluster connectivity, with support for up to 256 virtual devices that are configured on demand through Cisco UCS Manager.



## **Cisco UCS Virtual Interface Cards (VICs)**

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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. The Cisco UCS Virtual Interface Card (VIC) 1227 is a dual-port, Enhanced Small Form-Factor Pluggable (SFP+), 10 GigabitEthernet Ethernet and Fiber Channel over Ethernet (FCoE)-capable, PCI Express (PCIe) modular LAN on motherboard (mLOM) adapter. It is designed exclusively for the M4 generation of Cisco UCS C-Series Rack Servers and the C3160 dense storage servers.

Figure 4 Cisco UCS VIC 1227



### **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.



# **Cisco UCS Director Express for Big Data**

Cisco UCS Director Express for Big Data provides a single-touch solution that automates deployment of Hadoop Distributions on leading Cisco UCS Integrated Infrastructure for Big Data.

It also provides a single management pane across both physical infrastructure and Hadoop software. All elements of the infrastructure are handled automatically with little need for user input. Through this approach, configuration of physical computing, internal storage, and networking infrastructure is integrated with the deployment of operating systems, Java packages, and Hadoop along with the provisioning of Hadoop services. Cisco UCS Director Express for Big Data is integrated with major Hadoop distributions from Hortonworks, Cloudera, and MapR, providing single-pane management across the entire infrastructure.

It complements and communicates with Hadoop managers, providing a system wide perspective and enabling administrators to correlate Hadoop activity with network and computing activity on individual Hadoop nodes.

The appendix section describes on how to go about configuring Cisco UCS Director Express for Big Data and deploying popular Hadoop distributions such as Cloudera, MapR and Hortonworks on the Cisco UCS Integrated Infrastructure for Big Data cluster.

#### Figure 6

Cisco USCD Express for Big Data



## **Hortonworks Data Platform (HDP 2.2)**

The Hortonworks Data Platform 2.2 (HDP 2.2) is an enterprise-grade, hardened Apache Hadoop distribution that enables you to store, process, and manage large data sets.

Apache Hadoop is an open-source software framework that allows for the distributed processing of large data sets across clusters of computers using simple programming models. It is designed for high-availability and fault-tolerance, and can scale from a single server up to thousands of machines.

The Hortonworks Data Platform combines the most useful and stable versions of Apache Hadoop and its related projects into a single tested and certified package. Hortonworks offers the latest innovations from the open source community, along with the testing and quality you expect from enterprise-quality software.

The Hortonworks Data Platform is designed to integrate with and extend the capabilities of existing investments in data applications, tools, and processes. With Hortonworks, one can refine, analyze, and gain business insights from both structured and unstructured data – quickly, easily, and economically.

## **Key Features of HDP 2.2**

Hortonworks Data Platform enables Enterprise Hadoop: the full suite of essential Hadoop capabilities that are required by the enterprise and that serve as the functional definition of any data platform technology. This comprehensive set of capabilities is aligned to the following functional areas: Data Management, Data Access, Data Governance and Integration, Security, and Operations.

GOVERNANCE OPERATIONS DATA ACCESS INTEGRATION Script SQL Java/Sc... NoSQL In-Mem Others. Stream Search HBase Pia Hive Cascading Storm Soli Spark Engines Data Workflow, **HCatalog** Accumulo Authentication. Provision, Manage & Lifecycle & Governance Authorization, Audit & Phoenix Slider Monitor Slider Tez Tez s/T Data Protection Falcon Ambari Storage: HDFS ZooKeeper YARN: Data Operating System WebHDFS Resources: YARN NFS Access: Hive Flume Scheduling Pipeline: Falcon Saoop Cluster: Knox Oozie HDFS Kafka Cluster: Ranger Hadoop Distributed File System DATA MANAGEMENT

Figure 7 Hortonworks Data Platform

HDP 2.2 incorporates many new innovations that have happened in Hadoop and its supporting ecosystem of projects. Some of the key projects are listed below.

### **Tiered Storage in HDFS**

With HDP 2.2, HDFS provides the ability to utilize heterogeneous storage media within the HDFS cluster to enable the following tiered storage scenarios:

- Hot Data Tier: Provides a storage tier that consists of C240M4 servers to store datasets that require high speed storage access.
- Archival Data Tier: Provides storage dense tier that consists of C3160 server to store less frequently accessed datasets.

This is explained in detail in post HDP installation section.

### **Enterprise SQL at Scale in Hadoop**

While YARN has allowed new engines to emerge for Hadoop, one of the popular integration point with Hadoop continues to be SQL and Apache Hive is still the defacto standard.

New capabilities in HDP 2.2 include:

• Updated SQL Semantics for Hive Transactions for Update and Delete: ACID transactions provide atomicity, consistency, isolation, and durability. This helps with streaming and baseline update scenarios for Hive such as modifying dimension tables or other fact tables.

• Improved Performance of Hive with a Cost Based Optimizer: The cost based optimizer for Hive, uses statistics to generate several execution plans and then chooses the most efficient path as it relates system resources required to complete the operation. This presents a major performance increase for Hive.

### **Apache Tez**

Apache Tez is an extensible framework for building high performance batch and interactive data processing applications, coordinated by YARN in Apache Hadoop. Tez improves the MapReduce paradigm by dramatically improving its speed, while maintaining MapReduce's ability to scale to petabytes of data. Important Hadoop ecosystem projects like Apache Hive and Apache Pig use Apache Tez, as do a growing number of third party data access applications developed for the broader Hadoop ecosystem.

### Hive with Tez

As the defacto standard for SQL-In-Hadoop, Apache Hive is optimal for both batch and interactive queries at petabyte scale. Hive embeds Tez so that it can translate complex SQL statements into highly optimized, purpose-built data processing graphs that strike the right balance between performance, throughput, and scalability. Apache Tez innovations drove many of the Hive performance improvements delivered by the Stinger Initiative, a broad community effort that included contributions from 145 engineers across 44 different organizations. Tez helps make Hive interactive.

### Kafka for Processing the Internet of Things

Apache Kafka has quickly become the standard for high-scale, fault-tolerant, publish-subscribe messaging system for Hadoop. It is often used with Storm and Spark so as to stream events in to Hadoop in real time and its application within the "Internet of things" uses cases is tremendous.

### **Apache Flume**

Flume is a distributed, reliable, and available service for efficiently collecting, aggregating, and moving large amounts of streaming data into the Hadoop Distributed File System (HDFS). It has a simple and flexible architecture based on streaming data flows, and is robust and fault tolerant with tunable reliability mechanisms for failover and recovery.

### **Apache Sqoop**

Sqoop is a tool designed for efficiently transferring bulk data between Apache Hadoop and structured data stores such as relational databases. Sqoop imports data from external structured data stores into HDFS or related systems like Hive and HBase. Sqoop can also be used to extract data from Hadoop and export it to external structured data stores such as relational databases and enterprise data warehouses. Sqoop works with relational databases such as Teradata, Netezza, Oracle, MySQL, Postgres, and HSQLDB.

### **Apache Knox**

Knox provides perimeter security so that the enterprise can confidently extend Hadoop access to more of those new users while also maintaining compliance with enterprise security policies. Knox also simplifies Hadoop security for users who access the cluster data and execute jobs. It integrates with prevalent identity management and SSO systems and allows identities from those enterprise systems to be used for seamless, secure access to Hadoop clusters.

The Hortonworks Data Platform is the foundation for the next-generation enterprise data architecture – one that addresses both the volume and complexity of today's data.

## **Solution Overview**

This CVD describes architecture and deployment procedures for Hortonworks Data Platform (HDP 2.2) on a 64 Cisco UCS C240 M4 node cluster along with 4 archival node (Cisco UCS C3160) based on Cisco UCS Integrated Infrastructure for Big Data. This solution describes in detail the configuration of HDP 2.2 on Cisco UCS Integrated Infrastructure along with Archival nodes (UCS C3160) and defining storage policies for data placement.

The current version of the Cisco UCS Integrated Infrastructure for Big Data offers the following configuration depending on the compute and storage requirements:

<b>Performance Optimized</b>	Capacity Optimized	Extreme Capacity
16 Cisco UCS C240 M4 Rack Servers (SFF), each with:	16 Cisco UCS C240 M4 Rack Servers (LFF), each with:	2 Cisco UCS C3160 Rack Servers, each with:
• 2 Intel Xeon processors E5-2680 v3 CPUs	• 2 Intel Xeon processors E5-2620 v3 CPU	• 2 Intel Xeon processors E5-2695 v2 CPUs
• 256 GB of memory	• 128 GB of memory	• 256 GB of memory
Cisco 12-Gbps SAS Modular Raid Controller with 2-GB flash-based	Cisco 12-Gbps SAS Modular Raid Controller with 2-GB FBWC	Cisco 12-Gbps SAS Modular Raid Controller with 4-GB FBWC
<ul> <li>write cache (FBWC)</li> <li>24 1.2-TB 10K SFF SAS</li> </ul>	• 12 4-TB 7.2K LFF SAS drives (768 TB total)	• 60 4 TB (or 6TB) 7.2K LFF SAS drives (480 TB or 720 TB total)
<ul> <li>2 120-GB 6-Gbps 2.5-inch Enterprise Value</li> </ul>	• 2 120-GB 6-Gbps 2.5-inch Enterprise Value SATA SSDs for	• 2 120-GB 6-Gbps 2.5-inch Enterprise Value SATA SSDs for Boot
<ul> <li>SATA SSDs for Boot</li> <li>Cisco UCS VIC 1227 (with 2 10 GE SFP+</li> </ul>	<ul> <li>Boot</li> <li>Cisco UCS VIC 1227 (with 2 10 GE SFP+</li> </ul>	<ul> <li>2 Cisco UCS VIC 1227 (each with 2 10 GE SFP+ ports)</li> <li>2 built-in 10 GE LOM ports</li> </ul>
ports)	ports)	

#### Table 1 Cisco UCS Integrated Infrastructure for Big Data Configuration Details



This CVD describes the install process of HDP 2.2 for a 64 node (2 Master node + 62 Data node) of Performance Optimized Cluster configuration along with 4 Archival Nodes using Cisco UCS C3160 Servers.

The Performance cluster configuration consists of the following:

- Two Cisco UCS 6296UP Fabric Interconnects
- 64 UCS C240 M4 Rack-Mount servers (16 per rack)
- 4 UCS C3160 Rack Server (1 per rack)
- Four Cisco R42610 standard racks
- Eight vertical power distribution units (PDUs) (Country Specific)

# **Rack and PDU Configuration**

Each rack consists of two vertical PDUs. The master rack consists of two Cisco UCS 6296UP Fabric Interconnects, sixteen Cisco UCS C240 M4 Servers and one Cisco UCS C3160 connected to each of the vertical PDUs for redundancy; thereby, ensuring availability during power source failure. The expansion racks consists of sixteen Cisco UCS C240 M4 Servers and one Cisco UCS C3160 connected to each of the vertical PDUs for redundancy; thereby, ensuring availability during power source failure, similar to the master rack.

Note

Please contact your Cisco representative for country specific information.

Table 2 and Table 3 describe the rack configurations of rack 1 (master rack) and racks 2-4 (expansion racks).

Cisco 42URack	Master Rack
42	Cisco UCS FI 6296UP
41	
40	Cisco UCS FI 6296UP
39	
38	Unused
37	Unused
36	Cisco UCS C240 M4
35	
34	Cisco UCS C240 M4
33	
32	Cisco UCS C240 M4
31	
30	Cisco UCS C240 M4
29	
28	Cisco UCS C240 M4
27	

Table 2Rack 1 (Master Rack)

26       Cisco UCS C240 M4         25       Cisco UCS C240 M4         23       Cisco UCS C240 M4         21       Cisco UCS C240 M4         20       Cisco UCS C240 M4         19       Cisco UCS C240 M4         19       Cisco UCS C240 M4         19       Cisco UCS C240 M4         16       Cisco UCS C240 M4         15       Cisco UCS C240 M4         14       Cisco UCS C240 M4         13       Cisco UCS C240 M4         14       Cisco UCS C240 M4         15       Cisco UCS C240 M4         16       Cisco UCS C240 M4         17       Cisco UCS C240 M4         18       Cisco UCS C240 M4         19       Cisco UCS C240 M4         10       Cisco UCS C240 M4         9       Cisco UCS C240 M4         5       Cisco UCS C3160         1       Cisco UCS C3160	Cisco 42URack	Master Rack
25       Cisco UCS C240 M4         23       Cisco UCS C240 M4         21       Cisco UCS C240 M4         20       Cisco UCS C240 M4         19       Cisco UCS C240 M4         19       Cisco UCS C240 M4         17       Cisco UCS C240 M4         16       Cisco UCS C240 M4         15       Cisco UCS C240 M4         13       Cisco UCS C240 M4         11       Cisco UCS C240 M4         12       Cisco UCS C240 M4         13       Cisco UCS C240 M4         14       Cisco UCS C240 M4         15       Cisco UCS C240 M4         16       Cisco UCS C240 M4         17       Cisco UCS C240 M4         18       Cisco UCS C240 M4         10       Cisco UCS C240 M4         16       Cisco UCS C240 M4         10       Cisco UCS C240 M4         11       Cisco UCS C240 M4         12       Cisco UCS C240 M4         13       Cisco UCS C240 M4         14       Cisco UCS C240 M4         15       Cisco UCS C3160         16       Cisco UCS C3160         17       Cisco UCS C3160	26	Cisco UCS C240 M4
24       Cisco UCS C240 M4         23       Cisco UCS C240 M4         21       Cisco UCS C240 M4         20       Cisco UCS C240 M4         19       Cisco UCS C240 M4         17       Cisco UCS C240 M4         16       Cisco UCS C240 M4         15       Cisco UCS C240 M4         13       Cisco UCS C240 M4         11       Cisco UCS C240 M4         12       Cisco UCS C240 M4         13       Cisco UCS C240 M4         14       Cisco UCS C240 M4         15       Cisco UCS C240 M4         16       Cisco UCS C240 M4         17       Cisco UCS C240 M4         18       Cisco UCS C240 M4         19       Cisco UCS C240 M4         10       Cisco UCS C240 M4         11       Cisco UCS C240 M4         12       Cisco UCS C240 M4         13       Cisco UCS C240 M4         14       Cisco UCS C240 M4         15       Cisco UCS C240 M4         16       Cisco UCS C3160         17       Cisco UCS C3160         18       Cisco UCS C3160	25	
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19       Image: Cisco UCS C240 M4         17       Cisco UCS C240 M4         16       Cisco UCS C240 M4         15       Cisco UCS C240 M4         13       Cisco UCS C240 M4         12       Cisco UCS C240 M4         10       Cisco UCS C240 M4         9       Cisco UCS C240 M4         8       Cisco UCS C240 M4         7       Cisco UCS C240 M4         6       Cisco UCS C240 M4         5       Cisco UCS C240 M4         4       Cisco UCS C240 M4         5       Cisco UCS C3160         3       Cisco UCS C3160	20	Cisco UCS C240 M4
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13	14	Cisco UCS C240 M4
12       Cisco UCS C240 M4         11       Cisco UCS C240 M4         9       Cisco UCS C240 M4         8       Cisco UCS C240 M4         7       Cisco UCS C240 M4         6       Cisco UCS C240 M4         5       Cisco UCS C240 M4         3       Cisco UCS C3160         1       Cisco UCS C3160	13	
11       10         10       Cisco UCS C240 M4         9       6         8       Cisco UCS C240 M4         7       6         6       Cisco UCS C240 M4         5       6         4       Cisco UCS C240 M4         3       2         1       6	12	Cisco UCS C240 M4
10       Cisco UCS C240 M4         9       Cisco UCS C240 M4         8       Cisco UCS C240 M4         7       Cisco UCS C240 M4         6       Cisco UCS C240 M4         5       Cisco UCS C240 M4         4       Cisco UCS C3160         3       Cisco UCS C3160         1       Cisco UCS C3160	11	
9       6       Cisco UCS C240 M4         7       6       Cisco UCS C240 M4         5       6       Cisco UCS C240 M4         4       6       Cisco UCS C3160         3       2       1	10	Cisco UCS C240 M4
8       Cisco UCS C240 M4         7       6         6       Cisco UCS C240 M4         5       6         4       6         3       6         2       7         1       6	9	
7     6       6     Cisco UCS C240 M4       5        4     Cisco UCS C3160       3        2        1	8	Cisco UCS C240 M4
6     Cisco UCS C240 M4       5     4       4     Cisco UCS C3160       3     2       1     1	7	
5     6       4     Cisco UCS C3160       3     2       1     1	6	Cisco UCS C240 M4
4     Cisco UCS C3160       3     2       1	5	
3 2 1	4	Cisco UCS C3160
2 1	3	
1	2	
	1	

Table 2Rack 1 (Master Rack)

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#### Table 3Rack 2-4 (Expansion Racks)

Cisco 42URack	Expansion Rack
42	Unused
41	Unused
40	Unused
39	Unused
38	Unused
37	Unused

Cisco 42URack	Expansion Rack
36	Cisco UCS C240 M4
35	-
34	Cisco UCS C240 M4
33	_
32	Cisco UCS C240 M4
31	
30	Cisco UCS C240 M4
29	
28	Cisco UCS C240 M4
27	
26	Cisco UCS C240 M4
25	
24	Cisco UCS C240 M4
23	
22	Cisco UCS C240 M4
21	
20	Cisco UCS C240 M4
19	
18	Cisco UCS C240 M4
17	
16	Cisco UCS C240 M4
15	
14	Cisco UCS C240 M4
13	
12	Cisco UCS C240 M4
11	
10	Cisco UCS C240 M4
9	
8	Cisco UCS C240 M4
7	
6	Cisco UCS C240 M4
5	
4	Cisco UCS C3160
3	
2	
1	

Table 3Rack 2-4 (Expansion Racks)

# **Port Configuration on Fabric Interconnects**

	Table 4	Port Types and Port Numbers
Port Type		Port Number
Network		1
Appliance		2 to 5
Server		6 to 69

# Server Configuration and Cabling for C240M4

The C240 M4 rack server is equipped with Intel Xeon E5-2680 v3 processors, 256 GB of memory, Cisco UCS Virtual Interface Card 1227, Cisco 12-Gbps SAS Modular Raid Controller with 2-GB FBWC, 24 1.2-TB 10K SFF SAS drives, 2 120-GB SATA SSD for Boot.

Figure 8, illustrates the port connectivity between the Fabric Interconnect and Cisco UCS C240 M4 server. Sixteen Cisco UCS C240 M4 servers are used in Master rack configurations.

Figure 8 Fabric Topology for C240 M4

Cisco UCS 6296UP Fabric Interconnect A



# Server Configuration and Cabling for C3160

The C3160 rack server is equipped with Intel Xeon E5-2695 v2 processors, 256 GB of memory, 2 Cisco UCS Virtual Interface Card 1227, Cisco 12-Gbps SAS Modular Raid Controller with 4-GB FBWC, 60 4-TB 7.2K LFF SAS drives, 2 120-GB SATA SSD for Boot.

Figure 9, illustrates the port connectivity between the Fabric Interconnect and Cisco UCS C3160 server as an Appliance port. One Cisco UCS C3160 server is used in master rack configurations.

#### Figure 9 Fabric Topology for C3160

#### Cisco UCS 6296UP Fabric Interconnect A

	Cisco UCS 6296U	P Fabric Interco	nnect B	
<b>D</b> EADEZONEZONEZONEZONEZ				
	Cisco UCS C316	50 Rack Server		
C				

For more information on physical connectivity and single-wire management, see: <u>http://www.cisco.com/en/US/docs/unified\_computing/ucs/c-series\_integration/ucsm2.1/b\_UCSM2</u> -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

Figure 10 depicts a 64-node cluster along with 4 archival nodes. Every rack has 16 Cisco UCS C240 M4 servers along with 1 Cisco UCS C3160 as an archival server. Each link in the figure represents 16 x 10 Gigabit Ethernet link from each of the 16 servers connecting to a Cisco UCS Fabric Interconnect as a Direct Connect along with the Cisco UCS C3160 connected as an Appliance port to the Fabric Interconnect. Every server is connected to both the Cisco UCS Fabric Interconnects shown with dual link.



# **Software Distributions and Versions**

The software distributions required versions are listed below.

## Hortonworks Data Platform (HDP 2.2)

The Hortonworks Data Platform supported is HDP 2.0. For more information visit http://www.hortonworks.com

## **Red Hat Enterprise Linux (RHEL)**

The operating system supported is Red Hat Enterprise Linux 6.5. For more information visit http://www.redhat.com

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## **Software Versions**

The software versions tested and validated in this document are shown in table 5.

Layer	Component	Version or Release
Compute	Cisco UCS C240-M4	C240M4.2.0.3d
	Cisco UCS C3160	C3160M3.2.0.2.*
Network	Cisco UCS 6296UP	UCS 2.2(3d)A
	Cisco UCS VIC1227 Firmware	4.0(1d)
	Cisco UCS VIC1227 Driver	2.1.1.66
Storage	LSI SAS 3108	24.5.0-0020
Software	Red Hat Enterprise Linux Server	6.5 (x86_64)
	Cisco UCS Manager	2.2(3d)
	HDP	2.2

#### Table 5Software Versions



- The latest drivers can be downloaded from the link below: https://software.cisco.com/download/release.html?mdfid=283862063&flowid=25886&softwareid=283 853158&release=1.5.7d&relind=AVAILABLE&rellifecycle=&reltype=latest
- The latest supported RAID controller driver is already included with the RHEL 6.5 operating system.

# **Fabric Configuration**

This section provides details for configuring a fully redundant, highly available Cisco UCS 6296 fabric configuration.

- 1. Initial setup of the Fabric Interconnect A and B.
- 2. Connect to UCS Manager using virtual IP address of using the web browser.
- 3. Launch UCS Manager.
- 4. Enable server, uplink and appliance ports.
- 5. Start discovery process.
- 6. Create pools and polices for Service profile template.
- 7. Create Service Profile template and 64 Service profiles.
- 8. Associate Service Profiles to servers.

## Performing Initial Setup of Cisco UCS 6296 Fabric Interconnects

This section describes the steps to perform initial setup of the Cisco UCS 6296 Fabric Interconnects A and B.

#### **Configure Fabric Interconnect A**

1. Connect to the console port on the first Cisco UCS 6296 Fabric Interconnect.

- 2. At the prompt to enter the configuration method, enter console to continue.
- 3. If asked to either perform 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, answer 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.
- 12. Enter the Mgmt0 IPv4 netmask.
- **13.** Enter the IPv4 address of the default gateway.
- 14. Enter the cluster IPv4 address.
- 15. To configure DNS, answer y.
- 16. Enter the DNS IPv4 address.
- 17. Answer 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, answer **yes** to save the configuration.
- 20. Wait for the login prompt to make sure the configuration has been saved.

#### **Configure Fabric Interconnect B**

- 1. Connect to the console port on the second Cisco UCS 6296 Fabric Interconnect.
- 2. When prompted to enter the configuration method, enter console to continue.
- **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 that was configured for the first Fabric Interconnect.
- 5. Enter the Mgmt0 IPv4 address.
- 6. Answer yes to save the configuration.
- 7. Wait for the login prompt to confirm that the configuration has been saved.

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 login to Cisco UCS Manager.

1. Open a web browser and navigate to the Cisco UCS 6296 Fabric Interconnect cluster address.

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- 2. Click the Launch link to download the Cisco UCS Manager software.
- 3. If prompted to accept security certificates, accept as necessary.
- 4. When prompted, enter admin for the user-name and enter the administrative password.

5. Click Login to log in to the Cisco UCS Manager.

### Upgrading Cisco UCS Manager Software to Version 2.2(3d)

This document assumes the use of UCS 2.2(3d). Refer to Upgrading between Cisco UCS 2.0 Releases to upgrade the Cisco UCS Manager software and UCS 6296 Fabric Interconnect software to version 2.2(3d). Also, make sure the UCS C-Series version 2.2(3d) software bundles is installed on the Fabric Interconnects.

### Adding Block of IP Addresses for KVM Access

These steps provide details for creating a block of KVM IP addresses for server access in the Cisco UCS environment.

- 1. Select the LAN tab at the top of the left window.
- 2. Select Pools > IP Pools > IP Pool ext-mgmt.
- 3. Right-click IP Pool ext-mgmt
- 4. Select Create Block of IPv4 Addresses.

Figure 11 Adding Block of IPv4 Addresses for KVM Access Part 1

Equipment Servers LAN SAN VM	Admin	General IP Addres	ses IP Blocks	Faults	Events		
Filter: All	-	Actions			Properties		
		Telete	k of IPv4 Addres	sses	Name: Description:	ext-mgmt	
LAN Cloud     Appliances     Internal LAN     Policies     Pools     Pools     IP Pools     IP Pools     IP Pool ext-mgr     IP Pools     IP Pool Iscs=nnr     S		Create Block of IPv6 Addresses Create DNS Suffix Create IPV4 WINS Server Show Pool Usage		sses	GUID: 0000000-0000-0000-0000-000000000 Size: 0 Assigned: 0 Assignment Order: O Default O Sequential		0000000000
	Show Navigator	Pv4 Addresses					
🔤 🙀 Sub-Organizations 🕀 🖉 Traffic Monitoring Sessio	Create Block of 1	Pv6 Addresses	$\langle \neg$				
⊞- <b>‡</b> Netflow Monitoring	Copy Copy XML		Ctrl +C Ctrl +L				
	Delete		Ctrl +D				

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

rigure 12	Auuing Diock of 11 V4	Auuresses joi	AV M ACC	ess 1 un 2	
🔺 Create Blo	ck of IPv4 Addresses				X
Create a Block of IPv4 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		
				ОК	Cancel

Figure 12 Adding Block of IPv4 Addresses for KVM Access Part 2

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

Figure 13 Adding Block of IPv4 Addresses for KVM Access Part 3

🔺 Create Blo	ck of IPv4 Addresses			X
Create a Block of IPv4 Addresses				
From:	10.29.160.30 0	Size: 🕕	64	-
Subnet Mask:	255.255.255.0	Default Gateway: 10.2	9.160.1	
Primary DNS:	0.0.0.0	Secondary DNS: 0.0.1	0.0	
				.er

### **Enabling Uplink Port**

These steps provide details for enabling uplinks ports.

- 1. Select the Equipment tab on the top left of the window.
- 2. Select Equipment > Fabric Interconnects > Fabric Interconnect A (primary) > Fixed Module.
- 3. Expand the Unconfigured Ethernet Ports section.
- Select port 1, that is connected to the uplink switch, right-click, then select Reconfigure > Configure as Uplink Port.
- 5. Select Show Interface and select 10GB for Uplink Connection.
- 6. A pop-up window appears to confirm your selection. Click Yes, then click OK to continue.
- 7. Select Equipment > Fabric Interconnects > Fabric Interconnect B (subordinate) > Fixed Module.

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8. Expand the Unconfigured Ethernet Ports section.

- Select port 1, that is connected to the uplink switch, right-click, then select Reconfigure > Configure as Uplink Port.
- 10. Select Show Interface and select 10GB for Uplink Connection.
- 11. A pop-up window appears to confirm your selection. Click Yes, then click OK to continue.

Figure 14 **Enabling Uplink Ports** ID: 1 Slot ID: 1 🖮 🎟 Fabric Interconnects Admin State: Disabled 🖃 🏧 Fabric Interconnect A (primary) User Label: 🖹 🎟 Fixed Module MAC: 54:7F:EE:1C:03:A8 Actions 🖶 – 🖪 Ethernet Ports Mode: Access Enable Pori - Port 1 Port Type: Physical Role: Unconfigured -I Port 2 🗕 🗖 Disable Port 📲 Port 3 Transceiver - 🖪 Port 4 Reconfigur -I Port 5 0GB CU1M Configure as Uplink Port – 🔲 Port 6 2053783-1 -I Port 7 Configure as FCoE Uplink Port SCO-TYCO - 🖪 Port 8 Configure as Server Port -I Port 9 D1818A11K - 🖪 Port 10 Configure as FCoE Storage Port -🖪 Port 11 Configure as Appliance Port -I Port 12

## **Configuring VLANs**

Table 6

VLANs are configured as in shown in table 6.

VLAN Configurations

	VLAN	Fabric	NIC Port	Function	Failover
Ī	default(VLAN1)	А	eth0	Management, User connectivity	Fabric Failover to B
	vlan11_DATA1	В	eth1	Hadoop	Fabric Failover to A
	vlan12_DATA2	А	eth2	Hadoop with multiple NICs support	Fabric Failover to B

All of the VLANs created need to be trunked to the upstream distribution switch connecting the fabric interconnects. For this deployment default VLAN1 is configured for management access (Installing and configuring OS, clustershell commands, setup NTP, user connectivity, etc) and vlan11\_DATA1 is configured for Hadoop Data traffic.

With some Hadoop distributions supporting multiple NICs, where Hadoop uses multiple IP subnets for its data traffic, vlan12\_DATA2 can be configured to carry Hadoop Data traffic allowing use of both the Fabrics (10 GigE on each Fabric allowing 20Gbps active-active connectivity).

Further, if there are other distributed applications co-existing in the same Hadoop cluster, then these applications could use vlan12\_DATA2 providing full 10GigE connectivity to this application on a different fabric without affecting Hadoop Data traffic (here Hadoop is not enabled for multi-NIC).



- All applications talking to Hadoop should be able to reach Hadoop VLAN. That is, all applications should be able to access all the Hadoop nodes.
- We are using default VLAN1 for management traffic.

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

1. Select the LAN tab in the left pane in the UCS Manager GUI.

- 2. Select LAN > VLANs.
- 3. Right-click the VLANs under the root organization.
- 4. Select Create VLANs to create the VLAN.

#### Figure 15 Creating VLAN

uipment Servers LAN SAN VM Admin	VLANs ≪ Filter ⇒ Export 😪	3 Print					
Filter: All	Name	ID	Туре	Transport	Native	VLAN Sharing	Primary V
	😑 VLAN default (1)	1	Lan	Ether	Yes	None	
AN LAN LAN Cloud  Course Lan	Details General Org Perm Fault Summary	ssions VLAN Group Me	mbership Faults Eve Properties	ents Name: <b>default</b>		VL	AN ID: 1
Appliant Create VLANs Application Create VLANs Policie	Actions Modify VLA		Native Network L Multicast Policy Multicast Policy Ins Sharing	VLAN: Yes : Type: Lan .ocale: External Owner: Local Name: <not set=""> stance: org-root/me 1 Type:  None</not>	-policy-default Primary () Isolat	Fab If Transport Create ed Community	ric ID: Dual Type: Virtual Type: Ether Multicast Pol

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- 5. Enter vlan11\_DATA1 for the VLAN Name.
- 6. Click the **Common/Global** radio button for the vlan11\_DATA1.
- 7. Enter 11 on VLAN IDs of the Create VLAN IDs.
- 8. Click OK and then, click Finish.
- 9. Click **OK** in the success message box.

Figure 16Creating VLAN for Data	
▲ Create VLANs	x
Create VLANs	0
VLAN Name/Prefix: Vian11_DATA1 Multicast Policy Name: Cnot set> Create Multicast Policy © Common/Global C 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. Sharing Type: None Primary Isolated Community	
	4
Check Overlap OK Can	cel

- 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 vlan12\_DATA2 for the VLAN Name.
- **15.** Click the **Common/Global** radio button for the vlan12\_DATA2.
- 16. Enter 12 on VLAN IDs of the Create VLAN IDs.
- 17. Click OK and then, click Finish.

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A Create VLANs	X
Create VLANs	0
VLAN Name/Prefix: vlan12_DATA2	
Common/Global C Fabric & C Fabric B C Both Fabrics Contigured Differentiy	
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")	
Sharing Type: Shore Primary Sisolated Community	
• III	۱.
Check Overlap OK	Cancel

1

Figure 17 Creating VLAN for Hadoop Data

18. The below screenshot shows the created VLANs.

#### Figure 18

List of VLANs created for Hadoop Data

	VLANs						
ment Servers LAN SAN VM Admin	🔍 Filter 👄 Export 🗞 Print						
Filter: All	Name	ID	Туре	Transport	Native	VLAN Sharing	Primary VLAN Nam
	🔲 VLAN default (1)	1	Lan	Ether	Yes	None	
LAN	VLAN vlan11_DATA1 (11)	11	Lan	Ether	No	None	
- Claud	VLAN vlan12_DATA2 (12)	12	Lan	Ether	No	None	
⊕ 🚥 Fabric B ───∰ QoS System Class							
LAN Pin Groups	•				111		
Dirreshold Policies      VLAN Groups      VLAN Groups      VLAN default (1)	Details General Org Permissions	VLAN Group Membersł	nip Faults Events				
VLAN vlan11_DATA1 (11) VLAN vlan12_DATA2 (12)	Fault Summary	Pro	perties				

### **Create VLAN for Appliance Port**

There steps provide details for creating VLAN for Appliance port configuration.

- 1. Select the LAN tab in the left pane in the UCS Manager GUI.
- 2. Select LAN > Appliances > VLANs.
- 3. Right-click VLANs under the root organization.
- 4. Select Create VLANs to create the VLAN.
- 5. Enter vlan11\_Appliance for the VLAN Name.
- 6. Click the Common/Global radio button.
- 7. Enter 11 for VLAN ID.

Figure 19 Creating VLAN for Appliance Port 1



Figure 20

Creating VLAN for Appliance Port 2



### **Configuring Appliance Port**

These steps provide details for configuring Appliance ports.

- 1. Select the **Equipment** tab on the top left of the window.
- 2. Select Equipment > Fabric Interconnects > Fabric Interconnect A (primary) > Fixed Module.

- 3. Expand the Unconfigured Ethernet Ports section.
- 4. Select port 2, right-click the port, and select **Reconfigure > Configure as an Appliance Port**.

Figure 21 Configure as Appliance Port 1

Email: Eabric Interconnects     Email: Eabric Interconnect A (primary)	Admin Sta	te: Disabled	ID: <b>2</b> User Label:		Slot ID: 1
Fixed Module      Homet Ports	Actions 	Pari Pari	MAC: 54 Mode: Ur Port Type: Ph Transceiver	:7F:EE:1C:03:A! Iknown Iysical	9 Role: Unconfigured
	-1 Recor	Configure as Uplink Configure as FCoE L Configure as Server Configure as FCoE S Configure as Applia	Port Jplink Port Port Storage Port Ince Port	B CU1M 53783-1 D-TYCO 735A06¥	

- 5. A confirmation message box appears. Click Yes, then OK to continue.
- 6. Select Platinum for the Priority.
- 7. Keep the Pin Group as <not set>.
- 8. Keep the Network Control Policy as Default.
- 9. Keep the Flow Control Policy as Default.
- 10. Click the 10Gbps radio button for the Admin Speed.
- 11. Click the Trunk radio button for the Port Mode.
- 12. Select Default VLAN, and click the Native VLAN radio button.

	-1				
Pri Dia Ci	ority: Platinum	-	Create LAN Dia	Crown	
HII G	olicy: default	•		Group Control Po	lico
Flow Control P	olicy; default	•	Create Flow Co	otrol Policy	ncy
Aduit Condition	back	Charl C 20 Charl C 40	Choc	indroit oney	
Aamin Speed(g		apps () zo apps () 40	apps		
LANs					
'ort Mode: 💽	Trunk 🔘 Access				
lote: Selecting I	(solated/Community vl	an(s) will make this a Pro	miscuous port		
Select	Name	Native VLAN	Sharing Type	<b>Q</b>	
Select	Name default	Native VLAN	Sharing Type None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN ©	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	Sharing Type None None		
Select	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance		None None None		

Figure 22 Configure as Appliance Port 2

- 13. Select the Equipment tab on the top left of the window.
- 14. Select Equipment > Fabric Interconnects > Fabric Interconnect B (Subordinate) > Fixed Module.
- 15. Expand the Unconfigured Ethernet Ports section.
- 16. Select port 2, right-click the port, and select **Reconfigure > Configure as an Appliance Port**.

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 Actions MAC: 54:7F:EE:03 Mode: Unknown Port Type: Physical Transceiver	9C:A9 Role: Unconfigured
 Configure as Uplink Port Configure as FCoE Uplink Port Configure as Server Port Configure as FCoE Storage Port	Q

- 17. A confirmation message box appears. Click Yes, then OK to continue.
- 18. Select Platinum for the Priority.
- **19.** Keep the Pin Group as <not set>.
- 20. Keep the Network Control Policy as Default.
- 21. Keep the Flow Control Policy as Default.
- 22. Click the 10Gbps radio button for the Admin Speed.
- 23. Click the Trunk radio button for the Port Mode.
- 24. Select vlan11\_Appliance, and click the Native VLAN radio button.

Figure 24 Configure as Appliance Port 4

Pri	ority: Platinum	•			
Pin G	roup: <not set=""></not>	-	🛨 Create LAN Pin	Group	
twork Control P	olicy: default	-	🛨 Create Networ	k Control Pa	licy
Flow Control P	olicy: default	<b>T</b>	🛨 Create Flow Co	ontrol Policy	
Admin Speed(g	bps): 🔿 1 Gbps 💿 10	Gbps 🔿 20 Gbps 🔿 40	Gbps		
6.N					
ANS					
ort Mode: 💽	Trunk C Access				
ote: Selecting I	Isolated/Community v	lan(s) will make this a Pro	miscuous port		
	1		chauta a Trans	(m)	
Select	Name	Native VLAN	j Snaring Lype	L÷.	
Select	Name default	Native VLAN	None Snaring Type	L.¥	
Select	Name default vlan11_Appliance	Native VLAN O	None None		
Select	Name default vlan11_Appliance	Native VLAN O	None None		
Select	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance	Native VLAN C	None None		
Select	Name default vlan11_Appliance	Native VLAN	None None		
	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance	Native VLAN	None None None		
	Name default vlan11_Appliance	Native VLAN	None None None		
Select	Name default vlan11_Appliance	Native VLAN C C	None None None		
Select	Name default vlan11_Appliance	Native VLAN C C	None None		
Select	Name default vlan11_Appliance	Native VLAN C C	None None		
Select	Name default vlan11_Appliance		None None None		
Select	Name default vlan11_Appliance		None None None		

**25.** Repeat steps 1 through 24 for configuring appliance port on port 3, 4, and 5 for configuring Cisco UCS C3160 on the expansion racks.

### **Enabling Server Ports**

These steps provide details for enabling server ports.

- 26. Select the Equipment tab on the top left of the window.
- 27. Select Equipment > Fabric Interconnects > Fabric Interconnect A (primary) > Fixed Module.

- 28. Expand the Unconfigured Ethernet Ports section.
- 29. Select all the ports that are connected to the Servers right-click them, and select **Reconfigure** > **Configure as a Server Port**.
- 30. A pop-up window appears to confirm your selection. Click Yes then OK to continue.
- 31. Select Equipment > Fabric Interconnects > Fabric Interconnect B (subordinate) > Fixed Module.
- 32. Expand the Unconfigured Ethernet Ports section.
- 33. Select all the ports that are connected to the Servers right-click them, and select Reconfigure > Configure as a Server Port.
- 34. A pop-up window appears to confirm your selection. Click Yes then OK to continue.

Figure 25 Enabling Server Ports



Figure 26

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Showing Servers, Appliance and Uplink Ports

		Ethernet Ports	\$					
quipment Servers LAN SAN VM Admin	_	🔍 Filter 👄 Expo	ort 😓 Print 🛛 If Role: 🔽 All 🛛	🗸 Unconfigured 🔽 Network 🔽 🤅	Gerver 🔽 FCoE Uplink 🔽	Unified Uplink 🔽 Appli	ance Storage 🔽 FCoE Storage	🗸 Unified Storage 🛛 Monit
Filter: All		Slot	Port ID	MAC	If Role	If Type	Overall Status	Administrative State
	- 1	1	1 GICLD	E4:75:55:10:02:40	Metucal	Develop		Cashlad
Rack-Mounts		1	1	54:7F:EE:10:03:A8	Network Annelianse Channen	Physical		Enableu
EFX		1	2	54:7F:EE:10:03:A9	Appliance Storage	Physical		Enabled
🕀 👁 Servers		1	3	54:7F:EE:10:03:AA	Appliance Storage	Physical	T Up	T Enabled
😑 🚥 Fabric Interconnects		1	4	54:7F:EE:10:03:AB	Appliance Storage	Physical	T Up	T Enabled
🖨 📼 Fabric Interconnect A (primary)		1	5	54:/F:EE:1C:U3:AC	Appliance Storage	Physical	1 Up	T Enabled
🖨 🎟 Fixed Module		1	6	54:7F:EE:1C:03:AD	Server	Physical	1 Up	1 Enabled
🖨 🗝 Ethernet Ports		1	7	54:7F:EE:1C:03:AE	Server	Physical	1 Up	1 Enabled
		1	8	54:7F:EE:1C:03:AF	Server	Physical	1 Up	1 Enabled
Port 2		1	9	54:7F:EE:1C:03:80	Server	Physical	1 Up	1 Enabled
Port 3		1	10	54:7F:EE:1C:03:B1	Server	Physical	1 Up	1 Enabled
Port 4		1	11	54:7F:EE:1C:03:B2	Server	Physical	1 Up	1 Enabled
Port 5		1	12	54:7F:EE:1C:03:B3	Server	Physical	1 Up	1 Enabled
Port 7		1	13	54:7F:EE:1C:03:B4	Server	Physical	1 Up	1 Enabled
Port 8		1	14	54:7F:EE:1C:03:B5	Server	Physical	1 Up	1 Enabled
Port 9		1	15	54:7F:EE:1C:03:86	Server	Physical	1 Up	1 Enabled
Port 10		1	16	54:7F:EE:1C:03:B7	Server	Physical	1 Up	1 Enabled
		1	17	54:7F:EE:1C:03:B8	Server	Physical	1 Up	1 Enabled
		1	18	54:7F:EE:1C:03:B9	Server	Physical	1 Up	1 Enabled
	-	1	19	54:7F:EE:1C:03:BA	Server	Physical	1 Up	1 Enabled
	=	1	20	54:7F:EE:1C:03:BB	Server	Physical	1 Up	1 Enabled
Port 15		1	21	54:7E:EE:1C:03:BC	Server	Physical	1 Un	1 Enabled
Port 16		1	22	54:7E:EE:10:03:8D	Server	Physical	1 Un	1 Enabled
Port 12		1	23	54:7E:EE:1C:03:BE	Server	Physical	1 Un	1 Enabled
Port 19		1	24	54:7E:EE:10:03:BE	Server	Physical	1 Un	1 Enabled
Port 20		1	25	54:7E:EE:10:03:00	Server	Physical	1 Un	Enabled
Port 21		1	26	54:7E:EE:10:03:01	Server	Physical	* Un	Enabled
		1	27	54:7E:EE:10:00:02	Server	Physical	• Up	Enabled
		1	20	54:7E:EE:10:03:02	Corvor	Physical	• Up	Enabled
		1	20	54:7E:EE:10:03:03	Corver	Physical	• Up	Enabled
		1	27	54.7F.EE:10:03:04	Center	Disuster		Crabled
Port 26		1	30	54:7F:EE:10:03:05	Server	Priysical	T Op	Enabled
		1	31	54:7F:EE:1C:U3:C6	Server	Physical	T Up	T Enabled
		1	32	54:7F:EE:1C:03:C7	Server	Physical	1 Up	1 Enabled

# **Creating Pools for Service Profile Templates**

### **Creating an Organization**

Organizations are used as a means to arrange 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 within the Cisco UCS Manager GUI:

- 1. Click New on the top left corner in the right pane in the UCS Manager 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 create MAC address pools:

- 1. Select the LAN tab on the left of the window.
- 2. Select Pools > root.
- 3. Right-click MAC Pools under the root organization.
- 4. Select Create MAC Pool to create the MAC address pool. Enter ucs for the name of the MAC pool.
- 5. (Optional) Enter a description of the MAC pool.
- 6. Select Assignment Order Sequential.
- 7. Click Next.
- 8. Click Add.
- 9. Specify a starting MAC address.
- 10. Specify a size of the MAC address pool, which is sufficient to support the available server resources.

1

11. Click OK.
#### Figure 27 Creating MAC Pool Window

🔺 Create MAC Pool		X
Unified Co	omputing System	Manage
Create MAC Pool	Define Name and Description	0
2. <u>Description</u> 2. <u>Add MAC Addresses</u>	Name: ucs Description:	
	Assignment Order : O Default O Sequential	
	< Prev Next >	Finish Cancel



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Specifying First MAC Address and Size

📥 Create a Block of MAC Addresses		×
Create a Block of MAC Addresses		0
First MAC Address: 00:25:85:00:00 To ensure uniqueness of MACs in the LAN fabric, you are strongly encouraged to use the following MAC prefix: 00:25:85:xx:xx:xx	Size: 0	512
	ОК	Cancel

#### 12. Click Finish.

Figure 29 Adding MA	C Addresses		
🗼 Create MAC Pool			×
Unified Co	omputing Syst	tem M	lanagei
Create MAC Pool	Add MAC Addresses		Ø
2. √ <u>Add MAC Addresses</u>	Name	From 000:25:85:00:00	To ऎ 00:25:B5:00:00 ▲
			•
	🛨 Add 🥤	Delete	
	< Prev	Next	Finish Cancel

13. When the message box displays, click **OK**.

Figure 30	<b>Confirming Newly Added MAC Pool</b>
Create M	AC Pool 🛛 🔀
•	Successfully created MAC POOL ucs.
	OK

### **Creating Server Pools**

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 within the Cisco UCS Manager GUI:

- 1. Select the Servers tab in the left pane in the UCS Manager GUI.
- 2. Select Pools > root.
- 3. Right-click the Server Pools.
- 4. Select Create Server Pool.
- 5. Enter your required name (ucs) for the Server Pool in the name text box.
- 6. (Optional) enter a description for the organization
- 7. Click Next to add the servers.

	Figure 31	Setting Name and Description of Server Pool			
🗼 Create Server Pool				Þ	×
Unified	Comput	ing System Manager			
Create Server Pool	Set Name ar	nd Description		0	)
<ol> <li>√<u>Set Name and</u> <u>Description</u></li> <li>2. <u>Add Servers</u> </li> </ol>					
	Name: ucs				
	U				
	Description:				
			< Prev Next >	Finish Cancel	]

- 8. Select all the Cisco UCS C240M4SX servers to be added to the server pool you previously created (ucs), then Click >> to add them to the pool.
- 9. Click Finish.

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10. Click OK, and then click Finish.

