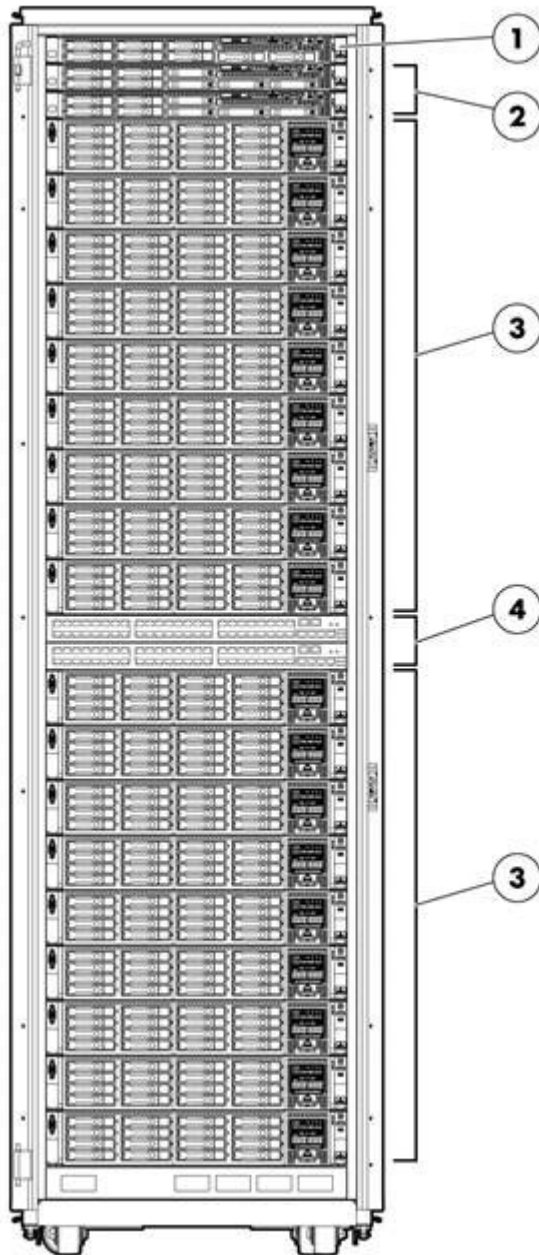


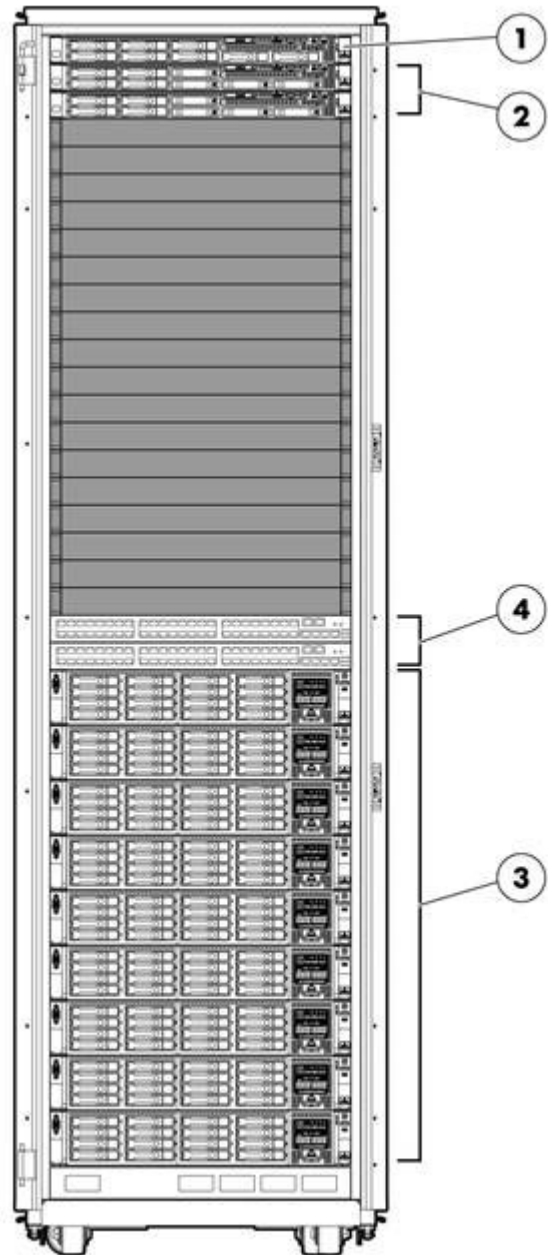
### Overview

### HP AppSystem for Apache Hadoop - Base System configurations



#### Full Rack Base System - Front View

1. Management node - HP ProLiant DL360p Gen8 servers(1)
2. Head nodes - HP ProLiant DL360p Gen8 servers (2)
3. Worker nodes - HP ProLiant DL380e Gen8 servers (18)
4. HP A5830AF-48G Switch (2)