	Figure 32	Adding Servers to t	he Server Poo	ol	
A Create Server Pool	Caller, Wager				X
Unified	Comput	ing Syste	m Mai	nage	r
Create Server Pool	Add Servers	5			0
1. √ <u>Set Name and</u>					
Description 2. √ <u>Add Servers</u>	Servers		_		Pooled Servers
	C Sl R	U PID			PID A A A C 🛱
	1	UCSC-C240-M4SX			·
	3	UCSC-C240-M4SX			
	4	UCSC-C240-M4SX			
	5	UCSC-C24U-M4SX			
			· · · · · · · · · · · · · · · · · · ·		
	/				
	• •				
	10	UCSC-C240-M4SX		>>	
	11	UCSC-C240-M4SX			
	12	UCSC-C240-M45X		<<	
	13	UCSC-C240-M4SX			
	14	UCSC-C240-M4SX			
	15	UCSC-C240-M4SX			
	16	UCSC-C240-M4SX			-
	Details for rack	-unit-1			Details
	Model:	UCSC-C240-M4SX			Model:
	Serial Number	ECH1852V0PU			Serial Number:
	Jenar Number.	1			
	Vendor:	Cisco Systems Inc			Vendor:
					<pre>&lt; Prev Nevt &gt; Finish Cancel</pre>

# **Creating Policies for Service Profile Templates**

### **Creating Host Firmware Package Policy**

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

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

- 1. Select the Servers tab in the left pane in the UCS Manager GUI.
- 2. Select Policies > root.
- 3. Right-click Host Firmware Packages.
- 4. Select Create Host Firmware Package.
- 5. Enter your required Host Firmware package name (ucs).

- 6. Click the 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.

Figure 33 Creating Host Firmware Package

Create Host Firmware Package	X
Create Host Firmware Package	0
Name: ucs	
How would you like to configure the Host Firmware Package?  Simple	
Blade Package: <mark><not set=""></not></mark> ▼ Rack Package: 2.2(3d)C ▼	
ОК	Cancel

## **Creating QoS Policies**

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

### **Best Effort Policy**

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- 1. Select the LAN tab in the left pane in the UCS Manager GUI.
- 2. Select Policies > root.

- 3. Right-click QoS Policies.
- 4. Select Create QoS Policy.

Figure 34 Creating QoS Policy



- 5. Enter BestEffort as the name of the policy.
- 6. Select BestEffort from the drop down menu.
- 7. Keep the Burst (Bytes) field as default (10240).
- 8. Keep the Rate (Kbps) field as default (line-rate).
- 9. Keep Host Control radio button as default (none).
- 10. Once the pop-up window appears, click OK to complete the creation of the Policy.

Figure 35	Creating BestEffort	QoS Policy	
Create 0	QoS Policy		0
Name: BestEf Egress Priority Burst(Bytes Rate(Kbps Host Contro	fort y: Best Effort ): 10240 ): line-rate sl: • None • Full	Create Qo5 Policy  Successfully created QO5 Policy BestEffort.  Show Navigator for QO5 Policy BestEffort  OK	
		OK Cano	el:

#### **Platinum Policy**

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- 1. Select the LAN tab in the left pane in the UCS Manager GUI.
- 2. Select Policies > root.
- 3. Right-click QoS Policies.
- 4. Select Create QoS Policy.
- 5. Enter Platinum as the name of the policy.
- 6. Select Platinum from the drop down menu.
- 7. Keep the Burst (Bytes) field as default (10240).
- 8. Keep the Rate (Kbps) field as default (line-rate).
- 9. Keep Host Control radio button as default (none).
- 10. Once the pop-up window appears, click **OK** to complete the creation of the Policy.

Figure 36 Creating Platinum QoS Policy

<mark> Create Qo5</mark> P	olicy				>
Create Q	oS Policy				Ø
Name: Platinum		-	Create Q	oS Policy 🗙	
Egress			<b>i</b>	Successfully created QOS Policy Platinum.	
Priority:	Platinum	-	~	Show Navigator for QOS Policy Platinum	
Burst(Bytes):	10240			OK	
Rate(Kbps):	line-rate				
Host Control:	💿 None 🔿 Full				
				OK Can	cel

#### **Setting Jumbo Frames**

Follow these steps for setting up the Jumbo frames and enabling QoS:

- 1. Select the LAN tab in the left pane in the UCS Manager 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. Check the Enabled Check box next to Platinum.
- 6. In the Best Effort row, select best-effort for weight.
- 7. In the Fiber Channel row, select none for weight.
- 8. Click Save Changes.
- 9. Click OK.

```
Figure 37
```

#### Setting Jumbo Frames

Equipment Servers LAN SAN VM Admin	General Events	FSM						
Filter: All	Priority	Enabled	Co5	Packet Drop	Weight	Weight (%)	MTU	Multicast Optimized
± =	Platinum	<b>v</b>	5		10	• 90	9000	<b>-</b>
	Gold		4	<b>V</b>	9	▼ N/A	normal	<b>-</b>
E-C LAN Cloud	Silver		2	<b>V</b>	8	▼ N/A	normal	<b>-</b>
🖶 🚥 Fabric B 	Bronze		1	✓	7	▼ N/A	normal	<b>-</b>
LAN Pin Groups	Best Effort	<b>V</b>	Any		best-effort	▼ 9	normal	-
	Fibre Channel	✓	3		none	▼ 1	fc	▼ N/A
Appliances     Appliances     Appliances     Appliances     Simpliances     Simpliances     Appliances     Appliances								

### **Creating Local Disk Configuration Policy**

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

- 1. Select the Servers tab on the left pane in the UCS Manager GUI.
- 2. Go to **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. Check the Protect Configuration box.
- 7. Keep the FlexFlash State field as default (Disable).
- 8. Keep the FlexFlash RAID Reporting State field as default (Disable).
- 9. Click OK to complete the creation of the Local Disk Configuration Policy.
- 10. Click OK.

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gure 50	Conjiguring Local Disk I oucy	
🔺 Create Loo	cal Disk Configuration Policy	X
Create L	ocal Disk Configuration Policy	0
	Name: ucs	
	Description:	
	Mode: Any Configuration	
Pro	otect Configuration: 🔽	
If Protect Co	<b>onfiguration</b> is set, the local disk configuration is preserved if the service p ted	profile
with the serve	er. In that case, a configuration error will be raised when a new service pro	ofile is
that server if	im the local disk configuration in that profile is different.	
FlexFlash —		
	FlexFlash State: O Disable C Enable	
If FlexFlash 9	State is disabled, SD cards will become unavailable immediately.	
FlexFlash RAJ	ID Reporting State: Usable C Enable	
	OK	Cancel

#### Figure 38 Configuring Local Disk Policy

### **Creating Server BIOS Policy**

The BIOS policy feature in Cisco UCS automates the BIOS configuration process. The traditional method of setting the BIOS is done manually and is often error-prone. By creating a BIOS policy and assigning the policy to a server or group of servers, you can enable transparency within the BIOS settings configuration.

**\$** Note

BIOS settings can have a significant performance impact, depending on the workload and the applications. The BIOS settings listed in this section is for configurations optimized for best performance which can be adjusted based on the application, performance and energy efficiency requirements.

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

- 1. Select the Servers tab in the left pane in the UCS Manager GUI.
- 2. Select Policies > root.
- 3. Right-click BIOS Policies.

4. Select Create BIOS Policy.

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- 5. Enter your preferred BIOS policy name (ucs).
- 6. Change the BIOS settings as per the following figures:

Figure 39 Creating Server BIOS Policy

A Create BIOS Policy	X
Unified C	omputing System Manager
Create BIOS Policy	Main @
YMain     Question     YMain     Question     Ymain     Imtel Directed IO     A. □ RAS Memory     Subscription     Serial Port     A. □ USB     T. □ PCI     B. □ OPI     QUEstion     Dect Options     II. □ Server Management	Name: ucs Description: Reboot on BIOS Settings Change: Quiet Boot: Odisabled Oneabled Onealt Post Error Pause: Odisabled Oneabled Onealt Resume Ac On Power Loss: Ostay-Off Oneatstate Onealt Pront Panel Lockout: Odisabled Oneabled Oneabled Oneatt
	< Prev Next > Finish Cancel

Fig	gure 40 Creating Server BIOS Policy for Processor	
🚔 Create BIOS Policy		
Unified C	computing System Manager	
	-	6
Create BIOS Policy	Processor	<b>E</b>
1. √ <u>Main</u>		
<ol> <li>Processor</li> <li>Intel Directed IO</li> </ol>	Turbo Boost: C disabled I enabled C Platform Default	-
4. RAS Memory	Enhanced Intel Speedstern: C. disabled C. Platform Default	
5. Serial Port 6. UISB		
7. P <u>PCI</u>	Hyper Threading: C disabled C Placform Default	
8. LI <u>OPI</u> 9. Di om end pote stele	Core Multi Processing: all	
10. Boot Options	Execute Disabled Bit: O disabled O enabled IO Platform Default	
11. D <u>Server Management</u>	Virtualization Technology (VT): O disabled C enabled C Platform Default	
	Hardware Pre-fetcher: C disabled C enabled C Platform Default	
	Adjacent Cache Line Pre-fetcher: 🔿 disabled 🕤 enabled 💿 Platform Default	
	DCU Streamer Pre-fetch: C disabled C enabled C Platform Default	
	DCU IP Pre-fetcher: C disabled C enabled I Platform Default	-
	Direct Cache Access: C disabled C enabled C Platform Default	
	Processor C States C disabled C enabled C Platform Default	
	Processor CIE: • disabled • enabled • Platform Default	
	Processor C3 Report:  O disabled C acpi-c2 C acpi-c3 C Platform Default	
	Processor C6 Report:      disabled      renabled      Platform Default	
	Processor C7 Report: C disabled C enabled C Platform Default	
	CPU Performance: C enterprise C high-throughput C hpc C Platform Default	
	Max Variable MTRR Setting: O auto-max O 8 O Platform Default	
	Local X2 APIC: 🔘 xapic 🔘 x2apic 🔘 auto 🔘 Platform Default	
	Power Technology: performance	
	Energy Performance	
	Frequency Floor Override: 🔘 disabled 💿 enabled 🔘 Platform Default	
	P-STATE Coordination: 📀 hw-all 🔿 sw-all 🔿 sw-any 🔿 Platform Default	
	DRAM Clock Throttling: performance	
	Channel Interleaving: Platform Default	
	Rank Interleaving: Platform Default	
	Demand Scrub: © disabled © enabled © Platform Default	
	Patrol Scrub: 💽 disabled 🔿 enabled 🔿 Platform Default	
	< Prev Next > Finish O	ancel

Fi	igure 41 Creati	ng Server BIOS Policy for Intel Directed IO	
A Create BIOS Policy	A DESCRIPTION OF	and the second second	X
Unified C	omputing	System Manager	
Create BIOS Policy	Intel Directed IO		0
Main     Vintel Directed ID     A. □ RAS Memory     Serial Port     G. □ USB     OPI     DOM and PCIe Slots     OOI     Boot Options     II. □ Server Management	VT For Directed IO Interrupt Remap Coherency Support ATS Support Pass Through DMA Support	<ul> <li>disabled enabled Platform Default</li> </ul>	
		< Prev Next >	Finish Cancel

Constinue Common BIOC Balian fam Intel Dimented IO

- 7. Click **Finish** to complete creating the BIOS policy.
- 8. Click OK.

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F	igure 42	Creating Server BIOS Policy for Memory	
A Create BIOS Policy			X
Unified C	omputir	ng System Manager	
Create BIOS Policy	RAS Memory		0
\ <u>Main</u> \ <u>Processor</u> \ <u>Intel Directed IO</u> <b>4</b> . <u>VRAS Memory</u> S. <u>Serial Port</u> 6. <u>USB</u> 7. <u>PCI</u> 8. <u>OPI</u> 9. <u>LOM and PCIe Slots</u> 10. <u>Boot Options</u> 11. <u>Server Management</u>	Memory RAS Config: NUMA: LV DDR Mode: DRAM Refresh Rate:	maximum-performance      disabled      enabled      Platform Default     power-saving-mode      performance-mode      auto      Platform Default	
		< Prev Next > Finish	Cancel

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# **Creating Boot Policy**

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

- 1. Select the Servers tab in the left pane in the UCS Manager GUI.
- 2. Select Policies > root.
- 3. Right-click the Boot Policies.
- 4. Select Create 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. Keep Enforce vNIC/vHBA/iSCSI Name check box checked.
- 9. Keep Boot Mode Default (Legacy).
- 10. Expand Local Devices > Add CD/DVD and select Add Local CD/DVD.
- 11. Expand Local Devices and select Add Local Disk.
- 12. Expand vNICs and select Add LAN Boot and enter eth0.
- 13. Click OK to add the Boot Policy.
- 14. Click OK.

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Fų	gure 44	Creating Boot	Policy Part 2					
A Create Boot Policy	Y	1.0.0						X
Create Boot Policy								0
Name: Description: Reboot on Boot Order Change: Enforce vNIC/vHBA/ISCSI Name: Boot Mode:	ucs V Legacy Uefi							
WARNINGS: The type (primary/secondary) do The effective order of boot device If Enforce vNIC/vHBA/iSCSI N If it is not selected, the vNICs/vHE Add CD/DVD Add Local CD/DVD	es not indicate a boo es within the same de ame is selected and BAS/ISCSI are selecte Boot Order DE C A Filt	t order presence. avice class (LAN/Stora the vNIC/vHBA/ISCSI id if they exist, otherv di f they exist, otherv ær   ⇔ Export   ѽ Prin	ige/iSCSI) is dete does not exist, a vise the vNIC/vHB t	rmined by PCIe b config error will b A/ISCSI with the l	us scan order. ie reported. iowest PCIe bus	scan order is use	d.	
<ul> <li>Add Remote CD/DVD</li> <li>Add Floppy</li> <li>Add Local Floppy</li> <li>Add Local Floppy</li> <li>Add Remote Floppy</li> </ul>	Name © CD/DVE S Local Di LAN	Order Order	vNIC/vHB/	/iSCSI vNIC	Type	Lun ID	WWN	<b></b>
Add Remote Virtual Drive CIMC Mounted vMedia      VNICs     Add LAN Boot VHBAS		euio	etito Move	Add LAN B	Boot	OK	(Cancel	
							ОК	Cancel

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# **Creating Power Control Policy**

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

- 15. Select the Servers tab in the left pane in the UCS Manager GUI.
- **16.** Select **Policies > root**.
- 17. Right-click the Power Control Policies.
- 18. Select Create Power Control Policy.



**Creating Power Control Policy Part 1** 

- 19. Enter ucs as the Power Control policy name.
- 20. (Optional) enter a description for the boot policy.
- 21. Select No cap for Power Capping selection.
- 22. Click OK to the Power Control Policy.
- 23. Click OK.

I

Figure 46	<b>Creating Power Control Policy Part 2</b>	
A Create F	Power Control Policy	X
Create	Power Control Policy	0
Name	e: ucs	
Power C If you ch priority v the high capping.	Capping hoose <b>cap</b> , the server is allocated a certain amount of power based of within its power group. Priority values range from 1 to 10, with 1 bein lest priority. If you choose <b>no-cap</b> , the server is exempt from all pow Cap Cap	on its ng ver
Cisco UCS require mo at full capa	Manager only enforces power capping when the servers in a power ore power than is currently available. With sufficient power, all server acity regardless of their priority.	group rs run
	ОК	Cancel

# **Creating Service Profile Template**

To create a service profile template, follow these steps:

- 1. Select the Servers tab in the left pane in the UCS Manager GUI.
- 2. Right-click Service Profile Templates.
- 3. Select Create Service Profile Template.

#### Figure 47

**Creating Service Profile Template** 

E i Conuere L		Service Pro	ifile Templates	
Equipment Servers L	AN   SAN   VM   Admin	🕒 🕀 🛋 🔍 I	Filter 👄 Export 😸 Print	
Filter: All	-	Name		A alabaa a a
I		Name		Auuress
		🔜 🦾 📩 root		
🖃 🥪 Servers				
🖨 🖑 Service Profile	s			
🖻 🎪 root				
Asub-Org	ganizations			
🖨 🔽 Service Profil	Service Profile Templates			
🕀 🤔 root	Service Profile Templates			
🕀 🖉 Policies	Create Service Profile Ter	nplate		
⊞-@Pools ⊞-@ Schedules				

4. The Create Service Profile Template window appears.

These steps below provide a detailed configuration procedure to identify the service profile template:

a. Name the service profile template as ucs. Click 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.

	igure 48 Identify Service Profile Template
▲ Create Service Profile Te	nplate
Unified	Computing System Manager
Create Service Profile Template  1. ✓ Identify Service Profile Template  2. Networking  3. Storage  4. Zoning  5. VNIC/VHBA Placemen  6. VMEdia Policy  7. Server Boot Order  8. Maintenance Policy  9. Server Assignment  10. Operational Policies	Identify Service Profile Template You must enter a name for the service profile template and specify the template type. You can also specify how a UUID will be assigned to this template and enter a description. Name: ucc The template will be created in the following organization. Its name must be unique within this organization. Where: org-root The template will be created in the following organization. Its name must be unique within this organization. Type: Initial Template © Updating Template Specify how the UUID will be assigned to the server associated with the service generated by this template. UUID Assignment: Hardware Default The UUID assigned by the manufacturer will be used. Note: This UUID will not be migrated if the service profile is moved to a new server. Optionally enter a description for the profile. The description can contain information about when and where the service profile should be used.
	< Prev Next > Finish Cancel

# **Configuring Network Settings for the Template**

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- 1. Keep the Dynamic vNIC Connection Policy field at the default.
- 2. Click 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.

F	Sigure 49 C	onfiguring Network Settin	gs for the Template		
▲ Create Service Profile Terr	nplate				X
Unified (	Computir	ng System N	lanager		
Create Service Profile Template  1. ✓Identify Service Profile Template  2. ✓Networking  3. □ Storage  4. □ Zoning  5. □ yNIC/VHBA Placement  6. □ yMedia Policy  7. □ Server Boot Order  8. □ Maintenance Policy  9. □ Server Assignment	Networking Optionally specify Dynamic vNIC Conner How woul Click Add to specify o	LAN configuration information. ction Policy: Select a Policy to use of d you like to configure LAN com- ne or more vNICs that the server sh	no Dynamic vNIC Policy by defanet of the LAN.	•••• ▼ 💽 Create Dynamic v ert 💿 No vNICs 💿 Use Conn	(NIC Connection Pc ectivity Policy
10. Doperational Policies	Name	MAC Address	Fabric ID	Native VLAN	<b>P</b>
	iSCSI VNICs	transformation of the second se	lete Add Modify		8
				Prev Next > Finis	h Cancel

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- 4. The Create vNIC window displays. Name the vNIC as eth0.
- 5. Select UCS in the Mac Address Assignment pool.
- 6. Click the Fabric A radio button and Check the Enable failover check box for the Fabric ID.
- 7. Check the default check box for VLANs and click the Native VLAN radio button.
- 8. Select MTU size as 1500
- 9. Select adapter policy as Linux
- 10. Select QoS Policy as BestEffort.
- 11. Keep the Network Control Policy as Default.
- 12. Keep the Connection Policies as Dynamic vNIC.
- 13. Keep the Dynamic vNIC Connection Policy as <not set>.
- 14. Click OK.

Figure 50	Configuring vNIC eth0	
🛕 Create vNIC		<b>X</b>
Create vNIC		0
Name: eth0 Use vNIC Template: Create vNIC Template	MAC Address MAC Address Assignment: ucs(512/512)   Create MAC Pool The MAC address will be automatically assigned from the selected pool.	
Fabric ID:       Fabric A       Fabric B       E         VLAN in LAN cloud will take the precedence         VLANs         Filter       Export       Print         Select       Name         Vlani1_Appliance       Vlani1_Appliance         Vlani2_DATA1       Vlani2_DATA2         Create VLAN       MTU:       1500         Warning       Make sure that the MTU has the same v corresponding to the Egress priority of the Egress	e over the Appliance Cloud when there is a name clash.          Native VLAN         Image: Cloud when there is a name clash.         Image: Cloud when there is a name clash	E
Adapter Performance Profile Adapter Policy: Linux QoS Policy: BestEffort Network Control Policy: default Connection Policies Opnamic vNIC OusNIC VMQ Dynamic vNIC Connection Policy: <not s<="" td=""><td></td><td></td></not>		
		OK Cancel

**15.** Click **Add** to add a vNIC to the template.

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- 16. The Create vNIC window appears. Name the vNIC eth1.
- 17. Select ucs in the Mac Address Assignment pool.

18. Click the Fabric B radio button and Check the Enable failover check box for the Fabric ID.

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- 19. Check the vlan11\_DATA1 check box for VLANs, and click the Native VLAN radio button
- 20. Select MTU size as 9000
- 21. Select adapter policy as Linux
- 22. Select QoS Policy as Platinum.
- 23. Keep the Network Control Policy as Default.
- 24. Keep the Connection Policies as Dynamic vNIC.
- 25. Keep the Dynamic vNIC Connection Policy as <not set>.
- 26. Click OK.

Figure 51	Configuring vNIC eth1	
A Create vNIC	the second se	X
Create vNIC		Ø
Name: eth1 O Use vNIC Template: Create vNIC Template	MAC Address MAC Address Assignment: ucs(512/512)   Create MAC Pool The MAC address will be automatically assigned from the selected pool.	
Fabric ID: Fabric A   VLAN in LAN cloud will take the precedence   VLANs   Filter   Filter   Gefault   vlan11_Appliance   vlan11_DATA1   vlan12_DATA2   Treate VLAN MU: 9000 Warning Make sure that the MTU has the same voltores priority of the Egress priority egress priority of the Egress priority e	Enable Failover te over the Appliance Cloud when there is a name clash.	E
Adapter Performance Profile         Adapter Policy:         Linux         QoS Policy:         Platinum         Network Control Policy:         default         Connection Policies         Image: Dynamic VNIC         Dynamic VNIC Connection Policy:         Adapter Policy:         Image: Dynamic VNIC Connection Policy:         Image: Dynamic VNIC Connection Policy:         Image: Dynamic VNIC Connection Policy:		
		OK Cancel

27. Click Add to add a vNIC to the template.

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- 28. The Create vNIC window appears. Name the vNIC eth2.
- 29. Select ucs in the Mac Address Assignment pool.
- 30. Click the Fabric A radio button, and then Check the Enable failover check box for the Fabric ID.

31. Check the vlan12\_DATA2 check box for VLANs, and then click the Native VLAN radio button.

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- 32. Select MTU size as 9000.
- **33.** Select adapter policy as Linux.
- 34. Select QoS Policy as Platinum.
- **35.** Keep the Network Control Policy as Default.
- 36. Keep the Connection Policies as Dynamic vNIC.
- 37. Keep the Dynamic vNIC Connection Policy as <not set>.
- 38. Click OK.

Figure 52	Configuring vNIC eth2	
A Create vNIC		×
Create vNIC		0
Name: eth2 Use vNIC Template: Create vNIC Template	MAC Address MAC Address Assignment: ucs(512/512)  Create MAC Pool The MAC address will be automatically assigned from the selected pool.	
Fabric ID: ● Fabric A ● Fabric B ▼ B VLAN in LAN cloud will take the precedence VLANs Filter ⇒ Export ⊗ Print	Enable Failover e over the Appliance Cloud when there is a name clash.	
Select Name default vlan11_Appliance vlan11_DATA1 vlan12_DATA2	Native VLAN	E
Create VLAN MTU: 9000 Warning Make sure that the MTU has the same v corresponding to the Egress priority of t Pin Group: <not set=""> • • • • Creat</not>	value in the <u>QoS System Class</u> he selected QoS Policy. ate LAN Pin Group	
	Ŭ	
Adapter Performance Profile Adapter Policy: Linux QoS Policy: Platinum Network Control Policy: default Connection Policies  O Dynamic vNIC O usNIC VMQ Dynamic vNIC Connection Policy: <not s<="" td=""><td></td><td></td></not>		
		OK Cancel

# **Configuring Storage Policy for the Template**

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Follow these steps to configure storage policies:

1. Select ucs for the local disk configuration policy.

- 2. Click the No vHBAs radio button for the option, How would you like to configure SAN connectivity?
- 3. Click Next to continue to the next section.

Figura 53	Configuring Storage Cottings
rigure JJ	



4. Click Next once the zoning window appears to go to the next section.

#### Figure 54 Configure Zoning

A Create Service Profile Tem	plate					x
Unified C	Col	mputing	System	Manag	ger	
Create Service Profile Template 1. √Identify Service Profile	Zor	<b>ning</b> Specify zoning informa	tion			0
2. √Networking 3. √ <u>Storage</u> 4. √ <u>Zoning</u> 5. √ <u>NIC/vHBA Placement</u> 6. <u>MyMedia Policy</u> 7. <u>Server Boot Order</u>	WA NOT Zonir 1. 2. 3.	RNING: Switch in end F be applied. Ing configuration involves Select vHBA Initiator ( Select vHBA Initiator ( Add selected Initiator)	Host mode. In end-ho s the following steps: s) (vHBAs are created on Group(s) (s) to selected Initiator G	ost mode, zoning storage page) roup(s)	configuration will	
8. <u>Maintenance Policy</u> 9. <u>Server Assignment</u> 10. <u>Operational Policies</u>	S	elect vHBA Initia		Select vHBA Init	tiator Groups	
		•	>> Add To >>	Name	Storage Connection Policy Name	
		<b>•</b>			👕 Delete 🚹 Add 📲 Modify	
	•					4
					<pre></pre>	ncel

## Configuring vNIC/vHBA Placement for the Template

Follow these steps to configure vNIC/vHBA placement policy:

- 1. Select the Default Placement Policy option for the Select Placement field.
- 2. Select eth0, eth1 and eth2 assign the vNICs in the following order:
  - a. eth0
  - b. eth1
  - **c.** eth2

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- 3. Review to make sure that all of the vNICs were assigned in the appropriate order.
- 4. Click Next to continue to the next section.

Figure	55
I Iguic	55

vNIC/vHBA Placement



## **Configuring vMedia Policy for the Template**

1. Click Next once the vMedia Policy window appears to go to the next section.

#### Figure 56 UCSM vMedia Policy Window

Create Service Profile Temp	plate	X
Unified C	Computing System Manager	
Create Service Profile Template 1. √ <u>Identify Service Profile</u>	<b>vMedia Policy</b> Optionally specify the Scriptable vMedia policy for this service profile template.	0
<u>Template</u> 2. √ <u>Networking</u> 3. √ <u>Storage</u> 4. √ <u>Zoning</u>	vMedia Policy: Select vMedia Policy to use 🔹 Treate vMedia Policy	
S.	The default boot policy will be used for this service profile.	
	< Prev Next > Finish	Cancel

# **Configuring Server Boot Order for the Template**

Follow these steps to set the boot order for servers:

- 1. Select ucs in the Boot Policy name field.
- 2. Review to make sure that all of the boot devices were created and identified.
- 3. Verify that the boot devices are in the correct boot sequence.
- 4. Click OK.

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5. Click Next to continue to the next section.

I	Figure 57	Creating Boot Polic	.y			
▲ Create Service Profile Terr	nplate					X
Unified (	Comput	ing Systei	m Manager			
Create Service Profile Template  1. √Identify Service Profile Template  2. √Networking  3. √Storage  4. √Zoning  5. √vNICA/HBA Placement  6. √vMedia Policy  7. √Server Boot Order  8. △Maintenance Policy  9. △Server Assignment  10. △Operational Policies	Server Boot Optionally spe Select a boot policy. Boot Policy: ucs Reboot on Boot Enforce vNIC/VHB. WARNINGS: The type (primary The effective orde	Name: ucs Description: Order Change: No A/ISCSI Name: Yes Boot Mode: Legacy //secondary) does not indicat er of boot devices within the e	ervice profile template.  Create Boot Policy  a boot order presence.  same device class (LAN/Storage,	/ISCSI) is determined	d by PCIe bus scan o	e order. ∋d
	If it is not selected Boot Order	d, the vNICs/vHBAs/ISCSI are → Export Print Order	vNIC/vHBA/ISCSI vNIC	the VNIC/VHBA/ISCS	I with the lowest PC	Ie bus scan on
	LAN eth	1 2 3 0	ethO	Primary		
	•		111	< Prov.	Next > Einie	+
					HINS IN THIS	

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In the Maintenance Policy window, follow these steps to apply the 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 the servers to the pool:

- 3. Select ucs for the Pool Assignment field.
- 4. Keep the Server Pool Qualification field at default.
- 5. Select ucs in Host Firmware Package.

#### Figure 58

Server Assignment

A Create Service Profile Tem	plate	X
Unified C	Computing System Manager	
Create Service Profile Template	Server Assignment Optionally specify a server pool for this service profile template.	0
I. ✓ Identity Service Profile Template     Z. ✓ Networking     J. ✓ Storage     4. ✓ Zoning     5. ✓ YNIC/XHBA Placement     6. ✓ Wildedia Balary	You can select a server pool you want to associate with this service profile template. Pool Assignment: UCS	^
<ol> <li>V<u>Mvedia Policy</u></li> <li>✓ Server Boot Order</li> <li>✓ Maintenance Policy</li> <li>✓ Server Assignment</li> <li>10. □ Operational Policies</li> </ol>	Select the power state to be applied when this profile is associated with the server. Up      Down	
	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: <a href="https://www.not.set-">www.not.set-</a> Restrict Migration: <a href="https://www.not.set-">www.not.set-</a>	Ш
	Firmware Management (BIDS, Disk Controller, Adapter)         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	-
	< Prev Next > Finish	Cancel

# **Configuring Operational Policies for the Template**

In the Operational Policies Window, follow these steps:

6. Select ucs in the BIOS Policy field.

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- 7. Select ucs in the Power Control Policy field.
- 8. Click Finish to create the Service Profile template.
- 9. Click OK in the pop-up window to proceed.

	Figure 59	Selecting BIOS and Power Control Policy	
▲ Create Service Profile 1	Femplate		X
Unified	Compu	ting System Manager	
Create Service Profile Templa 1. √ <u>Identify Service Pro</u>	tte Operation Optionally s	al Policies specify information that affects how the system operates.	0
<u>Template</u> 2. √ <u>Networking</u>	BIOS Configur	ation	8
3. √ <u>Storage</u> 4. √ <u>Zoning</u> 5. √ <u>vNIC/vHBA Placema</u> 6. √ <u>vMedia Policy</u> 7. √ <u>Server Boot Order</u>	If you want to BIOS Policy:	override the default BIOS settings, select a BIOS policy that will be associated with this service profile	
<ol> <li>✓<u>Maintenance Policy</u></li> <li>✓<u>Server Assignment</u></li> </ol>	External IPMI	Management Configuration	8
10. √ <u>Operational Polic</u>	ies Management	IP Address	8
	Monitoring Co	onfiguration (Thresholds)	8
	Power Contro	I Policy Configuration	*
	Power control Power Contro	policy determines power allocation for a server in a given power group. I Policy: ucs O	
	Scrub Policy		8
	KVM Manager	nent Policy	8
		<pre></pre>	Cancel

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Select the Servers tab in the left pane of the UCS Manager GUI.

- 1. Go to Service Profile **Templates** > **root**.
- 2. Right-click Service Profile Templates ucs.
- 3. Select Create Service Profiles From Template.



#### Creating Service Profiles from Template

Figure 60

4. The Create Service Profile from Template window appears.



Association of the Service Profiles will take place automatically. The Final Cisco UCS Manager window is shown in Figure 46. Servers

Figure 62	UCS Manager sho	wing all Nodes
	e es manager sure	

ment Servers LAN SAN VM Admir
Filter: All
3
Equipment
🗄 🐲 Rack-Mounts
envers
Fabric Interconnects

🔍 Filter 👄 E	Export 😂 Print														
Name	Overall Status	PID	Model	Serial	User Label	Cores	Memory	Adapters	NICs	HBAs	Operability	Power State	Assoc State	Profile	Fault
Server 1	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0PU		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 2	1 Ok	UCSC-C240	Cisco UCS C	FCH1850V36U		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 3	1 Ok	UCSC-C240	Cisco UCS C	FCH1844V0QK		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 4	🕇 Ok	UC5C-C240	Cisco UCS C	FCH1852V0PY		24	262144	1	3	0	1 Operable	🕇 On	1 Associated	org-root/ls	N/A
Server 5	1 Ok	UC5C-C240	Cisco UCS C	FCH1851V1ZZ		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 6	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0L4		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 7	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0QJ		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 8	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0QC		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 9	1 Ok	UC5C-C240	Cisco UCS C	FCH1851V23J		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 10	1 Ok	UC5C-C240	Cisco UCS C	FCH1852V0NF		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 11	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0PP		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 12	1 Ok	UCSC-C240	Cisco UCS C	FCH1851V213		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 13	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0QF		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 14	1 Ok	UC5C-C240	Cisco UCS C	FCH1851V243		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 15	1 Ok	UC5C-C240	Cisco UCS C	FCH1851V216		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
Server 16	1 Ok	UCSC-C240	Cisco UCS C	FCH1852V0NA		24	262144	1	3	0	1 Operable	1 On	1 Associated	org-root/ls	N/A
	A Filter      Filter      Farter      Farter      Server 1     Server 2     Server 3     Server 3     Server 3     Server 4     Server 5     Server 6     Server 7     Server 1     Se	Image: Server 1         Image: Overall 38400           Server 1         Image: Overall 38400           Server 2         Image: Overall 38400           Server 3         Image: Overall 38400           Server 4         Image: Overall 38400           Server 3         Image: Overall 38400           Server 4         Image: Overall 38400           Server 5         Image: Overall 38400           Server 6         Image: Overall 38400           Server 7         Image: Overall 38400           Server 10         Image: Overall 38400           Server 10         Image: Overall 38400           Server 11         Image: Overall 38400           Server 13         Image: Overall 38400           Server 15         Image: Overall 4000           Server 15         Image: Overall 40000           Server 15	Image         Operall Status         PID           Server 1         0 of 0 Status         PID           Server 2         0 of 0 Status         PID           Server 3         0 of 0 Status         PID           Server 3         0 ok         UCSC-C240           Server 4         0 ok         UCSC-C240           Server 5         0 ok         UCSC-C240           Server 5         0 ok         UCSC-C240           Server 7         0 ok         UCSC-C240           Server 8         0 ok         UCSC-C240           Server 9         0 ok         UCSC-C240           Server 10         0 ok         UCSC-C240           Server 11         0 ok         UCSC-C240           Server 13         0 ok         UCSC-C240           Server 15         0 ok         UCSC-C240	Image         Export         Export         Export         Export           Name         Overall Ratus         PID         Model           Server 1         It 0k         UCSC-C240         Gace UCS C           Server 2         0k         UCSC-C240         Gace UCS C           Server 3         0k         UCSC-C240         Gace UCS C           Server 4         0k         UCSC-C240         Gace UCS C           Server 5         0k         UCSC-C240         Gace UCS C           Server 7         0k         UCSC-C240         Gace UCS C           Server 8         0k         UCSC-C240         Gace UCS C           Server 9         0k         UCSC-C240         Gace UCS C           Server 10         0k         UCSC-C240         Gace UCS C           Server 11         0k         UCSC-C240         Gace UCS C           Server 11         0k         UCSC-C240         Gace UCS C           Server 13         0k         UCSC-C240         Gace UCS C           Server 11         0k         UCSC-C240         Gace UCS C           Server 13         0k         UCSC-C240         Gace UCS C	Image         Overal Status         PID         Model         Serial           Server 1              •             OK         UCSC-C240         Class ULS C         FCH1852V0PU           Server 2              •             OK         UCSC-C240         Class ULS C         FCH1852V0PU           Server 3              •             OK             UCSC-C240             Class ULS C             FCH1852V0PU           Server 4             •             OK             UCSC-C240             Class ULS C             FCH1852V0PU           Server 5             •             OK             UCSC-C240             Class ULS C             FCH1852V0PU               Server 5             *             OK             UCSC-C240             Class ULS C             FCH1852V0PU               Server 5             *             OK             UCSC-C240             Class ULS C             FCH1852V0PU               Server 5             *             OK             UCSC-C240             Class ULS C             FCH1852V0PU               Server 1             *             OK             UCSC-C240             Class ULS C             FCH1852V0PU               Server 11             *             OK             UCSC-C240             Class ULS C             FCH1852V0PU          <	Image         Overall Status         PID         Model         Serial         User Label           Server 1         I         OK         USS-C240         Claco UCS C         FCH1852V0PU           Server 2         I         OK         UCSC-C240         Claco UCS C         FCH1852V0PU           Server 3         I         OK         UCSC-C240         Claco UCS C         FCH1852V0PU           Server 4         I         OK         UCSC-C240         Claco UCS C         FCH1852V0PY           Server 4         I         OK         UCSC-C240         Claco UCS C         FCH1852V0PY           Server 5         I         OK         UCSC-C240         Claco UCS C         FCH1852V0QY           Server 7         I         OK         UCSC-C240         Claco UCS C         FCH1852V0Q1           Server 7         I         OK         UCSC-C240         Claco UCS C         FCH1852V0Q2           Server 8         I         OK         UCSC-C240         Claco UCS C         FCH1852V0Q1           Server 9         I         OK         UCSC-C240         Claco UCS C         FCH1852V0Q1           Server 10         I         OK         UCSC-C240	Image         Overall Status         PID         Model         Serial         User Label         Cores           Server 1         1         0k         UCSC-240         Claco UCS C         FCH1852V0PU         24           Server 2         1         0k         UCSC-240         Claco UCS C         FCH1852V0PU         24           Server 3         1         0k         UCSC-240         Claco UCS C         FCH1852V0PU         24           Server 3         1         0k         UCSC-240         Claco UCS C         FCH1852V0PV         24           Server 4         1         0k         UCSC-240         Claco UCS C         FCH1852V0PV         24           Server 5         1         0k         UCSC-240         Claco UCS C         FCH1852V0PV         24           Server 6         1         0k         UCSC-240         Claco UCS C         FCH1852V0L4         24           Server 7         1         0k         UCSC-240         Claco UCS C         FCH1852V0QC         24           Server 8         1         0k         UCSC-240         Claco UCS C         FCH1852V0QC         24           Server 10         1         0k         UCSC-240-	♣         Filter         ⇒ Export         ≥ Print           Name         Overall Status         PID         Model         Serial         User Label         24         262144           © Server 1         ↑         0k         USSC-C240, Gao UCS C         FCH1852V0PU         24         262144           © Server 3         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0PU         24         262144           © Server 3         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0PV         24         262144           © Server 3         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0PV         24         262144           © Server 4         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0PV         24         262144           © Server 5         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0QC         24         262144           © Server 6         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0QC         24         262144           © Server 11         ↑         0k         UCSC-C240, Gao UCS C         FCH1852V0QF         24         262144           © Server 11         ↑         0k         UCS	Image         Overall Status         PID         Model         Seriel         User Label         Cores         Memory         Adapters           Server 1         I         OK         UCSC-C240         Cisco UCS C         FCH1852V0PU         24         262144         1           Server 2         I         OK         UCSC-C240         Cisco UCS C         FCH1852V0PU         24         262144         1           Server 3         I         OK         UCSC-C240         Cisco UCS C         FCH1850V36U         24         262144         1           Server 3         I         OK         UCSC-C240         Cisco UCS C         FCH1851V0QK         24         262144         1           Server 4         I         OK         UCSC-C240         Cisco UCS C         FCH1852V0PY         24         262144         1           Server 5         I         OK         UCSC-C240         Cisco UCS C         FCH1852V0QI         24         262144         1           Server 6         I         OK         UCSC-C240         Cisco UCS C         FCH1852V0QF         24         262144         1           Server 10         I         OK         UCSC-C240         Cisco UCS C	♣ Filter         ⇒ Export         ≥ Print           ■ Server 1         ↑         0k         USC-C240         Cisco         USC+1852V0PU         24         262144         1         3           ■ Server 1         ↑         0k         USC-C240         Cisco         USC+1852V0PU         24         262144         1         3           ■ Server 3        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# **Configuring CIMC Access Using the CIMC Configuration Utility on C3160**

### Introduction

The following sections provide an overview of how to setup the CIMC network connectivity for UCS C3160.

- 1. Cisco C-Series Rack Servers provides a physical local video and two USB connections for a USB keyboard, video monitor, and USB mouse connection through the front and back panel of the rack server using the Cisco provided dongle connector.
- 2. All rack servers can have up to 4 active KVM over IP sessions in addition to the local connection at front or rear panels. all active sessions have full control of the console.

**3.** KVM over IP supports text and graphics modes of the graphics controller and needs no manual setting to view data.

### **Cable Connectivity**

Figure 63

Cisco UCS 6296UP Fabric Interconnect A

Cable connections for C3160 servers:

Cisco UCS C3160 Rack Server

Connection for C3160 Server:

- 1. Connect video monitor, USB keyboard and USB mouse to Cisco C3160 rack servers through the back panel using the Cisco provided dongle connector.
- 2. Connect the network port of the C3160 Server to Management port of the Management switch.

#### Power up the KVM

Complete the steps below in order to power up the server:

1. Plug the power cord into the chassis.



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• CIMC initializes system standby (Power Off mode).



- CIMC is active and can be controlled through GUI or CLI, if you know the IP address.
- 2. Depress Front Panel Power:
  - The Fans begin to spin up.
  - Then POST sequence begins.
  - At this point you can either boot up or begin the installation process.
  - Note that for large memory, models can display a blank screen for several minutes.

#### F8 to Configure and View CIMC IP

While in BIOS you can press F8 for the CIMC IP address configuration and password reset.

- 1. Set NIC mode to Dedicated.
- 2. Set NIC redundancy to None
- 3. Choose IPv4 for Static configuration.
- 4. Enter the CIMC IP, subnet and gateway information.
- 5. After entering IP information, press F5 in order to display the configured IP.

NTC mode				NTC redundancu		
Dedicated:	[X]			None:	٢x	1
Shared LOM:	[]			Active-standhu:	L° I	- 1
Cisco Card:	[]			Active-active:	ſ	1
SIOC Slot:	1				L	р.
IP (Basic)						
IPV4:	[X]	IPV6:	[]			
DHCP enabled	[]					
CIMC IP:	10.29.160	.230				
Prefix/Subnet:	255.255.2	55.0				
Gateway:	10.29.160	.1				
	0.0.0.0					
VLAN (Advanced)						
VLAN enabled:	[ ]					
Priority:	0					
****	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	***	жжж	<del>kokokokokokokokokokokokokokokokokokoko</del>	****	***

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6. Press F1 and enter Additional Settings (optional).


- 7. Press F10 in order to save the configuration.
- 8. Press ESC to exit.

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# cisco

Press <F2> Setup, <F6> Boot Menu, <F7> Diagnostics, <F8>Cisco IMC Configuration, <F12> Network Boot Bios Version : C3160M3.2.0.2a.0.090920140606 Platform ID : C3160M3

Cisco IMC IPv4 Address : 10.29.160.230 Cisco IMC MAC Address : FC:5B:39:A0:0A:E4

Processor(s) Intel(R) Xeon(R) CPU E5–2695 v2 @ 2.40GHz Total Memory = 256 GB Effective Memory = 256 GB Memory Operating Speed 1866 Mhz

### Access CIMC

1. Then point a Web browser to the configured CIMC IP address http://10.29.160.230

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- Default username: admin
- Default password: password

Figure 64 Cisco Integrated Management Window



2. Once logged in successfully. The server can be controlled using CIMC

#### Figure 65 Cisco Integrated Management Controller



3. Click Launch KVM Console.

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# **Installing Redhat Enterprise Linux 6.5 software Raid (OS based Mirroring) on C3160 System using CIMC**

The following section provides detailed procedures for installing Red Hat Linux 6.5.

#### Access CIMC

- 1. Then point a Web browser to the configured CIMC IP address http://10.29.160.230
- Default username: admin
- Default password: password

Fig	gure 66	CIMC Log in Page
Cisco Integrated Managem	e × +	
← ■ https://10.29.160	0.230/login.html	▼ C 🔩 ▼ 🔍 Search 🟠 🖨 🖡 🏫 🚀 🚼 D.▼ 👜▼ 🛐 🧔 ▼
tilitiliticisco	Cisco Inte C3160-FCH18 Version: 2.0(2c)	egrated Management Controller 334J73J Log In Cancel
©2008-2014, Cis	sco Systems, Inc.	All rights reserved.

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2. Once logged in successfully. The server can be controlled using CIMC.



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Figure 67

CIMC: Sever Summary Page

3. Click Launch KVM Console.

Restart the server by using KVM Console, Macros > Static Macros > Ctrl-Alt-Del

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

2. Click the Activate Virtual Devices found under Virtual Media tab.



3. In the KVM window, select the Virtual Media tab and Click the Map CD/DVD.



4. Browse to the Red Hat Enterprise Linux Server 6.5 installer ISO image file.

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The Red Hat Enterprise Linux 6.5 DVD is assumed to be on the client machine.

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

Figure 68 Browse to Red Hat Enterprise Linux ISO Image

4	Open	1000			п	1	X
	Look in:	📜 ISO		-	ø	<del>ب</del> 📰 🔁	
	Recent Items	ESXi-5.1.0 ESXi-5.5.0 rhel-serve rhel-serve ucs-c3160	-799733-custom-Cisco-2. -1746018-Custom-Cisco- r-6.5-x86_64-dvd.iso r-7.0-x86_64-dvd.iso -huu-2.0.1.45.iso	1.0.3.iso 5.5.1.3.iso			
	My Documents						
	Computer Q Network	File name: Files of type:	rhel-server-6.5-x86_64-dvd.iso Disk iso file (*.iso)			- (	Open Cancel

- 6. In the KVM window, select the KVM tab to monitor during boot.
- 7. In the KVM window, select the Macros > Static Macros > Ctrl-Alt-Del button in the upper left corner.
- 8. Click OK.
- 9. Click **OK** to reboot the system.
- **10.** On reboot, the machine detects the presence of the Red Hat Enterprise Linux Server 6.5 install media.
- 11. Select the Install or upgrade an existing system.



**12.** Skip the Media test and start the installation



13. Click Next

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14. Select language of installation, and then Click Next

What langua installation	ge would you like to use during the rocess?		
Arabic (العربية)			
Assamese (অসমীয়া)			
Bengali (বাংলা)			
Bengali(India) (বাংল	( ভারত))		
Bulgarian (Българ	ки)		
Catalan (Català)			
Chinese(Simplified			
Croatian (Hrvatski)	(中文(正體))		
Czech (Čeština)			
Danish (Dansk)			
Dutch (Nederlands)			
English (English)			
Estonian (eesti kee			
Finnish (suomi)			
German (Deutsch)			
Greek (Ελληνικά)			
Gujarati (ગુજરાતી)			
Hebrew (עברית)			
Hindi (हिन्दी)			
Hungarian (Magyai			
celandic (Icelandic			
lloko (Iloko)			
hadonesian (Indone	jid)		
Select the ap the system.	propriate keyboard for		
alian			
alian (IBM)			
allan (ILZ)			
nanese			
apanese			
apanese orean atin American			
apanese orean atin American lacedonian			
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15. Select Basic Storage Devices and Click Next.

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<u> </u>	a construction of the second sec		
	What type of devices will your installation involve?		
	Basic Storage Devices Installs or upgrades to typical types of storage devices. If you're not sure which option is right for you,		
	this is probably it.		
	Specialized Storage Devices O Installs or upgrades to enterprise devices such as Storage Area Networks (SANs). This option will allow		
	you to add FCoE / ISCSI / zFCP disks and to filter out devices the installer should ignore.		
		de Back	Next
Ľ			
	k		
	Storage Device Warning	1	
	🛕 The storage device below may contain data.		
	ATA INTEL SSDSC2BB12 114473.460938 MB pci-0000:00:1f.2-scsi-4:0:0:0		
	We could not detect partitions or filesystems on this device.		
	This could be because the device is <b>blank</b> , <b>unpartitioned</b> , or <b>virtual</b> . If not, there may be data on the device that can not be recovered if you use it		
	in this installation. We can remove the device from this installation to protect the data.		
	Are you sure this device does not contain valuable data?		
	Apply my choice to all devices with undetected partitions or filesystems		
	Yes, discard any data No, keep any data		
		1	
		<b>Back</b>	Next

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#### Figure 73 RHEL Installation: Storage Devices Selection

16. Provide hostname and configure Network for the host.

Figure 74	RHEL Installation: Speci	fy Hostname		
	Please name this computer. The hostname identifies the computer on a network.			
Hostname	e: rhel65			
Configur	e Network			
			Back	Next

Figure 75 RHEL Installation: IPv4 Settings for eth0

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			Editing	eth0			
Connect	tion name:	ethC	)				
☑ Conr ☑ Avai	nect automa lable to all u	ticall isers	у				
Wired	802.1x Sec	urity	IPv4 Sett	ings	IPv6 Sett	ings	
Metho	od: Manua	I					•
Addr	esses						
Ad	dress	Netr	mask	Gat	teway	A	dd
10.	29.160.165	255.	255.255.0	10.	29.160.1	De	lete
DNS	5 servers:						
Sea	rch domains	:					
DHO	CP client ID:						
	Require IPv4	addr	essing for	this	connectio	n to co	mplete
						Rout	es
					Cancel		Apply

,		Edition	oth1	
		Ealting	etni	
Connect	tion name:	eth1		
✓ Coni ✓ Avai	hect automation lable to all use	<b>cally</b> ers		
Wired	802.1x Secur	ity IPv4 Set	tings IPv6 S	ettings
Metho	od: Manual			0
Addr	esses			
Ad	dress	Netmask	Gateway	/ Add
19	2.168.11.165	255.255.25	5.0	Delete
DNS	5 servers:			
Sea	rch domains:			
DHO	CP client ID:			
$\checkmark$	Require IPv4 a	ddressing fo	r this connect	tion to complete
				Routes

Figure 76 RHEL Installation: IPv4 Settings for eth1

Figure 77 RHEL Installation: Location Selection



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Figure 78	RHEL Installation: E	Inter Root Credent	ials	
The root the syste user.	account is used for administering em. Enter a password for the root			
Root Password:	•••••			
Confirm:	•••••			
				Back Next

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17. Choose Create Custom Layout for Installation type.



**18.** Following steps can be used to create two software RAID 1 partitions for boot and, or (root) partitions.

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a. Choose free volume and click on Create and choose RAID Partition.



Figure 80 RHEL Installation: Create RAID Partition

b. Choose "Software RAID" for File system Type and set size for Boot volume

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		Free 114471	. MB	ib) (Houeld		oscibbil,			
Device 🖡	Size (MB)	Mount Point/ RAID/Volume	Type Format						
Hard Drives									
rightarrow sdd (/dev/sdd)									
Free	114470				Add Partiti	on			
sde (/dev/sde)     Eree	114470		Mount Point:	<not appli<="" td=""><td>cable&gt;</td><td></td><td>~</td><td></td><td></td></not>	cable>		~		
nee	114470		File System Type:	software P	AID		\$		
				O Drive	Size	Model		í	
				✓ sdd	114473 MB	ATA INTEL S	SDSC2BB12		
			Allowable Drives:	🗆 sde	114473 MB	ATA INTEL S	SDSC2BB12	1	
			Cize (MD):	2049				_	
			Size (MB):	2040			~	Ð	
			Additional Size O	ptions					
			<ul> <li>Fill all space u</li> </ul>	ip to (MB):		2048	<u>^</u>		
			<ul> <li>Fill to maximu</li> </ul>	um allowabl	e size				
			Force to be a p	rimary parti	tion				
			<ul> <li>Encrypt</li> </ul>						
						Cancel	ОК		
						Cr	eate Edit	Delete	Reset

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Figure 81 RHEL Installation: Add RAID Partition

**19.** Similarly, do the RAID configuration for the other free volume.



Figure 82 RHEL Installation: Create RAID Partition

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k		Drive /dev/sde (1) Free 114473 MB	114473 MB) (Model: ATA INTEL SSDSC2BB12)
Device	Size (MB)	Mount Point/ RAID/Volume Type	Format
Hard Drives			Add Partition
sdd1 Free	2048 112424	Mount Point:	<not applicable=""></not>
✓ sde (/dev/sde) Free	114473	File System Type:	: software RAID
		Allowable Drives:	○ Drive     Size     Model       □ sdd     114473 MB     ATA INTEL SSDSC2BB12       : ✓ sde     114473 MB     ATA INTEL SSDSC2BB12
		Size (MB):	2048
		Additional Size O <ul> <li>Fixed size</li> </ul>	Dptions
		○ Fill all space of	up to (MB):
		<ul> <li>Fill to maximum</li> </ul>	num allowable size
		Force to be a p	primary partition
		Encrypt	
			Cancel
			Create Edit Delete Res
			👍 Back 📄 🕨

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Figure 83 RHEL Installation: Add RAID Partition

**20.** Now similarly create RAID partitions for root (/) partition on both the devices and use rest of the available space

		/dFree 211242	4 MB					/			
Device	Size (MB)	Mount Point/ RAID/Volume	Ту	/pe	Format						
Hard Drives											
sdd (/dev/sdd)											
sdd1	2048		softwa	are RAID	$\checkmark$						
Free	112424		-		Creat	e Storage					
sde (/dev/sde)				Create P	artition	e e ter age					
sde1	2048		softw	O Stan	dard Partition						
Free	112424										
				Create S	oftware RAID		Informat	ion			
				RAID	Partition						
				O RAID	e a RAID format						
				Requi	res at least 2 fro						
				Create I	MV		Informat	ion			
				O LVM	Volume Group						
				Requi	res at least 1 fre Logical Volum	e LVM formal e					
				Creat	a logical volun	ne on selected		P			
				Creat	an LVM format	ed partition					
						Cancel	Create				
			L								
								Create	Edit	Del	ete 🛛

#### Figure 84 RHEL Installation: Create RAID Partition

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k		<b>Drive /dev/sdd (1</b> ) /«Free 2 112424 MB	14473 MB) (Model: ATA IN	TEL SSDSC2BB12)			
Device	Size (MB)	Mount Point/ RAID/Volume	Format				
→ Hard Drives							
▼ sdd (/dev/sdd)			Add Partitio	on			
sdd1 Free	2048 112424	Mount Point:	<not applicable=""></not>				
▼ sde (/dev/sde)		File System Type:	software RAID		•		
sdel	2048			Model			
Free	112424		Sdd 114473 MB	ATA INTEL SSDSC2BB12			
		Allowable Drives:	□ sde 114473 MB	ATA INTEL SSDSC2BB12			
			_				
		Size (MB):	200				
		Additional Size O	ptions				
		<ul> <li>Fixed size</li> </ul>					
		○ Fill all space u	ip to (MB):	1	<u>^</u>		
		Fill to maximum	im allowable size				
		Force to be a p	rimary partition				
		Encrypt					
				Cancel OK			
				Create	Edit	Delete	Reset
						<b>e</b> Back	Nex Nex

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Figure 85 RHEL Installation: Add RAID Partition



Figure 86 RHEL Installation: Create RAID Partition

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k		<b>Drive /dev</b> /dFree 2112424 N	<b>v/sde (11</b> 48	.4473 MB) (	Model: ATA IN	TEL SSDSC2BB	12)				
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format							
r Hard Drives ▼ sdd (/dev/sdd) sdd1 sdd2	2048	Mount Po	int:	<not appl<="" th=""><th>Add Partitio</th><th>on</th><th></th><th>~</th><th></th><th></th><th></th></not>	Add Partitio	on		~			
saa2 ▼ sde (/dev/sde) sde1	2048	File Syste	m Type:	software F	AID	•• ••		•			
Free	112424	Allowable	Drives:	☐ sdd ☑ sde	114473 MB 114473 MB	ATA INTEL SS ATA INTEL SS	DSC2BB12 DSC2BB12				
		Size (MB): Additiona O Fixed	al Size Op I size	200 ptions				~			
		<ul><li>Fill all</li><li>Fill to</li></ul>	l space u maximu	p to (MB): Im allowabl	le size	1					
		Force f Encry	to be a pr pt	rimary parti	ition						
						Cancel	ОК				
							Create	Edi	t	Delete	Res
										<b>e</b> Back	•

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Figure 87 RHEL Installation: Add RAID Partition

21. The above steps created 2 boot and 2 root (/) partitions. Following steps will RAID1 Devices

			Ple	ease	Select A Device
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format	
▼ sdd (/dev/sdd)					
sdd1	2048		software RAID	$\checkmark$	
sdd2	112424		software RAID	$\checkmark$	
▼ sde (/dev/sde)					
sdel	2048		software RAID	$\checkmark$	
sde2	112424		software RAID	$\checkmark$	
					Create Edit Delete Rese
					📥 Back 📄 🕨

Figure 88 RHEL Installation: Selected RAID Devices

22. Choose one of the boot partitions and click on Create > RAID Device.

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k		<b>Drive</b> / /d/dev/s 2 11242	/ <b>dev/sdd (114</b> sdd2 24 MB	473 MB) (Ma	del: ATA INTEL	SSDSC2BB1	2)			
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
Hard Drives										
▼ sdd (/dev/sdd)										
sdd1	2048		software RAID	$\checkmark$						
sdd2	112424		software DAVE	Cre	ate Storage					
<b>▽ sde</b> (/dev/sde)			Create	Partition	ate storage					
sdel	2048		softw O Stan	idard Partitio	1					
sde2	112424		softw Gene							
			Create	Software RA	D	Informatio	on			
			O RAID	) Partition						
			Creat	e a RAID form						
			Requ	ires at least 2						
			Create	LVM		Informatio	on			
			O LVM	Volume Gro	.ip					
			Requ							
			O LVM	Logical Volu	me		8			
			O LVM	Physical Vo	ume ume					
			Creat	te an LVM form						
					Cancel	Create				
					Gunder					
							Create	Edit	Delete	Rece
							cicate			1030
									Back	N

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Figure 89 RHEL Installation: Select RAID Device

23. Choose this as /boot (boot device) and in RAID members, choose all the boot partitions created above in order to create a software RAID 1 for boot.

k		Drive /4/dev/ 2 1124	/ <b>dev/sdd (1144</b> 7 sdd2 24 MB	73 MB	) (Model: /	ATA INT	EL SSDS	C2BB	12)						
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Form	at										
<ul> <li>Hard Drives</li> </ul>															
sdd (/dev/sdd)															
sdd1	2048		software RAID	$\checkmark$											
sdd2	112424		software RAID	1				_							
				-	Make RAI	D Dev	lce								
sde1	2048		Mount Point:	/	boot					~					
sde2	112424		File System Typ	pe:	ext4					\$					
			RAID Device:		md0					\$					
			RAID Level:		RAID1					\$					
			RAID Members	:	<ul> <li>✓ sdd1</li> <li>□ sdd2</li> <li>✓ sde1</li> </ul>	20 112 20	48 MB 424 MB 48 MB								
			Number of spa	res:	)	112	171 MD								
			Encrypt												
							Cancel		OK						
									0	reate	Edit	Delet	e	Re	se
												<b>H</b> Back	:	•	Ne

Figure 90 RHEL Installation: Make RAID Device

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24. Similarly repeat for / partitions created above choosing both members with mount point as "/".



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Figure 91 RHEL Installation: Select RAID Device

•		<b>Drive /</b> /(/dev/s 2 11242	' <b>dev/sdd (11447</b> 3 dd2 ?4 MB	B) (Mode	el: ATA INTEL SSDSC2BB12)
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format	
<ul> <li>✓ RAID Devices md0 (/dev/md0)</li> <li>✓ Hard Drives</li> </ul>	2045	/boot	ext4	$\checkmark$	
✓ sdd (/dev/sdd) sdd1	2048	md0		Make I	RAID Device
sdd2	112424		Mount Point:	/	×
✓ sde (/dev/sde) sde1 sde2	2048 112424	md0	File System Type RAID Device: RAID Level:	e: ext4 md1 RAID1	
			RAID Members:	✓   sdd:     ✓   sde:	2 112424 MB 2 112424 MB
			Encrypt	is: [0	V
					Cancel OK
					Create Edit Delete Reset
					Back Next

Figure 92 RHEL Installation: Make RAID Device

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			Ple	ase Se	ect A De	vice				
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
✓ RAID Devices										
md0 (/dev/md0)	2045	/boot	ext4	$\checkmark$						
md1 (/dev/md1)	112359	/	ext4	$\checkmark$						
Hard Drives										
sdd (/dev/sdd)										
sdd1	2048	md0	software RAID	$\checkmark$						
sdd2	112424	md1	software RAID	$\checkmark$						
▼ sde (/dev/sde)										
sde1	2048	md0	software RAID	$\checkmark$						
sde2	112424	md1	software RAID	$\checkmark$						
						(	Create	Edit	Delete	Rese
									<b>Back</b>	N N

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#### Figure 93 RHEL Installation: All the Selected Devices

25. Click on Next.

Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
7 RAID Devices										
<b>md0</b> (/dev/md0)	2045	/boot	ext4	$\checkmark$						
mdl (/dev/mdl)	112359	/	ext4	$\checkmark$						
<ul> <li>Hard Drives</li> </ul>				Dortit	oning Womi					
			The partiti	Partit	oning warnin	igs ad generated	the			
sdd1	2048	md0	following v	varnings.	ne you request	eu generated	uie			
sdd2	112424	md1	You have r	not specifie	a swan nartiti	on Although	not			
			strictly rec	uired in all	cases, it will si	gnificantly in	nprove			
sdel	2048	md0	performan	ice for mos	installations.					
			Would you scheme?	like to con	inue with your	requested pa	artitioning			
						No	Yes			
							Create	Edit	Delete	Ret

Figure 94 RHEL Installation: Warning before RAID Partitioning



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Swap partition can be created using the similar steps, however, since these systems are high in memory, this step is skipped (click **Yes**).

26. Click Next, and then click Format.

R.			Ple	ease Sele	ect A Device	9	
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format			
<ul> <li>RAID Devices md0 (/dev/md0) md1 (/dev/md1)</li> <li>Hard Drives</li> <li>sdd (/dev/sdd) sdd1 sdd2</li> <li>Sde (/dev/sde) sde1 sde2</li> </ul>	2045 112359 2048 112424 2048 112424	/boot / md0 md1 md0 md1	ext4 ext4 The followi formatted, /dev/sdd /dev/sde	Format ng pre-existing destroying all d partition tab partition tab	Warnings devices have been s ata. le (MSDOS) le (MSDOS)	elected to be	

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Figure 95 RHEL Installation: Destroy Old Devices

27. Select default settings and click Next.

ure 96	6 RHEL	nstallation: Installing Boot Loader	
7 Insta	Il boot loador on /dou/cd	Change device	
⊻ IIISLd	in boot loader on /dev/so		
Use	a boot loader password	Change password	
loot lo	ader operating syste	n list	
Default	Label	Device	Add
۲	Red Hat Enterprise Linu	: /dev/mdl	Edit
			Delete
			Dece

28. Continue with RHEL Installation as shown below.

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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		
<ul> <li>Virtualization Host</li> </ul>		
O Desktop		
<ul> <li>Software Development Workstation</li> </ul>		
O Minimal		
lease select any additional repositories that you want to use for software installation.		
High Availability		
Load Balancer		
Red Hat Enterprise Linux		
Deallingh Changes		
🕂 Add additional software repositories 📄 📝 Modify repository		
ou can further customize the software selection now, or after install via the software		
nanagement application.		
nanagement application.		
nanagement application. Customize later O Customize now		
nanagement application. Customize later O Customize now	Back	

Figure 97 RHEL Installation: Keep the Default Installation Option

29. Once the installation is complete reboot the system.

Repeat the steps 1 through 29 to install Red Hat Linux 6.5 on Servers 66 through 68.

Note

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

## Installing Red Hat Enterprise Linux 6.5 using software RAID on C240 M4 Systems

The following section provides detailed procedures for installing Red Hat Enterprise Linux 6.5 using Software RAID (OS based Mirroring) on Cisco UCS C240 M4 servers.

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.

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This requires RHEL 6.5 DVD/ISO for the installation.

- 1. Log in to the Cisco UCS 6296 Fabric Interconnect and launch the Cisco UCS Manager application.
- 2. Select the Equipment tab.
- In the navigation pane expand Rack-Mounts and then Servers. 3.
- 4. Right click on the server and select KVM Console.



- 5. In the KVM window, select the Virtual Media tab.
- 6. Click the Activate Virtual Devices from the Virtual Media tab.



7. In the KVM window, select the Virtual Media tab and Click the Map CD/DVD.

Figure 100 KVM Console



8. Browse to the Red Hat Enterprise Linux Server 6.5 installer ISO image file.


The Red Hat Enterprise Linux 6.5 DVD is assumed to be on the client machine.

X 📥 Open Look in: 🚺 ISO • 1 📂 🛄 -ESXi-5.1.0-799733-custom-Cisco-2.1.0.3.iso 🐼 ESXi-5.5.0-1746018-Custom-Cisco-5.5.1.3.iso 🐼 rhel-server-6.5-x86\_64-dvd.iso Items rhel-server-7.0-x86 64-dvd.iso 🕝 ucs-c3160-huu-2.0.1.45.iso Desktop Documents Computer File name: rhel-server-6.5-x86 64-dvd.iso Open Network Files of type: Disk iso file (\*.iso) Cancel

Figure 101 Browse to Red Hat Enterprise Linux ISO Image

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

- 10. In the KVM window, select the KVM tab to monitor during boot.
- 11. In the KVM window, select the Macros > Static Macros > Ctrl-Alt-Del button in the upper left corner.
- 12. Click OK.

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- 13. Click **OK** to reboot the system.
- 14. On reboot, the machine detects the presence of the Red Hat Enterprise Linux Server 6.5 install media.
- 15. Select the Install or Upgrade an Existing System



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16. Skip the Media test and start the installation.



17. Click Next

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### Figure 104 RHEL Installation: Installation Wizard



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18. Select language of installation, and then Click Next

What language would you like to use during the installation process?	
Arabic (العربية)	
Assamese (অসমীয়া)	
Bengali (বাংলা)	
Bengali(India) (বাংলা ( ভারত))	
Bulgarian (Български)	
Catalan (Català)	
Chinese(Simplified) (中文(简体))	
Chinese(Traditional) (中文(正體))	
Croatian (Hrvatski)	
Czech (Čeština)	
Danish (Dansk)	
Dutch (Nederlands)	
English (English)	
Estonian (eesti keel)	
Finnish (suomi)	
French (Français)	
German (Deutsch)	
Greek (Ελληνικά)	
Gujarati (ગુજરાતી)	
Hebrew (עברית)	
Hindi (हिन्दी)	
Hungarian (Magyar)	
Icelandic (Icelandic)	
Iloko (iloko)	
Indonesian (Indonesia)	
Ibelies (Beliess)	e Back

Figure 105 RHEL Installation: Language Selection

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Figure 106	DUEI Installation.	I awayaga Calastian
rigure 100	KILL Instantation.	Language Selection

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Select the appropriate keyboard for the system.		
Italian		
Italian (IBM)		
talian (12)		
lananese		
Korean		
Latin American		
Macedonian		
Norwegian		
Polish		
Portuguese		
Romanian		
Russian		
Serbian		
Serbian (latin)		
Slovak (qwerty)		
Slovenian		
Spanish		
Swedish		
Swiss French		
Swiss French (latin1)		
Swiss German		=
Swiss German (latin1)		
Turkish		
U.S. English		
U.S. International		
Ukrainian		
United Kingdom		~
	🔶 Back 📄	Next

19. Select Basic Storage Devices and Click Next

### Figure 107 RHEL Installation: Installation Type

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What type of devices will your installation involve?		
<ul> <li>Basic Storage Devices</li> <li>Installs or upgrades to typical types of storage devices. If you're not sure which option is right for you, this is probably it.</li> </ul>		
this is probably it. Specialized Storage Devices Installs or upgrades to enterprise devices such as Storage Area Networks (SANs). This option will allow you to add FCOE / ISCS / zFCP disks and to filter out devices the installer should ignore.		
	<b>a</b> Back	Next 🔶
▶		
Storage Device Warning		
ATA INTEL SSDSC2BB12         114473.460938 MB         wc could not detect partitions or filesystems on this device.         This could be because the device is blank, unpartitioned, or virtual. If not, there may be data on the device that can not be recovered if you use it in this installation. We can remove the device from this installation to protect the data.         Are you sure this device does not contain valuable data?         Image: Apply my choice to all devices with undetected partitions or filesystems         Yes, discard any data       No, keep any data		
	Back	Next

20. Provide hostname and configure Network for the host.

Figure 108	RHEL Installation: Provide Host Name		
Pleas hostr netw	ase name this computer. The stname identifies the computer on a twork.		
nostname. Inc			
Configure Net	etwork		
		Back	Next

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Figure 109 RHEL Installation: IPV4 Setting for eth0

			Editing	eth0		
Connect	tion name:	eth0	)			
☑ Conr ☑ Avai	nect automa lable to all u	iticall users	У			
Wired	802.1x Sec	urity	IPv4 Sett	ings	IPv6 Sett	ings
Metho	od: Manua	l				0
Addr	esses					
Ad	dress	Netr	mask	Gat	teway	Add
10.	.29.160.165	255.	255.255.0	10.	29.160.1	Delete
DNS Sea DHC	5 servers: rch domains CP client ID: Require IPv4	s:	essing for	this	connection	n to complete
					Capaci	Routes

0	•			3,
		Editing et	hl	
Connect	tion name:	eth1		
<ul><li>✓ Conr</li><li>✓ Avai</li></ul>	nect automation lable to all use	cally ers		
Wired	802.1x Secur	ity IPv4 Setting	IPv6 Set	tings
Metho	od: Manual			•
Addr	esses			
Ad	dress	Netmask	Gateway	Add
192	2.168.11.165	255.255.255.0		Delete
DNS	5 servers:			
Sea	rch domains:			
DHO	CP client ID:			
	Require IPv4 a	ddressing for th	is connectio	n to complete
				Routes
			Cancel	Apply

# Figure 110 RHEL Installation: IPV4 Setting for eth1

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Figure 111 RHEL Installation: Selecting Location

rigure 112	KIILL Instation. L	iler Kool Creueniluis	
The root the syste user.	account is used for administering em. Enter a password for the root		
Root Password:	•••••		
Confirm:	•••••		
			Back Next

Figure 112 RHEL Installation: Enter Root Credentials

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21. Choose Create custom layout for Installation type.





Following steps can be used to create two software RAID 1 partitions for boot and / (root) partitions.

22. Choose free volume and click on Create and choose RAID Partition.



Figure 114 RHEL Installation: Create RAID Partition

23. Choose "Software RAID" for File system Type and set size for Boot volume.

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		Drive Free 11447	/ <b>dev/sdd (114473</b> 1 MB	MB) (Mode	I: ATA INTEL SS	DSC2BB12)				
Device	Size (MB)	Mount Point/ RAID/Volume	Type Format							
Hard Drives										
Free	114470				Add Partit	ion				
✓ sde (/dev/sde)     Free	114470		Mount Point:	<not ap<="" td=""><td>plicable&gt;</td><td></td><td></td><td>~</td><td></td><td></td></not>	plicable>			~		
			File System Type	software	RAID			\$		
				O Drive	Size 114473 MB	Model ATA INTEL	SSDSC2BB12			
			Allowable Drives	🗌 sde	114473 MB	ATA INTEL	SSDSC2BB12			
			Size (MB):	2048				-		
			Additional Size ( Fixed size	ptions						
			<ul> <li>Fill all space</li> <li>Fill to maxim</li> </ul>	up to (MB) um allowa	: hle size	2048		~		
			Force to be a	primary pa	rtition					
			Encrypt							
						Cano	el OK			
							Create	Edit	Delete	Rese

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Figure 115 RHEL Installation: Add Partition

24. Similarly, do the RAID partitioning for the other free volume.

		Free 114473 I	МВ							
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
Hard Drives										
$\checkmark$ sdd (/dev/sdd)										
sdd1	2048	S	oftware RAID	) 🗸						
Free	112424			Creat	Storago					
▼ sde (/dev/sde)			Create	Partition	storage					
Free	114473		<ul> <li>Stan</li> </ul>	dard Partition						
			Gene							
			Create	Software RAID		Information				
			RAID	) Partition						
			Creat	te a RAID formate						
			O KAIL	) Device ires at least 2 fre						
			Create	LVM		Information				
			O LVM	Volume Group						
			Requ	ires at least 1 fre						
			O LVM	Logical Volume						
			Creat	e a logical volum Physical Volum	e on selected v					
			Creat	te an LVM formate	d partition					
					Cancel	Create				
							Create	Edit	Delete	Res

Figure 116 RHEL Installation: Create RAID Partition

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		Drive /dev/sde (1	14473 MB) (Model: ATA	NTEL SSDSC2BB12)			
k		Free 114473 MB					
Device	Size (MB)	Mount Point/ RAID/Volume Type	Format				
✓ Hard Drives							
sdd (/dev/sdd)			Add Partit	ion			
Free	2048 112424	Mount Point:	<not applicable=""></not>		~		
		File System Type:	software RAID		\$		
Free	114473		O Drive Size	Model			
			🗌 sdd 114473 MB	ATA INTEL SSDSC2BB12			
		Allowable Drives:	✔ sde 114473 MB	ATA INTEL SSDSC2BB12			
		Size (MP):					
		Size (MD).	2040		~		
		<ul> <li>Fixed size</li> </ul>	puons				
		○ Fill all space u	up to (MB):	1	$\widehat{}$		
		<ul> <li>Fill to maximum</li> </ul>	um allowable size				
		Force to be a p	primary partition				
		Encrypt					
				Cancel OK			
				Create	EC	lit Dele	ete Res
						A Pa	ck 📄

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Figure 117 RHEL Installation: Add Partition

**25.** Now similarly create RAID partitions for root (/) partition on both the devices and use rest of the available space.

		/(Free 2 11242	<b>dev/sdd (1)</b> 4 MB	4473 MB) (Mo	del: ATA INTEL	SSDSC2BB1	2)		
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format					
<ul> <li>Hard Drives</li> </ul>									
sdd1	2048	5	software RA	ID 🗸					
Free	112424			Cre	ate Storade				
✓ sde (/dev/sde) sde1	2048		Creat	e Partition					
Free	112424		Ge	andard Parulio neral purpose pa e Software BAI	n rtition creation	Informatio			
				ID Partition eate a RAID form ID Device quires at least 2	ated partition free RAID forma	ited partitions			
			Creat	e LVM		Informatio	n		
				M Volume Gro <sup>quires</sup> at least 1 M Logical Volu	J <mark>p</mark> free LVM format me				
			Cre	eate a logical vol					
			O LV	M Physical Vol	ume				
					Cancel	Create			
					Cancer	Create			

Figure 118 RHEL Installation: Create RAID Partition

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₩.		Drive /dev/sdd (11 /dFree 2 112424 MB	4473 MB) (Model: ATA IN	TEL SSDSC2BB12)		
Device	Size M (MB) R/	lount Point/ AID/Volume	Format			
✓ Hard Drives ✓ sdd (/dev/sdd)	2048		Add Partitic	on		
Free	112424	Mount Point:	<not applicable=""></not>		~	
	2048	File System Type:	software RAID	•	•	
Free	112424	Allowable Drives:	✓ sdd 114473 MB Sde 114473 MB	ATA INTEL SSDSC2BB12 ATA INTEL SSDSC2BB12		
		Size (MB):	200		\$	
		Additional Size Op	otions			
		<ul> <li>Fill all space u</li> <li>Fill to maximu</li> </ul>	p to (MB): Im allowable size	1		
		<ul> <li>Force to be a present of the second se</li></ul>	rimary partition			
				Cancel OK		
				Create	Edit	Delete Reset
						Hext

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Figure 119 RHEL Installation: Add Partition

λ.		/dFree 21124	24 MB	73 MD) (MC	Gel: AIA INTEL	. 5505C28812	.)			
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
<ul> <li>Hard Drives</li> </ul>										
sdd (/dev/sdd)										
sdd1	2048		software RAID	$\checkmark$						
sdd2	112424		software DAID	Cre	ate Storage					
			Create	Partition	ace scorage					
sdel	2048		softw 🔿 Stan	dard Partitio	n					
Free	112424		Gener							
			Create 9	Software RA	ID	Informatio	n			
			RAID	Partition						
			Creat	e a RAID forn Device						
			Requi	res at least 2						
			Create I	VM		Informatio	n			
			O LVM	Volume Gro	up					
			Requi							
			O LVM	Logical Volt						
			O LVM	Physical Vo	lume					
			Creat							
					Cancel	Create				
						ſ	Create	Edit	Delete	Reset
						l				

Figure 120 RHEL Installation: Create RAID Partition

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k.		<b>Drive /dev/sde (1</b> ) /dFree 2112424 MB	14473 MB) (Model: ATA IN	TEL SSDSC2BB12)		
Device	Size (MB)	Mount Point/ RAID/Volume	Format			
<ul> <li>✓ Hard Drives</li> <li>✓ sdd (/dev/sdd)</li> <li>sdd1</li> <li>sdd2</li> <li>✓ sde (/dev/sde)</li> <li>sde1</li> </ul>	2048 112424 2048	Mount Point: File System Type:	Add Partitio	on	<ul><li></li></ul>	
Free	112424	Allowable Drives:	○ Drive         Size           □ sdd         114473 MB           ☑ sde         114473 MB	Model ATA INTEL SSDSC2BB12 ATA INTEL SSDSC2BB12		
		Size (MB): Additional Size O Fixed size Fill all space u Fill to maximu	200 ptions up to (MB): um allowable size	1		
		<ul> <li>Force to be a p</li> <li>Encrypt</li> </ul>	rimary partition	Cancel	:	
				Create	Edit	Delete Reset

1

Figure 121 RHEL Installation: Add Partition

26. The above steps created 2 boot and 2 root (/) partitions. Following steps will RAID1 devices.

<b>h</b>			Ple	ease	Select A Device
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format	
sdd1	2048	5	oftware RAID	$\checkmark$	
sdd2	112424	S	oftware RAID	$\checkmark$	
sde1	2048	S	oftware RAID	$\checkmark$	
sde2	112424	S	oftware RAID	$\checkmark$	
					Create Edit Delete Reset
					Sack Next

Figure 122 RHEL Installation: Selected RAID Devices

27. Choose one of the boot partitions and click on Create > RAID Device

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Figure 123 RHEL Installation: Create RAID Device

28. Choose this as /boot (boot device) and in RAID members, choose all the boot partitions created above in order to create a software RAID 1 for boot

		Drive /d/dev/ 2 1124	/ <b>dev/sdd (1144</b> ) sdd2 24 MB	73 MB) (	odel: /	ATA INTEL SSDSC2	BB12)		]		
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format							
Hard Drives											
▼ sdd (/dev/sdd)											
sdd1	2048		software RAID	$\checkmark$							
sdd2	112424		software RAID	1							
▼ sde (/dev/sde)				M	e RAI	ID Device		_			
sdel	2048		Mount Point:	/bo	1		`	-			
sde2	112424		File System Ty	pe: ex			:				
			RAID Device:	m			<				
			RAID Level:	RA	1		<	2			
			RAID Members	:	dd1 dd2 de1	2048 MB 112424 MB 2048 MB					
			Number of spa	res: 0	001	1111111					
			Encrypt								
						Cancel	ОК				
							Cre	ate	Edit	Delet	e Re

Figure 124 RHEL Installation: Make RAID Device

29. Similarly repeat for / partitions created above choosing both members with mount point as "/".

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Device       Size (MB)       Mount Point/ RAID/Volume       Type       Format         IRAID Devices md0 (view/md0)       2045 /boot       ext4       ✓         ' Hard Drives v sdd (rdev/sdd)       2048 md0       soft       Create Storage         sdd1       2048 md0       soft       Create Partition General purpose partition creation General purpose partition creation         v sde (rdev/sde)       soft       Create Storage         sde1       2048 md0       soft         Create Storage       Create Storage         sde2       112424       soft         Create Storage       Information         © RAID Partition       Create a RAID formated partition         Create a RAID formated partition       Information         © KMD Device Requires at least 1 free LVM       Information         © LVM Volume Group Requires at least 1 free LVM formated partition       LVM Volume Create an RAID formated partition         © LVM Physical Volume Create an UVM formated partition       Create an UVM formated partition			/d/dev/sd 2 112424	Id2 MB	aa (1144	73 MB) (MO		L 55D5C2881	.2)		
PAID Devices         md0 (rdev/md0)       2045 / boot       ext4         * Hard Drives         ▼ sdd (rdev/sdd)       Create Storage         sdd1       2048 md0       Soft         Create Partition       Standard Partition         sdd2       112424       Soft         Sde1       2048 md0       Soft         create Storage       Standard Partition         sde2       112424       Soft         create Schware RAID       Information         sde2       112424       Soft         Create a RAID formated partition       Create a RAID formated partition         Create a least 1 free RAID formated partition       Create LVM         Information       LVM Volume Group         Requires at least 1 free tVM formated partition       Create a logical volume on selected volume group         LVM Molycial Volume       Create a logical volume for the create a logical volume on selected volume group         LVM M physical Volume       Create an LVM formated partition	Device	Size (MB)	Mount Point/ RAID/Volume		Туре	Format					
md0 (rdev/mdb)       2045 /boot       ext4         F Hard Drives          sdd1       2048 md0       soft         sdd2       112424       soft         Sdd2 (rdev/sde)       Create Partition         Sdd2 (rdev/sde)       Standard Partition         Sdd2 (rdev/sde)       Create Software PAID         sdd2       112424       soft         Create a BAID formated partition       Create a BAID formated partition         Create a BAID formated partition       Create a BAID formated partition         Create a IAID formated partition       Create a IAID formated partition         Create a IAID formated partition       LVM Volume Group Requires at least 1 free LVM formated partition         LVM Volume Group Requires at least 1 free LVM formated partition       LVM Volume Create a logical volume or selected volume group         LVM Physical Volume Create an IVM formated partition       Create         Create an LVM formated partition       Create         Create an LVM formated partition       Create         Create an LVM formated partition       Create	✓ RAID Devices										
Hard Drives         sdd1       2048 md0       soft         sdd2       112424       soft         sdd2       112424       soft         sde1       2048 md0       soft         sde2       112424       Soft         sde2       112424       Soft         Create Software RAID       Information         sde2       112424       Soft         Create Software RAID       Information         Create RAID Partition       Create RAID formated partition         Create LVM       Information         VM Volume Group       Requires at least 1 free LVM formated partition         LVM Volume Group       Create a logical volume on selected volume group         LVM Volume Create an ILM formated partition       LVM Volume Create an ILM formated partition	md0 (/dev/md0)	2045	/boot	ext4	Ļ	$\checkmark$					
▼ sdd1       2048 md0       soft         sdd2       112424       soft         Sdd2 (/dev/sde)       General purpose partition creation         sde1       2048 md0       soft         Sde2       112424       soft         Sde2       112424       soft         Create Software RAID       Information         General purpose partition       Create a RAID formated partition         Sde2       112424       soft         Requires at least 2 free RAID formated partition       Requires at least 2 free RAID formated partition         Image: Create LVM       Information         Image: Create LVM       Information         Image: Create LVM       Informated partition         Image: LVM Volume Group       Requires at least 1 free LVM formated partition         Image: LVM       Image: LVM formated partition         Image: LVM Physical Volume       Create an LVM formated partition         Image: LVM formated partition       Create an LVM formated partition         Create an LVM formated partition       Create	7 Hard Drives										
sdd1       2048 md0       soft       Create Partition         sdd2       112424       soft       Standard Partition         General purpose partition creation       General purpose partition creation         sde1       2048 md0       soft       Create Software RAID       Information         sde2       112424       soft       Create a RAID formated partition       Create a RAID formated partition         sde2       112424       soft       RAID Portice       Reduires at least 2 free RAID formated partition         Create LVM       Information       LVM Volume Group       Requires at least 1 free LVM formated partition         Create a logical volume on selected volume group       LVM Physical Volume       Create an LVM formated partition         Create an LVM formated partition       Create an LVM formated partition       Create an LVM formated partition	▼ sdd (/dev/sdd)			1		Cre	te Storag	9			
sdd2       112424       soft       Cleater Partition         Sde1       2048 md0       soft       Create Software RAID       Information         sde2       112424       soft       RAID Partition       Create a RAID formated partition         Create       a RAID Porticion       Create a RAID formated partition       Create a RAID formated partition         Create       Create a RAID formated partition       Create a RAID formated partition       Create IVM         Create       LVM Volume Group       Requires at least 1 free LVM formated partition       LVM Volume on selected volume group         LVM Physical Volume       Create a logical volume on selected volume group       LVM Physical Volume         Create an LVM formated partition       Create an LVM formated partition	sdd1	2048	md0	soft	Create P	brtition	ite storag	-			
✓ sde (/dev/sde)       General purpose partition creation         sde1       2048 md0       soft         Sde2       112424       soft         ○ RAID Partition       Create 3 RAID formated partition         ○ Record Device       Record Device         Requires at least 2 free RAID formated partition       LVM Volume Group         Requires at least 1 free LVM       Information         ○ LVM Volume Group       Create a logical volume on selected volume group         ○ LVM Physical Volume       Create an LVM formated partition		112424		soft	O Stand	lard Partition					
sde1 2048 md0 soft Create Software RAID Information sde2 112424 soft RAID Partition Create a RAID formated partition RAID Device Requires at least 2 free RAID formated partition LVM Volume Group Requires at least 1 free LVM formated partition LVM Logical Volume Create a logical Volume on selected volume group LVM Physical Volume Create an LVM formated partition											
sde2 112424 soft Create a RAID Partition Create a RAID formated partition Requires at least 2 free RAID formated partition Create LVM Information LVM Volume Group Requires at least 1 free LVM formated partition LVM Logical Volume Create a logical Volume on selected volume group LVM Physical Volume Create an LVM formated partition	sdel	2048	md0	soft	Create S	oftware RAI	D	Informatio	on		
					Create     FAID     Requir     Create L     LVM 1     Requir     LVM 1     Create     LVM 1     Create	• a BAD form Device es at least 2 1 VM Volume Grot es at least 1 Logical Volut • a logical Volut • a logical Volut • a nuVM form	ated partition ree RAID form IP ree LVM forma me ume on selecte ume ated partition Cancel	ated partitions Information ated partition d volume group	on		
										<b>a</b> Back	

Figure 125 RHEL Installation: Create RAID Device

		/ <mark>(/dev/s</mark> 2 11242	dd2 4 MB						
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format					
md0 (/dev/md0)	2045	/boot	ext4	$\checkmark$					
✓ Hard Drives									
sdd (/dev/sdd) sdd1	2048	md0		Make RA	ID Device				
sdd2	112424	indo	Mount Point:	1		~			
sde (/dev/sde)     sde1	2048	md0	File System Type	e: ext4					
sde2	112424		RAID Device:	md1		\$			
			RAID Level:	RAID1		•			
			RAID Members:	<ul><li>✓ sdd2</li><li>✓ sde2</li></ul>	112424 MB 112424 MB				
			Number of spare	es: 0		× >			
			Encrypt						
					Cancel	ок			
		·							
						Create	Edit	Delete	Rese

## Figure 126 RHEL Installation: Make RAID Device

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[						
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format		
<b>md0</b> (/dev/md0)	2045	/boot	ext4	$\checkmark$		
md1 (/dev/mdl)	112359	/	ext4	$\checkmark$		
Hard Drives						
sdd1	2048	md0	software RAID	$\checkmark$		
sdd2	112424	md1	software RAID	$\checkmark$		
sdel	2048	md0	software RAID	$\checkmark$		
sde2	112424	md1	software RAID	$\checkmark$		
					Create	T clin
					Create	Edit

1

Figure 127 RHEL Installation: Selected RAID Devices

30. Click on Next.

Device       Size (MB)       Mount Point/ RAID/Volume       Type       Format         ▼ RAID Devices       md0 (dev/md0)       2045 /boot       ext4       ✓         ▼ Hard Drives       ✓       ext4       ✓         ▼ Sdd1 (dev/sdd)       2048 md0 sdd2       112424 md1       The partitioning scheme you requested generated the following warnings.         ▼ Sde1 (dev/sde)       2048 md0 sde2       112424 md1       You have not specified a swap partition. Although not strictly required in all cases, it will significantly improve performance for most installations.         Sde1 2048 md0 sde2 112424 md1       Would you like to continue with your requested partitioning scheme?       Would you like to continue with your requested partitioning										
<ul> <li>RAID Devices         md0 (/dev/md0) 2045 //boot ext4         vext4         vext4</li></ul>	Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format					
md0 (/dev/md0)       2045 /boot       ext4         md1 (/dev/md1)       112359 /       ext4         ✓ Hard Drives       ✓       sdd1       2048 md0         sdd1       2048 md0       sde2       112424 md1         ✓ sde (/dev/sde)       Sde1       2048 md0       sde1       2048 md0         sde1       2048 md0       sde1       2048 md0       sde1       2048 md0         sde2       112424 md1       Would you like to continue with your requested partitioning scheme?       Would you like to continue with your requested partitioning scheme?	RAID Devices									
mdl (/dev/mdl)       112359 /       ext4         ✓ Hard Drives       ✓       Sdd1 (/dev/sdd)         sdd1       2048 md0       scheme you requested generated the following warnings.         ✓ sde (/dev/sde)       Sde1       2048 md0         sde2       112424 md1       You have not specified a swap partition. Although not strictly required in all cases, it will significantly improve performance for most installations.         Yould you like to continue with your requested partitioning scheme?       Would you like to continue with your requested partitioning scheme?	md0 (/dev/md0)	2045	/boot	ext4	$\checkmark$					
✓ Hard Drives       Partitioning Warnings         ✓ sdd (/dev/sdd)       Sdd1       2048 md0         Sdd2       112424 md1       The partitioning scheme you requested generated the following warnings.         ✓ sde (/dev/sde)       Sde1       2048 md0         Sde2       112424 md1       You have not specified a swap partition. Although not strictly required in all cases, it will significantly improve performance for most installations.         Vould you like to continue with your requested partitioning scheme?       Would you like to continue with your requested partitioning scheme?	md1 (/dev/md1)	112359	/	ext4	$\checkmark$					
<ul> <li>✓ sdd (/dev/sdd)</li> <li>✓ sdd (/dev/sde)</li> <li>✓ sde (/dev/sde)</li> <li>✓ sde1 2048 md0</li> <li>✓ sde2 112424 md1</li> <li>✓ Would you like to continue with your requested partitioning scheme?</li> <li>✓ Would you like to continue with your requested partitioning scheme?</li> </ul>	<ul> <li>Hard Drives</li> </ul>				Dautitie	ning Wornings				
sdd1       2048 mdo         sdd2       112424 md1         ✓ sde(/dev/sde)	sdd (/dev/sdd)			The partit	Partitio	ning warnings	arated the			
sdd2 112424 md1 ♥ sde (/dev/sde) sde1 2048 md0 sde2 112424 md1  Vou have not specified a swap partition. Although not strictly required in all cases, it will significantly improve performance for most installations.  Would you like to continue with your requested partitioning scheme?  No Yes	sdd1	2048	md0	following	warnings.	e you requested gen	erated the			
<ul> <li>sde (/dev/sde)</li> <li>sde1 2048 md0</li> <li>sde2 112424 md1</li> <li>Would you like to continue with your requested partitioning scheme?</li> <li>No Yes</li> </ul>	sdd2	112424	md1	You have	not specified	swap partition Alt	hough not			
sde1 2048 md0 sde2 112424 md1 performance for most installations. Would you like to continue with your requested partitioning scheme? No Yes				strictly re	equired in all c	ases, it will significa	ntly improve			
sde2 112424 md1 Would you like to continue with your requested partitioning scheme? No Yes	sdel	2048	md0	performa	nce for most i	stallations.				
Would you like to continue with your requested partitioning scheme?         No       Yes										
No Yes				Would yo scheme?	u like to conti	ue with your reques	ted partitioning			
						No	Yes			
							Create	Edit	Delete	Re

Figure 128 RHEL Installation: Partitioning Warning



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Swap partition can be created using the similar steps, however, since these systems are high in memory, this step is skipped (click **Yes**)

31. Click Next, and Format.

k.			Ple	ease Se	lect A De	vice				
Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format						
<ul> <li>▼ RAID Devices md0 (/dev/md0) md1 (/dev/md0)</li> <li>▼ Hard Drives</li> <li>▼ sdd (/dev/sdd) sdd1 sdd2</li> <li>▼ sde (/dev/sde) sde1 sde2</li> </ul>	2045 112359 2048 112424 2048 112424	/boot / md0 md1	ext4 ext4 The followi formatted, /dev/sdd /dev/sde	Forma ng pre-existi destroying al partition t partition t	t Warnings ig devices have b data. able (MSDOS) able (MSDOS) Canc	cel	ted to be			
						(	Create	Edit	Delete	Reset
									<b>Back</b>	Next

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Figure 129 RHEL Installation: Format Warning

32. Select default settings and click Next.

Install boot loader on /dev/sdd.       Change device         Use a boot loader password       Change password         Boot loader operating system list       Add         @ Red Hat Enterprise Linux /dev/md1       Edit         Deleter       Other	
Use a boot loader password       Change password         Boot loader operating system list       Add         @ Red Hat Enterprise Linux /dev/md1       Edit         Delet       Delet	
Boot loader operating system list Default Label Device Add e Red Hat Enterprise Linux /dev/md1 Delet	
Default       Label       Device       Add <ul> <li>Red Hat Enterprise Linux /dev/md1</li> <li>Delet</li> </ul>	
Red Hat Enterprise Linux /dev/md1  Edit Delet	
Delet	٦.
	ี โ
	_
ack ack	Next

Figure 130 RHEL Installation: Install Boot Loader

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**33.** Continue with RHEL Installation as shown below.

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	
🔾 Identity Management Server	
<ul> <li>Virtualization Host</li> </ul>	
) Desktop	
Software Development Workstation	
⊃ Minimal	
lease select any additional repositories that you want to use for software installation.	
High Availability	
Load Balancer	
Red Hat Enterprise Linux	
Basiliant Channes	
🕂 Add additional software repositories	
pu can further customize the software selection now, or after install via the software	
nanagement application.	
nanagement application.	
nanagement application. Customize later	
nanagement application. © Customize later O Customize now	

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Figure 131 RHEL Installation: Keep the Default Installation

34. Once the installation is complete reboot the system.

Repeat the steps 1 through 34, to install Red Hat Enterprise Linux 6.5 on Servers 2 through 64.

Note

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

The host-names and their corresponding IP addresses are shown in Table 7.

Hostname	eth0	eth1	eth2
rhel1	10.29.160.101	192.168.11.101	192.168.12.101
rhel2	10.29.160.102	192.168.11.102	192.168.12.102
rhel3	10.29.160.103	192.168.11.103	192.168.12.103
rhel4	10.29.160.104	192.168.11.104	192.168.12.104
rhel5	10.29.160.105	192.168.11.105	192.168.12.105
rhel6	10.29.160.106	192.168.11.106	192.168.12.106

Table 7Host-names and IP Addresses

Hostname	eth0	eth1	eth2
rhel7	10.29.160.107	192.168.11.107	192.168.12.107
rhel8	10.29.160.108	192.168.11.108	192.168.12.108
rhel9	10.29.160.109	192.168.11.109	192.168.12.109
rhel10	10.29.160.110	192.168.11.110	192.168.12.110
rhel11	10.29.160.111	192.168.11.111	192.168.12.111
rhel12	10.29.160.112	192.168.11.112	192.168.12.112
rhel13	10.29.160.113	192.168.11.113	192.168.12.113
rhel14	10.29.160.114	192.168.11.114	192.168.12.114
rhel15	10.29.160.115	192.168.11.115	192.168.12.115
rhel16	10.29.160.116	192.168.11.116	192.168.12.116
rhel64	10.29.160.164	192.168.11.164	192.168.12.164
rhel65	10.29.160.165	192.168.11.165	NA
rhel66	10.29.160.166	192.168.11.166	NA
rhel67	10.29.160.167	192.168.11.167	NA
rhel68	10.29.160.168	192.168.11.168	NA

 Table 7
 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 HDP installation, cluster parallel shell, creating a local Red Hat repo and others. In this document, we use rhell for this purpose.

# 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 cluster-shell (clush, a cluster wide parallel shell), and shell-scripts without having to use passwords.

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

1. Login to the Admin Node (rhel1)

ssh 10.29.160.101

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



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 {101..168}; 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.

# **Configuring /etc/hosts**

Setup /etc/hosts on the Admin node and other nodes as follows; this is a pre-configuration to setup DNS as shown in the further section.

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 (rhel1) and other nodes as follows

#### **On Admin Node (rhel1)**

```
vi /etc/hosts
127.0.0.1 local host localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6
10.29.160.101 rhel1.mgmt
10.29.160.102 rhel2.mgmt
10.29.160.103 rhel3.mgmt
10.29.160.105 rhel5.mgmt
10.29.160.106 rhel6.mgmt
10.29.160.107 rhel7.mgmt
10.29.160.108 rhel8.mgmt
10.29.160.109 rhel9.mgmt
10.29.160.111 rhel11.mgmt
```

10.29.160.112 rhel12.mgmt 10.29.160.113 rhel13.mgmt 10.29.160.114 rhel14.mgmt 10.29.160.115 rhel15.mgmt 10.29.160.116 rhel16.mgmt 10.29.160.168 rhel68.mgmt 192.168.11.101 rhel1 192.168.11.102 rhel2 192.168.11.103 rhel3 192.168.11.104 rhel4 192.168.11.105 rhel5 192.168.11.106 rhel6 192.168.11.107 rhel7 192.168.11.108 rhel8 192.168.11.109 rhel9 192.168.11.110 rhel10 192.168.11.111 rhel11 192.168.11.112 rhel12 192.168.11.113 rhel13 192.168.11.114 rhel14 192.168.11.115 rhel15 192.168.11.116 rhel16 192.168.11.168 rhel68

# Setup ClusterShell

ClusterShell (or clush) is cluster wide shell to run commands on several hosts in parallel.

From the system connected to the Internet download Cluster shell (clush) and install it on rhell. Cluster shell is available from EPEL (Extra Packages for Enterprise Linux) repository.

wget http://dl.fedoraproject.org/pub/epel//6/x86\_64/clustershell-1.6-1.el6.noarch.rpm

```
scp clustershell-1.6-1.el6.noarch.rpm rhell:/root/
Login to rhell and install cluster shell
```

yum -y install clustershell-1.6-1.el6.noarch.rpm

Edit /etc/clustershell/groups file to include host-names for all the nodes of the cluster. These set of hosts are taken when running clush with '-a' option For 68 node cluster as in our CVD, set groups file as follows,

```
vi /etc/clustershell/groups
all: rhel[1-68]
```

[root@rhel1 ~]# vi /etc/clustershell/groups
[root@rhel1 ~]# cat /etc/clustershell/groups
all: rhel[1-68]



 For more information and documentation on ClusterShell, visit https://github.com/cea-hpc/clustershell/wiki/UserAndProgrammingGuide

Note

Clustershell will not work if not ssh to the machine earlier (as it requires to be in known\_hosts file), for instance, as in the case below.

```
[root@Redhat-JB-R1 ~]# ssh rhel2
The authenticity of host 'rhel2 (10.0.127.52)' can't be established.
RSA key fingerprint is f2:0c:db:50:64:f1:9e:a6:7a:9d:c6:d4:8d:9e:e5:37.
Are you sure you want to continue connecting (yes/no)?
```

### [root@rhel1 ~]# ssh rhel5.mgmt

```
The authenticity of host 'rhel5.mgmt (10.29.160.105)' can't be established.
RSA key fingerprint is 7a:98:75:9a:6a:1a:80:a4:97:43:6c:8a:12:57:db:74.
Are you sure you want to continue connecting (yes/no)?
```

# **Creating Red Hat Enterprise Linux (RHEL) 6.5 Local Repo**

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

- 1. Log on to rhell. 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 directory.
- 3. Alternatively, if you have access to a Red Hat ISO Image, Copy the ISO file to rhel1.

scp rhel-server-6.5-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-6.5-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

```
[root@rhel1 ~]# mkdir -p /var/www/html/rhelrepo
[root@rhel1 ~]# mkdir -p /mnt/rheliso
[root@rhel1 ~]#
[root@rhel1 ~]# mount -t iso9660 -o loop /root/rhel-server-6.5-x86_64-dvd.iso /mnt/rheliso/
[root@rhel1 ~]# 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
[rhel6.5]
name=Red Hat Enterprise Linux 6.5
baseurl=http://10.29.160.101/rhelrepo
gpgcheck=0
enabled=1
```

6. Now copy rheliso.repo file from /var/www/html/rhelrepo to /etc/yum.repos.d on rhel1

cp /var/www/html/rhelrepo/rheliso.repo /etc/yum.repos.d/



Based on this repo file yum requires httpd to be running on rhel1 for other nodes to access the repository.

#### 7. Copy the **rheliso.repo** to all the nodes of the cluster.

clush -a -b -c /etc/yum.repos.d/rheliso.repo --dest=/etc/yum.repos.d/

```
[root@rhel1 ~]# clush -a -b -c /etc/yum.repos.d/rheliso.repo --dest=/etc/yum.repos.d/
```

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

Note

This step is needed to install software on Admin Node (rhel1) using the repo (such as httpd, createrepo, etc).

```
vi /etc/yum.repos.d/rheliso.repo
[rhel6.5]
name=Red Hat Enterprise Linux 6.5
baseurl=file:///var/www/html/rhelrepo
gpgcheck=0
enabled=1
9. Creating the Red Hat Repository Database.
```

Install the createrepo package on admin node (rhel1). Use it to regenerate the repository database(s) for the local copy of the RHEL DVD contents.

yum -y install createrepo

#### [root@rhel1 ~]# yum -y install createrepo

Loaded plugins: product-id, refresh-packagekit, security, subscription-manager This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register. rhel6.5 | 3.9 kB 00:00 rhel6.5/primary db | 3.1 MB 00:00 Setting up Install Process Resolving Dependencies --> Running transaction check --> Package createrepo.noarch 0:0.9.9-18.el6 will be installed --> Processing Dependency: python-deltarpm for package: createrepo-0.9.9-18.el6.noarch -> Running transaction check --> Package python-deltarpm.x86 64 0:3.5-0.5.20090913git.el6 will be installed --> Processing Dependency: deltarpm = 3.5-0.5.20090913git.el6 for package: python-deltarpm-3.5-0.5.20090913git.el6.x86 64 -> Running transaction check

10. Run createrepo on the RHEL repository to create the repo database on admin node

cd /var/www/html/rhelrepo
createrepo .

```
[root@rhel1 rhelrepo]# createrepo .
Spawning worker 0 with 3763 pkgs
Workers Finished
Gathering worker results
Saving Primary metadata
Saving file lists metadata
Saving other metadata
Generating sqlite DBs
Sqlite DBs complete
```

11. Finally, purge the yum caches after httpd is installed (steps in section "Install Httpd").

# **Configuring DNS**

This section details setting up DNS using dnsmasq as an example based on the /etc/hosts configuration setup in the earlier section.

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

1. Disable Network manager on all nodes

```
clush -a -b service NetworkManager stop
clush -a -b chkconfig NetworkManager off
```

2. Update /etc/resolv.conf file to point to Admin Node

```
vi /etc/resolv.conf
nameserver 192.168.11.101
```

**Note** This step is needed if setting up dnsmasq on Admin node. Else this file should be updated with the correct nameserver.

3. Install and Start dnsmasq on Admin node

```
yum -y install dnsmasq
service dnsmasq start
chkconfig dnsmasq on
```

4. Deploy /etc/resolv.conf from the admin node (rhel1) to all the nodes via the following clush command:

```
clush -a -B -c /etc/resolv.conf
```

**Note** A clush copy without - -dest copies to the same directory location as the source-file directory.

5. Ensure DNS is working fine by running the following command on Admin node and any datanode

```
[root@rhel2 ~]# nslookup rhel1
Server:192.168.11.101
Address:192.168.11.101#53
Name: rhel1
Address: 192.168.11.101 •
[root@rhel2 ~]# nslookup rhel1.mgmt
Server: 192.168.11.101
```
```
Address: 192.168.11.101#53
Name: rhell.mgmt
Address: 10.29.160.101 •
[root@rhel2 ~]# nslookup 10.29.160.101
Server: 192.168.11.101
Address: 192.168.11.101#53
101.160.29.10.in-addr.arpa name = rhell.mgmt. •
```

### **Installing httpd**

Setting up RHEL repo on the admin node requires httpd. This section describes the process of setting up one

1. Install httpd on the admin node to host repositories.

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 10.29.160.101:80

```
[root@rhel1 ~]# vi /etc/httpd/conf/httpd.conf
[root@rhel1 ~]# cat /etc/httpd/conf/httpd.conf | grep ServerName
# ServerName gives the name and port that the server uses to identify itself.
#ServerName www.example.com:80
ServerName 10.29.160.101:80
# ServerName directive.
# ServerName dummy-host.example.com
```

3. Start httpd

service httpd start chkconfig httpd on

4. Purge the yum caches after httpd is installed (step followed from section Setup Red Hat Repo)

clush -a -B yum clean all clush -a -B yum repolist

[root@rhel1 ~]# clush -a -B yum clean all

#### rhel[1-17] (17)

Loaded plugins: product-id, refresh-packagekit, security, subscription-manager This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register. Cleaning repos: rhel6.5 Cleaning up Everything

Note

While suggested configuration is to disable SELinux as shown below, if for any reason SELinux needs to be enabled on the cluster, then ensure to run the following to make sure that the httpd is able to read the Yum repofiles chcon -R -t httpd\_sys\_content\_t /var/www/html/

# **Upgrading Cisco Network driver for VIC1227**

The latest Cisco Network driver is required for performance and updates. The latest drivers can be downloaded from the link below:

https://software.cisco.com/download/release.html?mdfid=283862063&flowid=25886&softwareid=283 853158&release=1.5.7d&relind=AVAILABLE&rellifecycle=&reltype=latest

In the ISO image, the required driver kmod-enic-2.1.1.66-rhel6u5.el6.x86\_64.rpm can be located at \Linux\Network\Cisco\12x5x\RHEL\RHEL6.5

From a node connected to the Internet, download, extract and transfer kmod-enic-2.1.1.66-rhel6u5.el6.x86\_64.rpm to rhell (admin node).

Install the rpm on all nodes of the cluster using the following clush commands. For this example the rpm is assumed to be in present working directory of rhel1.

[root@rhel1 ~] # clush -a -b -c kmod-enic-2.1.1.66-rhel6u5.el6.x86\_64.rpm
[root@rhel1 ~] # clush -a -b "rpm -ivh kmod-enic-2.1.1.66-rhel6u5.el6.x86\_64.rpm "
Ensure that the above installed version of kmod-enic driver is being used on all nodes by running the

command "modinfo enic" on all nodes

```
[root@rhel1 ~] # clush -a -B "modinfo enic | head -5"
```

filename:	/lib/modules/2.6.32-431.el6.x86_64/extra/enic/enic.ko
version:	2.1.1.66
license:	GPL v2
author:	Scott Feldman <scofeldm@cisco.com></scofeldm@cisco.com>
description:	Cisco VIC Ethernet NIC Driver

# **Installing xfsprogs**

From the admin node rhell run the command below to Install **xfsprogs** on all the nodes for xfs filesystem.

clush -a -B yum -y install xfsprogs

[root@rhel1 ~]# clush -a -B yum -y install xfsprogs

Loaded plugins Setting up Ins Resolving Deper > Running tr > Package x > Finished Dependencies Re	- : product-id, re: tall Process ndencies ansaction check Esprogs.x86_64 0 ependency Resolut	Fresh-packagekit, secu :3.1.1-14.el6 will be cion	rity, subscription <sup>.</sup> installed	-manager
Package	Arch	Version	Repository	Size
Installing: xfsprogs	x86_64	3.1.1-14.el6	rhel6.5	724 k
Transaction Su	nmary			
Install	l Package(s)			
Total download Installed size Downloading Pac Running rpm_cho Running Transac Transaction Te Running Transac	size: 724 k : 3.2 M ckages: eck_debug ction Test st Succeeded ction vfsprogs-3 1 1-1	14 e16 v86 64		1/1
Verifying :	xfsprogs-3.1.1-3	L4.e16.x86_64		1/1
Installed: xfsprogs.x86	_64 0:3.1.1-14.e	16		
Complete!				

# Setting up JAVA

I

HDP 2.2 requires JAVA 7, download jdk-7u75-linux-x64.rpm from oracle.com (http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html) to admin node (rhel1).

Create the following files java-set-alternatives.sh and java-home.sh on admin node (rhell)

#### vi java-set-alternatives.sh

```
#!/bin/bash
for item in java javac javaws jar jps javah javap jcontrol jconsole jdb; do
    rm -f /var/lib/alternatives/$item
    alternatives --install /usr/bin/$item $item /usr/java/jdk1.7.0_75/bin/$item 9
    alternatives --set $item /usr/java/jdk1.7.0_75/bin/$item
    done
vi java-home.sh
```

```
export JAVA_HOME=/usr/java/jdk1.7.0_75
```

Run the following commands on admin node (rhell) to install and setup java on all nodes

1. Copying JDK rpm to all nodes

```
clush -b -a -c /root/jdk-7u75-linux-x64.rpm --dest=/root/Make the two java scripts created above executable
```

chmod 755 ./java-set-alternatives.sh ./java-home.sh

3. Copying java-set-alternatives.sh to all nodes

clush -b -a -c ./java-set-alternatives.sh --dest=/root/
4. Extract and Install JDK on all nodes

```
clush -a -b rpm -ivh /root/jdk-7u75-linux-x64.rpm
```

5. Setup Java Alternatives

clush -b -a ./java-set-alternatives.sh

6. Ensure correct java is setup on all nodes (should point to newly installed java path)

```
clush -b -a "alternatives --display java | head -2"
```

- 7. Setup JAVA\_HOME on all nodes
  - clush -b -a -c ./java-home.sh --dest=/etc/profile.d

8. Display JAVA\_HOME on all nodes

clush -a -b "echo \\$JAVA\_HOME" 9. Display current java -version

clush -B -a java -version

### **NTP Configuration**

The Network Time Protocol (NTP) is used to synchronize the time of all the nodes within the cluster. The Network Time Protocol daemon (ntpd) sets and maintains the system time of day in synchronism with the timeserver located in the admin node (rhel1). Configuring NTP is critical for any Hadoop Cluster. If server clocks in the cluster drift out of sync, serious problems will occur with HBase and other services.

```
Installing an internal NTP server keeps your cluster synchronized even when an outside NTP server is inaccessible.
```

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

```
vi /root/ntp.conf
server 10.29.160.101
driftfile /var/lib/ntp/drift
restrict 127.0.0.1
restrict -6 ::1
includefile /etc/ntp/crypto/pw
keys /etc/ntp/keys
```

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

[root@rhel1	~]#	for	SERVER	in	{102168};	do	scp	/root/ntp.conf	10.29.160	.\$SERVER:	/etc/	ntp.co	nf; done	
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00
ntp.conf											100%	136	0.1KB/s	00:00

for SERVER in {102..168}; do scp /root/ntp.conf
10.29.160.\$SERVER:/etc/ntp.conf; done

```
<u>Note</u>
```

Instead of the above for loop, this could be run as a clush command with "-w" option.

```
clush -w rhel[2-68] -b -c /root/ntp.conf --dest=/etc
Do not use clush -a -b -c /root/ntp.conf --dest=/etc command as it overwrites /etc/ntp.conf on
the admin node.
```

Run thef following to syncronize the time and restart NTP daemon on all nodes

```
clush -a -B "yum install -y ntpdate"
clush -a -b "service ntpd stop"
clush -a -b "ntpdate rhel1"
clush -a -b "service ntpd start"
Ensure restart of NTP daemon across reboots
```

clush -a -b "chkconfig ntpd on"

# **Enabling Syslog**

ſ

Syslog must be enabled on each node to preserve logs regarding killed processes or failed jobs. Modern versions such as syslog-ng and rsyslog are possible, making it more difficult to be sure that a syslog daemon is present. One of the following commands should suffice to confirm that the service is properly configured:

```
clush -B -a rsyslogd -v
```

[root@rhel1 ~]# clush -B -a rsyslogd -v	
rhel[1-17] (17)	
rsyslogd 5.8.10, compiled with:	
FEATURE REGEXP:	Yes
FEATURE LARGEFILE:	No
GSSAPI Kerberos 5 support:	Yes
FEATURE DEBUG (debug build, slow code):	No
32bit Atomic operations supported:	Yes
64bit Atomic operations supported:	Yes
Runtime Instrumentation (slow code):	No
See http://www.rsyslog.com for more information	

clush -B -a service rsyslog status

# Setting ulimit

On each node, **ulimit -n** specifies the number of inodes that can be opened simultaneously. With the default value of 1024, the system appears to be out of disk space and shows no inodes available. This value should be set to 64000 on every node.

Higher values are unlikely to result in an appreciable performance gain.

For setting ulimit on Redhat, edit /etc/security/limits.conf on admin node rhell and add the following lines:

```
root soft nofile 64000
root hard nofile 64000
```



Copy the /etc/security/limits.conf file from admin node (rhell) to all the nodes using the following command.

clush -a -b -c /etc/security/limits.conf --dest=/etc/security/

#### [root@rhel1 ~]# clush -a -b -c /etc/security/limits.conf --dest=/etc/security/

Verify the **ulimit** setting with the following steps:

Note

Ulimit values are applied on a new shell, running the command on a node on an earlier instance of a shell will show old values

Run the following command at a command line. The command should report 64000.

clush -B -a ulimit -n

# **Disabling SELinux**

SELinux must be disabled during the install procedure and cluster setup. SELinux can be enabled after installation and while the cluster is running.

SELinux can be disabled by editing /etc/selinux/config and changing the SELINUX line to SELINUX=disabled. The following command will disable SELINUX on all nodes.

clush -a -b "sed -i 's/SELINUX=enforcing/SELINUX=disabled/g' /etc/selinux/config "
clush -a -b "setenforce 0"

[root@rhel1 ~]# clush -a -b "sed -i 's/SELINUX=enforcing/SELINUX=disabled/g' /etc/selinux/config "



The above command may fail if SELinux is already disabled.

### Set TCP Retries

Adjusting the tcp\_retries parameter for the system network enables faster detection of failed nodes. Given the advanced networking features of UCS, this is a safe and recommended change (failures observed at the operating system layer are most likely serious rather than transitory). On each node, set the number of TCP retries to 5 can help detect unreachable nodes with less latency.

1. Edit the file /etc/sysctl.conf and on admin node rhel1 and add the following lines:

```
net.ipv4.tcp_retries2=5
```

Copy the /etc/sysctl.conf file from admin node (rhel1) to all the nodes using the following command.

```
clush -a -b -c /etc/sysctl.conf --dest=/etc/
```

2. Load the settings from default sysctl file /etc/sysctl.conf by running the below command.

```
clush -B -a sysctl -p
```

### **Disabling the Linux Firewall**

The default Linux firewall settings are far too restrictive for any Hadoop deployment. Since the UCS Big Data deployment will be in its own isolated network, there's no need to leave the IP tables service running.

```
clush -a -b "service iptables stop"
clush -a -b "chkconfig iptables off"
[root@rhel1 ~]# clush -a -b "service iptables stop"
[root@rhel1 ~]# clush -a -b "chkconfig iptables off"
```

### **Disable Swapping**

In order to reduce Swapping, run the following on all nodes. Variable vm.swappiness defines how often swap should be used. 0 is No Swapping, 60 is the default value.

clush -a -b " echo \'vm.swappiness=0\' >> /etc/sysctl.conf" Load the settings from default sysctl file /etc/sysctl.conf

```
clush -a -b "sysctl -p"
```

# **Disable Transparent Huge Pages**

Disabling Transparent Huge Pages (THP) reduces elevated CPU usage caused by THP. From the admin node, run the following commands

```
clush -a -b "echo never >
/sys/kernel/mm/redhat_transparent_hugepage/enabled"
clush -a -b "echo never >
/sys/kernel/mm/redhat_transparent_hugepage/defrag"
```

The above command needs to be run for every reboot, hence, copy this command to /etc/rc.local so they are executed automatically for every reboot.

On Admin node, run the following commands

```
rm -f /root/thp_disable
echo "echo never > /sys/kernel/mm/redhat_transparent_hugepage/enabled" >>
/root/thp_disable
echo "echo never > /sys/kernel/mm/redhat_transparent_hugepage/defrag " >>
/root/thp_disable
Copy file to each node
```

clush -a -b -c /root/thp\_disable Append the content of file thp\_disable to /etc/rc.local

clush -a -b "cat /root/thp\_disable >> /etc/rc.local"

# **Install Openssl**

Install Openssl and Openssl-devel version 1.0.1e-30 and above for RHEL6.5. This is a requirement for HDP 2.2 on all nodes. If openssl is already installed (generally the case), use the following command to upgrade openssl

```
clush -a -b -c /root/openssl-*
clush -a -b rpm -Uvh openssl-1.0.1e-*.rpm openssl-devel-1.0.1e-*.rpm
```

[root@rhel1 ~]# rpm -Uvh op	enssl-1.0.1e-30.el6_6.5.x86_64.rpm openssl-devel-1.0.1e-30.el6_6.5.x86_64.rpm
warning: openssl-1.0.1e-30.	el6 6.5.x86 64.rpm: Header V3 RSA/SHA1 Signature, key ID c105b9de: NOKEY
Preparing	######################################
1:openssl	######################################
2:openssl-devel	

#### (RPMs are available at:

http://mirror.centos.org/centos/6/updates/x86\_64/Packages/openssl-1.0.1e-30.el6\_6.5.x86\_64.rpm and http://mirror.centos.org/centos/6/updates/x86\_64/Packages/openssl-devel-1.0.1e-30.el6\_6.5.x86\_64.rp m)

```
<u>Note</u>
```

This requires krb5-devel and zlib-devel as dependencies. If not installed, install it as follows on the nodes throwing error "yum –y install krb5-devel zlib-devel"

# **Disable IPv6 Defaults**

Disable IPv6 as the addresses used are IPv4.

clush -a -b "echo \'net.ipv6.conf.all.disable\_ipv6 = 1\' >> /etc/sysctl.conf"

clush -a -b "echo \'net.ipv6.conf.default.disable\_ipv6 = 1\' >> /etc/sysctl.conf"
 clush -a -b "echo \'net.ipv6.conf.lo.disable\_ipv6 = 1\' >> /etc/sysctl.conf"
Load the settings from default sysctl file /etc/sysctl.conf

```
clush -a -b "sysctl -p"
```

# **Configuring Data Drives on Name Node**

This section describes steps to configure non-OS disk drives as RAID1 using StorCli command as described below. All the drives are going to be part of a single RAID1 volume. This volume can be used for Staging any client data to be loaded to HDFS. This volume won't be used for HDFS data.

```
From the website download storcli:
http://www.lsi.com/downloads/Public/RAID%20Controllers/RAID%20Controllers%20Common%20Fi
les/1.14.12 StorCLI.zip
```

Extract the zip file and copy storcli-1.14.12-1.noarch.rpm from the linux directory.

1. Download storcli and its dependencies and transfer to Admin node.

scp storcli-1.14.12-1.noarch.rpm rhel1:/root/

- 2. Copy storcli rpm to all the nodes using the following commands:
- clush -a -b -c /root/storcli-1.14.12-1.noarch.rpm --dest=/root/
- **3.** Run the below command to install storcli on all the nodes

clush -a -b rpm -ivh storcli-1.14.12-1.noarch.rpm

4. Run the below command to copy storcli64 to root directory.

```
cd /opt/MegaRAID/storcli/
cp storcli64 /root/
```

```
[root@rhel1 ~]# cd /opt/MegaRAID/storcli/
[root@rhel1 storcli]# ls
install.log libstorelibir-2.so libstorelibir-2.so.14.07-0 storcli64
[root@rhel1 storcli]# cp storcli64 /root/
```

5. Copy storcli64 to all the nodes using the following commands:

clush -a -b -c /root/storcli64 --dest=/root/

**6.** Run the following script as root user on NameNode and Secondary NameNode to create the virtual drives.

```
vi /root/raidl.sh
./storcli64 -cfgldadd
r1[$1:1,$1:2,$1:3,$1:4,$1:5,$1:6,$1:7,$1:8,$1:9,$1:10,$1:11,$1:12,$1:13,$1:14,$1:15,$1
:16,$1:17,$1:18,$1:19,$1:20,$1:21,$1:22,$1:23,$1:24] wb ra nocachedbadbbu strpsz1024
-a0
The above script requires enclosure ID as a parameter. Run the following command to
get enclousure id.
./storcli64 pdlist -a0 | grep Enc | grep -v 252 | awk '{print $4}' | sort | uniq -c |
awk '{print $2}'
chmod 755 raidl.sh
MageCli againt as follows
```

Run MegaCli script as follows

./raid1.sh <EnclosureID> obtained by running the command above  $WB\colon Write\ back$ 

RA: Read Ahead

NoCachedBadBBU: Do not write cache when the BBU is bad.

Strpsz1024: Strip Size of 1024K

Note

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

# **Configuring Data Drives on Data Nodes**

This section describes steps to configure non-OS disk drives as individual RAID0 volumes using StorCli command as described below. These volumes are going to be used for HDFS Data.

Issue the following command from the admin node to create the virtual drives with individual RAID 0 configurations on all the datanodes.

clush -w rhel[3-64] -B ./storcli64 -cfgeachdskraid0 WB RA direct NoCachedBadBBU strpsz1024 -a0

WB: Write back

RA: Read Ahead

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 Data Drives on Archival Nodes**

This section describes steps to configure non-OS disk drives as 4 RAID5 volumes using StorCli command as described below. These volumes are going to be used for HDFS Archival data.

1. Run the following script as root user on Archival Nodes to create the virtual drives.

```
vi /root/raid5.sh
./storcli64 /c0 add vd type=raid5 drives=$1:1-15 WB ra direct Strip=1024
./storcli64 /c0 add vd type=raid5 drives=$1:16-30 WB ra direct Strip=1024
./storcli64 /c0 add vd type=raid5 drives=$1:31-45 WB ra direct Strip=1024
./storcli64 /c0 add vd type=raid5 drives=$1:46-60 WB ra direct Strip=1024
```

 The above script requires enclosure ID as a parameter. Run the following command to get enclousure id.

```
./storcli64 pdlist -a0 | grep Enc | grep -v 252 | awk '{print $4}' | sort | uniq
-c | awk '{print $2}'
chmod 755 raid5.sh
```

Run MegaCli script as follows

./raid5.sh <EnclosureID> obtained by running the command above

WB: Write back

RA: Read Ahead

Strpsz1024: Strip Size of 1024K



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

# **Configuring the Filesystem for NameNodes, DataNodes and Archival nodes**

The following script will format and mount the available volumes on each node whether it is namenode, Data node or Archival node. OS boot partition is going to be skipped. All drives are going to be mounted based on their UUID as /data/disk1, /data/disk2, and so on.

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.

Note

The script assumes there are no partitions already existing on the data volumes. If there are partitions, then they have to be deleted first before running this script. This process is documented in the "Note" section at the end of the section

```
vi /root/driveconf.sh
#!/bin/bash
#Commented because the script intermittently fails on some occasions
[["-x" == "${1}"]] \&\& set -x \&\& set -v \&\& shift 1
count=1
for X in $(ls /dev/disk/by-id/scsi-*)
do
echo "$X considered"
D=${X##*/}
Y = $ \{D:5\}
if [[ -b ${X} && `/sbin/parted -s ${X} print quit |/bin/qrep -c boot` -ne 0 ]]
then
echo "$X bootable - skipping."
continue
elif [[ ${Y} =~ SATA INTEL SSD* ]]
then
echo "$X bootable partition skipping"
else
echo "$X for formating"
/sbin/parted -s ${X} mklabel gpt quit -s
/sbin/parted -s ${X} mkpart 1 6144s 100% quit
#Identify drive mapping in /dev/sd*
drive=`ls -l ${X} | cut -d " " -f11 | cut -d "/" -f3`
drive map="/dev/$drive"
/sbin/mkfs.xfs -f -q -l size=65536b,lazy-count=1,su=256k -d sunit=1024,swidth=6144 -r
extsize=256k -L ${drive}1 ${drive map}1
(( $? )) && continue
#Identify UUID
UUID=`blkid ${drive_map}1 | cut -d " " -f3 | cut -d "=" -f2 | sed 's/"//g'`
echo "UUID of ${drive_map}1 = ${UUID}"
/bin/mkdir -p /data/disk${count}
(( $? )) && continue
/bin/mount -t xfs -o allocsize=128m,noatime,nobarrier,nodiratime -U ${UUID}
/data/disk${count}
```

```
(( $? )) && continue
echo "UUID=${UUID} /data/disk${count} xfs allocsize=128m,noatime,nobarrier,nodiratime
0 0" >> /etc/fstab
((count++))
fi
done
```

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

```
chmod 755 /root/driveconf.sh
clush -a -B -c /root/driveconf.sh
```

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

```
clush -a -B /root/driveconf.sh
```

4. Run the following from the admin node to list the partitions and mount points

```
clush -a -B df -h
clush -a -B mount
clush -a -B cat /etc/fstab
```

```
<u>Note</u>
```

In-case there is need to delete any partitions, it can be done so using the following. Run command 'mount' to identify which drive is mounted to which device /dev/sd<?> umount the drive for which partition is to be deleted and run fdisk to delete as shown below.

Care to be taken not to delete OS partition as this will wipe out OS

```
mount
umount /data/disk1 # <-- disk1 shown as example
(echo d; echo w;) | sudo fdisk /dev/sd<?>
```

# **Cluster Verification**

The section describes the steps to create the script cluster\_verification.sh that helps to verify CPU, memory, NIC, storage adapter settings across the cluster on all nodes. This script also checks additional prerequisites such as NTP status, SELinux status, ulimit settings, JAVA\_HOME settings and JDK version, IP address and hostname resolution, Linux version and firewall settings.

Create script cluster\_verification.sh as follows on the Admin node (rhel1).

```
vi cluster_verification.sh
#!/bin/bash
shopt -s expand aliases
# Setting Color codes
green='\e[0;32m'
red='\e[0;31m'
NC='\e[Om' # No Color
echo -e "${green} === Cisco UCS Integrated Infrastructure for Big Data \ Cluster
Verification === ${NC}"
echo ""
echo ""
echo -e "${green} ==== System Information ==== ${NC}"
echo ""
echo ""
echo -e "${green}System ${NC}"
clush -a -B " `which dmidecode` |grep -A2 '^System Information'"
echo ""
echo ""
echo -e "${green}BIOS ${NC}"
clush -a -B " `which dmidecode` | grep -A3 '^BIOS I'"
echo ""
```

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```
echo ""
echo -e "${green}Memory ${NC}"
clush -a -B "cat /proc/meminfo | grep -i ^memt | uniq"
echo ""
echo ""
echo -e "${green}Number of Dimms ${NC}"
clush -a -B "echo -n 'DIMM slots: '; `which dmidecode` |grep -c \setminus
'^[[:space:]]*Locator:'"
clush -a -B "echo -n 'DIMM count is: '; `which dmidecode` | grep \ "Size" | grep -c
"MB""
clush -a -B " `which dmidecode` | awk '/Memory Device$/,/^$/ {print}' |\ grep -e
'^Mem' -e Size: -e Speed: -e Part | sort -u | grep -v -e 'NO \ DIMM' -e 'No Module
Installed' -e Unknown"
echo ""
echo ""
# probe for cpu info #
echo -e "${green}CPU ${NC}"
clush -a -B "grep '^model name' /proc/cpuinfo | sort -u"
echo ""
clush -a -B "`which lscpu` | grep -v -e op-mode -e ^Vendor -e family -e\ Model: -e
Stepping: -e BogoMIPS -e Virtual -e 'Byte -e ''NUMA node(s)'"
echo ""
echo ""
# probe for nic info #
echo -e "${green}NIC ${NC}"
clush -a -B "`which if
config` | egrep '(^e|^p)' | awk '{print \1' \ xargs -1
`which ethtool` | grep -e ^Settings -e Speed"
echo ""
clush -a -B "`which lspci` | grep -i ether"
echo ""
echo ""
# probe for disk info #
echo -e "${green}Storage ${NC}"
clush -a -B "echo 'Storage Controller: '; `which lspci` | grep -i -e \ raid -e storage
-e lsi"
echo ""
clush -a -B "dmesg | grep -i raid | grep -i scsi"
echo ""
clush -a -B "lsblk -id | awk '{print \$1,\$4}'|sort | nl"
echo ""
echo ""
echo -e "${green} ======== Software ========== ${NC}"
echo ""
echo ""
echo -e "${green}Linux Release ${NC}"
clush -a -B "cat /etc/*release | uniq"
echo ""
echo ""
echo -e "${green}Linux Version ${NC}"
clush -a -B "uname -srvm | fmt"
echo ""
echo ""
echo -e "${green}Date ${NC}"
clush -a -B date
echo ""
echo ""
echo -e "${green}NTP Status ${NC}"
clush -a -B "ntpstat 2>&1 | head -1"
echo ""
echo ""
echo -e "${green}SELINUX ${NC}"
clush -a -B "echo -n 'SElinux status: '; grep ^SELINUX= \ /etc/selinux/config 2>&1"
echo ""
echo ""
```

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```
echo -e "${green}IPTables ${NC}"
    clush -a -B "`which chkconfig` --list iptables 2>&1"
    echo ""
   clush -a -B " `which service` iptables status 2>&1 | head -10"
   echo ""
    echo ""
   echo -e "${green}Transparent Huge Pages ${NC}"
    clush -a -B " cat /sys/kernel/mm/*transparent_hugepage/enabled"
   echo ""
    echo ""
    echo -e "${green}CPU Speed${NC}"
    clush -a -B "echo -n 'CPUspeed Service: '; `which service` cpuspeed \ status 2>&1"
   clush -a -B "echo -n 'CPUspeed Service: '; `which chkconfig` --list \ cpuspeed 2>&1"
   echo ""
    echo ""
    echo -e "${green}Java Version${NC}"
   clush -a -B 'java -version 2>&1; echo JAVA_HOME is {JAVA_HOME:-Not \setminus Defined!}'
   echo ""
    echo ""
    echo -e "${green}Hostname Lookup${NC}"
    clush -a -B " ip addr show"
   echo ""
   echo ""
    echo -e "${green}Open File Limit${NC}"
    clush -a -B 'echo -n "Open file limit(should be >32K): "; ulimit -n'
Change permissions to executable
```

```
chmod 755 cluster_verification.sh
Run the Cluster Verification tool from the admin node. This can be run before starting HDP 2.2 to
identify any discrepancies in Post OS Configuration between the servers or during troubleshooting of
any cluster / Hadoop issues.
```

```
./cluster verification.sh
```

# **Installing HDP 2.2**

HDP is an enterprise grade, hardened Hadoop distribution. HDP combines Apache Hadoop and its related projects into a single tested and certified package. HDP 2.2 includes more than a hundred new features and closes thousands of issues across Apache Hadoop and its related projects with the testing and quality expected from enterprise quality software. HDP 2.2 components are depicted in figure below. The following sections go in detail on how to install HDP 2.2 on the cluster configured as shown in the earlier sections.

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# **Pre-Requisites for HDP Installation**

This section details the pre-requisites for HDP Installation such as setting up of HDP Repositories.

### **Hortonworks Repo**

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From a host connected to the Internet, download the Hortonworks repositories as shown below and transfer it to the admin node.

mkdir -p /tmp/Hortonworks cd /tmp/Hortonworks/

1. Download Hortonworks HDP Repo

wget http://public-repo-1.hortonworks.com/HDP/centos6/HDP-2.2.0.0-centos6-rpm.tar.gz



#### 2. Download Hortonworks HDP-Utils Repo

```
wget
```

http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos6/HDP-UTILS-1.1.0. 20-centos6.tar.gz [root@Srv1 Hortonworks]# wget http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos6/HDP-UTI LS-1.1.0.20-centos6.tar.gz --2015-03-06 17:04:09-- http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos6/HDP-UTILS-1. 1.0.20-centos6.tar.gz Resolving public-repo-1.hortonworks.com... 54.230.119.106, 54.239.132.164, 54.239.132.162, ... Connecting to public-repo-1.hortonworks.com[54.230.119.106]:80... connected. HTTP request sent, awaiting response... 200 0K Length: 14076549 (13M) [application/x-tar] Saving to: äHDP-UTILS-1.1.0.20-centos6.tar.gzâ

#### 3. Download Ambari Repo

wget http://public-repo-1.hortonworks.com/ambari/centos6/ambari-1.7.0-centos6.tar.gz

```
[root@Srv1 Hortonworks]# wget http://public-repo-1.hortonworks.com/ambari/centos6/ambari-1.7.0-centos6.tar.gz
--2015-03-06 17:05:23-- http://public-repo-1.hortonworks.com/ambari/centos6/ambari-1.7.0-centos6.tar.gz
Resolving public-repo-1.hortonworks.com.. 54.192.118.219, 54.192.118.224, 54.230.118.187, ...
Connecting to public-repo-1.hortonworks.com[54.192.118.219]:80... connected.
HTTP request sent, awaiting response... 200 0K
Length: 103219329 (98M) [application/x-tar]
Saving to: âambari-1.7.0-centos6.tar.gzâ
```

4. Copy the repository directory to the admin node

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

5. Extract the files

login to rhell

```
cd /var/www/html/Hortonworks
tar -zxvf HDP-2.2.0.0-centos6-rpm.tar.gz
tar -zxvf HDP-UTILS-1.1.0.20-centos6.tar.gz
tar -zxvf ambari-1.7.0-centos6.tar.gz
```

6. Create the hdp.repo file with following contents

```
vi /etc/yum.repos.d/hdp.repo
[HDP-2.2.0.0]
name=Hortonworks Data Platform Version - HDP-2.2.0.0
baseurl=http://rhel1/Hortonworks/HDP/centos6/2.x/GA/2.2.0.0
gpgcheck=0
enabled=1
priority=1
[HDP-UTILS-1.1.0.20]
name=Hortonworks Data Platform Utils Version - HDP-UTILS-1.1.0.20
baseurl= http://rhel1/Hortonworks/HDP-UTILS-1.1.0.20/repos/centos6
gpgcheck=0
enabled=1
priority=1
```

```
[root@rhel1 ~]# vi /etc/yum.repos.d/hdp.repo
[root@rhel1 ~]# cat /etc/yum.repos.d/hdp.repo
[HDP-2.2.0.0]
name=Hortonworks Data Platform Version - HDP-2.2.0.0
baseurl=http://rhel1/Hortonworks/HDP/centos6/2.x/GA/2.2.0.0
gpgcheck=0
enabled=1
priority=1
[HDP-UTILS-1.1.0.20]
name=Hortonworks Data Platform Utils Version - HDP-UTILS-1.1.0.20
baseurl= http://rhel1/Hortonworks/HDP-UTILS-1.1.0.20/repos/centos6
gpgcheck=0
enabled=1
priority=1
```

7. Create the Ambari repo file with following contents

```
vi /etc/yum.repos.d/ambari.repo
[Updates-ambari-1.7.0]
name=ambari-1.7.0 - Updates
baseurl=http://rhel1/Hortonworks/ambari/centos6/1.x/updates/1.7.0
gpgcheck=0
enabled=1
priority=1
```

[root@rhel1 ~]# vi /etc/yum.repos.d/ambari.repo [root@rhel1 ~]# cat /etc/yum.repos.d/ambari.repo [Updates-ambari-1.7.0] name=ambari-1.7.0 - Updates baseurl=http://rhel1/Hortonworks/ambari/centos6/1.x/updates/1.7.0 gpgcheck=0 enabled=1 priority=1

From the admin node copy the repo files to /etc/yum.repos.d/ of all the nodes of the cluster.

clush -a -b -c /etc/yum.repos.d/hdp.repo --dest=/etc/yum.repos.d/ clush -a -b -c /etc/yum.repos.d/ambari.repo --dest=/etc/yum.repos.d/

# **HDP Installation**

Follow these steps to install HDP.

Install and Setup Ambari Server on rhel1

yum -y install ambari-server

<pre>[root@rhel1 ~]# yum -y instal: Loaded plugins: product-id, re This system is not registered Setting up Install Process Resolving Dependencies &gt; Running transaction check &gt; Package ambari-server.nod &gt; Finished Dependency Resolv Dependencies Resolved</pre>	l ambari-server efresh-packagekit, to Red Hat Subscri arch 0:1.7.0-169 wi ution	security, subscription-manager iption Management. You can use su ill be installed	bscription-manager to register.
Package	Arch	Version	Repository
Installing: ambari-server	noarch	1.7.0-169	Updates-ambari-1.7.0
Transaction Summary			
Install 1 Package(s)			
Total download size: 96 M Installed size: 123 M Downloading Packages: ambari-server-1.7.0-169.noarch Running rpm_check_debug Running Transaction Test Transaction Test Succeeded Running Transaction Warning: RPMDB altered outside Installing : ambari-server-	1.rpm ∋ of yum. 1.7.0-169.noarch [{		96 ME

### Setup Ambari Server

ambari-server setup -j \$JAVA HOME -s



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Start Ambari Server

ambari-server start

#### **Confirm Ambari Server Startup**

ps -ef | grep ambari-server

```
[root@rhel1 ~]# ambari-server start
Using python /usr/bin/python2.6
Starting ambari-server
Ambari Server running with 'root' privileges.
Organizing resource files at /var/lib/ambari-server/resources...
Server PID at: /var/run/ambari-server/ambari-server.pid
Server out at: /var/log/ambari-server/ambari-server.out
Server log at: /var/log/ambari-server/ambari-server.log
Waiting for server start.....
Ambari Server 'start' completed successfully.
[root@rhel1 ~]# ps -ef | grep ambari-server
                  1 59 01:31 pts/0
                                      00:00:15 /usr/java/jdk1.7.0 75/bin/java -server -XX:NewRatio=3
root
         6069
dLimit -XX:CMSInitiatingOccupancyFraction=60 -Xms512m -Xmx2048m -Djava.security.auth.login.config=/et
java.security.krb5.conf=/etc/krb5.conf -Djavax.security.auth.useSubjectCredsOnly=false -cp /etc/ambar
r/lib64/qt-3.3/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin:/sbin/:/usr
ambari.server.controller.AmbariServer
root
         6186 4896 0 01:31 pts/0
                                      00:00:00 grep ambari-server
```

#### Log into Ambari Server

Ambari

Once the Ambari service has been started, access the Ambari Install Wizard through the browser.

- 1. Point the browser to http://<IP address for rhel1>:8080
- 2. Log in to the Ambari Server using the default username/password: admin/admin. This can be changed at a later period of time.

rigure 155	Amburt Server Login	
	Sign in	
	-	
	Username	
	admin	
	Password	

Figure 133 Ambari Server Login

.....

Once logged in the Welcome to Apache Ambari window appears.

Figur	re 134 Apache Ambari	
🚕 Ambari		📰 🔒 admin 🗸
Clusters	Welcome to Apache Ambari	
No clusters	Provision a cluster, manage who can access the cluster, and cust	omize views for Ambari users.
III Views	Create a	Cluster
Views	Use the Install Wizard to select sen	vices and configure your cluster
L User + Group Management	-	
Users	Launch Insta	all Wizard
Groups		
	Manage Users + Groups	Deploy Views
	Manage the users and groups that can access Ambari	Create view instances and grant permissions
	<b>_</b>	
	Users Groups	Views

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# **Create a Cluster**

Use the following steps to create a cluster.

- 1. Click Launch install wizard button.
- 2. At the Get started page type "Cisco\_HDP" as name for the cluster in the text box.
- 3. Click the Next button.

Ambari If admin     CLUSTER INSTALL WIZARD   Get Started   Select Stack   Install Options   Confirm Hosts   Choose Services   Assign Masters   Assign Slaves and Clients   Customize Services   Review   Install, Start and Test   Summary	1	Figure 135   Ambari Getting Started
CLUSTER INSTALL WIZARD         Det Stated         Select Stack         Install Options         Confirm Hosts         Choose Services         Assign Masters         Assign Slaves and Clients         Kreiw         Install, Start and Test         Summary	🝌 Ambari	admin
Select Stack       This wizard will walk you through the cluster installation process. Let's start by naming your new cluster.         Install Options       Name your cluster Learn more         Confirm Hosts       Cisco_HDP         Choose Services       Next→         Assign Slaves and Clients       Next→         Review       Install, Start and Test         Summary       Name your cluster Learn more	CLUSTER INSTALL WIZARD Get Started	Get Started
Install Options   Confirm Hosts   Choose Services   Assign Masters   Assign Slaves and Clients   Customize Services   Review   Install, Start and Test   Summary	Select Stack	This wizard will walk you through the cluster installation process. Let's start by naming your new cluster.
Confirm Hosts   Choose Services   Assign Masters   Assign Slaves and Clients   Customize Services   Review   Install, Start and Test   Summary	Install Options	Name vour cluster Learn more
Choose Services   Assign Masters   Assign Slaves and Clients   Customize Services   Review   Install, Start and Test   Summary	Confirm Hosts	Cisco_HDP
Assign Masters       Next →         Assign Slaves and Clients          Customize Services          Review          Install, Start and Test          Summary	Choose Services	
Assign Slaves and Clients Customize Services Review Install, Start and Test Summary	Assign Masters	Next $\rightarrow$
Customize Services Review Install, Start and Test Summary	Assign Slaves and Clients	
Review Install, Start and Test Summary	Customize Services	
Install, Start and Test Summary	Review	
Summary	Install, Start and Test	
	Summary	

### **Select Stack**

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In the following screen

- Select HDP 2.2 stack.
- Expand "Advanced Repository Options". Under the advanced repository option.
  - Select RedHat 6 checkbox.
  - Uncheck rest of the checkbox.
  - Update the Redhat 6 HDP-2.2 URL to http://rhel1/Hortonworks/HDP/centos6/2.x/GA/2.2.0.0
  - Update the Redhat 6 HDP-UTILS-1.1.0.20 URL to http://rhel1/Hortonworks/HDP-UTILS-1.1.0.20/repos/centos6

Ambari	_	_		<b>å</b> 2			
LUSTER INSTALL WIZARD Get Started	Select S	tack					
Select Stack	Please select th	ie service stack that	you want to use to install your Hadoop cluster.				
Install Options Confirm Hosts Choose Services Assign Masters Assign Slaves and Clients	Stacks © HDP 2.2 O HDP 2.1 O HDP 2.0 O HDP 1.3						
Customize Services	<ul> <li>Advanced</li> </ul>	Advanced Repository Options					
Review Install, Start and Test Summary	Customize th have access by all hosts a	e repository Base U to the internet, you ind use those Base I	RLs for downloading the Stack software packages. If your hosts do not will have to create a local mirror of the Stack repository that is accessible URLs here.				
	Important: V System you a	Vhen using local mir are installing for you	ror repositories, you only need to provide Base URLs for the Operating r Stack. Uncheck all other repositories.				
	os	Name	Base URL				
	🗖 redhat5	HDP-2.2	http://public-repo-1.hortonworks.com/HDP/centos5/2.x/GA/2.				
		HDP-UTILS- 1.1.0.20	http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/re				
	₽ redhat6	HDP-2.2	http://rhel1/Hortonworks/HDP/centos6/2.x/GA/2.2.0.0	do			
		HDP-UTILS- 1 1 0 20	http://rhei1/Hortanworks/HDP-UTILS-1.1.0.20/repos/centas6	do			
	n suse11	HDP-2.2	http://public.com.1.hortopworke.com/HDB/pucc11cn2/2.v/CA				

### **HDP Installation**

In order to build up the cluster, the install wizard needs to know general information about how the cluster has to be set up. This requires providing the Fully Qualified Domain Name (FQDN) of each of the host. The wizard also needs to access the private key file that was created in Set Up Password-less SSH. It uses these to locate all the hosts in the system and to access and interact with them securely.

- 1. Use the **Target Hosts** text box to enter the list of host names, one per line. One can also use ranges inside brackets to indicate larger sets of hosts.
- 2. Select the option Provide your SSH Private Key in the Ambari cluster install wizard
  - **a.** Copy the contents of the file /root/.ssh/id\_rsa on rhel1 and paste it in the text area provided by the Ambari cluster install wizard.

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Make sure there is no extra white space after the text----END RSA PRIVATE KEY-----

#### [root@rhel1 ~]# cat /root/.ssh/id\_rsa

----BEGIN RSA PRIVATE KEY-----MIIEoQIBAAKCAQEAyDOIRbk4mBZrizc0/g0M2iYT2h4vxkIxA/uvQVPthFreUdgT Zehw/Qtdk7meeqhqqsHmb1CriF0m6SxvPEXW2cGoAx75hZwTuDIR3Q1vk6oYUmDW BKq5TMfUMKfD7tknkGkq5N+YHsPCoNILlz/Wqc01hZ20tiCmrxeRnPGSlJY74/Db A0BewMuNajAoVppPD6cLGF6/NK0RpEDUnCuwe5pCRV5tko+qzBeBF5oeCS6Ya6I7 nS0HplJXV0Mv23SNUwl3cswbqLdrr3atG6YRieVrmmr/PlrKMp192tzQ1mHZMBqG w1RJTILjygW0gp5g7NQBGeM7sX4V60mzv4vmzwIBIwKCAQEAg4+UEI+o2PjKVCuX 2h+XEwMUXCJ3KoNEyBpr2nj7KxckYas/8oLN6B1pYR0UB3X2YZVc6hBwuLI+JDMk hrGNMALqwDjtHUl0yX/9HDlmlDyTo9k8LvPY2q8zqvHnJ+3Jisi92Dspc01xRRxQ wnpofjAmlCDx5WXp4MZYX9HynCcKmheFefobLys6qloxd84eHWly6b0xUldh7hsQ pcK+xpdFWlsHYFbvckTuCHUAezF4+uBT5F0PMiD7PwzrvbXKA65ABuezv9qq2/11 PekIkRvbosniFbBUi220S1uN/gsaZgmSQ9gTarJ1V8zMy6K31LETcOckl2LZHRX2 5sEx6wKBqQD9CiKc0HFiulrQWW5cLTDJU8wzTiNK4M9lQb2LOhfFuZfluiAl3Ref yiL9MjE3A5Mnn9pcRxMmXXPF4t9iuLh3+3tCsr1TzPm14WT+Fipa9sh+3JZ2HKgm pCquAEdoFRK4oP3/yYQq95qie2SC9sB0z6zVohdyNUvnkiMb9vwi3wKBqQDKiyTi Yu4210wsYKfZ7YjomjRKUFaH4CKtnyJy1SM3wFPRnZJd4BUaMq0DaTxr2tW4si+4 t88M8XS6FHGHymSqRtL0tYzM1mmwUtjCLNZQfqSeg1NovekXxXL0iUze18PL3ZOH AeBj0/GLQ3SF/PGWMokCwNtaJoV/xldBdIsqEQKBgEERPBmx8UVF3NZ9ZYVqtMY0 <u>09KtsU3Ex52x0ad1VpHt5TsSmo1kv06TEE+8cw41f2x5j+vXwxh+bjozBj30/Dwc</u> GGGbrQbrkKscs5HLL3Z5+QqtwEpB4hiQnUKvnVVHP1QMJA6S53YxCdz7KH1ypnqq bkWQFKhW2QEIUivDKuRlAoGASzr/EkIAtUfFb5Gdbj0n4V3Y6Gb7kY3DvNS1BhSm rk7ADAdTnzX5NZ3L08gAf9TwS+ppfx+zTfNIn0MFmNYlY9EpyJs0S/1adLE0roWu sC8J8bu/5RNWk8z+z9s5zwUrd5txT2cY1J8t1KQGtWyUPxoVoe/ccfENA5LP872s xnsCqYAFRE4SbB416p9miiR1+qNCiihM9N+FmHMmcP/y80QL/MoAYoHB1Tn8cwVu l+sju4bWGUZvnGMWXwpEU5zVBra+yShh309IwjP/1kpCNWz7CX+/uI6FY+slZxTr t5P/Avh0vUKMhRFjXFQoY5yqNUkasvIu6S8Q1un18N2IhEqw1q== ----END RSA PRIVATE KEY-----

3. Click the **Register** and **Confirm** button to continue.

Get Started	Install Options
Select Stack	Enter the list of hosts to be included in the cluster and provide your SSH key.
Install Options	Target Hosts
Confirm Hosts	Enter a list of hosts using the Fully Qualified Domain Name (FQDN), one per line. Or use Pattern Expressions
Choose Services	rhel[1-68]
Assign Masters	
Assign Slaves and Clients	
Customize Services	
Review	
Install. Start and Test	Host Registration Information
Summany	• Provide your SSH Private Key to automatically register hosts
Summary	Browse No file selected.
	ItjcferwOGppS+SKOu7gK
	/TDiheIJOpe3q03ZJ9fDS5Ls6cg8cUVGZrXffSVHeTT
	END RSA PRIVATE KEY
	SSH user (root or passwordless sudo account) root

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### **Hostname Pattern Expressions**



### **Confirm Hosts**

This screen allows to ensure that Ambari has located the correct hosts for the cluster and to check those hosts to make sure they have the correct directories, packages, and processes to continue the install.

If any hosts were selected in error, it can be removed by selecting the appropriate **checkboxes** and clicking the grey **Remove Selected** button. To remove a single host, click the small white **Remove** button in the Action column.

When the lists of hosts are confirmed, click Next.

LUSTER INSTALL WIZARD Get Started	Co	onfirm Hosts			
Select Stack Install Options	PI	egistering your hosts. ease confirm the host list and remo	ve any hosts that you do not want to	include in the clus	ter.
Confirm Hosts		m Remove Selected	Show: All (68)   Install	ina (0)   Registering	(0)   <u>Success (68)</u>   <u>Fail (</u>
Choose Services		Host	Progress	Status	Action
Assign Masters		rhel1		Success	fi Remove
Customize Services		rhel2		Success	節 Remove
Review		rhel3		Success	節 Remove
Install, Start and Test		rhel4		Success	fi Remove
Summary		rhel5		Success	節 Remove
		rhel6		Success	節 Remove
		rhel7		Success	節 Remove
		rhel8		Success	1 Remove
		rhel9		Success	節 Remove
	-	rhol10		Russes	(4.0)

### **Choose Services**

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HDP is made up of a number of components. See Understand the Basics for more information.

- 1. Select all to preselect all items.
- 2. When you have made your selections, click Next.

🝌 Ambari

Figure 139

#### Ambari Service Selection

CLUSTER INSTALL WIZARD Get Started Select Stack Install Options Confirm Hosts Choose Services Assign Masters Assign Slaves and Clients Customize Services Review Install, Start and Test

Summary

	_	ad 🗮 🖬 🕹 ad
Choose Ser	vices	
Choose which services y	'ou want to install	on your cluster.
Service all none	Version	Description
HDFS	2.6.0.2.2.0.0	Apache Hadoop Distributed File System
YARN + MapReduce2	2.6.0.2.2.0.0	Apache Hadoop NextGen MapReduce (YARN)
₩ Tez	0.5.2.2.2.0.0	Tez is the next generation Hadoop Query Processing framework written on top of YARN.
✓ Nagios	3.5.0	Nagios Monitoring and Alerting system
🔽 Ganglia	3.5.0	Ganglia Metrics Collection system (RRDTool will be installed too)
₩ Hive	0.14.0.2.2.0.0	Data warehouse system for ad-hoc queries & analysis of large datasets and table & storage management service
₩ HBase	0.98.4.2.2.0.0	Non-relational distributed database and centralized service for configuration management & synchronization
₽ Pig	0.14.0.2.2.0.0	Scripting platform for analyzing large datasets
🔽 Sqoop	1.4.5.2.2.0.0	Tool for transferring bulk data between Apache Hadoop and structured data stores such as relational databases
🔽 Oozie	4.1.0.2.2.0.0	System for workflow coordination and execution of Apache Hadoop jobs. This also includes the installation of the optional Oozie Web Console which relies on and will install the ExtUS Library.
🔽 Zookeeper	3.4.6.2.2.0.0	Centralized service which provides highly reliable distributed coordination
7 Falcon	0.6.0.2.2.0.0	Data management and processing platform
₹ Storm	0.9.3.2.2.0.0	Apache Hadoop Stream processing framework
✓ Flume	1.5.2.2.2.0.0	A distributed service for collecting, aggregating, and moving large amounts of streaming data into HDFS
🛛 Kafka	0.8.1.2.2.0.0	A high-throughput distributed messaging system
✔ Knox	0.5.0.2.2.0.0	Provides a single point of authentication and access for Apache Hadoop services in a cluster
✓ Slider	0.60.0.2.2.0.0	A framework for deploying, managing and monitoring existing distributed applications on YARN.
← Back		$Next \to$

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### **Assign Masters**

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The Ambari install wizard attempts to assign the master nodes for various services that have been selected to appropriate hosts in the cluster. The right column shows the current service assignments by host, with the hostname and its number of CPU cores and amount of RAM indicated.

1. Reconfigure the service assignment to match the table shown below:

Service Name	Host
NameNode	rhel1
SNameNode	rhel2
HistoryServer	rhel2
ResouceManager	rhel2
Nagios Server	rhel1
Ganglia Collector	rhel1
HiveServer2	rhel2
HBase Master	rhel2
Oozie Server	rhel1
Zookeeper	rhel1, rhel2, rhel3
Kafka Broker	rhell
Knox Gateway	rhell
App Timeline Server	rhel2
Hive Metastore	rhel2
WebHCat Server	rhel2
Falcon Server	rhel2
DRPC Server	rhel2
Nimbus	rhel2
Storm UI Server	rhel2

 Table 8
 Reconfiguring the Service Assignment



**Note** On a small cluster (<16 nodes), consolidate all master services to run on a single node. For large clusters (> 64 nodes), deploy master services across 3 nodes.

2. Click the Next button.

### **Assign Slaves and Clients**

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The Ambari install wizard attempts to assign the slave components (DataNodes, NodeManagers, RegionServers, Supervisor and Flume) to appropriate hosts in the cluster. Reconfigure the service assignment to match below:

- 1. Assign DataNode, NodeManager, RegionServer, Supervisor and Flume on nodes rhel3- rhel68
- 2. Assign Client to all nodes
- 3. Click the Next button.

Client Service Name	Host
DataNode	rhel3 to rhel68
NodeManager	rhel3 to rhel68
RegionServer	rhel3 to rhel68
Client	All nodes, rhel1-rhel68
Supervisor	rhel3-rhel68
Flume	rhel3-rhel68
Archival Nodes	rhel65 to rhel68

#### Figure 141 Ambari Slave and Client Assignment

CLUSTER INSTALL WIZARD	Assi	gn Slav	es and C	lients			
Select Stack Install Options Confirm Hosts	Assign Hosts th "Client" Client, F	slave and client hat are assigned will install HDFS Pig, Sqoop, Oozi	components to hosts master components : Client, MapReduce2 e Client, ZooKeeper (	you want to run them are shown with <b>*</b> . Client, YARN Client, <sup>°</sup> Client, Falcon Client a	on. Tez Client, HCat Cl and Slider.	ient, Hive Client	, HBase
Choose Services	Host	all   none	all   none	all   none	all   none	all   none	all   none
Assign Masters Assign Slaves and Clients	rhel1*	🗖 DataNode	🗖 NodeManager	RegionServer	🗖 Supervisor	E Flume	🔽 Client
Customize Services	rhel2*	🗖 DataNode	🗖 NodeManager	RegionServer	🗆 Supervisor	E Flume	🗹 Client
Review	rhel3 🗮	☑ DataNode	NodeManager	RegionServer	🔽 Supervisor	Flume	Client
Install, Start and Test	rhel4	☑ DataNode	NodeManager	RegionServer	☑ Supervisor	Flume	Client
Summary	rhel5	☑ DataNode	🔽 NodeManager	RegionServer	☑ Supervisor	Flume	Client
	rhel6	🗹 DataNode	NodeManager	RegionServer	🗹 Supervisor	Flume	🗹 Client
	rhel7	🗹 DataNode	NodeManager	RegionServer	🔽 Supervisor	Flume	🗹 Client
	rhel8	☑ DataNode	NodeManager	RegionServer	🔽 Supervisor	Flume	☑ Client
	rhel9	☑ DataNode	NodeManager	RegionServer	☑ Supervisor	Flume	🗹 Client
	rhel10	🔽 DataNode	♥ NodeManager	RegionServer	Supervisor	<ul> <li>✓ Flume</li> <li>1 - 17 of 17</li> </ul>	✓ Client K ← →
	← Back	:					Next

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#### **Customize Services**

This section presents with a set of tabs that manage configuration settings for Hadoop components. The wizard attempts to set reasonable defaults for each of the options here, but this can be modified to meet specific requirements. Following sections provide configuration guidance that should be refined to meet specific use case requirements.

Following are the changes made

- Memory and service level setting for each component and service level tuning.
- Create a separate configuration for archival nodes to account for them having different number of data drives (4 Volumes of RAID5 each with 14+1 drives) compared to data nodes (24 volumes). We will then point Ambari to these archive nodes and override the default configuration for these nodes.
- Customize the log locations of all the components to ensure growing logs do not cause the SSDs to run out of space.

### HDFS

In Ambari, choose HDFS Service from the left tab and go to Configs tab.

Use the "Search" box on top to filter for the properties mentioned in the tab to update the values

#### **HDFS JVM Settings**

Update the following HDFS configurations in Ambari:

Property Name	Value
NameNode Java Heap Size	4096
Hadoop maximum Java heap size	4096
DataNode maximum Java heap size	4096
DataNode Volumes Failure Toleration	3

#### Manage Config Groups for Archival Nodes

Ambari initially assigns all hosts in your cluster to one default configuration group for each service installed. Since there are different number of data drives (volumes) on archival nodes (4) as compared to other data nodes (24), create a new group for archive nodes and override the default data node directories that were picked up.

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1. Under the HDFS tab, click Manage Config Groups

1	Figure 142 HDFS Manage Config Groups
CLUSTER INSTALL WIZARD Get Started	Customize Services
Install Options	We have come up with recommended configurations for the services you selected. Customize them as you see fit.
Confirm Hosts Choose Services	HDFS MapReduce2 YARN Tez Nagios 2 Ganglia Hive 1 HBase Pig Sqoop Oozie 1
Assign Masters Assign Slaves and Clients	Zookeeper Falcon Storm Flume Kafka Knox 1 Slider Misc
Customize Services	Group HDFS Default (68)   Manage Config Groups  Filter
Install, Start and Test	▼ NameNode
Summary	NameNode hosts rhel1
	NameNode directories /data/disk1/hadoop/hdfs/namenode
	NameNode Java heap 1024 MB size
	NameNode new 200 MB generation size

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- 2. Create an Archive group by clicking the + button on the left and entering "Archive" for the name.
- Figure 143 Manage HDFS Configuration Groups

ou can apply different sets of HDFS	configurations to grou	ps of hosts by managing HDFS Configuration Group	os and their host
DFS Configuration Group.	IFS Configuration Gro	up have the same set of configurations for HDFS. Ea	ach nost belongs to one
DFS Default (68)	<ul> <li>hel1</li> <li>rhel2</li> <li>rhel3</li> <li>rhel4</li> <li>rhel5</li> <li>rhel6</li> <li>rhe17</li> <li>rhe18</li> <li>rhe19</li> <li>rhe19</li> <li>rhe110</li> <li>rhe1111</li> <li>rhe112</li> <li>rhe113</li> <li>rhe114</li> <li>rhe115</li> </ul>		
+	Overrides	O properties	+ -
	Description	Default cluster level HDFS configuration	

	Figure 144	Create New Configuration Group
Create	New Configura	ation Group
Name:	Archive	
Description:	60 Disks	
		Cancel

Now the Archive group should appear in the Configuration Groups.



Manage HDFS Configuration Groups	X
You can apply different sets of HDFS configurations to groups of hosts by managing HDFS Configuration Groups and their host membership. Hosts belonging to a HDFS Configuration Group have the same set of configurations for HDFS. Each host belongs to one HDFS Configuration Group.	
HDFS Default (64)	×
+ - ☆ →        Overrides     0 properties       Description     60 disks	•
Cancel	ave

3. Add archive nodes to the archive group, by clicking on the + sign on the right and selecting the archive nodes, and click OK when done.

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#### Figure 146 Select Configuration Group Hosts

#### **Select Configuration Group Hosts**

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configu	irations.	
4 out of 6	8 hosts selected	Filter Components •
	Host	IP Address
	rhel63	10.29.160.163
	rhel64	10.29.160.164
•	rhel65	10.29.160.165
•	rhel66	10.29.160.166
V	rhel67	10.29.160.167
•	rhel68	10.29.160.168
		Show: 10 🔽 😽 🔶 🕨
		Cancel

Now you should see the archive nodes appear under the Archive configuration group. Click **Save** to commit the new configuration group you created.

#### Figure 147 Manage HDFS Configuration Groups

u can apply different sets of HDFS mbership. Hosts belonging to a HI JFS Configuration Group.	configurations to grou DFS Configuration Grou	ps of hosts by managing HDFS Configuration Groups and their host up have the same set of configurations for HDFS. Each host belongs to one	
FS Default ( 64) hive (4)	rhel65 rhel66 rhel67 rhel68		
+ -	v → Overrides	0 properties	T
	Description	60 Disks	

Next we will configure the archive nodes to use different data directories than the data nodes by overriding this value by following the below steps.

- 4. Select HDFS Default group, scroll down to "Data Node directories" property and copy first four lines from the Data Node directories.
- CLUSTER INSTALL WIZARD Get Started **Customize Services** Select Stack We have come up with recommended configurations for the services you selected. Customize them as you see Install Options fit. Confirm Hosts HDFS MapReduce2 YARN Tez Nagios (2) Ganglia Hive (1) HBase Pig Sqoop Oozie (1) Choose Services Assign Masters Zookeeper Falcon Storm Flume Kafka Knox 1 Slider Misc Assign Slaves and Clients Group Archive (1) Manage Config Groups Filter. -HDFS Default (64) Review Install, Start and Test Summary NameNode hosts rhel1 /data/disk1/hadoop/hdfs/namenode NameNode directories
- 5. And then select Archive config group

Figure 148 Manage HDFS: Customize Services Part1

6. Scroll down to the "Data Node directories" property and click override button (to the right of the textbox) and paste those four lines from Data Node directories here.

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/data/disk1/hadoop/hdfs/data /data/disk2/hadoop/hdfs/data /data/disk3/hadoop/hdfs/data /data/disk4/hadoop/hdfs/data

Get Started	Customize S	ervices				
Select Stack			-lasted. Outputs the set			
Install Options	fit.	we nave come up with recommended configurations for the services you selected. Customize them as you see fit.				
Confirm Hosts						
Choose Services	HDFS MapReduce2	(ARN Tez Nagios 2) Ganglia Hive 🚺	HBase Pig Sqoop	Oozie 1		
ssign Masters	ZooKeeper Falcon St	orm Flume Kafka Knox 1 Slider Mi	sc			
ssign Slaves and Clients						
Customize Services	Group Archive (4)	Manage Config Groups	Filter	-		
leview						
stall, Start and Test	NameNode					
Summary	Secondary NameNode					
	<ul> <li>DataNode</li> </ul>	DataNode				
	DataNode hosts	rhel3 and 65 others				
	DataNode directories	/data/disk1/hadoop/hdfs/data /data/disk2/hadoop/hdfs/data /data/disk3/hadoop/hdfs/data /data/disk4/hadoop/hdfs/data /data/disk6/hadoop/hdfs/data	•			
		/data/disk1/ <u>hadoop/hdts</u> /data /data/disk2/ <u>hadoop/hdts</u> /data /data/disk3/ <u>hadoop/hdts</u> /data /data/disk4/ <u>hadoop/hdts</u> /data		•		

Figure 149 Manage HDFS: Customize Services Part2

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7. We are done customizing the Archive Config Group. For all remaining steps, select back the HDFS default group.

Set Started	Customize S	ervices			
ielect Stack	We have come up with recommended configurations for the services you selected. Customize them as you see fit.				
choose Services	HDFS MapReduce2	(ARN Tez Nagios 2) Ganglia Hive 1	HBase Pig Sqoop Oozie 1		
ssign Masters	Zookeeper Falcon St	torm Flume Katka Knox 🚺 Slider M	MISC		
ustomize Services	Group HDFS Default (	64)  Manage Config Groups	Filter		
eview					
tall, Start and Test	NameNode				
Summary	Secondary NameNode				
	DataNode				
	DataNode hosts	rhel3 and 65 others			
	DataNode directories	/data/disk1/ <u>hadoop/hdfs</u> /data /data/disk2/ <u>hadoop/hdfs</u> /data /data/disk3/ <u>hadoop/hdfs</u> /data /data/disk4/ <u>hadoop/hdfs</u> /data /data/disk5/hadoop/hdfs/data			
		/data/disk1/hadoop/hdfs/data /data/disk2/hadoop/hdfs/data /data/disk3/hadoop/hdfs/data /data/disk4/hadoop/hdfs/data	Switch to 'Archive'		

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Figure 150 Manage HDFS: Customize Services Part3

#### **Update Log Directory**

Change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1
Figure 151	Manage HD	FS: Customize	Services Part4
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Customia	ze Services
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We have come up with rec fit.	ommended configurations for the services you se	ected. Customize th	nem as you see
HDFS MapReduce2 Y. Zookeeper Falcon Sto	ARN Tez Nagios (2) Ganglia Hive (1) orm Flume Kafka Knox (1) Slider Mi:	HBase Pig S	qoop Oozie 1
Group HDFS Default (6	4)   Manage Config Groups	Nar	0 -
<ul> <li>Advanced hadoop-en</li> </ul>	V		
Hadoop Log Dir Prefix	/data/disk1/log/hadoop		Hadoop Log Dir Prefix hdfs_log_dir_prefix
Hadoop PID Dir Prefix	/var/run/hadoop		Hadoop Log Dir Prefix

### MapReduce2

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In Ambari, choose MapReduce Service from the left tab and go to "Configs" tab. Use the "Search" box on top to filter for the properties mentioned in the tab to update the values Update the following MapReduce configurations.

 Table 11
 MapReduce Property Name and Value

Property Name	Value
Default virtual memory for a job's map-task	4096
Default virtual memory for a job's reduce-task	8192
Map-side sort buffer memory	1638
yarn.app.mapreduce.am.resource.mb	4096
mapreduce.map.java.opts	-Xmx3276m
mapreduce.reduce.java.opts	-Xmx6552m
yarn.app.mapreduce.am.command-opts	-Xmx6552m

Similarly under MapReduce2 tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1.

#### Figure 152 MapReduce: Customize Services

We have come up with reco fit.	mmended configurations for the services you s	selected. Customize them a	s you see
HDFS MapReduce2 YA ZooKeeper Falcon Stor	RN Tez Nagios (2) Ganglia Hive (1) m Flume Kafka Knox (1) Slider M	HBase Pig Sqoop	Oozie 1
Group MapReduce2 Def	ault (68)   Manage Config Groups	[/var]	0 •
<ul> <li>Advanced mapred-env</li> </ul>			
Advanced mapred-env Mapreduce Log Dir Prefix	/data/disk1/log/hadoop-mapreduce	c	

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### YARN

In Ambari, choose YARN Service from the left tab and go to "Configs" tab. Use the "Search" box on top to filter for the properties mentioned in the tab to update the values Update the following YARN configurations

#### Table 12Yarn Property Name and Value

Property Name	Value
ResourceManager Java heap size	4096
NodeManager Java heap size	2048
yarn.nodemanager.resource.memory-mb	184320
YARN Java heap size	4096
yarn.scheduler.minimum-allocation-mb	4096
yarn.scheduler.maximum-allocation-mb	184320

Similarly under YARN tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

#### Figure 153 Yarn: Customize Services

## **Customize Services**

We have come up with re fit.	ecommended configurations for the services y	you selected. Customize them a	as you see
HDFS MapReduce2	YARN Tez Nagios 2 Ganglia Hive	e 🚺 HBase Pig Sqoop	Oozie 1
ZooKeeper Falcon S	torm Flume Kafka Knox 1 Slider	Misc	
Group YARN Default	(68) - Manage Config Groups	Mar	0 -
<ul> <li>Advanced yarn-env</li> </ul>			
YARN Log Dir Prefix	/data/disk1/log/hadoop-yarn	5	
YARN PID Dir Prefix	/var/run/hadoop-yarn		

### Tez

No changes required.

Figure 154 Tez: Customize Services

### **Customize Services**



### Nagios

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On the Nagios tab, it is required to provide:

- Nagios admin password (as per organizational policy standards)
- Hadoop admin email



### **Customize Services**

We have come up with reco fit.	ommended configura	tions for the sei	rvices you selecte	d. Customize the	em as you see
HDFS MapReduce2 YA	RN Tez Nagios	Ganglia Hi	ive 🚺 HBase	Pig Sqoop	Oozie 1
Zookeeper Falcon Stor	rm Flume Kafka	Knox 1	Slider Misc		
Group Nagios Default (6	8) 💌 Manage (	Config Groups	F	ilter	•
<ul> <li>General</li> </ul>					
Nagios Admin username	nagiosadmin				
Nagios Admin password	*****	•••		C	
Hadoop Admin email	admin@admin.com	n			D

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### Ganglia

No changes are required.

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We ha fit.	ave come up wit	h recommended	d configura	tions for the	services yo	u selectec	I. Custo	omize the	m as you :	see
HDFS Zookee	MapReduce2 eper Falcon	YARN Tez	: Nagios ne Kafka	Ganglia Knox (1	Hi∨e <b>1</b> Slider	HBase Misc	Pig	Sqoop	Oozie	
Group	Ganglia Det	fault (68) 🔻	Manage	Config Grou	abs	Fil	ter			•

### Hive

In Ambari, choose HIVE Service from the left tab and go to Configs tab.

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On the **Hive** tab, enter:



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Install Hive as is with just the following Log Dir changes, this uses MapReduce as engine. The Section on "Configuring Hive to use Apache Tez", goes into details on tuning Hive for Performance by using Apache Tez as the execution engine and using Cost Based Optimizer to run queries.

Following are the changes for configuring Log Dir on Hive:

- Enter the Hive database password as per organizational policy.
- Change hive log directory by finding the Log Dir property and modifying the /var prefix to /data/disk1.
- Change the WebHCat log directory by finding the Log Dir property and modifying the /var prefix to /data/disk1.

#### Figure 157 Hive: Customize Services Part1

#### **Customize Services**

We have come up with refit.	ecommended configurations for the services you selected. Customize them as you see
HDFS MapReduce2 ZooKeeper Falcon S	YARN Tez Nagios Ganglia Hive HBase Pig Sqoop Oozie 1 Storm Flume Kafka Knox 1 Slider Misc
Group Hive Default (6	• Manage Config Groups     •
Hive Metastore	
Hi∨e Metastore host	rhel2
Database Type	MySQL
Hive Database	• New MySQL Database
	C Existing MySQL Database
	O Existing PostgreSQL Database
	C Existing Oracle Database
Database Host	rhel2
Database Name	hive
Database Username	hive
Database Password	•••••

1

Figure 158 Hive: Customize Services Part2

We have come up with fit.	n recommended configurations	for the services you	selected. Customiz	e them as you see
HDFS MapReduce2	YARN Tez Nagios Ga	anglia Hive HBas	se Pig Sqoop	Oozie 1
ZooKeeper Falcon	Storm Flume Kafka Kr	nox 1 Slider N	Aisc	
Group Hive Defeut	Managa Carfin C	200100	Nor	0 -
	(68) • Manage Coning G	sroups	/vai	0
<ul> <li>Advanced hive-e</li> </ul>	nv	noups	IVal	
Advanced hive-e Hive Log Dir	/data/disk1/log/hive	910uh2	Mai	0
Advanced hive-e Hive Log Dir Hive PID Dir	/data/disk1/log/hive /var/run/hive	91 OUP3	Ivai	3
Advanced hive-e Hive Log Dir Hive PID Dir	/data/disk1/log/hive /var/run/hive	51 UUP3	Ivai	3

### HBase

I

In Ambari, choose HBASE Service from the left tab and go to **Configs** tab. Use the "Search" box on top to filter for the properties mentioned in the tab to update the values Update the following **HBASE configurations**:

#### Table 13HBASE Configuration

Property Name	Value
HBase Master Maximum Java Heap Size	4096
HBase RegionServers Maximum Java Heap Size	16384

### 

**Note** If you are not running HBase, keep the default value of 1024 for Java Heap size for HBase RegionServers and HBase Master.

Similarly under HBase tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

Figure 159 HBase: Customize Services

We have come up witi fit.	) recommended configu	rations for the sei	vices you select	ed. Customize	e them as you see
IDFS MapReduce2	YARN Tez Nagio	is Ganglia Hi	ve HBase P	ig Sqoop	Oozie 1
Zookeeper Falcon	Storm Flume Kafl	ka Knox 1	Slider Misc		
2	ult (60) - Manage	: Config Groups	(	Var	0 -
Group HBase Defa					-
Group HBase Defa     Advanced hbase	env				
Group HBase Defa     Advanced hbase     HBase Log Dir	env /data/disk1/log/h	nbase			0

1

## Pig

No changes are required.

We hav fit.	/e come up with re	ecommended co	nfigurations for t	the services y	ou selected. C	Customize them	as you see
IDFS looKeej	MapReduce2	YARN Tez № torm Flume	Nagios Ganglia Kafka Knox (	a Hive Hi 1 Slider	Base Pig Misc	Sqoop Oozi	• 1
Group	Pig Default (68	a) 🚽 Manag	ge Config Group	s	Filter		•
Ad	vanced pig-env						

### Sqoop

No changes are required.

Figure 160 Sqoop Customize Services **Customize Services** We have come up with recommended configurations for the services you selected. Customize them as you see fit. HDFS Pig Oozie 🚺 MapReduce2 YARN HBase Sqoop Tez Nagios Ganglia Hive ZooKeeper Falcon Storm Flume Kafka Knox Slider Misc Manage Config Groups Filter. Group Sqoop Default (68) Ŧ Ŧ Advanced sqoop-env

### Oozie

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Similarly under **Oozie** tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1.

Also enter the oozie database password as per organizational policy.

#### Figure 161 Oozie: Customize Services Part1

# Customize Services

We have come up with n fit.	ecommended configurations for the services you selected. Customize them as you see
HDFS MapReduce2 Falcon Storm Flume	YARN Tez Nagios Ganglia Hive HBase Pig Sqoop Oozie Zookeeper Kafka Knox 1 Slider Misc
Group Oozie Default	(68) <ul> <li>Manage Config Groups</li> <li>Filter</li> <li>Filte</li></ul>
Oozie Server	
Oozie Server host	rhel2
Database Type	Derby
Oozie Database	<ul> <li>New Derby Database</li> <li>Existing MySQL Database</li> <li>Existing PostgreSQL Database</li> <li>Existing Oracle Database</li> </ul>
Database Name	oozie
Database Username	oozie
Database Password	

1

Figure 162 Oozie: Customize Services Part2

We have come up with fit.	n recommended configurations for the services you selected	ed. Customize them :	as you see
HDFS MapReduce2	YARN Tez Nagios Ganglia Hive HBase P	ig Sqoop Oozie	ZooKeeper
Faicon Storm Flui			
Group Oozie Defai	ult (68) - Manage Config Groups	var	0 -
<ul> <li>Advanced oozie-</li> </ul>	env		
Oozie Log Dir	/data/disk1/log/oozie	0	

## Zookeeper

Similarly under Zookeeper tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

Figure 163 Zookeeper: Customize Services

## **Customize Services**

We have come up with reco fit.	mmended configurations for the services you s	elected. Customize them a	is you see
HDFS MapReduce2 YAI Falcon Storm Flume	RN Tez Nagios Ganglia Hive HBase Kafka Knox 🚹 Slider Misc	Pig Sqoop Oozie	ZooKeeper
Group Zookeeper Defau	It (68)   Manage Config Groups	Mar	0 -
<ul> <li>Advanced zookeeper-e</li> </ul>	nv		
ZooKeeper Log Dir	/data/disk1/log/zookeeper	C	
ZooKeeper PID Dir	/var/run/zookeeper		

### Falcon

Γ

Similarly under Falcon tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1.

Figure 104 Faicon: Customize Servic	Figure 164	Falcon:	Customize	Services
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## **Customize Services**

We have come up with fit.	recommended configurations for the services you s	elected. Customize them a	s you see
HDFS MapReduce2	YARN Tez Nagios Ganglia Hive HBase ne Kafka Knox 1 Slider Misc	e Pig Sqoop Oozie	ZooKeeper
Group Falcon Defa	ult (68)   Manage Config Groups	Nar	0 -
<ul> <li>Advanced falcon-</li> </ul>	env		
Falcon Log Dir	/data/disk1 /log/falcon	5	
Falcon DID Dir	Avar/rup/falcon		

1

### Storm

Similarly under Storm tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

Figure 165 Storm: Customize Servio
------------------------------------

## **Customize Services**

We have fit.	come u	up with rec	ommended config	urations for th	e service	es you sel	ected.	Customizi	e them as	s you see
HDFS N Falcon	MapRed Storm	luce2 YA	ARN Tez Nagi Kafka Knox ┫	os Ganglia Slider	Hi∨e Misc	HBase	Pig	Sqoop	Oozie	ZooKeeper
Group	Storm	Default ( <mark>6</mark>	8) 💌 Manage	e Config Grou	ps		Nar			₿ ▼
▼ Adv:	anced s	torm-env								
storm_lo	g_dir		/data/disk1∤log,	/storm					0	C
storm_pi	d_dir		/var/run/storm						0	

### Flume

Γ

Similarly under Flume tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

We have fit.	come up with re	commended co	onfigurations for t	the service	s you sele	cted. Cusi	tomize them	as you see
HDFS M Falcon	1apReduce2	/ARN Tez Kafka Kno	Nagios Gangli x 1 Slider	a Hive Misc	HBase	Pig Sq	oop Oozi	e ZooKeeper
Group	Flume Default (	68) 👻 Ma	anage Config Gro	oups		Avar		0 <b>-</b>

1

### Kafka

Similarly under Knox tab, change the default log location by finding the Log Dir property and modifying the /var prefix to /data/disk1

	W (1	<b>~</b> · ·	<i>a</i> .	<b>D</b> (1
Figure 167	Kafka:	Customize	Services	Part

### **Customize Services**

We have come up with fit.	recommended configurations for the services you	i selected. Customize	e them as you see
HDFS MapReduce2 Falcon Storm Flun	YARN Tez Nagios Ganglia Hive HBa ne Kafka Knox (1) Slider Misc	ise Pig Sqoop	Oozie ZooKeeper
Group Kafka Defau	It (68) - Manage Config Groups	Avar	◎ -
<ul> <li>Advanced kafka-a</li> </ul>	inv		
Kafka PID dir	/var/run/kafka		
kafka_log_dir	/data/disk1/log/kafka		0 0

Figure 168 Kafka: Customize Services Part2

### **Customize Services**

We have come up with re fit.	commended configurations for the services y	you selected. Customize them as you s	ee.
HDFS MapReduce2 ` Falcon Storm Flume	/ARN Tez Nagios Ganglia Hive H Kafka Knox Slider Misc	HBase Pig Sqoop Oozie Zool	Keeper
Group Knox Default (6	8) V Manage Config Groups	Filter	•
<ul> <li>Knox Gateway</li> </ul>			
Knox Gateway host	rhel1		
Knox Master Secret	•••••	C 🖻	

### Knox

ſ

For Knox, change the gateway port to 8444 to ensure no conflicts with local HTTP server.

#### Figure 169 **Knox:** Customize Services **Customize Services** We have come up with recommended configurations for the services you selected. Customize them as you see fit. HDFS MapReduce2 YARN Tez Nagios Ganglia Hive HBase Pig Sqoop Oozie Zookeeper Falcon Storm Flume Kafka Knox Slider Misc Group Knox Default (68) 👻 Manage Config Groups gateway . Knox Gateway Knox Gateway host rhel1 Advanced gateway-log4j Advanced gateway-site 0 gateway.gateway.conf.dir deployments gateway.hadoop. false 0 kerberos.secured gateway gateway.path 0 0 0 gateway.port 8444

1

### Slider

No changes are required.



## **Customize Services**

We have come up with recommended configurations for the services you : fit.	selected. Customize them as	s you see
IDFS MapReduce2 YARN Tez Nagios Ganglia Hive HBas alcon Storm Flume Kafka Knox Slider Misc	se Pig Sqoop Oozie	ZooKeeper
Group Slider Default (68)   Manage Config Groups	Filter	•
Advanced slider-env		
Advanced elider leg (i		

### Misc

No changes are required.

#### Figure 171 Misc: Customize Services

Get Started	Customize Services
Select Stack	We have some up with recommanded configurations for the convision you collected. Outparize them as you app
nstall Options	fit.
Confirm Hosts	
Choose Services	HDFS MapReduce2 YARN Tez Nagios Ganglia Hive HBase Pig Sqoop Oozie ZooKeeper
ssign Masters	Falcon Storm Flume Kafka Knox Slider Misc
ssign Slaves and Clients	
Customize Services	Users and Groups
leview	Deale
stall, Start and Test	
umman/	

### Review

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The assignments that have been made are displayed. Check to ensure everything is correct before clicking on **Deploy** button. If any changes are to be made, use the left navigation bar to return to the appropriate screen.

### Deploy

Once review is complete, click the **Deploy** button.

CLUSTER INSTALL WIZARD Review Get Started Please review the configuration before installation Select Stack Install Options Confirm Hosts Admin Name : admin Choose Services Cluster Name : Cisco\_HDP Assign Masters Total Hosts : 68 (68 new) Assign Slaves and Clients Repositories: Customize Services redhat6 (HDP-2.2): http://rhel1/Hortonworks/HDP/centos6/2.x/GA/2.2.0.0 redhat6 (HDP-UTILS-1.1.0.20); Install, Start and Test http://rhei1/Hortonworks/HDP-UTILS-1.1.0.20/repos/centos6 Services: HDES DataNode : 66 hosts NameNode : rhel1 SNameNode : rhel2 YARN + MapReduce2 App Timeline Server : rhel2 NodeManager : 66 hosts ResourceManager : rhel2 Tez ← Back

Figure 172 Review the Assignments

The progress of the install is shown on the screen. Each component is installed and started and a simple test is run on the component. The next screen displays the overall status of the install in the progress bar at the top of the screen and a host-by-host status in the main section.

To see specific information on what tasks have been completed per host, click the link in the **Message** column for the appropriate host. In the **Tasks pop-up**, click the individual task to see the related log files. Select filter conditions by using the **Show** drop-down list. To see a larger version of the log contents, click the **Open** icon or to copy the contents to the clipboard, use the **Copy** icon.

I

Depending on which components are installing, the entire process may take 10 or more minutes.

When successfully installed and started the services appears, click Next.





### **Summary of Install Process**

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The Summary page gives a summary of the accomplished tasks. Click Complete.



Complete  $\rightarrow$ 



Cisco UCS Integrated Infrastructure for Big Data with Hortonworks Data Platform

### **Archival Storage in HDFS**

HDFS along with Apache Hadoop version 2.6.0 (included in HDP 2.2) provides the ability to utilize tiered (heterogeneous) storage media within the HDFS cluster to enable Archival storage to store less frequently accessed datasets and Flash based fast storage to store datasets that require lower latencies for read/write workloads.

In this section, we will go into details on using Cisco UCS C3160 as the Archival Storage.

Over time, frequency of reads on a dataset decreases (recently written data is more frequently accessed while aged data is less frequently accessed). This old dataset is deemed as "cold." As the amount of data under storage grows, there is a need to optimize storage of such 'cold' datasets. An Archival storage tier, consisting of nodes with slow spinning high density storage drives and low compute power, provides cost efficiency for storing these "cold" datasets.

HDP 2.2 introduces an 'ARCHIVE' Storage Type and related Storage Policies - 'Hot', 'Warm', 'Cold'.

The placement of data blocks is tied to the temperature of the data. The default storage type is DISK, which is on Data Nodes; by default every data is considered Hot and placed in Hot data-tier storage (UCS C240 M4).





For WARM option, 2 replicas are placed on the drives of Data Nodes and one replica in Archival Storage.

In COLD option, all replicas are placed in Archival storage.

A directory within HDFS is then assigned a storage policy. Depending on the policy, data copied into that directory is then stored in the appropriately tagged data nodes.

For example - assign directory "/cold-data" to COLD storage policy

hdfs dfsadmin -setStoragePolicy /cold-data COLD

All disk volumes in the Archival storage tier nodes are tagged with the 'ARCHIVE' storage type. Administrators can then apply the 'Cold' Storage Policy to datasets that need to be stored on the Archival storage tier nodes. Since the 'Cold' Storage Policy is applied after the dataset has been created, the policy will be enforced when the HDFS Mover tool is run.

Sections below will go in detail on configuring Archival Storage.



If HDP 2.2 is deployed on only a single Rack with 16 Cisco UCS C240 M4 servers along with only one Cisco UCS C3160 as the archival node, then as a best practice, use only Hot and Warm policies to ensure data redundancy. This is because, using COLD won't provide 3 way replication as only one copy will be stored in Archival storage (which provides data redundancy through RAID5 but is not equivalent to 3 way replication). If there are two Archival nodes, this would still provide strong data redundancy, as there are two copies, one on each Archival node, which is further protected through RAID5 protection.

Steps:

1. Shutdown all data nodes.

Go to Hosts > Actions > Filtered Hosts > DataNodes > Sto
----------------------------------------------------------

🛛 🍌 Ambari Cisi	co_HDP <mark>1 ops</mark>			Dashboar	d Services	Hosts Admin	🟭 🛓 admin 🗸
Actions - Filter: A	All (16) ▼						
+ Add New Hosts		IP Address	Cores (CPU)	RAM 🜲	Disk Usage 🍦	Load Avg 🌲	Components
Selected Hosts (0)  Filtered Hosts (16)	Hosts	• 10.29.160.101	48 (48)	252.17GB		2.39	21 Components
All Hosts (16)	DataNodes NodeManagers	Start	48 (48)	252.17GB		0.08	19 Components
🗆 🔮 rhel11	RegionServers	<ul> <li>Restart</li> </ul>	48 (48)	252.17GB		0.14	• 19 Components
🗆 🔮 rhel12	Supervisors	Decommission	48 (48)	252.17GB		0.08	• 19 Components
🗖 🔮 rhel13		10.29.100.113	48 (48)	252.17GB		0.08	• 19 Components
🗖 🔮 rhel14		10.29.160.114	48 (48)	252.17GB		0.06	• 19 Components
🗖 🔮 rhel15		10.29.160.115	48 (48)	252.17GB		0.04	• 19 Components
🗖 🔮 rhel16		10.29.160.116	48 (48)	252.17GB		0.05	• 19 Components
🗖 🔮 rhel17		10.29.160.117	48 (48)	252.26GB		0.08	• 19 Components

1

Figure 176 Ambari GUI: Stop the DataNodes

Figure 177 DataNodes Successfully Stopped



2. Assign the Archive Storage Type to the DataNode

Go to HDFS > Config > Select Archive in the Config groups

#### Edit all archive directories and add [ARCHIVE] as a prefix in front of each entry

[ARCHIVE]/data/disk1/hadoop/hdfs/data [ARCHIVE]/data/disk2/hadoop/hdfs/data [ARCHIVE]/data/disk3/hadoop/hdfs/data [ARCHIVE]/data/disk4/hadoop/hdfs/data

HDFS 2	Summary Configs	Quick Links 🗸		Service	Actions 💌
MapReduce2					
YARN	Group Archive (1) 🔻	Manage Config Groups	Filter		•
😐 Tez					
Nagios	V2 about an hour	admin V1 admin ago about an hour ago			
🕏 Ganglia	Current	Current			
O Hive	X- V2 Current ad	imin authored on Tue, Mar 17, 2015 22:53		Discard	Save
HBase					
😐 Pig	NameNode				
😐 Sqoop					
Oozie	Secondary NameNode				
Sookeeper					
Falcon	<ul> <li>DataNode</li> </ul>				
Storm					
Flume	DataNode directories	/data/disk1/hadoop/hdfs/data /data/disk2/hadoop/hdfs/data /data/disk3/hadoop /hdfs/data /data/disk4/hadoon/hdfs/data /data/disk5/hadoon/hdfs/data /data/disk6	<b>^</b>		
🔮 Kafka		/hadoop/hdfs/data/data/disk7/hadoop/hdfs/data/data/disk8/hadoop/hdfs/data/ //ata/disk9/hadoon/hdfs/data/disk1/hadoon/hdfs/data/disk1/hadoon			
🛇 Knox		/hdfs/data/data/disk12/hadoop/hdfs/data/data/disk13/hadoop/hdfs/data,			
□ Slider Actions		ARCHIVEI/data/disk1/hadoop/hdfs/data ARCHIVEI/data/disk2/hadoop/hdfs/data ARCHIVEI/data/disk3/hadoop/hdfs/data ARCHIVEI/data/disk4/hadoop/hdfs/data	<b>a</b> •		

Figure 178 HDFS Configuration

Save the configuration

3. Create cold and warm archive HDFS Directories.

sudo -u hdfs hadoop dfs -mkdir /archive-cold sudo -u hdfs hadoop dfs -mkdir /archive-warm

[root@rhel1 ~]# sudo -u hdfs hadoop dfs -mkdir /archive-cold DEPRECATED: Use of this script to execute hdfs command is deprecated. Instead use the hdfs command for it. [root@rhel1 ~]# sudo -u hdfs hadoop dfs -mkdir /archive-warm DEPRECATED: Use of this script to execute hdfs command is deprecated. Instead use the hdfs command for it.

4. Set Storage Policies on HDFS Directory and then confirm these

sudo -u hdfs hdfs dfsadmin -setStoragePolicy /archive-cold COLD sudo -u hdfs hdfs dfsadmin -setStoragePolicy /archive-warm WARM sudo -u hdfs hdfs dfsadmin -getStoragePolicy /archive-cold sudo -u hdfs hdfs dfsadmin -getStoragePolicy /archive-warm [root@rhel1 ~]# sudo -u hdfs hdfs dfsadmin -setStoragePolicy /archive-cold COLD Set storage policy COLD on /archive-cold [root@rhel1 ~]# sudo -u hdfs hdfs dfsadmin -setStoragePolicy /archive-warm WARM Set storage policy WARM on /archive-warm [root@rhel1 ~]# sudo -u hdfs hdfs dfsadmin -getStoragePolicy /archive-cold The storage policy of /archive-cold: 3lockStoragePolicy{COLD:2, storageTypes=[ARCHIVE], creationFallbacks=[], replicationFallbacks=[]} [root@rhel1 ~]# sudo -u hdfs hdfs dfsadmin -getStoragePolicy /archive-warm Phe storage policy of /archive-warm: 8lockStoragePolicy{WARM:5, storageTypes=[DISK, ARCHIVE], creationFallbacks=[DISK, ARCHIVE], replicationFallbacks=[DISK, ARCHIVE]}

5. Start all the DataNodes.

Click HDFS > Restart all > Confirm restart all

	🝌 Ambari	Cisco_H	DP 🚺 ops	_	_	Dash	board	Services	Hosts 15	Admin		🛓 admin	•
1	🔮 HDFS 3 🐉		Summary	Configs		Quick Links+						Service Actio	ins 🕶
	<ul> <li>MapReduce2</li> <li>YARN</li> </ul>		2 Restar	t Required: 2 Compor	nents on 1 Host					_		Restart 🕶	
	😐 Tez									F	Restart A	All	
	Nagios		Summary				Alerts	and Health	Checks	F	Restart D	)ataNodes	Ъ.

#### Figure 179 Ambari GUI: Restart HDFS DataNodes

#### Figure 180

#### Ambari: Restart DataNodes

🛛 🍌 Ambari Cis	co_HDP <b>0</b> ops				Dashboard	Services	Hosts 15 Adr	nin 📰 🕹 admin 🗸
Actions  Filter:	All (16) 🕶							
+ Add New Hosts			IP Address 🛊	Cores (CPU) ≑		Disk Usage	Load Avg	Components
Selected Hosts (0) 🕨			Any	Any	Any		Any	Filter <b>T</b>
Filtered Hosts (16) 🕨	Hosts	• ]	10.29.160.101	48 (48)	252.17GB		0.29	21 Components
All Hosts (16)	DataNodes NodeManagers	Þ	Start	48 (48)	252.17GB		0.00	19 Components
🗆 \ominus rhel11	RegionServers	•	Restart	48 (48)	252.17GB		0.08	19 Components
🗆 \ominus rhel12	Supervisors	×	Decommission	48 (48)	252.17GB		0.04	19 Components
🗖 🗢 rhel13		2	10.20.100.110	48 (48)	252.17GB		0.08	19 Components

6. Copy test files into Warm and Cold Storage HDFS Directories.

Create your test file and copy into warm and cold HDFS directories.

echo "This is a tiered storage test file" > /tmp/storagetest.txt sudo -u hdfs hadoop fs -put /tmp/storagetest.txt /archive-cold sudo -u hdfs hadoop fs -put /tmp/storagetest.txt /archive-warm sudo -u hdfs hadoop fs -cat /archive-cold/storagetest.txt sudo -u hdfs hadoop fs -cat /archive-warm/storagetest.txt [root@rhel1 tmp]# echo "This is a tiered storage test file" > /tmp/storagetest.txt [root@rhel1 tmp]# sudo -u hdfs hadoop fs -put /tmp/storagetest.txt /archive-cold [root@rhel1 tmp]# sudo -u hdfs hadoop fs -put /tmp/storagetest.txt /archive-warm [root@rhel1 tmp]# sudo -u hdfs hadoop fs -cat /archive-cold/storagetest.txt Fhis is a tiered storage test file [root@rhel1 tmp]# sudo -u hdfs hadoop fs -cat /archive-warm/storagetest.txt Fhis is a tiered storage test file

7. Use mover script to apply Storage Policies

sudo -u hdfs hdfs mover -p /archive-warm
sudo -u hdfs hdfs mover -p /archive-cold

[root@rhel1 ~]# sudo -u hdfs hdfs mover -p /archive-warm 15/03/18 03:25:06 INFO mover.Mover: namenodes = {hdfs://rhel1:8020=[/archive-warm]} 15/03/18 03:25:07 INFO balancer.KeyManager: Block token params received from NN: update interval=10hrs, 0sec, token lifetime=10hrs, 15/03/18 03:25:07 INFO balancer.KeyManager: Update block keys every 2hrs, 30mins, 0sec 15/03/18 03:25:07 INFO balancer.KeyManager: Update block keys every 2hrs, 30mins, 0sec 15/03/18 03:25:07 INFO block.BlockTokenSecretManager: Setting block keys 15/03/18 03:25:07 INFO block.BlockTokenSecretManager: Setting block keys 15/03/18 03:25:07 INFO net.NetworkTopology: Adding a new node: /default-rack/192.168.11.113:50010 15/03/18 03:25:07 INFO net.NetworkTopology: Adding a new node: /default-rack/192.168.11.105:50010 15/03/18 03:25:07 INFO net.NetworkTopology: Adding a new node: /default-rack/192.168.11.112:50010 15/03/18 03:25:07 INFO net.NetworkTopology: Adding a new node: /default-rack/192.168.11.112:50010

[root@rhe	el1 ~]# su	udo -ı	hdfs hdfs mover -p /archive-cold
15/03/18	03:25:44	INFO	mover.Mover: namenodes = {hdfs://rhel1:8020=[/archive-cold]}
15/03/18	03:25:45	INFO	balancer.KeyManager: Block token params received from NN: update interval=10hrs, 0sec, token lifetime=10hrs,
15/03/18	03:25:45	INFO	block.BlockTokenSecretManager: Setting block keys
15/03/18	03:25:45	INFO	balancer.KeyManager: Update block keys every 2hrs, 30mins, 0sec
15/03/18	03:25:45	INFO	block.BlockTokenSecretManager: Setting block keys
15/03/18	03:25:45	INFO	net.NetworkTopology: Adding a new node: /default-rack/192.168.11.109:50010
15/03/18	03:25:45	INFO	net.NetworkTopology: Adding a new node: /default-rack/192.168.11.112:50010
15/03/18	03:25:45	INFO	net.NetworkTopology: Adding a new node: /default-rack/192.168.11.116:50010
15/03/18	03:25:45	INFO	net.NetworkTopology: Adding a new node: /default-rack/192.168.11.105:50010

#### 8. Run fsck to check the number of replicas and locations of the blocks

sudo -u hdfs hadoop fsck -racks -locations -blocks -files \
/archive-cold/storagetest.txt
sudo -u hdfs hadoop fsck -racks -locations -blocks -files \
/archive-warm/storagetest.txt

[root@rhel1 ~]# sudo -u hdfs h	adoop fsck -racks -locations -blocks -files /archive-warm/storagetest.txt
DEPRECATED: Use of this script	to execute hdfs command is deprecated.
Instead use the hdfs command f	or it.
Connecting to namenode via htt	p://rhel1:50070
FSCK started by hdfs (auth:SIM	PLE) from /192.168.11.101 for path /archive-warm/storagetest.txt at Wed Mar 18 03:29:47 EDT 2015
/archive-warm/storagetest.txt :	35 bytes, 1 block(s): 0K
0. BP-857809477-192.168.11.101	-1426658417364:blk_1073742388_1637 len=35 repl=3 [/default-rack/192.168.11.107:50010, /default-rack/192.168.11.1
7:50010, /default-rack/192.168	.11.109:50010]
Status: HEALTHY	
Total size: 35 B	
Total dirs: 0	
Total files: 1	
Total symlinks:	0
Total blocks (validated):	1 (avg. block size 35 B)
Minimally replicated blocks:	1 (100.0 %)
Over-replicated blocks:	0 (0.0 %)
Under-replicated blocks:	0 (0.0 %)
Mis-replicated blocks:	0 (0.0 %)
Default replication factor:	3
Average block replication:	3.0
Corrupt blocks:	0
Missing replicas:	0 (0.0 %)
Number of data-nodes:	14
Number of racks:	
FSCK ended at Wed Mar 18 03:29	:47 EDT 2015 in 1 milliseconds
rne filesystem under path '/ar	Chive-warmy storagetest.txt' is healthi

Under the WARM storage policy, two replicas are placed on data nodes while 1 replica is placed in Archival node. As shown in the screenshot, two replicas are stored in data nodes and one in Archival node.

### **Configuring Hive to use Apache Tez**

Apache Hive was originally built for large-scale operational batch processing and it is very effective with reporting, data mining and data preparation use cases. These usage patterns remain very important but with widespread adoption of Hadoop, the enterprise requirement for Hadoop to become more real time or interactive has increased in importance as well.

With the Stinger initiative, Hive query time has improved dramatically, enabling Hive to support both batch and interactive workloads at speed and at scale.

Stinger Initiative was designed to enable Hive to answer human-time use cases (i.e. queries in the 5-30 second range) such as big data exploration, visualization, and parameterized reports through faster performance improvement to hive. One of the main change with Stinger Initiative was to run Hive queries with Apache Tez execution engine instead of the Map-reduce engine. Apache Tez innovations drove many of the Hive performance improvements delivered by the Stinger Initiative

Following are the configurations to enable Hive for faster query (for more details such as using ORCFile, refer http://hortonworks.com/blog/5-ways-make-hive-queries-run-faster/)

#### Set Hive to use Apache Tez

In Ambari, first select **Hive** and navigate to **Configs** tab. Then, in the filter text box type "**execution**" to find the "hive.execution.engine" property. Change its value from **mr** to **tez** as shown below:

#### hive.execution.engine=tez

	Figure 181	Ambari: Configuring Hive	e to use Ap	ache Tez	:				
🚕 Ambari Cisco_	HDP 10 ops		Dashboard	Services	Hosts	Admin		🛓 admin 👻	
HDFS	Summary Configs						-	Service Actions 🕶	
MapReduce2									
⊘ YARN	Group Hive Default (16)	Manage Config Groups			e	execution		•	
😐 Tez									
Nagios	2 hours an	admin							
Ganglia	Current								
📀 Hive	X- V1 Current ad	Imin authored on Tue, Mar 17, 2015 22:53					Di	iscard Save	
HBase							_		
😐 Pig	<ul> <li>General</li> </ul>								
😐 Sqoop									
🗢 Oozie	hive.exec.pre.hooks	org.apache.hadoop.hive.ql.hooks.ATSHook					0		
ZooKeeper	hive.exec.post.hooks	org.apache.hadoop.hive.ql.hooks.ATSHook				hi	ve.execi	ution.engine	
Falcon	hive.execution.engine	tez				В	kpects o	ne of [mr, tez]. Choi	oses execution
Storm		L				er	ngine. O	ptions are: mr (Map	) reduce, default) or
S Flume						te	z (nadoo	op 2 oniy)	

#### **Enable Vectorization**

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Vectorized query in execution improves performance of operations like scans, aggregations, filters and joins, by performing them in batches of 1024 rows at once instead of single row each time.

Instructions to enable vectorization: In Ambari, first select Hive and navigate to Configs tab. Then, in the filter text box type "execution" to find the "hive.vectorized.execution.enabled" and "hive.vectorized.execution.reduce.enabled" properties. Ensure both their values are set to "true"

```
hive.vectorized.execution.enabled = true
hive.vectorized.execution.reduce.enabled = true
```

	6	<sup>1</sup>	
O HDFS	Summary Configs		Service Actions -
MapReduce2			
YARN	Group Hive Default (16	) < Manage Config Groups	execution 🛛 💌
😐 Tez			
Nagios	2 hours at	admin	
🗢 Ganglia	Current		
Hive	🔀 🗕 V1 Current a	dmin authored on Tue, Mar 17, 2015 22:53	Discard
HBase			
😐 Pig	<ul> <li>General</li> </ul>		
🖵 Sqoop			
Oozie	nive.exec.pre.nooks	org.apache.hadoop.nive.ql.hooks.ATSHook	
🕏 ZooKeeper	hive.exec.post.hooks	org.apache.hadoop.hive.ql.hooks.ATSHook	
🕏 Falcon	hive.execution.engine	tez	C 0 A
🗢 Storm			
S Flume			
🔮 Kafka	Performance		
Knox	hive vectorized.	true	
😐 Slider	execution.enabled		hive.vectorized.execution.reduce.ena
Actions -	hive.vectorized.	true	This flag should be set to true to ena
	execution.reduce.		mode of the reduce-side of query exe
	enabled		default value is true.

Figure 182 Ambari: Set Preferences - Vectorization for Hive

#### Enable cost based query optimization

Background: Hive optimizes each query's logical and physical execution plan before submitting for final execution. A recent addition to Hive, Cost-based optimization, performs further optimizations based on query cost, resulting in potentially different decisions: how to order joins, which type of join to perform, degree of parallelism and others.

Enable cost-based optimization (also known as CBO): In Ambari, first select Hive and navigate to Configs tab. Then, in the filter text box type "stats" to find the "hive.compute.query.using.stats", "hive.stats.fetch.column.stats" and "hive.stats.fetch.partition.stats" properties. Ensure all their values are set to "true". Then, in the filter text box type "cbo" and ensure that "hive.compute.query.using.stats" property is also set to true

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hive.cbo.enable=true hive.compute.query.using.stats=true hive.stats.fetch.column.stats=true hive.stats.fetch.partition.stats=true



#### Ambari: Set Preferences - Query Optimization for Hive

## Conclusion

Hadoop has evolved into a leading data management platform across all verticals. The Cisco UCS Integrated Infrastructure for Big Data with Hortonworks (HDP 2.2) with Tiered Storage offers a dependable deployment model for enterprise Hadoop that offers a fast and predictable path for businesses to unlock value in Big Data while providing customer with storage archival to ensure faster drives are used for Hot and Warm data.

The configuration detailed in the document can be extended to clusters of various sizes depending on what application demands. Up to 80 servers (5 racks) can be supported with no additional switching in a single UCS domain with no network over-subscription. Scaling beyond 5 racks (80 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**

This section provides the BOM for 64 nodes Performance Optimized Cluster with 4 nodes Cisco UCS C3160 for Archival nodes. See Table 14 and Table 15 for BOM for the master rack, Table 16 and Table 17 for BOM for expansion racks (rack 2 to 4), Table 18 and 19 for software components.

Part Number	Description	Quantity
UCS-SL-CPA3-P	Performance Optimized Cluster	1
UCSC-C240-M4SX	UCS C240 M4 SFF 24 HD w/o CPU, mem, HD, PCIe, PS, railkt w/expndr	16
UCSC-MRAID12G	Cisco 12G SAS Modular Raid Controller	16
UCSC-MRAID12G-2GB	Cisco 12Gbps SAS 2GB FBWC Cache module (Raid 0/1/5/6)	16
UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	16
CAB-9K12A-NA	Power Cord 125VAC 13A NEMA 5-15 Plug North America	32
UCSC-PSU2V2-1200W	1200W V2 AC Power Supply for 2U C-Series Servers	32
UCSC-RAILB-M4	Ball Bearing Rail Kit for C220 M4 and C240 M4 rack servers	16
UCSC-HS-C240M4	Heat Sink for UCS C240 M4 Rack Server	32
UCSC-SCCBL240	Supercap cable 250mm	16
UCS-CPU-E52680D	2.50 GHz E5-2680 v3/120W 12C/30MB Cache/DDR4 2133MHz	32
UCS-MR-1X162RU-A	16GB DDR4-2133-MHz RDIMM/PC4-17000/dual rank/x4/1.2v	256
UCS-HD12T10KS2-E	1.2 TB 6G SAS 10K rpm SFF HDD	384
UCS-SD120G0KSB-EV	120 GB 2.5 inch Enterprise Value 6G SATA SSD (BOOT)	32
UCSC-PCI-1C-240M4	Right PCI Riser Bd (Riser 1) 20nbd SATA bootdrvs+ 2PCI slts	16
UCS-FI-6296UP-UPG	UCS 6296UP 2RU Fabric Int/No PSU/48 UP/ 18p LIC	2
CON-SNTP-C240M4SX	SMARTNET 24X7X4 UCS C240 M4 SFF 24 HD w/o CPU, mem	16
CON-SNTP-FI6296UP	SMARTNET 24X7X4 UCS 6296UP 2RU Fabric Int/2 PSU/4 Fans	2
SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	32
UCS-ACC-6296UP	UCS 6296UP Chassis Accessory Kit	2
UCS-PSU-6296UP-AC	UCS 6296UP Power Supply/100-240VAC	4
N10-MGT012	UCS Manager v2.2	2
UCS-L-6200-10G-C	2rd Gen FI License to connect C-direct only	70
UCS-BLKE-6200	UCS 6200 Series Expansion Module Blank	6
UCS 6296UP Fan Module	UCS 6296UP Fan Module	8

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#### Table 14Bill of Materials for C240M4SX Base rack

Part Number	Description	Quantity
CAB-9K12A-NA	Power Cord 125VAC 13A NEMA 5-15 Plug North America	4
UCS-FI-E16UP	UCS 6200 16-port Expansion module/16 UP/ 8p LIC	4
RACK-UCS2	Cisco R42610 standard rack w/side panels	1
CON-OS-R42610	ONSITE 8X5XNBD Cisco R42610 expansion rack no side panel	1
RP208-30-1P-U-2=	Cisco RP208-30-U-2 Single Phase PDU 20x C13 4x C19 (Country Specific)	2
CON-OS-RPDUX	ONSITE 8X5XNBD Cisco RP208-30-U-X Single Phase PDU 2x	2

#### Table 14Bill of Materials for C240M4SX Base rack

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Table 15

Bill of Materials for C3160 Base Rack

Part Number	Description	Quantity
UCS-SA-C3160-D	Extreme Capacity	1
UCSC-C3160	Cisco UCS C3160 Base Chassis w/ 4x PSU, 2x120GB SSD RailKit	1
CAB-9K12A-NA	Replace with Power Cord 125VAC 13A NEMA 5-15 Plug North America	4
UCSC-C3X60-SBLKP	UCS C3x60 SIOC blanking plate	1
UCSC-PSU1-1050W	UCS C3X60 1050W Power Supply Unit	4
UCSC-C3X60-12SSD	Cisco UCS C3X60 2x120GB SATA Enterprise Value SSD	2
UCSC-C3X60-RAIL	UCS C3X60 Rack Rails Kit	1
UCSC-C3X60-SVRN4	Cisco C3X60 Server Node E5-2695 v2 CPU 256GB 4GB RAID cache	1
UCSC-HS-C3X60	Cisco UCS C3X60 Server Node CPU Heatsink	2
UCS-CPU-E52695B	2.40 GHz E5-2695 v2/115W 12C/30MB Cache/DDR3 1866MHz	2
UCS-MR-1X162RZ-A	16GB DDR3-1866-MHz RDIMM/PC3-14900/dual rank/x4/1.5v	16
UCSC-C3X60-R4GB	UCS C3X60 12G SAS RAID Controller with 4GB cache	1
UCSC-C3160-SIOC	Cisco UCS C3160 System IO Controller with mLOM mez adapter	1
UCSC-C3X60-56HD4	Cisco UCS C3X60 Four rows 56x 4TB Drives	1
UCSC-C3X60-HD4TB	UCS C3X60 4TB NL-SAS 7.2K HDD including C3X60 HDD carrier Top-load	56
UCSC-C3X60-EX16T	Cisco UCS C3X60 Disk Exp Tray w/ 4x 4TB	1

Part Number	Description	Quantity
UCS-HD4T7KS3-E	4TB SAS 7.2K RPM 3.5 inch HDD/hot plug/drive sled mounted	4
UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	1
CON-SNTP-C3160VD1	UCS C3160 BD D Server	1
SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	2

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Note

If using 6 TB drives for C3160, use the following PID instead of 4TB drives.

UCSC-C3X60-56HD6	Cisco UCS C3X60 Four row of drives containing 56 x 6TB (Total)	1
UCSC-C3X60-HD6TB	UCS C3X60 6TB 12Gbps NL-SAS 7200RPM HDD w carrier- Top-load	56
UCSC-C3X60-EX24T	Cisco UCS C3160 Expander with 4x 6TB 7200RPM NL-SAS Drives	1
UCSC-C3X60-6TBRR	UCS C3X60 6TB 12Gbps NL-SAS 7200RPM HDD w carrier- Rear-load	4

#### Table 16Bill of Materials for Expansion Racks

Part Number	Description	Quantity
UCSC-C240-M4SX	UCS C240 M4 SFF 24 HD w/o CPU, mem, HD, PCIe, PS, railkt w/expndr	48
UCSC-MRAID12G	Cisco 12G SAS Modular Raid Controller	48
UCSC-MRAID12G-2GB	Cisco 12Gbps SAS 2GB FBWC Cache module (Raid 0/1/5/6)	48
UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	48
CAB-9K12A-NA	Power Cord 125VAC 13A NEMA 5-15 Plug North America	96
UCSC-PSU2V2-1200W	1200W V2 AC Power Supply for 2U C-Series Servers	96
UCSC-RAILB-M4	Ball Bearing Rail Kit for C220 M4 and C240 M4 rack servers	48
UCSC-HS-C240M4	Heat Sink for UCS C240 M4 Rack Server	48
UCSC-SCCBL240	Supercap cable 250mm	48
UCS-CPU-E52680D	2.50 GHz E5-2680 v3/120W 12C/30MB Cache/DDR4 2133MHz	96

Part Number	Description	Quantity
UCS-MR-1X162RU-A	16GB DDR4-2133-MHz RDIMM/PC4-17000/dual rank/x4/1.2v	768
UCS-HD12T10KS2-E	1.2 TB 6G SAS 10K rpm SFF HDD	1152
UCS-SD120G0KSB-EV	120 GB 2.5 inch Enterprise Value 6G SATA SSD (BOOT)	96
UCSC-PCI-1C-240M4	Right PCI Riser Bd (Riser 1) 20nbd SATA bootdrvs+ 2PCI slts	48
SFP-H10GB-CU3M=	10GBASE-CU SFP+ Cable 3 Meter	96
CON-SNTP-C240M4SX	SMARTNET 24X7X4 UCS C240 M4 SFF 24 HD w/o CPU, mem	48
RACK-UCS2	Cisco R42610 standard rack w/side panels	3
CON-OS-R42610	ONSITE 8X5XNBD Cisco R42610 expansion rack no side panel	3
RP208-30-1P-U-2=	Cisco RP208-30-U-2 Single Phase PDU 20x C13 4x C19 (Country Specific)	6
CON-OS-RPDUX	ONSITE 8X5XNBD Cisco RP208-30-U-X Single Phase PDU 2x	3

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#### Table 17Bill of Materials for C3160 Expansion Rack

Part Number	Description	Quantity
UCSC-C3160	Cisco UCS C3160 Base Chassis w/ 4x PSU, 2x120GB SSD RailKit	3
CAB-9K12A-NA	Replace with Power Cord 125VAC 13A NEMA 5-15 Plug North America	12
UCSC-C3X60-SBLKP	UCS C3x60 SIOC blanking plate	3
UCSC-PSU1-1050W	UCS C3X60 1050W Power Supply Unit	12
UCSC-C3X60-12SSD	Cisco UCS C3X60 2x120GB SATA Enterprise Value SSD	6
UCSC-C3X60-RAIL	UCS C3X60 Rack Rails Kit	3
UCSC-C3X60-SVRN4	Cisco C3X60 Server Node E5-2695 v2 CPU 256GB 4GB RAID cache	3
UCSC-HS-C3X60	Cisco UCS C3X60 Server Node CPU Heatsink	6
UCS-CPU-E52695B	2.40 GHz E5-2695 v2/115W 12C/30MB Cache/DDR3 1866MHz	6
UCS-MR-1X162RZ-A	16GB DDR3-1866-MHz RDIMM/PC3-14900/dual rank/x4/1.5v	48
UCSC-C3X60-R4GB	UCS C3X60 12G SAS RAID Controller with 4GB cache	3
UCSC-C3160-SIOC	Cisco UCS C3160 System IO Controller with mLOM mez adapter	3
UCSC-C3X60-56HD4	Cisco UCS C3X60 Four rows 56x 4TB Drives	3

Part Number	Description	Quantity
UCSC-C3X60-HD4TB	UCS C3X60 4TB NL-SAS 7.2K HDD including C3X60 HDD carrier Top-load	168
UCSC-C3X60-EX16T	Cisco UCS C3X60 Disk Exp Tray w/ 4x 4TB	3
UCS-HD4T7KS3-E	4TB SAS 7.2K RPM 3.5 inch HDD/hot plug/drive sled mounted	12
UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	3
SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	6
CON-SNTP-C3160VD1	UCS C3160 BD D Server	3

#### Table 18 Red Hat Enterprise Linux License

Red Hat Enterprise Linux		
RHEL-2S-1G-3A	Red Hat Enterprise Linux	68
CON-ISV1-RH2S1G3A	3 year Support for Red Hat Enterprise Linux	68

Table 19

Bill of Materials for Hortonworks



Choose one of the part numbers.

Part Number	Description	Quantity
UCS-BD-HDP-ENT=	HORTONWORKS ENTERPRISE EDITION	68
UCS-BD-HDP-EPL=	HORTONWORKS ENTERPRISE PLUS EDITION	68

## Appendix

## **Cisco UCS Director Express for Big Data**

## Introduction

Hadoop has become a strategic data platform embraced by mainstream enterprises as it offers the fastest path for businesses to unlock value in big data while maximizing existing investments.

As you consider Hadoop to meet your growing data and business needs, operational challenges often emerge. Despite its compelling advantages, Hadoop clusters can be difficult, complex, and time consuming to deploy. Moreover, with so much data increasing so quickly, there is a need to find ways to consistently deploy Hadoop clusters and manage them efficiently.



The UCSD Express appliances (UCSD Express VM and Baremetal Agent VM) can also be installed on an existing VMware ESXi server with proper network connectivity (See Figure 174) to the UCS domain that manages the Hadoop servers. In such a case, skip the sections until Downloading the UCS Director Express software components.

## **UCS Director Express for Big Data**

Cisco UCS Director Express for Big Data provides a single-touch solution that automates deployment of Hadoop on Cisco UCS Common Platform Architecture (CPA) for Big Data infrastructure. It also provides a single management pane across both Cisco UCS integrated infrastructure and Hadoop software. All elements of the infrastructure are handled automatically with little need for user input. Through this approach, configuration of physical computing, internal storage, and networking infrastructure is integrated with the deployment of operating systems, Java packages, and Hadoop along with the provisioning of Hadoop services. Cisco UCS Director Express for Big Data is integrated with major Hadoop distributions from Cloudera, MapR, and Hortonworks, providing single-pane management across the entire infrastructure. It complements and communicates with Hadoop managers, providing a system wide perspective and enabling administrators to correlate Hadoop activity with network and computing activity on individual Hadoop nodes.

## Key features of UCS Director (UCSD) Express for Big Data

- Faster and Easier Big Data Infrastructure Deployment: Cisco UCS Director Express for Big Data extends the Cisco UCS Integrated Infrastructure for Big Data with one-click provisioning, installation, and configuration, delivering a consistent, repeatable, flexible, and reliable end-to-end Hadoop deployment.
- Massive Scalability and Performance: Cisco's unique approach provides appliance-like capabilities for Hadoop with flexibility that helps ensure that resources are deployed right the first time and can scale without arbitrary limitations.
- **Centralized Visibility:** Cisco UCS Director Express for Big Data provides centralized visibility into the complete infrastructure to identify potential failures and latent threats before they affect application and business performance.
- **Open and Powerful:** Provides open interfaces that allows further integration into third-party tools and services while allowing flexibility for your own add-on services.

## **UCSD Express Management Server Configuration**

The basic requirement for deploying and executing the UCSD Express software is a server with VMWare ESXi based virtualization environment. Such a physical server machine with ESXi must be connected to the target Hadoop servers in the UCS domain by means of the management network and a dedicated PXE network.

The following are the potential network topologies:

1. The UCSD Express Management server is outside of the UCS Domain containing the C-Series servers that would be used to form the Hadoop cluster. For example, a standalone (CIMC managed) C220 M4 rack server provisioned with UCSD Express VMs is connected to the UCS Domain





2. The UCSD Express Management server is hosted on a C220 M4 rack server that is connected to and managed by the same UCS Domain. This is the method used in this document.
#### Figure 185 UCSD Express Management Server that is being managed as part of the same UCS Domain



## **UCSD Management Server Cabling**

For this deployment a C220 M4 rack server equipped with Intel Xeon E5-2620 v3 processors, 128 GB of memory, Cisco UCS Virtual Interface Card 1227, Cisco 12-Gbps SAS Modular Raid Controller with 512-MB FBWC, 4 X 600 GB 10K SFF SAS drives is used (any other Cisco UCS server can also be used for this purpose).

The C220 M4 server shall be connected to the UCS Fabric Interconnects as shown in Figure 188. The ports on the on the Fabric Interconnects must be configured as server ports.

#### Figure 186 Fabric Topology for C220 M4



Cisco UCS 6296UP Fabric Interconnect (FI B)
Cisco UCS C220 M4 Rack Server

## **Software Versions**

The UCSD management server is a C220 M4 server that is managed by the UCS Manager. Refer to the software information section in the main part of this Cisco UCS Integrated Infrastructure for Big Data with Hortonworks. See Software Distributions and Versions. In addition, the following software distributions are necessary.

## UCS Director Express for Big Data (1.1)

For more information visit

http://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-director-express-big-data-1-1/mo del.html

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## VMware vSphere 5.5

UCS Director express requires the VMware vSphere 5.5 hypervisor. For more information see http://www.vmware.com

## **Fabric Configuration**

The UCSD management server is a C220 M4 server that is managed by the UCS Manager. Refer to the Fabric Configuration section in the main part of this document for more details.

## **Configuring VLANs**

UCSD Express management server requires two network interfaces. It's service profile need to be

- Management Network default (VLAN 1)
- PXE Network

Table 20

UCSD Express Management Server vNIC configurations

VLAN	Fabric	NIC Port	Function	Failover
default(VLAN1)	А	eth0	Management, User connectivity	Fabric Failover to B
vlan85_PXE	В	eth1	PXE	Fabric Failover to A

PXE VLAN dedicated for PXE booting purpose. Follow these steps in Configuring VLANs to create a dedicated VLAN for PXE. The management network shall continue to be on the default VLAN.

## **Other UCS configurations**

Perform all other UCS configurations such as QOS policy, necessary policies and service profile template by following the documentation above. See the section Creating Pools for Service Profile Templates onwards in this Cisco UCS Integrated Infrastructure for Big Data with Hortonworks cisco validated design.



Create the service profile template named as ESXi\_Host with two vNICs as shown in the above table. For vNIC eth0, select default VLAN as the native VLAN, and for vNIC eth1, select PXE VLAN (vlan85\_PXE) as the native VLAN.

## **Creating Service Profile from the Template**

Select the Servers tab in the left pane of the UCS Manager GUI.

- 1. Go to Service Profile Templates > root.
- 2. Right-click Service Profile Templates ESXi\_Host.
- 3. Select Create Service Profiles From Template.

-Fault Summary	▲ ▲ G ● ■ New -	🕞 Options 🛛 😧 🗴 Pending Activities 🛛 🔯 Exit	ahaha <mark>cisco</mark>
1 14	7 13 >> To Service Profile Ten	emplates 👌 📩 root 🕴 📊 Service Template ESXi_Host	Service Template ESXi_Host
Equipment Servers LAN SAN V	M Admin General Storage Netwo	work ISCSI vNICs Boot Order Policies Events FSM	
Eliuminent Service Template Service Profile  Service Profile Template Service Template R  Service Template R  Service Template UC	Image: Storage Treewise Templat         Image: Templat         Show Navigator         Create Service Profiles From Template         Create a Clone         Disassociate Template         Associate with Server Pool         Change UUID         Change World Wide Node Name         Change Local Disk Configuration Policy         Change Serial over LAN Policy         Modify vNIC/vHBA Placement         Copy       Ctrl+C         Copy XML       Ctrl+L	Profiles From Template Properties Name: ESXI_Host Description: UUID: Hardware Default Power State: ↑ Up Type: Updating Template Associated Server Pool Ce Policy Maintenance Policy Maintenance Policy Maintenance Policy Management IP Address figureiton	
	Delete Ctrl+D		we Changes Reset Values
<u> </u>			11696C Y01069

Figure 187 Creating Service Profiles from Template

4. The Create Service Profile from Template window appears.

Figure 188 Selecting Name and Total number of Service Profiles

🗼 Create Service Profiles From Template	×
Create Service Profiles From Template	0
Naming Prefix: ESXi Name Suffix Starting Number: 1 Number of Instances: 1	
ОК	Cancel

Association of the Service Profiles will take place automatically.

## **Installing VMware vSphere ESXi 5.5**

The following section provides detailed procedures for installing VMware vSphere ESXi 5.5.

There are multiple methods to install VMware vSphere ESXi 5.5. The installation procedure described in this deployment guide uses KVM console and virtual media from Cisco UCS Manager.

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

2. Select the Servers tab.

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- 3. In the navigation pane expand Service Profiles.
- 4. Right click on the newly created service profile ESXi1 and select KVM Console.

#### Figure 189 Selecting KVM Console

Equipment Servers LAN SAN VM Admin		Boot Order Virtual Machines FC Zones Policies	Server Details CIMC Sessions F5M VIF Paths Faults Events
Filter: 9	Service Profiles 🔹	General Scorage Network	ISCST VINICS VINIE
•		Fault Summary	Properties
Service Profiles		0 2 0 0	
Cot     Cot     Admin     Cot     Admin     Cot     Cot	Show Navigator Boot Server Shutdown Server Reset KVM Console SSH to CIMC for SoL Rename Service Profile Create a Clone Create a Service Profile Template	us rall Status: ① Ok tatus Details Desired Power State: ① Up Assoc State: ① Associated Assigned State: ① Assigned Note: The "Desired Power State" is the Power State of the server set via UCSM. It may be therefore different from the actual value. For the actual server power	WARNING         This service profile is not modifiable because it is bound to the service profile template ESXI_Host.         To modify this service profile, please <u>unkind</u> it from the template.         Name:       ESXI1         User Label:
	Disassociate Service Profile Change Service Profile Association	state click the "Server Details" Tab	Service Profile Template: <b>ESXi_Host</b> Template Instance: org-root/Is-ESXi_Host
	Associate with server Pool	ons	Assigned Server or Server Pool
⊡	Linking from the Templete	Set Desired Power State	Management IP Address
E - ₹ srhd3	Change LILITD	Rock Server	Maintenance Policy
🕌 🎎 Sub-O	Reset LILITD	boot Berver	
	Change Management IP Address	Shutdown Server	
	Reset Management IP Address	Reset	
	Change Dynamic vNIC Connection Policy	₩ KVM Console >>	
	Change Local Disk Configuration Policy	SSH to CIMC for SoL >>	
	Change Serial over LAN Policy	Rename Service Profile	
	Change World Wide Node Name		
	Modify vNIC/vHBA Placement		Save Changes Reset Values

5. In the KVM window, force a reboot by executing the Ctrl-Alt-Del macro.





6. As the server goes through a reboot, monitor the progress via the KVM window. When the LSI MegaRAID SAS-MFI BIOS screen appears, press **Ctrl-R** to Enter the Cisco 12G SAS Modular Raid Controller BIOS Configuration Utility.

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📥 UCS40 / E	5Xi1 (Rack -31) - KVN	1 Console(Launched By: admin)				
File View	Macros Tools Virtu					
	si 🥪 shutdown serve	er 📚 Reset				
	Properties					
LSI Meq	yaRAID SAS-	-MFI BIOS				
Version	n 6.19.05.0 «ht(c) 2014	9 (Build May 07, 2014) 4 ISI Commonstion				
cohdutí	ynt (C) 201	f LSI Corporation				
HA -0	(Bus 9 Dev	0) Cisco 12G SAS Modular Ra	id Controller			
Batter	y Status: I	Fully charged				
PCI 510	ot Number:	Θ				
ID LUN	VENDOR	PRODUCT	REVISION	(	CAPACITY	
	LSI	 Cisco 12G SAS Modular Baid	4.250.00-3632	-	 2048 <b>m</b> B	
20 0	SEAGATE	ST9146803SS	0004	1	140014MB	
21 0	SEAGATE	ST9146803SS	0004	1	140014 <b>m</b> B	
22 0	TOSHIBA	MBF2300RC	5704 MUO2	2	286102MB	
23 0	нтн	1101_0500_0110	nuus	L	11447300	
⊖ JBOD	(s) found (	on the host adapter				
⊖ JBOD	(s) handled	d by BIOS				
0 115 m t i		c) found on the host adapter				
o viru		s, iouna on the nost adapter				
0 Virtu	ual Drive(s	s) handled by BIOS				
Press	<ctrl><r> 1</r></ctrl>	to Run MegaRAID Configuratio	n Utility			
				10.29.160.60	admin 0.4 fps	0.001 KB/s 🔒

#### Figure 191 KVM Window displaying the LSI MegaRAID SAS-MFI BIOS screen

- 7. In the MegaRAID configuration utility, under VD Mgmt section, use the arrow keys to select the Cisco 12G SAS Modular RAID (Bus 0xNN, Dev 0xNN) line item.
- 8. Press the function key F2.

ſ

9. Select the option Clear Configuration, and press ENTER.



10. To the question Are you sure you want to clear the configuration? click YES and press ENTER key.

Cisco 12G	SAS Modular Raid Controller BIOS Configuration Utility 5.06-0004
VD Mgmt PD	Mgmt Ctrl Mgmt Properties
L 1 01 4	Virtual Drive Management
	ZG SHS MOdular Kal (Bus 0x05, Dev 0x00) Mo Crount O PAID E
-[+]	Selecting this option will delete all virtual
-[+]	drives.
— н	
-[-] Dr	Are you sure you want to clear the configuration?
-[-]	
	YES NO
F1-Help F2-	Operations F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctlr

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- 11. In the VD Mgmt section, use the arrow keys to select the Cisco 12G SAS Modular RAID (Bus 0xNN, Dev 0xNN) line item.
- 12. Press the function key F2, select Create Virtual Drive and press ENTER.



- 13. In the RAID Level: press ENTER and choose RAID-5.
- 14. In the Drives section, press **SPACE** on the desired number of drives to select them to be part of the RAID group. Use the Up and Down arrow keys to navigate.

Cisco 12G SAS Modular Raid Controller BIOS Configuration Utility 5.06-0004					
VD Mgmt PD Mgmt Ctrl Mgmt Properties					
Virtual Drive Management					
Create New UD					
RAID Level: RAID-5 PD per Span : N/A Drives					
Secure VD:         ID         Type Size         #           No         IX1:-:02          135.97         GB         00           IX1:-:03          135.97         GB         01					
Data Protection:         Disable         IXI::04         278.46 GB         02           I I::06 FDE         110.82 GB					
Basic Settings Size: 271.945 GB Name:					
F1-Help F12-Ctlr					

- 15. Select the Advanced button, and Check the Initialize checkbox.
- 16. Press OK to continue with initialization.



17. After the initialization is complete, the following message appears. Press OK to continue.



- 18. Press Ctrl-N twice to navigate to the Ctrl Mgmt screen.
- 19. Select Boot device field and press ENTER.

ſ

Cisco 12G SAS Modular Raid Controller UD Mgmt PD Mgmt Ctrl Mgmt Propertie Controller Alarm Control Enable Silence 1GB	r BIOS Configuration Utility 5.06-0004 es er Settings- de: BIOS Mode: Boot device: Ignore err VD 0 271.94 GB NONE
Rebuild Rate: 30 Patrol Rate BGI Rate : 30 Cache flush Interva CC Rate : 30 Spinup delay Recon Rate : 30 Spinup drive	30 [ ] Maintain PD Fail History al: 4 [X] Enable controller BIOS 12 [ ] Enable Stop CC on Error
Set Factory Defaults APPLY	Image: Cancel       Image: Cancel         Cancel       < Next >         rl-P-Prev       Page         F12-Ctlr       Ctrl-S-Save

1

- 20. Select the VD 0, and press ENTER again.
- 21. Press Ctrl+S to save the configuration.
- 22. Press ESC to exit the MegaRAID configuration utility.

Cisco 12G SAS Modular Raid Controller BIOS Configuration Utility 5.06-0004
VD Mgmt PD Mgmt Ctrl Mgmt Properties
Controller Settings
Alarm Control — Coercion Mode: BIOS Mode: Boot device:
Enable Silence 1GB Ignore err VD 0 271.94 GB
Are you sure you want to exit?
rebuild hate. 30
BGI Rate : 30 ontroller BIOS
CC Rate : 30 OK Cancel top CC on Error
Recon. Rate : 30 anced Import
[] Enable JBOD
Set Factory Defaults APPLY CANCEL < Next >
F1-Help F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctlr Ctrl-S-Save

- 23. In the KVM window, select the Virtual Media menu.
- 24. Click the Activate Virtual Devices found in the right hand corner of the Virtual Media selection menu.

🛕 C240M4 / ucs1 (Rack -1) - KV	M Console(Launched By: admin)					x
File View Macros Tools Virt	ual Media Help					
🕹 Boot Server 📣 Shutdown Se	Create Image					
KVM Console Properties	Activate Virtual Devices					
	No Signa	10.20.160.89	admin	14 frs	0.251 /2	26 9
Connected to ID: 10.20.160.00		10/20/100/05	Garnin	211 po		unterne T
Connected to 19: 10:29,160.89					5)	ystem "r

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25. In the KVM window, select the Virtual Media menu and Select Map CD/DVD.





26. Browse to the VMware vSphere ESXi 5.5 installer ISO image file.



The VMware vSphere ESXi 5.5 installable ISO is assumed to be on the client machine.

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27. Click Open to add the image to the list of virtual media.

📥 Open			×
Look in:	🌗 Images	💌 🤌 📂	<b></b> .
Recent Items Desktop My Documents Computer	kickstart RHEL-Adm Splunk UCSD-1_0 ucsde-1_1 RHEL6.4-2 RHEL6.5-2 rhel-serve	in :0130130.0-Server-x86_64-DVD.iso :0131111.0-Server-x86_64-DVD1.iso r-7.0-x86_64-dvd.iso Mvisor-Installer-201410001-2143827.x86_64.iso	
	, File name:	Wware-VMvisor-Installer-201410001-2143827.x86_64.iso	Open
Network	Files of type:	Disk iso file (*.iso)	Cancel

Figure 193 Browse to VMWare ESXi Hypervisor ISO Image

- 28. In the KVM window, select the KVM tab to monitor during boot.
- **29.** In the KVM window, select the **Macros** > **Static Macros** > **Ctrl-Alt-Del** button in the upper left corner.
- **30.** Click **OK** to reboot the system.

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31. On reboot, the machine detects the presence of the VMWare ESXi install media.

#### Figure 194 ESXi Standard Boot Menu

ESXi-5.5.0-20141004001-standard Boot Menu
ESXi-5.5.0-20141004001-standard Installer
Boot from local disk
Automatic boot in 2 cocoude
Automatic boot in <b>2</b> seconds
Automatic boot in <b>2</b> seconds

32. Select the ESXi-5.5.0-yyyymmddnnnn-standard Installer. The installer begins automatically.

1

	Loading ESXi installer	
Loading /net_nix4.v01 Loading /net_nx n.v00		

#### Figure 195 Loading the ESXi Installer





33. Press ENTER to continue.

34. Press F11 to accept End user License Agreement (EULA) and continue.

Figure 197 Accept End User License Agreement (EULA)

End User License Agreement (EULA)
VMHARE END USER LICENSE AGREEMENT
PLEASE NOTE THAT THE TERMS OF THIS END USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE, REGARDLESS OF ANY TERMS THAT MAY APPEAR DURING THE INSTALLATION OF THE SOFTWARE.
IMPORTANT-READ CAREFULLY: BY DOWNLOADING, INSTALLING, OR USING THE SOFTWARE, YOU (THE INDIVIDUAL OR LEGAL ENTITY) AGREE TO BE BOUND BY THE TERMS OF THIS END USER LICENSE AGREEMENT ("EULA"). IF YOU DO NOT AGREE TO THE TERMS OF THIS EULA, YOU MUST NOT DOWNLOAD, INSTALL, OR USE THE SOFTWARE, AND YOU MUST DELETE OR RETURN THE UNUSED SOFTWARE TO THE VENDOR FROM WHICH YOU ACQUIRED IT WITHIN THIRTY (30) DAYS AND REQUEST A REFUND OF THE LICENSE FEE, IF ANY, THAT
Use the arrow keys to scroll the EULA text
(ESC) Do not Accept (F11) Accept and Continue

35. Select the storage device. Press ENTER to proceed with the installation.

Figure 198 Selecting the Storage Device for installing the ESXi operating system.

Select a Disk to Install or Upgrade * Contains a VMES partition # Claimed by VMware Virtual SAN (VSAN)	
Storage Device Local: Cisco UCSC-MRAID126 (nas.670da6e715b126a01c9be) Remote: (none)	Capacity 271.95 GiB
(Esc) Cancel (F1) Details (F5) Refresh (Enter)	Cont inve

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36. Select the Keyboard US Default. Press ENTER to continue.

Figure 199	Choose the Keyboard layout
1 15 11 1 1 / /	encose me negooura rayou



37. Choose the root password and confirm it. Press ENTER to continue.

#### Figure 200 Choose the root password

En	ter a root pa	ssword	
Root password: Confirm password:			
(Esc) Cancel	(F9) Back	(Enter) Continue	

- 38. Press F11 to confirm and begin installation.
- 39. Once the installation completes, the following message is displayed in the KVM.
- **40.** Remove the VMWare vSphere Hypervisor's ISO from the Virtual Media menu, by selecting it as shown.

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#### Figure 201 ESXi installation complete – Unmount the Virtual Media

- 41. Click Yes to proceed with un-mapping of the ISO.
- 42. Press ENTER to reboot the server.

The VMWare vSphere ESXi installation is complete.

## **Configuring the Management Network**

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- 1. Once the server reboots, press F2 to log on.
- 2. Enter username as root, and the password chosen above.

#### Figure 202 VMWare ESXi initial screen as seen via the KVM Console

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	VMware ESXi 5.5.0 (VMKernel Release Build 2143827)	
	Cisco Systems Inc UCSC-C220-M4S	
	2 x Intel(R) Xeon(R) CPU E5-2623 v3 @ 3.00GHz 256 GiB Memory	
	Download tools to manage this host from: http://0.0.0.0/ http://[fe80::225:b5ff:feae:9f]/ (STATIC)	
<f2> (</f2>	Custonize System/View Logs	<b>〈F12〉</b> Shut Down/Restart

- 3. Press F2 to continue
- 4. Select Configure Management Network, and press ENTER.
- 5. Select IP Configuration option.

#### Figure 203 Enter the IP configuration option of the Management Network

Configure Management Network	IP Configuration
Configure Management Network Network Adapters VLAN (optional) IP Configuration DNS Configuration Custom DNS Suffixes	IP Configuration Automatic IP Address: 169.254.63.159 Subnet Mask: 255.255.0.0 Default Gateway: Not set This host can obtain an IP address and other networking parameters automatically if your network includes a DHCP server. If not, ask your network administrator for the appropriate settings.
<up down=""> Select</up>	<b>⟨Enter⟩</b> Change <b>⟨Esc⟩</b> Exit

6. Press ENTER to continue.

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- 7. Use the Up/Down arrow keys to highlight the Set Static IP address and network configuration option, and press **SPACE** key to select it.
- 8. Enter the static IP address, Subnet Mask and Default Gateway.

#### Figure 204 Enter the IP Address configuration details



- 9. Press OK to submit the changes.
- 10. Press ESC key exit the Management Network Screen.
- 11. In the Configure Management Network: Confirm dialog box, Press Y to restart the Management Network.

12. Verify the IP address settings in the System Customization screen.

#### Figure 205 Verify the IP address details in the System Customization screen

System Customization	Configure Management Network
Configure Password Configure Lockdown Node Configure Lockdown Node Restart Management Network Test Management Network Test Management Network Network Restore Options Configure Keyboard Troubleshooting Options View System Logs View System Logs View Support Information Reset System Configuration	Hostname: localhost IP Address: 10.29.160.251 IPv6 Addresses: fe80::225:b5ff:feae:9f/64 To view or modify this host's management network settings in detail, press <enter>.</enter>
	KEnter> More     KEsc> Log Out

## Installing the VMWare ESXi client software

- 1. Using a web browser, visit the url: https://10.29.160.251/
- 2. Click on Download vSphere Client.

#### Figure 206 Accessing the ESXi web interface



Figure 207

Download the VMWare vSphere ESXI client software



#### VMware-viclient-all-5.5.0-1993072.exe

http://vsphereclient.vmware.com/vsphereclient/1/9/9/3/0/7/2/VMware-viclient-all-5.5.0-199... Show in folder Remove from list

3. Proceed to install the downloaded VMWare client software.

Figure 208

记 Wware vSphere Client 5.	5 🛛
vmware	Welcome to the installation wizard for VMware vSphere Client 5.5
	The installation wizard will allow you to remove VMware vSphere Client 5.5. To continue, click Next.
VMware VSphere* Client <sup>®</sup>	
	Next > Cancel

## Configuring the vSphere ESXi hypervisor

1. After the installation is complete, launch the VMWare vSphere client.

Installing the vSphere Client software

2. Enter the chosen IP address, the username as root, and the chosen password.

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3. Click on Login to continue.

### Figure 209 Logging into the ESXi using vSphere Client 🗿 ¥Mware vSphere Client х **vm**ware<sup>•</sup> VMware vSphere<sup>®</sup> Client In vSphere 5.5, all new vSphere features are available only ų, through the vSphere Web Client. The traditional vSphere Client will continue to operate, supporting the same feature set as vSphere 5.0, but not exposing any of the new features in vSphere 5.5. The vSphere Client is still used for the vSphere Update Manager (VUM) and Host Client, along with a few solutions (e.g. Site Recovery Manager). To directly manage a single host, enter the IP address or host name. To manage multiple hosts, enter the IP address or name of a vCenter Server. IP address / <u>N</u>ame: 10.29.160.251 Ŧ User name: root \*\*\*\*\*\* Password: 🔲 Use <u>W</u>indows session credentials Login ⊆lose Help

- 4. In the vSphere Client, click on the Configuration tab on the right, and within the Hardware section, click on Networking.
- 5. Click on Add Networking link on the upper right hand side.

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6. In the Add Networking dialog box, click the Virtual Machine radio button and click Next.

#### Figure 211 Adding a new Virtual Machine Network

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🗿 Add Network Wizard	
Connection Type Networking hardware can	be partitioned to accommodate each service that requires connectivity,
Connection Type Network Access Connection Settings Summary	Connection Types  Virtual Machine Add a labeled network to handle virtual machine network traffic.  VMkernel The VMkernel TCP/IIP stack handles traffic for the following ESXI services: vSphere vMotion, ISCSI, NFS, and host management.
Help	< Back Next > Cancel

- 7. Click the **Create a vSphere standard switch** radio button and make sure that the checkbox next to vmnic1 is checked.
- 8. Click Next.

#### Figure 212 Creating a new vSphere Standard Switch

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🚱 Add Network Wizard	
Virtual Machines - Networl Virtual machines reach ne	<b>c Access</b> tworks through uplink adapters attached to vSphere standard switches.
Connection Type Network Access	Select which vSphere standard switch will handle the network traffic for this connection. You may also create a new vSphere standard switch using the unclaimed network adapters listed below.
Connection Settings Summary	Create a vSphere standard switch Speed Networks     Cisco Systems Inc Cisco VIC Ethernet NIC
	Vmnic1 10000 Full None
	C Use vSwitch0 Speed Networks Cisco Systems Inc Cisco VIC Ethernet NIC
	mic0 10000 Full 10.29.160.1-10.29.160.254
	Preview:
	Virtual Machine Port Group Physical Adapters VM Network 2
Help	< Back Next > Cancel

- 9. In the Port Group Properties, change the Network Label field to PXE\_VLAN85.
- **10.** Leave the VLAN ID(Optional) field as None(0).
- 11. Click Next.

Elemen 212	Constitute the	Dant Carrie	C 41	DVE VI AN	.7
rigure 215	Creating the	Port Group	<i>jor ine</i>	PAL VLAI	۲.

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🛃 Add Network Wizard	
Virtual Machines - Conne Use network labels to ic	ection Settings dentify migration compatible connections common to two or more hosts.
Connection Type Network Access Connection Settings Summary	Port Group Properties         Network Label:       PXE_VLAN85         VLAN ID (Optional):       None (0)         Preview:
Help	< Back Cancel

12. Click Finish to complete adding the Network.

#### Figure 214 Verify the Created vSphere Standard Switches

1

🛃 Add Network Wizard		<u> </u>
Ready to Complete Verify that all new and mo	dified vSphere standard switches are configured appropriately.	
Connection Type Network Access Connection Settings Summary	Host networking will include the following new and modified standard switches: Preview:  Virtual Machine Port Group PXE_VLAN85  PXE_VLAN85  Virtual Machine Port Group PXE_VLAN85  PXE_VLAN85	
Help	< Back Finish Ca	ncel

- 13. Click on the Time Configuration under the Software section.
- 14. Click on Properties at the upper right hand corner.



#### Figure 215 Enabling the NTP Client on the ESXi

- 15. In the NTP Daemon (ntpd) Options dialog box, click Options.
- 16. Click on the General options.

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17. Click to select the start and stop with host radio button.



🛃 NTP Daemon (ntpd) Opl	tions X
General NTP Settings	Status         Stopped         Startup Policy         Start automatically if any ports are open, and stop when all ports are closed         Start and stop with host         Start and stop manually         Service Commands         Start       Stop         Restart
	OK Cancel <u>H</u> elp

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- 18. Click on NTP Settings option.
- 19. Click on Add button to add the NTP server's IP address.
- 20. Press OK to continue.

#### Figure 217 Adding a new NTP Server to the ESXi NTP Settings

🛃 NTP Daemon (ntpd) Opt	ions	X
General NTP Settings	NTP Servers Add NTP Server Address: 10.29.160.100 OK Cancel Help	
	Add Edit Remove	

- 21. In the next screen, verify the IP-address in the NTP Servers list.
- 22. Click on the checkbox Restart NTP service to apply changes.
- 23. Press the button OK twice to complete the time configurations.

rigure 218 Kestart NTP Service	Figure 218	Restart NTP Service
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🛃 NTP Daemon (ntpd) Optio	ns	×
General NTP Settings	NTP Servers          10.29.160.100         Add         Edit         Restart NTP service to apply changes	
	OK Cancel <u>H</u> el	p

24. Time configuration option would now show that the NTP client is running, along with the IP address of the NTP client.

Cisco UCS	5 Integrated	Infrastructure	for Big	Data wit	h Hortonworks	Data Platform
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# **Downloading the UCS Director Express Software Components**

The software components of UCS Director Express for Big Data need to be downloaded from three different locations.

Software component	File Names	Link to Download
Cisco UCS Director Express 1.0 OVF	CUCSD_Express_1_0_0_0_GA.z	https://software.cisco.c om/download/release.ht ml?mdfid=286281255 &flowid=71403&softw areid=285018084&rele ase=1&relind=AVAILA BLE&rellifecycle=&rel type=latest
Cisco UCS Director 5.2.0.1 patch	cucsd_patch_5_2_0_1.zIP	https://software.cisco.c
Cisco UCS Director Baremetal Agent 5.2 OVF	CUCSD_BMA_5_2_0_0_VMWA RE_GA.zip	om/download/release.ht ml?mdfid=286283454 &flowid=72903&softw areid=285018084&rele ase=5&relind=AVAILA BLE&rellifecycle=&rel type=latest
Cisco UCS Director Express for Big Data 1.1 Upgrade Package	UCSDExpress_Big_Data_1.1_Up grade_Package.zip	https://software.cisco.c om/download/release.ht
25. Cisco UCS Director Express for Big Data BMA Update Package	UCSDExpress_BMA_Big_Data_ 1.1_Upgrade_Package.zip	ml?mdfid=286284995 &flowid=73724&softw areid=285018084&rele ase=1&relind=AVAILA BLE&rellifecycle=&rel type=latest

#### Table 21 Cisco UCS Director Express Big Data 1.1 Software Components

## **Download the Software Components**

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1. Using the links provided Table 15 above, download the Cisco UCS Director Express for Big Data 1.1 OVF Appliance zip file.

	Figure 220	Cisco	UCS Director E.	xpress for Big	Data 1.0 L	Download Pag	<i>le</i>		
⇒ C 🙆 https:	//software.cisco.co	m/download,	/release.html?mc	lfid=28628125	5&flowid=7	1403&softwar	eid=285018	084&reli (	) کر ا
սիսիս cisco <sup>թո</sup>	oducts & Services	Support	How to Buy	Training & Eve	Worldwide [chan nts P:	nge] Log In   Acco artners	unt   Register	My Cisco	▼ Q
OWNIOAd So wnloads Home > Proc	Dftware Jucts > Servers - Unifie	d Computing > U	ICS Director > UCS E	irector Express for	Big Data 1.0 >	躁 Download C UCS Director Virte	Cart (Ditems) ( al Appliance S	+) Feedback oftware-1	Hel
Search	Release 1	.0						Add Devi	ices
Expand All   Collapse Al	Cisco UCSD Express	Patch as well as Bt	MA Patch for Cisco LICSI	) Express for Big Data	10			Add Noti	fication
	File Information			, Expression English	Release Date	▼ Size			
◆All Releases ▶0	Cisco UCS Director or Big Data (Patch n Checksum - 5b2a6o cucsde_bma_patch_5	Bare Metal Agent eed to be applied 11950f07837e29bo _0_0_1.zip	Patch for Cisco UCS D on top Cisco UCS Dire dcc52dca301) 👔	irector Express F ector BMA 5.0. MD5	19-NOV-2014	10.37 MB		ownload dd to cart	
	Cisco UCSD Expres: 5 Checksum - ca444 cucsde_patch_1_0_0	s For Big Data Pato 19a25057af5072aca _1.zip	ch (Patch needs to be Ifaf7fc7d933) 👔	applied on 1.0. MD	19-NOV-2014	1.76 MB	D	ownload dd to cart	
	Cisco UCSD Expres hock - CVE-2014-62 ow to apply this pat cucsd_bash_hotfix.zij	s Hotfix for Bash ( 71, CVE-2014-7169) ch 🚡	Code Injection Vulnera ) Note: Patch has READ	ibility (Bash ShellS IME that explains h	06-OCT-2014	1.82 MB	D	ownload dd to cart	
	Cisco UCS Director 8d6cb7dc36107ca5c CUCSD_Express_1_0	Express for Big Da 1f93a9faf69d49c) _0_0_GA.zip	ata 1.0 (OVF Appliance	) MD5 Checksum	05-SEP-2014	2663.09 MB	D	ownload dd to cart	
	Cisco UCS Director m - 517fa2a881b8cal UCSDExpress_BMA_{	Express for Big Data D6dff0c3ad17a1cc 5.0_Big_Data_Packa	ata BMA Update Packa 9b 🚡 igetgz	ge MD5 Checksu	05-SEP-2014	343.95 MB	D	ownload dd to cart	
Related Information									-
Dashboard Inform	nation Sources								
Select different informa	ation sources for access to	relevant troublesho	ooting information.						
Information Sources									

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2. Using the links provided Table 15 above; download the Cisco UCS Director 5.2.0.1 Patch zip file, and Cisco UCS Director Baremetal Agent 5.2 VMware vSphere OVF Appliance zip file.
## Figure 221 Cisco UCS Director 5.2 Download Page

Downloads Home > Products > Servers - Unified Computing > UCS Director > UCS Director 5.2 > UCS Director Virtual Appliance Software-5

# UCS Director 5.2

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Search  Expand All   Collapse All	Release 5			Add Devices
Latest	CUCSD 5.2.0.1 Patch			
5 ▼All Releases	File Information	Release Date 🔻	Size	
<b>▶</b> 5	Cisco UCS Director 5.2.0.1 Patch (Patch need to be applied on top of 5.2 MD5 Checksum - 1ef745cd8bbd43a46aa1398247dbfc1c ) cucsd_patch_5_2_0_1.zip	03-FEB-2015	1141.61 MB	Download Add to cart
	Cisco UCS Director 5.2.0.0A HOTFIX Patch (PSIRT FIX FOR NTP - Patch need to be applied on top of 5.2.0.0 MD5 Checksum - 24f9a3c0c2c6aa1ab83fc0da70cf5c e7) cucsd_patch_5_2_0_0A.zip	15-JAN-2015	1.45 MB	Download Add to cart
	Cisco UCS Director 5.2 (HyperV Appliance) MD5 Checksum - f04047c63e5c142 2ff49fe575a77d143 CUCSD_5_2_0_0_HYPERV_GA.zip	20-DEC-2014	9344.73 MB	Download Add to cart
	Cisco UCS Director 5.2 (VMWare vSphere OVF Appliance. MD5 Checksum - 06 bfb6fe95aabef9c69555b535946363 )	20-DEC-2014	2869.15 MB	Download Add to cart
	Cisco UCS Director Baremetal Agent 5.2 (HyperV Appliance MD5 Checksum - 0fd872b48f9f302416b6769a247cbbec )	20-DEC-2014	8195.32 MB	Download Add to cart
	Cisco UCS Director Baremetal Agent 5.2 (VMWare vSphere OVF Appliance MD 5 Checksum - a0c34c4c924720dc9d2f9b099c5b9b5c) CUCSD_BMA_5_2_0_0_VMWARE_GA.zip	20-DEC-2014	1857.43 MB	Download Add to cart

**3.** Using the links provided Table 21 above; download the Cisco UCS Director 5.2.0.1 Patch zip file, and the Cisco UCS Director Baremetal Agent 5.2 VMWare vSphere OVF Appliance zip file.

#### Figure 222 Cisco UCS Director Express for Big Data 1.1 Download Page

Downloads Home > Products > Servers - Unified Computing > UCS Director > UCS Director Express for Big Data 1.1 > UCS Director Virtual Appliance Software-1

### UCS Director Express for Big Data 1.1

Search  Expand All   Collapse All	Release 1			Add Devices
▼ Latest	Cisco UCSD Express 1.1 (Upgrade Package and BMA Patch)			
1 ▼All Releases	File Information	Release Date 🔻	Size	
<b>▶</b> 0	Cisco UCS Director Express for Big Data 1.1 BMA Update Package (MD5 Check sum 25e434da9b06465cade4902e0e5b0d81 ) UCSDExpress_BMA_5.2_Big_Data_1.1_Upgrade_Package.zip	10-MAR-2015	353.13 MB	Download Add to cart
	Cisco UCS Director Express for Big Data 1.1 Upgrade_Package (MD5 Checksu m 8748164497a2b42ee4ba079098a0a1e3) 👔 UCSDExpress_Big_Data_1.1_Upgrade_Package.zip	10-MAR-2015	2.05 MB	Download Add to cart

- 4. Please all the files in a directory in the client windows workstation.
- 5. Unzip the contents of the CUCSD\_Express\_1\_0\_0\_0\_GA.zip and CUCSD\_BMA\_5\_2\_0\_0\_VMWARE\_GA.zip.

# **Installing Cisco UCS Director Express for Big Data**

The Cisco UCS Director Express for Big Data shall be installed on the VMWare vSphere hypervisor using the vSphere Client software.

# **Deploying the Cisco UCS Director Baremetal Agent OVF**

- 1. Launch the VMWare vSphere client software
- 2. Enter the chosen IP address, the username as root, and the chosen password.
- 3. Click on Login to continue.
- 4. From the File menu, Select Deploy OVF Template.

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<b>@</b> 1	0.29.160.251 - <del>vS</del> phere Client		<
File	Edit View Inventory Adminis	tration Plug-ins Help	
	New	rentory 🕨 🛐 Inventory	1
	Deploy OVF Template		
	Export •		
	Report •	localhost.localdomain VMware E5Xi, 5.5.0, 2143827   Evaluation (60 days remaining)	
	Browse VA Marketplace	Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Local Users & Groups Events Permissions	4
	Print Maps	close tab ⊠	
	Exit	What is a Host?	l
	-	A host is a computer that uses virtualization software, such as ESX or ESXI, to run virtual machines. Hosts provide the CPU and memory resources that virtual machines use and give virtual machines access to storage and network connectivity. You can add a virtual machine to a host by creating a new one or by deploying a virtual appliance. The easiest way to add a virtual machine is to deploy a virtual appliance is a pre-built virtual machine with an operating system and software already installed. A new virtual machine will need an operating system installed on it, such as Windows or Linux.	
		vSphere Client	
		Basic Tasks	
		局 Deploy from VA Marketplace	
		Explore Further	
		📃 Learn about v Sphere	
		Manage multiple hosts, eliminate downtime, load	1
Rec	ent Tasks	Name, Target or Status contains: -	K
Nar	ne Targe	t Status Details Initiated by Requested Start Ti  Start Time Completed Time	
1	Tasks	Evaluation Mode: 60 days remaining root	11

5. Choose the Cisco UCS Director Baremetal Agent 5.2.0.0 OVF template. Click **Open**.

6. Click Next to continue.

Figure 224	Select the Cisco	UCS Director	Raremetal Ag	ent OVF file
rigure 224	select the Cisco	UCS Director	рагетени Ад	eni Ov I jue

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Deploy OVF Template Source Select the source location.		
Source OVF Template Details Name and Location Disk Format Ready to Complete	Deploy from a file or URL CSD BMA 5.2.0.0 VMWARE GA\cucsd bma 5.2.0.0.0vf R Browse Enter a URL to download and install the OVF package from the Internet, or specify a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.	
Help	< Back Next >	Cancel

- 7. Review the details of the OVF template, Click Next.
- 8. Accept the End User License Agreement. Click Next to continue.
- 9. In the Name and Location option, Enter the name of the VM. Click Next to continue.

# Figure 225 Enter Cisco UCS Director Baremetal Agent VM Name

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Performed by DVF Template Name and Location Specify a name and location	n for the deployed template
Source OVF Template Details End User License Agreement Name and Location Disk Format Network Mapping Ready to Complete	Name: [CUCSD-BM-5.2.0.0_36] The name can contain up to 80 characters and it must be unique within the inventory folder.

10. In the Disk Format option, click the **Thick Provision Lazy Zeroed** radio button. Click **Next** to continue.

## Figure 226 Select the Disk Format for the VM

Poploy OVF Template					
<b>Disk Format</b> In which format do you wa	nt to store the virtual disks?				
Source OVF Template Details	Datastore:	datastore1			
End User License Agreement Name and Location	Available space (GB):	263.5			
Disk Format Network Mapping					
Ready to Complete	Thick Provision Lazy Zeroe	d			
	C Thick Provision Eager Zero	ed			
	C Thin Provision				
Help			< Back	Next >	Cancel
					1.

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- 11. In the Network Mapping option,
- Choose VM Network as the destination network for source Network 1.
- Choose **PXE\_VLAN85** as the destination network for source Network 2.
- 12. Click Next to continue.

# Figure 227 Network Mapping for Deployed Template

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Deploy OVF Template			_ 🗆 ×
Network Mapping What networks should the	deployed template use?		
Source OVF Template Details End User License Agreement	Map the networks used in this OVF	template to networks in your inventory	
Name and Location	Source Networks	Destination Networks	
<u>Disk Format</u>	Network 1	VM Network	
Network Mapping Ready to Complete	Network 2	PXE_VLAN85	
	Description: The Network 1 network		*
Help		< Back Next > Ca	ancel

13. Review the details of the VM, click the check box **Power on after deployment** and click **Finish** to proceed with the VM deployment.

### Figure 228 Deploy the Cisco UCS Director Baremetal Agent VM

🛃 Deploy O¥F Template		
Ready to Complete		
Are these the options you	want to use?	
Source OVF Template Details End User License Agreement	When you click Finish, the deploym	ent task will be started.
Name and Location	OVE file:	C:\CVD\Images\ucsde-1_1\CUCSD_BMA_5_2_0_0_VMW
Disk Format	Dowpload size:	1.8 GB
Network Mapping	Size op disk:	40.0.GB
Ready to Complete	Name:	CUCSD-BM-5 2 0 0 36
	Host/Cluster:	localbost
	Datastore:	datastore1
	Disk provisioning:	Thick Provision Lazy Zeroed
	Network Mapping:	"Network 1" to "VM Network"
	Network Mapping:	"Network 2" to "PXE_VI AN85"
	network mapping.	
	-	
	I✓ Power on after deployment	
Help		< Back Finish Cancel

### Figure 229 Cisco UCS Director Baremetal Agent VM Deployment in Progress



# Configuring the Cisco UCS Director Baremetal Agent VM (BMA-VM)

The Cisco UCS Director Baremetal Agent VM named as CUCSD-BM-5.2.0.0\_36 shall be known as BMA-VM here onwards.

- 1. Right click on the BMA-VM, and select Edit Settings.
- 2. In the Virtual Machine Properties dialog box, click on the Options Tab.
- **3.** Click on the VMWare **Tools**, Click on the **Synchronize guest time with host** option in the Advanced **section**.
- 4. Click on **OK** button to accept the changes.

Figure 230 Edit VM Settings to Synchronize the Guest Time with the ESXi Host



5. Right click on the BMA-VM, and select Open Console.



Figure 231 Access the VM Console of the BMA-VM

6. In the console accept the End User License Agreement by typing yes and press ENTER.

Figure 232 Accept the EULA



- 7. Login as root user using the default password pxeboot.
- 8. Configure the network interfaces by editing the ifcfg-eth0 and ifcfg-eth1 files located at /etc/sysconfig/network-scripts/ directory, as follows:

Network Interface	Configuration
eth0	IP Address: 10.29.160.36, Subnet Mask: 255.255.255.0

Table 22BMA-VM network configurations

eth1	IP Address: 192.168.85.36, Subnet Mask: 255.255.255.0

# Figure 233 Editing the BMA-VM NIC eth0

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### Figure 234 Editing the BMA-VM NIC eth1

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9. Restart the network service by using the service command.

# service network restart

Figure 235 Restart the network

[root@localhost ~]# service network restart	
Shutting down interface eth0:	[FAILED]
Shutting down interface eth1:	E OK 1
Shutting down loopback interface:	E OK 1
Bringing up loopback interface:	E OK 1
Bringing up interface eth0:	E OK 1
Bringing up interface eth1:	E OK J

# Installing the Cisco UCS Director Express Big Data Upgrade Package

- 1. Copy over the UCSDExpress\_BMA\_5.2\_Big\_Data\_1.1\_Upgrade\_Package.zip that was downloaded from cisco.com to this VM, by using a secure shell FTP session.
- 2. Unzip the contents in a temporary staging directory.
- 3. Change directory into the scripts/bin directory.
- 4. Change the permissions to add execute permissions to the copyfiles.sh script file and execute it.

## chmod +x copyfiles.sh

### Figure 236 Install the Cisco UCS Director Express Big Data Upgrade Package

```
[root@localhost stage] # ls
CentOSLive bd_bma_version.info feature-bigdata-intel.jar
Hortonworks-2.1 cloudera-5.0.1 mapr_common_templates
Hortonworks-2.2 cloudera-5.2.0 ntp_server_config.sh
MapR-3.1.1 cloudera-5.2.1 run.sh.template
MapR-4.0.1 cloudera-5.3.0 scripts
bd-sw-rep common_templates templates
[root@localhost stage] # cd scripts/bin
[root@localhost bin] # chmod +x ./copyfiles.sh
```

5. Execute the copyfiles.sh script.

# ./copyfiles.sh

This script copies the number of software modules such as CentOSLive image into the BMA-VM and creates a new repository directory by name **bd-sw-rep** under the **/opt/cnsaroot** directory. This new directory acts as the repository of all the Big Data specific 3rd party hadoop distribution directories.

# **Configuring the Big Data software repositories**

# Copy the Contents of RHEL6.5 ISO into the BMA-VM

- Copy over the contents of the RHEL6.5 ISO into the directory /opt/cnsaroot/images/RHEL6.5 on the BMA-VM.
- 2. Copy the contents of the directory /opt/cnsaroot/images/RHEL6.5/isolinux into the directory /opt/cnsaroot/RHEL6.5.

Figure 237	Copy the Contents of RHEL6.	5 ISO into the BMA-VM

# Download and Place the Common Utility files in BMA-VM

- **3.** From a host connected to the Internet, download the Parallel-SSH and Cluster-Shell utility tools and copy them over to the /**opt/cnsaroot/bd-sw-rep** directory.
- Download Parallel SSH archive from https://pypi.python.org/packages/source/p/pssh/pssh-2.3.1.tar.gz
- Download Cluster-Shell RPM package from http://dl.fedoraproject.org/pub/epel/6/x86\_64/clustershell-1.6-1.el6.noarch.rpm

Figure 238 Copy the Cluster-Shell and Passwordless-SSH Utilities

-rw-r--r- 1 root root 250400 Feb 18 21:18 clustershell-1.6-1.el6.noarch.rpm -rw-r--r- 1 root root 23427 Feb 18 21:17 pssh-2.3.1.tar.gz [root@localhost bd-sw-rep]# pwd /opt/cnsaroot/bd-sw-rep [root@localhost bd-sw-rep]#

- 4. By following the instructions on this page of the BMA-Install guide, download and copy over the Hadoop Distro RPMs into their respective directories under /opt/cnsaroot/bd-sw-rep. http://www.cisco.com/c/en/us/td/docs/unified\_computing/ucs/ucs-director-express/bma-install-con fig/1-1/b\_ucsd\_express\_bma\_install\_config\_guide\_1-1/b\_ucsd\_express\_bma\_install\_config\_guide e chapter 0101.html#reference F3FE769E6A114DAD8CD5E3296556B70E
- 5. Upload the appropriate License files to the Hadoop distribution directories
- Place the Cloudera License in a file called ClouderaEnterpriseLicense.lic and place it under the /opt/cnsaroot/bd-sw-rep/cloudera05.x.y.
- Place the MapR license in a file called license.txt MapR License and place it under the directory /opt/cnsaroot/bd-sw-rep/MapR-X.Y.Z.

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Hortonworks distribution does not require any license file.

Figure 239 Copy the RPM Packages for the Hadoop Distributions



# Setup a UCSD Patch Directory in the BMA-VM

Cisco UCS Director Express for Big Data VM which will be installed in the next section, requires the patches to be kept in a web server. The BMA-VM comes pre-configured with a web-server used during PXE booting process. This section walks through the steps to create a directory to hold these patches in the BMA-VM.

1. In BMA-VM, create a directory by name patches under /var/www/html.

### mkdir /var/www/html/patches

2. Copy over the Cisco UCS Director Express for Big Data 1.1 specific patch files (See Table 3) to this patch directory.

Figure 240 Setup a UCSD Patch Directory in the HTTP Root Path

```
[root@localhost ~]# ls -1 /var/www/html/patches
total 1172256
-rw-r--r-- 1 root root 2139421 Feb 18 04:52 UCSDExpress_Big_Data_1.1_Upgrade_Package.zip
-rw-r--r-- 1 root root 1197064934 Feb 3 13:16 cucsd_patch_5_2_0_1.zip
```

3. Start the HTTPD server in the BMA-VM.

service httpd start

Figure 241 Start the HTTPD



4. Verify if these files are accessible by visiting the URL http://<BMA-VM's >IP address/patches/.

Figure 242 Verify the Accessibility of the Cisco UCS Director Express Patches

← → C 🗋 10.29.160.36/patches/		ණ <b>=</b>	
Apps dive Cisco UCS Manager			
Index of /patches			
Name	Last modified	Size Description	
Parent Directory		_	
🙌 UCSDExpress_Big_Data_1.1_Upgrade_Package.zip	18-Feb-2015 04:52	2 2.0 <b>M</b>	
🙌 cucsd_patch_5_2_0_1.zip	03-Feb-2015 13:16	5 1.1G	

BMA-VM configurations are complete.

# **Deploying the Cisco UCS Director Express OVF**

- 1. Launch the VMWare vSphere client software
- 2. Enter the chosen IP address, the username as root, and the chosen password.
- 3. Click Login to continue.
- 4. From the File menu, Select Deploy OVF Template.
- 5. Choose the Cisco UCS Director Express for Big Data 1.0 OVF template. Click Open.

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# Figure 243 Deploy the Cisco UCSD Express 1.0 OVF

Deploy OVF Template Source Select the source location.	
Source OVF Template Details Name and Location Disk Format Ready to Complete	Deploy from a file or URL          CUCSD Express 1 0 0 0 GA\cucsd express 1 0 0 0.0vf       Browse         Enter a URL to download and install the OVF package from the Internet, or specify a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.
Help	_≤Back Next ≥ Cancel

- 6. Review the details of the OVF, and Click Next to continue.
- 7. Accept the EULA, Click Next to continue.
- 8. Name the VM, Click Next to continue.

# Figure 244 Name the Cisco UCS Director Express VM

Peolov OVF Template			
Name and Location Specify a name and location for the deployed template			
Source OVF Template Details End User License Agreement Name and Location Disk Format Network Mapping Ready to Complete	Name: CUCSDE-1_1_35 The name can contain up to 80 characters and it must be unique within the inventory folder.		
Help	< Back Next >	Cancel	

**9.** Choose the destination network **VM Network** for the source network **Network 1**. Click **Next** to continue.

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# Figure 245 Cisco UCS Director Express VM Network Configuration

Deploy OVF Template			
Network Mapping What networks should the d	eployed template use?		
Source OVF Template Details End User License Agreement	Map the networks used in this OVF	template to networks in your inventory	
Name and Location	Source Networks	Destination Networks	
<u>Disk Format</u> <b>Network Mapping</b> Ready to Complete	Network 1	VM Network	
	Description: The "Network 1" network		×
Help		<u>Sack</u> Next <u>&gt;</u>	Cancel

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- **10.** In the Disk Format option, click the **Thick Provision Lazy Zeroed** radio button. Click **Next** to continue.
- 11. Review the details of the VM, Check the checkbox Power On after deployment.
- 12. Click Finish to proceed with deployment.



Peploy OVF Template Ready to Complete Are these the options you	want to use?	
Source OVF Template Details End User License Agreement Name and Location Disk Format Network Mapping Ready to Complete	When you click Finish, the deployment settings:          OVF file:         Download size:         Size on disk:         Name:         Host/Cluster:         Datastore:         Disk provisioning:         Network Mapping:	hent task will be started. C:\CVD\Images\UCSD-1_0\CUCSD_Express_1_0_0_0_GA 2.6 GB 100.0 GB CUCSDE-1_1_35 localhost. datastore1 Thick Provision Lazy Zeroed "Network 1" to "VM Network"
Help		< Back Finish Cancel

# Configuring the Cisco UCS Director Express VM (UCSD-VM)

The Cisco UCS Director Express VM named as CUCSDE-1\_1\_35 shall be known as UCSD-VM here onwards.

- 1. Right click on the UCSD-VM, and select Edit Settings.
- 2. In the Virtual Machine Properties dialog box, click on the **Options** tab.
- 3. Click on the VMware Tools, Click on the Synchronize guest time with host option in the Advanced section.
- 4. Click on **OK** button to accept the changes.

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## Figure 247 Edit VM Settings to Synchronize the Guest Time with the ESXi Host

CUCSDE-1_1_35 - Virtual Ma	chine Properties	Virtual Machine Version: 7
Hardware         Options         Resources           Settings         General Options         VMware Tools           Power Management         Advanced         General           Advanced         General         CPUID Mask           Boot Options         Fibre Channel NPIV         CPU/MMU Virtualization           Swapfile Location         Swapfile Location         Swapfile Location	Summary CUCSDE-1_1_35 Shut Down Standby Normal Expose Nx flag to Normal Boot None Automatic Use default settings	Power Controls   Suspend   Power on / Resume virtual machine   Restart Guest   Restart Guest   After powering on   After resuming   Before suspending   Before suspending   Before shutting down Guest   Advanced    Check and upgrade Tools during power cycling    Synchronize guest time with host
Help		OK Cancel

- 5. Right-click on the UCSD-VM and select Open Console.
- 6. Accept the End User License Agreement by typing yes and press the ENTER.
- 7. In the prompt to configure the static IP for the network interface, enter the IP address, Netmask and Gateway information.
- 8. Enter y to continue with the network configuration.

### Figure 248 Assigning the Static IP Address to the UCSD-VM eth0

This script Configuring	is executed on first boot only. static IP configuration
Do you want Do you want	to Configure static IP [y/n]? : y to configure IPv4/IPv6 [v4/v6] ? : v4
Conf igur ing	static IP for appliance. Provide the necessary access credentials
IP Addres Netmask: Gateway:	ss: 10.29.160.35 255.255.255.0 10.29.160.1
Configuring 29.160.1)	Network with : IP(10.29.160.35), Netmask(255.255.255.0), Gateway(10.
Do you want	to continue [y/n]? : y_

- 9. Configure the UCSD Express as the personality by entering the number 2.
- 10. At the prompt Switching personality to UCSD Express, Are you sure to continue [y/n]? Type y and hit ENTER.

Figure 249 Choose the UCSD Express Personality



11. The UCSD-VM goes through a personality change configuration as shown below.





Note

This step takes about 10-15 minutes to complete.

# **Applying the Upgrade Patches**

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- 1. Open a SSH/Putty session to the UCSD-VM.
- 2. Login as the user shelladmin with password changeme.

Figure 251 Logging onto the UCSD-VM Shell Administration Tool



- 3. In the Shell Admin Menu, enter 3 to stop the services.
- 4. At the prompt, Do you want to stop services [y/n]? Type y to confirm and hit ENTER to continue.

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Figure 252 Issuing the Command to Stop all the Services Via Shell Administration Tool.

<pre>1) Change ShellAdmin Password 2) Display Services Status 3) Stop Services 4) Start Services 5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	Select :	a number from the menu below
<pre>1) Change ShellAdmin Password 2) Display Services Status 3) Stop Services 4) Start Services 5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>		
2) Display Services Status 3) Stop Services 4) Start Services 5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect Disgnostics 28) Change Personality 29) Quit SELECT> 3	1)	Change ShellAdmin Password
3) Stop Services 4) Start Services 5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Infrangr Logs 19) Apply Patch 20) Shutdown Appliance 21) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit	2)	Display Services Status
4) Start Services 5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect Logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	3)	Stop Services
5) Stop Database 6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	4)	Start Services
6) Start Database 7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import C& Cert (JKS) File 13) Import C& Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit	5)	Stop Database
7) Backup Database 8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	6)	Start Database
8) Restore Database 9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit	7)	Backup Database
9) Time Sync 10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	8)	Restore Database
<pre>10) Ping Hostname/IP Address 11) Show Version 12) Import CA Cert (JKS) File 13) Import CA Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	9)	Time Sync
<pre>11) Show Version 12) Import C&amp; Cert (JKS) File 13) Import C&amp; Cert (PEM) File for VNC 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	10)	Ping Hostname/IP Address
<pre>12) Import CA Cert (JKS) File 13) Import CA Cert (JKS) File 14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	11)	Show Version
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<pre>14) Configure Network Interface 15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	13)	Import CA Cert(PEM) File for VNC
<pre>15) Display Network Details 16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	14)	Configure Network Interface
16) Enable Database for Cisco UCS Director Baremetal Agent 17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	15)	Display Network Details
17) Add Cisco UCS Director Baremetal Agent Hostname/IP 18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	16)	Enable Database for Cisco UCS Director Baremetal Agent
<pre>18) Tail Inframgr Logs 19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT&gt; 3</pre>	17)	Add Cisco UCS Director Baremetal Agent Hostname/IP
19) Apply Patch 20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	18)	Tail Inframgr Logs
20) Shutdown Appliance 21) Reboot Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	19)	Apply Patch
21) Report Appliance 22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	20)	Shutdown Appliance
22) Manage Root Access 23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	21)	Repoot Appliance
23) Login as Root 24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	ZZ)	Manage Root Access
24) Configure Multi Node Setup (Advanced Deployment) 25) Clean-up Patch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	23)	Login as koot Confirmen Wulti Nede Cotum (Advanced Deplement)
25) Clean-up Fatch Files 26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3	24)	Clear un Datab Filos
26) Collect logs from a Node 27) Collect Diagnostics 28) Change Personality 29) Quit SELECT> 3		Cellegt legg from a Made
28) Change Personality 29) Quit SELECT> 3	20)	Collegt Diegnostigs
29) Quit SELECT> 3	27)	Change Dergenelity
SELECT> 3	20)	Ouit
SELECT> 3	29)	Quit
	SEL	ECT> 3

5. In the Shell Admin menu, type 2 to view the status of the services. They all should be **NOT-RUNNING** as shown below.

	SELECT>	2	
Service		Status	PID
broker		NOT-RUNNING	
controller		NOT-RUNNING	
eventmgr		NOT-RUNNING	
client		NOT-RUNNING	
idaccessmgr		NOT-RUNNING	
inframgr		NOT-RUNNING	
TOMCAT		NOT-RUNNING	
websock		NOT-RUNNING	
3467 ?	00:00:0	00 mysqld_safe	
3888 ?	00:03:0	05 mysqld	
Press return	to conti	nue	

Figure 253 Verifying the Status of the UCSD-VM Services

- 6. In the Shell Admin menu, type 19 and ENTER to start the patching process.
- 7. Type **n** to the prompt **Do you want to take database backup before applying patch[y/n]**?.
- 8. At the prompt, Patch URL: enter http://<BMA\_IP>/patches/cucsd\_patch\_5\_2\_0\_1.zip
- 9. Hit ENTER to continue.

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Figure 254	Cisco UCS Director 5.2.0.1	Patch Application Process
------------	----------------------------	---------------------------

Select a	a number from the menu below
_1)	Change Shellådmin Password
21	Display Services Status
31	Stop Services
41	Start Services
5)	Stop Database
6)	Start Database
7)	Backup Database
8)	Restore Database
9)	Time Sync
10)	Ping Hostname/IP Address
11)	Show Version
12)	Import CA Cert (JKS) File
13)	Import CA Cert(PEM) File for VNC
14)	Configure Network Interface
15)	Display Network Details
16)	Enable Database for Cisco UCS Director Baremetal Agent
17)	Add Cisco UCS Director Baremetal Agent Hostname/IP
18)	Tail Inframgr Logs
19)	Apply Patch
20)	Shutdown Appliance
21)	Reboot Appliance
22)	Manage Root Access
23)	Login as Root
24)	Configure Multi Node Setup (Advanced Deployment)
25)	Clean-up Patch Files
26)	Collect logs from a Node
27)	Collect Diagnostics
28)	change Personality
29)	Quit
CFI	2CTN 10
Jun Luing Detah	
Do you want to tal	re detenses beckup before enploying netab[u/n] ) n
Heer selected ont	ion not to take backup proceeding with evaluation
Innlying Patch	
Patch IIRL <u>• htt</u>	n://10.29.160.36/natches/cucsd natch 5 2 0 1.zin
Applying the Patch	h http://10.29.160.36/patches/cucsd_patch_5_2_0_1.zip [y/n]? y

This 5.2.0.1 patch that is being applied to the UCSD-VM's, upgrades all the core application software to the latest Cisco UCS Director's code base. After this step completes, the Big Data Upgrade package for release 1.1 needs to be applied.

- 10. In the Shell Admin menu, type 19 and ENTER to start the patching process.
- 11. Type n to the prompt **Do you want to take database backup before applying patch[y/n]**?.
- 12. At the prompt, Patch URL:, enter http://<BMA\_IP>/patches/ UCSDExpress\_Big\_Data\_1.1\_Upgrade\_Package.zip
- 13. Hit ENTER to continue.

Figure 255 Cisco UCS Director Express for Big Data 1.1 Upgrade Package Installation Process

	1)	Change ShellAdmin Password
2	2)	Display Services Status
	3)	Stop Services
1	4)	Start Services
ţ	5)	Stop Database
t.	6)	Start Database
	7)	Backup Database
	3)	Restore Database
	9)	Time Sync
	10)	Ping Hostname/IP Address
	11)	Show Version
	12)	Import C& Cert (JKS) File
	13)	Import CA Cert(PEM) File for VNC
	14)	Configure Network Interface
	15)	Display Network Details
	16)	Enable Database for Cisco UCS Director Baremetal Agent
	17)	Add Cisco UCS Director Baremetal Agent Hostname/IP
	18)	Tail Inframgr Logs
	19)	Apply Patch
2	20)	Shutdown Appliance
	21)	Reboot Appliance
2	22)	Manage Root Access
2	23)	Login as Root
2	24)	Configure Multi Node Setup (Advanced Deployment)
2	25)	Clean-up Patch Files
2	26)	Collect logs from a Node
2	27)	Collect Diagnostics
2	28)	Change Personality
2	29)	Quit
	न.ान⊱	CT> 19
ving Patch		
nu want to	t.ak	e database backun before annlying natch[y/n]? n
selected (	onti	on not to take backun, proceeding with anniving match
pplving Pat	tch:	
atch URL :1	http	://10.29.160.36/patches/UCSDExpress Big Data 1.1 Upgrade Package.z
ying the Pa	atch	. http://10.29.160.36/patches/UCSDExpress_Big_Data_1.1_Upgrade_Pack

Appl Do y User

ip App age

## Figure 256 Cisco UCS Director Express for Big Data 1.1 Upgrade Package Application Complete

```
******
Jed Jan 21 22:10:45 UTC 2015 : Copying ui.properties file
*********************
irectory doesn't exit, continuing with installation process
  * * * * * * * * * * * * * * * *
Jed Jan 21 22:10:45 UTC 2015 : Copying SSL File
* * * * * * * * * * * * * * * * * * *
***********************************
Jed Jan 21 22:10:45 UTC 2015 : Copying VMWare Files & scalability folder
šcalability folder exists, taking backup /opt/scalability-01-21-2015-22-10-45
)iagnostics folder exists, taking backup /opt/diagnostics-01-21-2015-22-10-45
Jed Jan 21 22:10:45 UTC 2015 : Copying localization related files
Japanese Directory exits.
TrueType folder is present
     Jed Jan 21 22:10:45 UTC 2015 : Copying sysmgr jar to T1 library locations if exist
Jed Jan 21 22:10:45 UTC 2015 : Personality specific changes for upgrade
ersonality details --> Product Name : UCSD Express for Big Data , Product Version :
0.0.0
Restored account-type-exclusion-list.properties for UCSD Express for Big Data
Restored DefaultRoleMenuMappings.properties for UCSD Express for Big Data
Restored RegularSet menu.xml for UCSD Express for Big Data
lestored AdminSet menu.xml for UCSD Express for Big Data
Restored feature-exclusion-list.properties for UCSD Express for Big Data
Restored reports.xml for UCSD Express for Big Data
Restored about.json for UCSD Express for Big Data
estored signed-sku-mapping.xml for UCSD Express for Big Data
lestart services and database for the changes to take effect
INFO (FileUtil.java:958) *********
INFO (FileUtil.java:963)
INFO (FileUtil.java:967) 150121 22:10:45 [FileUtil] RunCommandThread: Completed thre
      Thread[Thread-1,5,main]
Completed installing package O
Press return to continue ...
```

14. After the successful application of the patch, type 4 and ENTER to start the services.

Note It takes about a few minutes for all the services to get started.

15. Type 2 to check on the services status. All the services should now be in **RUNNING** state.

	,		
	SELECT> 2		
Service	Status	PID	
broker	RUNNING	7756	
controller	RUNNING	7888	
eventmgr	RUNNING	7966	
client	RUNNING	8025	
idaccessmgr	RUNNING	8113	
inframgr	RUNNING	8172	
TOMCAT	RUNNING	8240	
websock	RUNNING	8320	
3467 ?	00:00:00 mysqld_safe		
3888 ?	00:05:52 mysqld		
Press return	to continue		

### Figure 257 Verify the Status of the Services in the UCSD-VM

<u>Note</u>

Even after all the services are in a RUNNING state, it would take an additional 3 to 5 minutes for the UCSD-VM client services to become available.

# Configuring the Cisco UCS Director Express for Big Data (UCSD Express)

The Cisco UCS Director Express for Big Data, henceforth known as UCSD-Express, needs to be configured with the IP address to the UCS domain (i.e. UCS Manager's) physical account. This allows the UCSD-Express to query the UCS Manager and perform inventory collection.

The UCSD-Express will also need to be configured with the BMA's physical account and configure it's services such as DHCP.

# Add the licenses to UCSD-Express

- 1. Using a web browser, visit the URL http://<UCSD-VM's IP>/.
- 2. Login as user admin with the default password admin.

UCSD Express for Big Data
Usemame: admin Password: Login
© 2014, Cisco Systems, Inc. All rights reserved. Cisco, the Cisco logo, and Cisco Systems are registered trademarks or trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

Figure 258 Logging onto the Cisco UCS Director Express for Big Data

3. Navigate to Administration > License screen.

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## Figure 259 Accessing the License Administration Page

1

ululu UCSD Express for Big Data adm	nin 🕥   Log Out   Cisco   About   Help   Object Search
Solutions  Converged Physical  Organizations  Policies	Administration  Favorites
Big Data Containers Big Data IP Pools UCS SP Templates for Big Data Hadoop Cluster Pro SRefresh I Favorite Add	License System Users and Groups Virtual Accounts Physical Accounts
Big Data IP Pools       Name     Description       Assignment Ord	Integration Mobile Access User Interface Settings Open Automation Support Information

- 4. Click on License Keys tab.
- 5. Click on Update License.
- 6. In the Update License dialog box, click Browse to select the license file.
- 7. Click Upload.
- 8. After the license file gets uploaded, Click Submit to apply the license.

uluulu UCSD Express for Big Data admin 🚳 Log Out   Cisco   About   Help   Object Searc
Solutions  Converged Physical  Organizations  Policies  Administration  Favorites
License
License Keys License Utilization License Utilization History Resource Usage Data
🛞 Refresh 🔟 Favorite 🔹 Update License 🎄 Apply Upgrade License 👙 Update Big Data License
License Keys
Update License
License Select a file for upload:
CCUIC201501181941456050.lic Browse Upload
Enter License Text
Submit Close

Figure 260 Applying the Base Cisco UCS Director License.

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9. The license keys are displayed as shown below.

## Figure 261 Cisco UCS Director Base Licenses got Applied Successfully

1

1

UCSD Express for Big Data		admin 🕢   Log Out	Cisco   About	Help   Object Search
Solutions  Converged Physical  Organization	ns 🔻 Polici	es 🔻 Administration	Favorites	
License				
License Keys License Utilization License Utilization H	listory Res	ource Usage Data		-
🍪 Refresh 🔟 Favorite  🏘 Update License 🏘 Ap	oply Upgrade	License 🛛 🏘 Update Big	g Data License	
License Keys		<b>E</b>	) 🖪 🗣 🔍	
	License E		License Value/Status	

- 10. Click on Update Big Data License.
- 11. In the Update Big Data Subscription dialog box, click Browse to select the Big Data specific license file.
- 12. Click Upload.
- 13. After the license file gets uploaded, Click Submit.

uluulu UCSD Express for Big Data admin 🚳   Log Out   Cisco   About   Help   Object Search
Solutions  Converged Physical  Organizations  Policies  Administration  Favorites
License
License Keys License Utilization License Utilization History Resource Usage Data
🛞 Refresh 🔟 Favorite   🌞 Update License 🛛 🌞 Apply Upgrade License 🖓 Update Big Data License
License Keys
Update Big Data Subscription
License Select a file for upload:         UCSD201501181943322190.lic         Browse         Upload
Submit Close
Total 3 items

# Figure 262 Applying the Cisco UCS Director Express Big Data Subscription License

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### *Figure 263 Completion of the License Application.*

UCSD Express for Big Data	admin 🗿	Log Out   Cisco   About   Help   Object Search			
Solutions  Converged Physical  Organization	ons 🔻 Policies 🔻 🛛 Adi	ministration  Favorites			
License					
License Keys License Utilization License Utilization	History Resource Usage	e Data			
🛞 Refresh 🔃 Favorite   🏶 Update License 🔗 A	pply Upgrade License 🦂	> Update Big Data License			
License Keys					
	License Entry	License Value/Status			
▼ 🗁 PAK: <internal> (#20150118194332219 - 2)</internal>					
	Expiration Date	March 18, 2015			
	License ID	PAK: <internal> (#20150118194332219 - 2)</internal>			
	CUIC-EBDS	1			
	CUIC-EBDS	1			
▼ 🗁 PAK: <internal> (#20150118194145605 - 1)</internal>					
D	Expiration Date	March 19, 2015			
D	License ID	PAK: <internal> (#20150118194145605 - 1)</internal>			
	CUIC-BASE-K9	1			
Total 7 items					

# Add the UCS Manager physical account to the UCSD-Express

1. In the UCSD-Express web console, navigate to Administration > Physical Accounts.

- 2. Click + ADD button
  - a. Input the UCS Manager Account details as follows.
  - b. In the Account Name field, enter a name to this UCS Manager account.
  - c. In the Server Address field, enter the IP address of the UCS Manager.
  - d. In the User ID field, enter admin.
  - e. In the Password field, enter the password to the UCS Manager's admin user.
  - f. In the Transport Type field, choose https.
- 3. Click Add.

ultulti UCSD Express for Big Da	Add Account			edmin 🥥   Log Out   Cisco   About   Help
Solutions V Converged Physical V Orga	Pod	Default Pod 💌 🔹		
Physical Accounts	Category	Computing 🔻 🐐		
Site Management Pods Physical Accounts	Account Type	UCSM 💌	8	
😵 Refresh 🔃 Favorite 🛛 🖶 Add	Authentication Type	Locally Authenticated 💌 🔹		
Physical Accounts	Server Management	All Servers 💌 🔹		
Account Nami Account Type Connection S	Account Name	UCSM40	•	Tag
	Server Address	10.29.160.40	•	
		Use Credential Policy		
	User ID	admin	•	
	Password	****	•	
	Transport Type	https 💌 🏶		
	Port	443	•	
	Description		]	
			Add Close	

# Figure 264 Adding the UCS Manager as a Physical Account in the UCSD-VM

Note

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After adding a physical account, the UCSD-Express will query the UCS Manager to perform the inventory collection. This process of inventory collection happens at scheduled intervals. Optionally, you may kick start the inventory collection process manually. These optional steps are described in the steps 4 to 8 below.

- 4. Goto Administration > System.
- 5. Click on System Tasks tab.
- 6. Open the folder Cisco UCS Tasks.
- 7. Click on UCS Inventory Collector Task.
- 8. Click **Run Now** button to execute the task.

#### Figure 265 Start the UCS Inventory Collection System Task

uluulu UCSD Exp	ress for Big Data								
Solutions <b>v</b> Converged	Physical 🔻 Organizati	ons 🔻 Policies	<ul> <li>Administr</li> </ul>	ation 🔻 🛛 Favori	tes				
System									
Custam Information   Mail Cahun   Custam Daramatare   Infrastructure Custam Daramatare   Educated Controls   Custam Tack Bolinu   Email Tampiatare   Unar   V									
🚱 Refresh 📑 Favorite	🎲 Manage Task 🛛 🏘 Ru	n Now 🐻 View	v Details			Contrastic (Linter			
System Tasks							9 🖪 😵 🔍		
	Label	Enabled	Frequency	Execution Noi	Execution Noi	Execution Sta	Execution Du	Start Time	Last Exect
🕨 🤐 Chargeback Tasks		Run Now							
🔻 🚞 Cisco UCS Tasks						-			
	UCS Monthly Historical C	Are you sure y	ou want to run t	ask UcsInventory	Collector:UCSM4	0' now?			
	Deleted UCSAccount Cle					d		02/18/2015 03:5	02/18/201
	UCS Server Transition 5				Submit	Close		02/18/2015 06:3	02/18/201
	UCS Event Record Purge					0.000			
	UCS Historical Data Aggre	Enabled	1 hour	LocalHost	LocalHost	Scheduled		02/18/2015 06:5	02/18/201
	UCS Event Subscription To	Enabled	4 hours	LocalHost	LocalHost	Scheduled		02/18/2015 04:3	02/18/201
	UCS Fault Record Purge T	Enabled	12 hours			Scheduled			
	UCS Daily Historical Data	Enabled	4 hours	LocalHost	LocalHost	Scheduled		02/18/2015 06:2	02/18/201
	UCS Monitoring DataColle	Enabled	15 minutes	LocalHost	LocalHost	OK	0 minutes 26 se	02/18/2015 07:4	02/18/201
	UCS Inventory Collector -	Enabled	1 hour	LocalHost	LocalHost	OK	0 minutes 45 sev	02/18/2015 07:4	02/18/201
▶ 🛄 General									
► 🔛 Physical Network Tasks									
▶ 🔛 Purging									
A Charles Chandred Tasks					-				
Total 50 items									

# Add the Bare Metal Agent physical account to the UCSD-Express

- 1. In the UCSD-Express web console, navigate to Administration > Physical Accounts.
- 2. Click on Bare Metal Agents tab; Click + Add.
- 3. Enter the BMA physical account information details as follows:
- 4. In BMA Name field, enter a name to this BMA physical account.
- 5. In the BMA Management Address field, enter the BMA-VM's IP address assigned to NIC eth0.
- 6. In the Login ID field, enter root.
- 7. In the Password field, enter the password. Default password is pxeboot.
- 8. Check the checkbox BMA Uses Different Interfaces for Management and PXE Traffic.
- 9. In the BMA PXE Interface Address field, enter PXE IP address i.e. BMA-VM's IP address assigned to NIC eth1.

10. Click Submit.

Add Bare Metal Agent Appliance						
BMA Name	BMA36	*				
BMA Management Address	10.29.160.36	*				
Login ID	root	*				
Password	*****					
	☑ BMA Uses Different Interfaces for Management a	nd PXE Traffic				
BMA PXE Interface Address	192.168.85.36	*				
Description						
Location						
UCSD Database Address	10.29.160.35 💌 *					
		Submit Close				

Figure 266 Adding the Bare Metal Agent Appliance Information

# **Configure the Bare Metal Agent's DHCP services**

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- 1. Navigate to Administration > Physical Accounts >Bare Metal Agents.
- 2. Select the BMA entry.
- 3. On the menu items row, click on the downward facing arrow located at the far right.
- 4. Select Configure DHCP.

#### Figure 267 Configuring the DHCP

ululu UCSD Express for E	Big Data		admin 🥥   L	og Out   Cisco   Abo	ut   Help   Object Search			
Dashboard Solutions ▼ Converged Physical ▼ Organizations ▼ Policies ▼ Administration ▼ Favorites								
Physical Accounts          Site Management       Pods       Physical Accounts       Managed Network Elements       Bare Metal Agents <ul> <li></li></ul>								
Bare Metal Agents								
BMA Name BMA Management Addr	PXE Server Address Re	eachable Location	Description Default BMA	Status	Add			
BMA36 10.29.160.36	192.168.100.36 🥥	YES	Yes	Active 03/2	1 View Details			
					Delete Start Services Stop Services Service Status Set Default BMA Configure Interf Configure DHCP			
					View DHCP Conf View BMA logs			
					View DHCP Configuration			

- 5. In the Configure DHCP dialog box, enter the following
- 6. In the DHCP Subnet field, enter the subnet that's associated with the BMA-VM's eth1 NIC.

1

- 7. In the DHCP Netmask, enter the appropriate subnet mask value for this network.
- 8. In the DHCP Start IP, enter a starting IP address in the same subnet.
- 9. In the DHCP End IP, enter a starting IP address in the same subnet.
- **10.** In the **Router IP Address**, enter the IP address of the gateway router in the network if available, if not may be left as blank or input the IP address of the BMA-VM's **eth1** NIC.
- 11. Click Submit.
| Configure DHCP    |                |       |
|-------------------|----------------|-------|
| DHCP Subnet       | 192.168.85.0   | •     |
| DHCP Netmask      | 255.255.255.0  | ]*    |
| DHCP Start IP     | 192.168.85.160 | •     |
| DHCP End IP       | 192.168.85.254 | ]*    |
| Router IP Address | 192.168.85.36  | ]     |
|                   | Submit         | Close |

Figure 268 Configuring the DHCP services on the BMA.

## Start the BMA services

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- 1. Navigate to Administration > Physical Accounts > Bare Metal Agents.
- 2. Select the BMA entry.
- 3. Click Start Services.
- 4. In the Start Bare Metal Agent Appliance dialog box, click Start to start the services.

#### Figure 269 Starting the BMA Services

uluilu cisco	UCSD Expres	ss for Big	Data							
Solutions 🔻	Converged P	Physical 🔻 🛛 O	rganizations 🔻	Policies 🔻 🛛 🗚 d	ministration 👻 🛛 🕅	vorites				
Physical Acco	ounts									
Site Manager	ment Pods Phys	sical Accounts	Managed Netwo	ork Elements Ba	ire Metal Agents					*
🛞 Refresh	🔝 Favorite 🛛 🖷	Add 📄 Edi	t 🔀 Delete	👙 Start Services	🔹 🌞 Stop Service	es 🏾 🌞 Service	Status 🌸 Set	Default BMA 🚦	Configure Interf	ace 🔘
Bare Metal	Agents							(d) 🖪 🕻	4	
BMA Name	BMA Manager	PXE Server A	Reachable	Location	Description	Default BMA	Status	Last Keep Ali	Image Catald	Enabled Servic
BMA36	10.29.160.36	192.14 Star	t Bare Metal Ag	ent Appliance						DHCP-Server: , T
_		A	re you sure you v	vant to start servio	es for the selected	Bare Metal Agen	t appliance(10.29.	160.36)?		
							Start	Close		
-										
-4										
Total 1 item	8									

- 5. Click on Service Status, to check the status of the services.
- 6. The Bare Metal Agent Service Status **message box should display both the** Network Services status and Database connectivity status as UP.

1

Figure 270	Verifying the Bare	Metal Agent Services Status
	,	Sector Sector Sectors

ultudu U	CSD Expre	ss for Big D	ata					
Solutions 🔻	Converged P	Physical 🔻 Orga	nizatio	ns 🔻 Policies 👻 Administration 👻 Favorites				
Physical Accour	nts							
Site Manageme	nt Pods Phys	sical Accounts	lanage	d Network Elements Bare Metal Agents				¥
🛞 Refresh	🖪 Favorite 🛛 🚭	Add 📄 Edit	<b>X</b> D	elete   👙 Start Services 🛛 👙 Stop Services 👙	Service Status 🛛 🏘 Se	t Default BMA 🛛 🁙	Configure Interf	ace 🧿
Bare Metal Age	ents					۵ 🖾 🕼		
BMA Name	BMA Manager	PXE Server A	Rea	phable   Location   Description   Defau	BMA Status	Last Keep Ali	Image Catald	Enabled Servic
BMA36	10.29.160.36	192.168.85.36	•	Bare Metal Agent Service Status				DHCP-Server: , T
				Network Services status in the Bare Metal Agent Database connectivity status from Bare Metal Ag	appliance : UP ent Appliance : UP Close			
4								
Total 1 items								

**Note** It may take a little while for the service status and on the BMA entry to get updated. The UCSD-Express and the associated BMA parts are now ready.

7. Double click on the BMA entry to verify the RHEL operating system repository.

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#### Figure 271 Verifying the RHEL Operating System Software

uluulu UCSD Express for Big Data	admin 🥥   Log Out   Cisco   About   Help   Object Search
Dashboard Solutions ▼ Converged Physical ▼ Organizations ▼ Policies ▼ A	dministration 🔻 Favorites
Physical Accounts > Bare Metal Agent (BMA36)	Back
BMA OS List PXE Service Requests NFS Mount Point	۲. ۲
🚱 Refresh 💷 Favorite	
BMA OS List	🏟 🖪 ¥ 🔍
Image Catalog Name	Last Updated
CentOS60	03/21/2015 02:05:13 GMT-0700
CentOSLive	03/21/2015 02:05:13 GMT-0700
RHEL6.4	03/21/2015 02:05:13 GMT-0700
RHEL6.5	03/21/2015 02:05:13 GMT-0700
Win2k12R2x64	03/21/2015 02:05:13 GMT-0700
Win2k12x64	03/21/2015 02:05:13 GMT-0700
Win2k8R2x64	03/21/2015 02:05:13 GMT-0700
Total 7 items	
<u> </u>	

Note

BMA-VM software periodically scan the /opt/cnsaroot directory to update the available list of operating system software repositories.

## **Creating the Hadoop Cluster using UCSD-Express**

For creating a Hadoop cluster of a desired distribution, the UCS Manager that's managing the target servers must be pre-configured to meet the following requirements. For performing these configurations, refer to any Cisco UCS Integrated Infrastructure for Big Data Cisco Validated Designs found at http://www.cisco.com/go/bigdata\_design

- **a.** The uplink ports fabric Interconnects must be reachable to that the UCSD-Express appliances management network (i.e. eth0).
- **b.** The UCS-Manager must be configured with a host firmware policy containing C-series rack mount server firmware packages.
- c. UCS Manager must be configured to discover the Rack Servers in its domain, and the respective ports are configured as server ports.
- **d.** The server pool must be configured with appropriate set of physical servers that are part of the UCS domain.

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e. The QOS System Classes Platinum and Best Effort must be configured and enabled.

Note	

C240/C220 M4 Rack Servers are supported from UCS firmware 2.2(3d) onwards.

## **Create the IP Address pools**

- 1. Using a web browser, visit the URL http://<UCSD-VM's IP>/.
- 2. Login as user admin with the default password admin.
- 3. Navigate to Solutions > Big Data Containers.
- 4. Click on the Big Data IP Pools Tab.
- 5. Click on + Add.

Creating the IP Address Pools

uludu UC	SD Expres	s for Big Da	ata				admin 🕙   Log Out	Cisco   About   Help	Object Search		
Dashboard	Solutions 🔻 🛛 Co	onverged Phys	ical 🔻 Orgar	izations 🔻 Policies 🔻	Administration 🔻	Favorites					
Big Data Contain	ners										
Big Data IP Poo	g Data IP Pools UCS SP Templates for Big Data Hadoop Cluster Profile Templates Hadoop Cluster Deploy Templates Deployed Clusters 🔹										
🚯 Refresh [	😵 Refresh 🔛 Favorite 🕞 Add										
Big Data IP Pools											
Name	Description	Assignment ¢	Size				Assigned				
Total 0 item											

6. In the Create an IP Pool dialog box.

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7. Enter the name MGMT. Click Next to continue.

IP Pool       IP Pool Name       MGMT         Description       Assignment Order       Default	Create an IP Pool							
IP Pool Name MGMT Description Assignment Order Default	IP Pool	IP Pool Management						
	IPv4 Addresses	IP Pool Name MGMT   Description  Assignment Order Default						

Figure 273 Creating the IP Address pool for MGMT VLAN

- 8. In the IPv4 Blocks table, click on +.
- 9. In the Add Entry to IPv4 Blocks dialog box, enter the following.
  - In the Static IP Pool field, enter the Static IP Address pool range in the format A.B.C.X A.B.C.Y.

- In the Subnet Mask field, enter the appropriate subnet mask.
- In the Default Gateway field, enter the IP address of the Gateway if present.
- In the Primary DNS field, enter the IP address of the DNS server.
- 10. Click Submit.

Create an IP Poo	bl								
V IP Pool		IP Pool - IPv4 A	Pool - IPv4 Addresses						
IPv4 Address	ses	IPv4 Blocks	<b>4 / X</b>						
			Static IP Pool	Subnet Mask	Default Gatew	Primary DNS	Secondary DN		
	Add Entry t	o IPv4 Blocks							
	Static IP F	Pool 10.29.16 Static IP	0.101 - 10.29.16 Pool. Example (If	0.200 * PV4): 192.168.0.1	- 192.168.0.50,19	2.168.0.100,192.1	68.1.20-192.168.1.7	/0	
	Subnet Ma	ask 255.255. Subnet M	255.0 ask, ex (IPV4): 2	*					
	Default G	ateway 10.29.16	0.1						
	Primary D	0.0.0.0							
	Secondar	y DNS 0.0.0.0							
							Submit	Close	
							Back	Submit Close	

Figure 274 Adding a Block of IP Address to the MGMT IP Address Pool

Note

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- The Default Gateway, Primary and Secondary DNS fields are optional.
- 11. Click Submit again to create the Big Data IP Pool.

Create an ID Pool	-								
Create all IP Pool									
V IP Pool	IP Pool - IPv4 A	IP Pool - IPv4 Addresses							
IPv4 Addresses									
	IPv4 Blocks	+ / ×							
		Static IP Pool	Subnet Mask	Default Gatew	Primary DNS	Secondary DI			
		10.29.160.100 -	255.255.255.0	10.29.160.1	0.0.0	0.0.0			
			Cubmit Dec	.14					
			Submit Rest	in and a second se					
			Added su	ccessfully					
			0	K					
			1						
		Total 1 items							
						Back	Submit	Clo	

Figure 275 IP Address Pool Added Successfully

Repeat this process for two more interfaces, by creating an IP address pool by name HDFS for Hadoop configurations to be associated with vNIC eth1, and an IP address pool by name DATA to be associated with vNIC eth2 in the service profiles. Please refer to "Configuring VLAN Section" above in Cisco UCS Integrated Infrastructure for Big Data CVDs.

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The following figure shows the UCSD-Express that is fully provisioned all the necessary Big Data IP address Pools.

#### Figure 276 All the IP Address Pools have been Configured Successfully

းပြားပြား cisco	UCSD Exp	oress for Big D	ata	admin 🜍   Log Out   Cisco   About   Help							
Solutions	Converged	Physical 🔻 Orga	anizations 🔻	Policies  Administration  Favorites							
Big Data C	Big Data Containers										
Big Data IP Pools UCS SP Templates for Big Data Hadoop Cluster Profile Templates Hadoop Cluster Deploy Templates Deployed 🕨 🔻											
😽 Refre	🛞 Refresh 🔃 Favorite 🖶 Add										
Big Data	IP Pools										
Name	Description	Assignment Order	Size	Assigned							
MGMT		default	100	0							
HDFS		default	100	0							
DATA		default	100	0							
Total 3 ite	ems			·							

## **Creating a Hadoop Cluster**

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- 1. Using a web browser, visit the URL http://<UCSD-VM's IP>/.
- 2. Login as user admin with the default password admin.
- 3. Navigate to Solutions >Big Data Containers.
- 4. Click on the Hadoop Cluster Deploy Templates Tab.
- 5. Click on Create Instant Hadoop Cluster.
- 6. In the Instant Hadoop Cluster Creation dialog box, enter the following.
- 7. In Big Data Account Name field, enter a preferred name.
- 8. In the UCS Manager Policy Name Prefix field, enter a prefix that is less than equal to 5 letters long.
- 9. In the Hadoop Cluster Name field, enter a preferred name of the cluster this will be the name assigned to the Hadoop cluster within the context of selected Hadoop Manager.
- 10. In the Hadoop Node Count filed, enter the desired number of nodes.

The minimum number of nodes allowed for Cloudera and Hortonworks Hadoop cluster is 4 and for MapR cluster it is 3.



There should be sufficient number of servers available in the server pool.

- 11. In the password fields, enter the preferred passwords and confirm them.
- Choose the OS Version from the drop-down box. For C220 M4/C240 M4 rack servers, only OS supported is RHEL 6.5.

```
Note
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At the time of this writing, RHEL6.5 is the only OS that is supported on C220 M4/C240 M4 rack servers.

- 13. In the Hadoop Distribution field, select Hortonworks from the drop-down list.
- 14. In the Hadoop Distribution Version field, select Hortonworks-2.2 from the drop-down list.

Figure 277 Selecting the Hadoop Distribution Version

Cloudera	Hadoop Distribution	cloudera 🔻 🔹					
	Hadoop Distribution Version	cloudera-5.2.0 💌 🔹					
		cloudera-5.2.0					
		cloudera-5.3.0					
	UCS Manager Account	cloudera-5.0.1					
	-	cloudera-5.2.1					
Hortonworks	Hadoop Distribution	Hortonworks 🔻 🔹					
	Hadoop Distribution Version	Hortonworks-2.1 💌 *					
		Hortonworks-2.1					
		Hortonworks-2.2					
MapR	Hadoop Distribution	MapR 💌 🏶					
	Hadoop Distribution Version	MapR-4.0.1 🔻 *					
		марк-4.0.1					
		MapR-3.1.1					
	UCS Manager Account	MapR-4.0.2					

- 15. In the UCS Manager Account, select the appropriate UCS-Manager account.
- 16. Select the organization.
- **17.** vNIC Template Entry
- **18.** Double-click on row eth0 and select appropriate Mgmt IP-pool, MAC Address Pool and enter the MGMT VLAN id. Click Submit.

Edit Entry		
vNIC Name	eth0 💌 *	
IP Pool	MGMT(10.29.160.101 - 10.29.160.200)	
MAC Address Pool	mac_pool1 (1978) 💌 *	
VLAN ID	1	*
	[4048-4093],[1-3967]	
	( MGMT VLAN)	
		Submit Close

#### Figure 278 Editing the vNIC Template to Provide the MGMT Network Configurations

**19.** Double-click on **eth1** and select appropriate IP-pool, MAC Address Pool and enter the DATA1 VLAN ID. Click **Submit**.

Figure 279 Editing the vNIC Template to Provide the DATA1 Network Configurations

Edit Entry		
vNIC Name	eth1 💌 *	
IP Pool	HDFS(192.168.11.101 - 192.168.11.200)	
MAC Address Pool	mac_pool1 (1978) 💌 *	
VLAN ID	11	*
	[4048-4093],[1-3967]	
	( DATA1 VLAN)	
		Submit Close

20. Double-click on eth2 and select appropriate IP-pool, MAC Address Pool and enter the DATA VLAN ID. Click Submit.

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Edit Entry		
vNIC Name	eth2 💌 🏶	
IP Pool	DATA(192.168.12.101 - 192.168.12.200)	
MAC Address Pool	mac_pool1 (1978) 🔻 *	
VLAN ID	12	*
	[4048-4093],[1-3967]	
	( DATA2 VLAN)	
		Submit Close
		Submit

#### Figure 280 Editing the vNIC Template to Provide the DATA2 Network Configurations

1



The following figure show the expanded version of the Instant Hadoop Cluster Creation dialog box with all the fields filed in.

-									
Instant Hadoop Cluster Creation									
Big Data Account Name	BD101				*				Î
LICSM Policy Name Prefix	Account na	ame can ha	ive atmost 10 a	lphanum	eric charac	ters			
	UCSM Poli	cy Name Pr	refix can have	atmost 5	characters				
Hadoop Cluster Name	BD101				*				
Hadoop Node Count	4				*				
SSH (root) Password			•	•					
Confirm SSH Password				*					- 1
Hadoop Manager Password	*******			•					- 1
Confirm Hadoop Manager Password	190 190 190 190 190			•					- 1
Host Node Prefix	node				*				- 1
OS Version	RHEL6.5	*							
Hadoop Distribution	Hortonwo	orks 💌 *	M4 Servers						
Hadoop Distribution Version	Hortonwo	rks	- *						- 1
	cloudera								
UCS Manager Account	UCSM40	-							
Organization	root	*							-
Server UUID pool	uuid_poo	11 ( 2029 )	- *						4
PXE VLAN ID	85	21 [1 2067	1		*				_
	[4048-409	3],[1-3967	1			~		]	
Server Pool		D	Server Pool	Serve	er Pool E	Assigned	Size		
		140;org-roo	M4_servers	50.00		8	13	_	
									. J
									1
	Total 1 if	tems					1		
Host Firmware Package					5				
	Accou	int Nam	Organization	N	ame	DN	Mode		
		140	root	defa	ult	org-root/fw	v-host staged		
		40	root	ESXi	_FW_Packa	org-root/fw	v-host staged		
								*	-
				1					- 1
									- 1
									- 1
	-					_		-	- 1
	Total 4 it	ems							- 1
vNIC Template		<b>&amp;</b>				<b>1</b>			- 1
	eth0	Name	IP Pool MGMT:10.29	.160.1	First MAC	Address 00:00:00	VLAN ID	-	- 1
	eth1		HDFS:0.0.0.	0	00:25:B5	00:00:00	11		- 1
	Con 2		DATA.0.0.0.	0	00.25.05		12		- 1
									- 1
	Total 3 it	ems	1						
							Cubrit		<b>T</b>
							Submit	L C10	se

Figure 281 Creating an Instant Hortonworks Hadoop Cluster

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21. Click Submit.

# **Monitoring the Hadoop Cluster Creation**

- 1. In the UCSD-Express web console, navigate to Organization ? Service Requests.
- 2. Browse through the workflows. There are 3 types of workflows executed.
- There would be one Master Workflows i.e. UCS CPA Multi-UCS Manager Hadoop cluster WF, per the Hadoop cluster creation request. Master workflow kick starts one or more UCS Manager-specific workflows. Besides that, this master workflow is responsible for Hadoop cluster provisioning.
- UCS Manager specific workflows i.e. Single UCS Manager Server Configuration WF, would in turn kick start one or more UCS CPA Node Baremetal workflows.
- UCS CPA Baremetal workflows provision the UCS service profiles and perform OS installation and custom configuration per node.

uluulu UCSD Expres	s for Big Data					admin 🧧	Log Out   Cisco	About   Help	Obje
Dashboard Solutions <b>v</b> Co	onverged Physical 🔻	Organizations 🔻	Policies 🔻 Admir	nistration 🔻	Favorites				
Service Requests for All User Gr	oups								
	Service Requests	Archived Service Re	equests Service Requ	uest Statistics	CloudSense More Reports				
V All User Groups	😵 Refresh 🛛 🔝 Fa	vorite 🐴 Create F	Request   🍪 Search a	ind Replace	📰 View Details 🛛 @ Cancel Request  🌞 R	esubmit Reque	st 🖹 Archive 📲 Ad	d Notes	
🦺 Default Group	Service Requests								<b>(</b>
	Service Request 1	Request Type	Initiating User		Catalog/Workflow Name	Initiator C	Request Time	Request Stat	
	348	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 23:38:05 GM	T-07 Complete	
	347	admin		UCS CPA Node BareMetal		03/17/2015 23:38:05 GM	T-07 Complete		
	346	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 23:38:05 GM	T-07 Complete	
Child Baremetal	345	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 23:38:04 GM	T-07 Complete	
workflows	344	Advanced	admin		Single UCSM Server Configuration WF		03/17/2015 23:36:19 GM	T-07 Complete	
WOIKITOWS	343	Advanced	admin		UCS CPA Multi-UCSM Hadoop Cluster WF		03/17/2015 23:35:24 GM	T-07 Complete	1
	342	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 14:31:27 GM	T-07 Complete	
	341	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 14:31:27 GM	T-07 Complete	
	340	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 14:31:27 GM	T-07 Complete	
	339	Advanced	admin		Single UCSM Server Configuration WF		03/17/2015 14:29:38 GM	T-07 Complete	
	338	Advanced	admin		UCS CPA Multi-UCSM Hadoop Cluster WF	3	03/17/2015 14:28:54 GM	T-07 Complete	
	337	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 11:24:20 GM	T-07 Complete	
	336	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 11:24:20 GM	T-07 Complete	
	335	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 11:24:20 GM	T-07 Complete	
Master workflows	334	Advanced	admin		UCS CPA Node BareMetal		03/17/2015 11:24:19 GM	T-07 Complete	
	333	Advanced	admin		Single UCSM Server Configuration WF		03/17/2015 11:22:37 GM	T-07 Complete	10
	332	Advanced	admin		UCS CPA Multi-UCSM Hadoop Cluster WF		03/17/2015 11:21:44 GM	T-07 Complete	
	Total 348 items, sho	wn 27 (paginated)	1		🔶 1 of 13 🗳			27	1

Figure 282List of Workflows Recently Complete

3. Double-click on one of the master workflows i.e. UCS CPA Multi-UCS Manager Hadoop Cluster to view the various steps undertaken to provision a Hadoop cluster.

Workflow Status Log Objects	Created and Modified Input/Output		•
Service Request			
Status			
			😵 Refresh
▼ Overview		Current status for the service request.	
Request ID	343	1 Initiated by admin	03/17/2015 23:35:30
Request Type	Advanced	Multi-UCSM Hadoop Cluster Profile	03/17/2015 23:35:53
Workflow Name	UCS CPA Multi-UCSM Hadoop Cluster WF		
Workflow Version Label	0	3 Setup Hadoop Cluster Env	03/17/2015 23:36:13
Request Time	03/17/2015 23:35:24 GMT-0700	Multi UCSM Configuration WF	03/17/2015 23:36:20
Request Status	Complete		
Comments		5 Multi BareMetal WF Monitor	03/18/2015 00:25:04
Ownership     Initiating User	admin	Synchronized Command Execution	03/18/2015 00:25:27
Inidading Oser	aunin	Custom SSH Command	02/18/2015 00.26.02
			03/16/2013 00:20:02
		8 Provision Hadoop Cluster Completed action	03/18/2015 00:41:06
		Omplete Completed successfully.	03/18/2015 00:41:09
		-	
			Close

Figure 283 Viewing a Completed Master Workflow

Note

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If necessary click on the Log tab to view the logs generated during the provisioning of the Hadoop Cluster.

4. Double-click on one of the child workflows: i.e. UCS CPA Node Baremetal.

Figure	284
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A Completed UCS CPA Node Baremetal workflow.

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Workflow Status Log Objects C	Created and Modified Input/Output			-
Service Request				
Status				
			🛞 Refre	sh
▼ Overview		Current status for the service request.		
Request ID	345	1 Initiated by admin	03/17/2015 23:38:05	
Request Type	Advanced	Modify Workflow Priority (High)	03/17/2015 23:38:08	
Workflow Name	UCS CPA Node BareMetal			
Workflow Version Label	0	3 Assign BareMetal SR ID	03/17/2015 23:38:11	
Request Time	03/17/2015 23:38:04 GMT-0700	Create UCS Service Profile from template	03/17/2015 23:38:17	
Comments	Complete	Service Profile unbind/rebind Action	03/17/2015 23:39:21	
▼ Ownership			00,17,2010 20105121	
Initiating User	admin	Modify UCS Service Profile Boot Policy	03/17/2015 23:40:23	
		Associate UCS Service Profile	03/17/2015 23:45:59	
			03/17/2015 23:46:00	
			00,17,2010 20110100	
		Bind/Unbind vNIC Template	03/17/2015 23:46:09	
		10 Bind/Unbind vNIC Template	03/17/2015 23:46:13	
		Setup PXE Boot (OS Type: CentOSLive)	03/17/2015 23:46:38	
		(12) Setup RAID Commands	03/17/2015 23:46:50	•
▼ Overview		Current status for the service request.		
Request ID	345	UCS Blade Power ON Action	03/17/2015 23:47:34	-
Request Type	Advanced	Monitor PXE Boot	03/17/2015 23:53:16	
Workflow Name	UCS CPA Node BareMetal	Monitor BAID Configuration	03/17/2015 23:53:17	
Request Time	0 03/17/2015 23:38:04 GMT-0700	(15) Honitor House configuration		
Request Status	Complete	16 UCS Blade Power OFF Action	03/17/2015 23:53:31	
Comments		Setup PXE Boot (OS Type: RHEL6.5)	03/17/2015 23:53:54	
▼ Ownership		Setup BAID Commands	03/17/2015 23:53:57	
Initiating User	admin			
		(19) UCS Blade Power ON Action	03/1//2015 23:57:17	
		Monitor PXE Boot	03/18/2015 00:04:19	
		21 Modify UCS Service Profile Boot Policy Server has Local Disks	03/18/2015 00:04:20	
		22 Service Profile unbind/rebind Action	03/18/2015 00:05:23	
		UCS Blade Power ON Action	03/18/2015 00:11:08	
		(24) Assign IP Status	03/18/2015 00:11:08	Ŧ
Request Status	Complete	$\checkmark$		
Comments	Complete	(24) Assign IP Status	03/18/2015 00:11:08	
▼ Ownership		Custom SSH Command	03/18/2015 00:16:37	
Initiating User	admin	Custom SSH Command	03/18/2015 00:17:10	
		Synchronized Command Execution	03/18/2015 00:18:14	
		28 UCS Blade Power OFF Action	03/18/2015 00:18:27	
		UCS Blade Power ON Action	03/18/2015 00:19:40	
		30 Synchronized Command Execution Completed action	03/18/2015 00:24:29	
		Complete Completed successfully.	03/18/2015 00:24:32	•
			Class	
			Close	

## Host and Cluster Performance Monitoring

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1. In the UCSD-Express web console, navigate to Solutions > Big Data Accounts for viewing the Hadoop cluster accounts.

ululu UCSD Express for I	Big Data		admin 🚱   Log	Out   Cisco   About   Help   Object Search
Dashboard Solutions  Converged	Physical   Organizations   Policie	es 🔻 Administration 🔻 Favorites		
Big Data Accounts				
Big Data Accounts				•
🛞 Refresh 🔃 Favorite  🖶 Add				
Big Data Accounts				🕸 🖪 ¥ 🔍
Account Name	Account Type	Data Center	Management Console IP	Login
C5A1	Cloudera Derived Account	Default Pod	10.29.160.124	root
MapR1	MapR Derived Account	Default Pod	10.29.160.128	root
hw2	Hortonworks Derived Account	Default Pod	10.29.160.131	root
Total 3 items				

Figure 285 Big Data Accounts Summary Screen

2. Double-click on one of the accounts to view the cluster-wide performance charts.



## **Cluster Management**

- 1. In the UCSD-Express web console, navigate to Solutions > Big Data Accounts for viewing the Hadoop cluster accounts.
- 2. Double-Click on one of the accounts to drill into the cluster.
- 3. Click on the Hosts tab.

				8		j		······································		
uludu U	CSD Expre	ss for Big I	Data					admin 🔾	Log Out   Cisco	About   Help
Dashboard	Solutions 🔻	Converged Pl	nysical 🔻 Organ	nizations 🔻 🛛	Policies  Administration	Favorites				
Big Data Accou	<u>ints</u> > Big Data	Accounts (C5A1	L)							
Summary Ho	sts Hadoop Cl	lusters Hadoop	Services Hado	op Service Role	es More Reports					
🚯 Refresh	🏨 Favorite  🧔	Add Managed N	lode 🙀 Add Liv	e Node 🛭 🏘 A	dd BareMetal Nodes 🛛 📰 View D	etails  💥 Delete No	de 🛛 🏘 Assign Rack	🜸 Recommission	Node/Decommissi	on Node
Hosts									🏟 🖪 [	¥ 🔍
Host IP	Kernel Name	Host Name	Rack Name	Health	Server Identity	BareMetal WF				Commission State
10.29.160.124	Linux	node1	/Default	Good	UCSM40;sys/rack-unit-5	334	Commissioned			
10.29.160.125	Linux	node2	/Default	Good	UCSM40;sys/rack-unit-16	335	Commissioned			
10.29.160.126	Linux	node3	/Default	Good	UCSM40;sys/rack-unit-10	336	Commissioned			
10.29.160.127	Linux	node4	/Default	Good	UCSM40;sys/rack-unit-11	337	Commissioned			
•		1	1			1	1			
Total 4 items										

Figure 287 Big Data Accounts – Viewing the List of Hosts of a Particular Hadoop Cluster

In this screen, the user can perform various management operations such as,

- Add one/more Baremetal nodes to the cluster.
- Delete a node back to Baremetal
- Decommission/Recommission

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4. Click on the Services tab, where one could Start/Stop the Hadoop services.

		Figu	ure 288	Vie	wing th	e Serv	ices P	rovisio	ned i	n Specific H	adoop	o Clus	ter						
uluulu cisco	JCSD Exp	ress for Big D	Data									admin	0	Log Out	Cisco	About	Help	Objec	t Search
Dashboard	Solutions 🔻	Converged Ph	iysical 🔻 Organiz	ations 🔻	Policies <b>v</b>	Administ	ration 🔻	Favorites											
Big Data Acc	o <u>unts</u> > Big Da	ta Accounts (C5A1	)																Back
Summary H	losts Hadoop	Clusters Hadoop	Services Hado	op Service R	oles More	e Reports													•
🚱 Refresh	🛄 Favorite	👙 Start All Service	es   🏘 Stop All Se	vices															
Hadoop Serv	ces														ĝ 🖪 🕯	7			
Status	Health	Service Type								Service Name									
STARTED	GOOD	FLUME	flume																
STARTED	GOOD	SQOOP	sqoop																
STARTED	GOOD	KS_INDEXER	ks_indexer																
STARTED	GOOD	HUE	hue																
STARTED	GOOD	SENTRY	Sentry																
STARTED	GOOD	ZOOKEEPER	zookeeper																
STARTED	GOOD	OOZIE	oozie																
STARTED	GOOD	IMPALA	impala																
STARTED	GOOD	HDFS	hdfs																
STARTED	GOOD	SOLR	solr																
STARTED	GOOD	SPARK	spark																
STARTED	GOOD	HBASE	hbase																
STARTED	GOOD	YARN	yarn																
STARTED	GOOD	HIVE	hive																
Total 14 item	5	ж. -																	

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## **Host level Monitoring**

In the Hosts tab, double-click on one of the hosts to view the host's statistics.

#### UCSD Express for Big Data Dashboard Solutions Converged Physical Organizations Policies Administration Favorites Big Data Accounts > Big Data Accounts (C5A1) > Hosts (C5A1) Back Summary Host Fault Host CPU Host Disks Host Disk Io Stats Host specific roles More Reports Refresh 🔅 🔻 Duration for Trending Last Day ~ -Average CPU IO Wait (%) (Last Day) Average CPU Idle (%) (Last Day) Average CPU Nice (%) (Last Day) • CPU System (%) (Last Day) Average 0.00008 100 100 0.16 80 80 0.0000 0.12 60 60 0.00004 0.08 40 40 0.00002 0.04 20 20 5:00 10:00 0:00 5:00 10:00 14:00 19:00 0:00 14:00 19:00 14:00 19:00 0:00 5:00 10:00 14:00 19:00 0:00 5:00 10:00 Date/Time Date/Time Date/Time Date/Time Host - node1 Host - node1 Host - node1 Host - node1 Average CPU User (%) (Last Day) Host CPU Usage (%) (Last Day) Load Average(%) (Last Day) • Host Memory Usage (%) (Last Day) --1.2 240000000000 1.6 60 1 16000000000 1.2 0 0.8 Date/Time 8000000000 0.8 0.6 C5A1: cpu\_steal\_rate(%) 14:00 20:00 0.4 0.4 2:00 C5A1: cpu soft irq rate(%

Summary Statistics Screen of a Specific Host in a Hadoop Cluster

The user may monitor various resource utilization metrics of the particular host by clicking on the other tabs in this screen.

# Reference

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For details on managing the Hadoop clusters deployed on the Cisco UCS Integrated Infrastructure for Big Data, see the *Cisco UCS Director Express for Big Data Management Guide* at:

http://www.cisco.com/c/en/us/td/docs/unified\_computing/ucs/ucs-director-express/management-guide/ 1-1/b\_Management\_Guide\_for\_Cisco\_UCS\_Director\_Express\_1\_1.html

## **Bill of Materials**

Figure 289

Table 23 provides the BOM for Cisco UCSD Big Data subscription licenses for up to 64 servers and Table 24 provides the BOM for the various Hadoop platforms.

CUIC-SVR-OFFERS=	Cisco UCS Director Server Offerings	1
CON-SAU-SVROFFERS	Cisco UCS Director Server Offerings Software Application Sup	1
CUIC-BASE-K9	Cisco UCS Director Software License	1
CON-SAU-CUICBASE	SW APP SUPP + UPGR Cisco UCS Director Base Software	1
CUIC-TERM	Acceptance of Cisco UCS Director License Terms	1

#### Table 23 Bill of Material for UCSD for Big Data Subscription Licenses for up to 64 Servers

CUIC-EBDS-LIC=	UCSD Express for Big Data - Standard Edition (SE)	1
CUIC-EBDS-LIC	UCSD Express for Big Data - Standard Edition (SE)	64
CUIC-EBDS-S1-3YR	UCSD Express for Big Data - SE 3 year	64
CUIC-TERM	Acceptance of Cisco UCS Director License Terms	1

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## Table 23Bill of Material for UCSD for Big Data Subscription Licenses for up to 64 Servers

## Table 24Bill of Material for Various Hadoop Platforms

Part Number	Description	
UCS-BD-CEBN=	CLOUDERA ENTERPRISE BASIC EDITION	
UCS-BD-CEFN=	CLOUDERA ENTERPRISE FLEX EDITION	
UCS-BD-CEDN=	CLOUDERA ENTERPRISE DATA HUB EDITION	
UCS-BD-HDP-ENT=	HORTONWORKS ENTERPRISE EDITION	
UCS-BD-HDP-EPL=	HORTONWORKS ENTERPRISE PLUS EDITION	
UCS-BD-M5-SL=	MapR M5 EDITION	
UCS-BD-M7-SL=	MapR M7 EDITION	