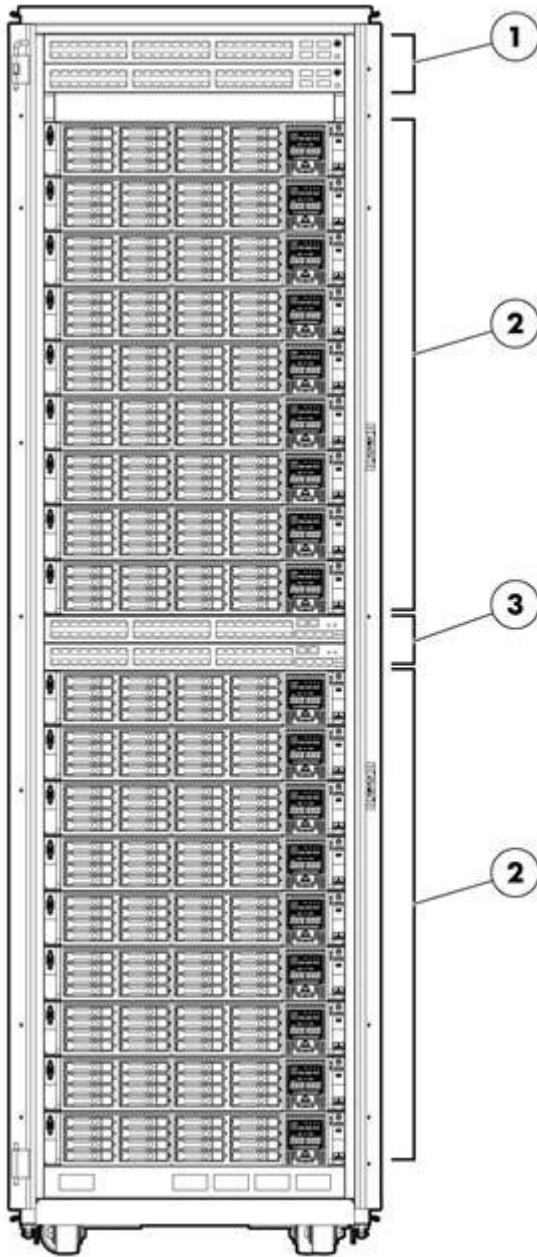


#### Half Rack Base System - Front View

1. Management node - HP ProLiant DL360p Gen8 servers(1)
2. Head nodes - HP ProLiant DL360p Gen8 servers (2)
3. Worker nodes - HP ProLiant DL380e Gen8 servers (9)
4. HP A5830AF-48G Switch (2)

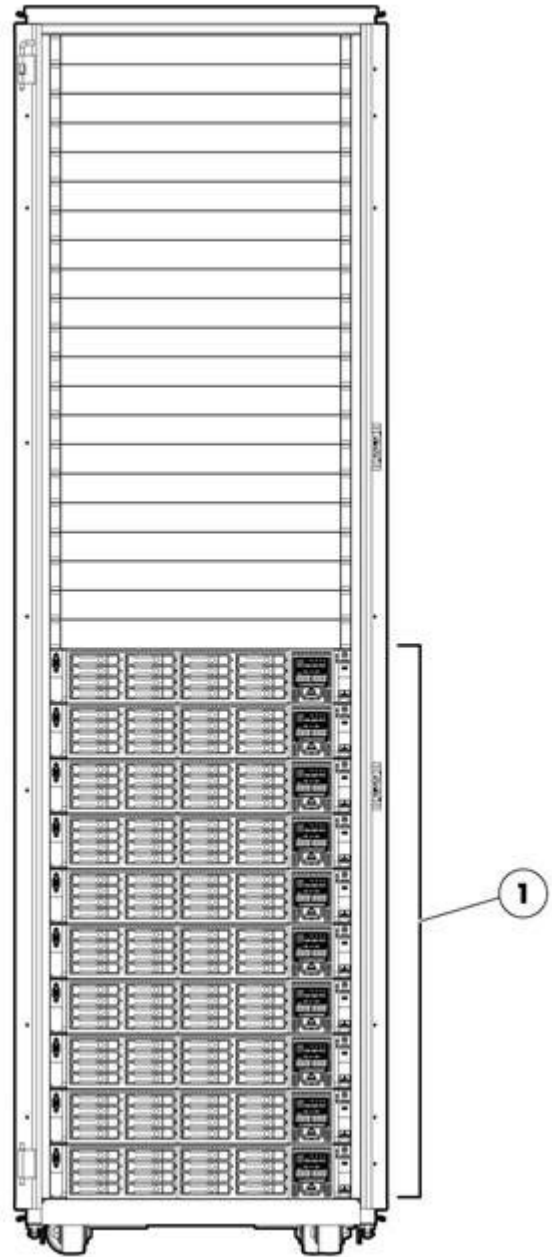
### Overview

### HP AppSystem for Apache Hadoop - Expansion Kit configurations



#### Full Rack Expansion Kit - Front View

1. HP 5900AF-48XG-4QSPF+ Switch (2) - Optional
2. Worker nodes - HP ProLiant DL380e Gen8 servers (18)
3. HP A5830AF-48G Switch (2)



#### Half Rack Expansion Kit - Front View

1. Worker nodes - HP ProLiant DL380e Gen8 servers (9)

### At A Glance

### Overview

The HP AppSystem for Apache Hadoop is a turnkey Hadoop solution designed to address customer concerns about the complexity and maturity of Apache Hadoop™ software. The AppSystem is a factory integrated and pre-configured Hadoop cluster that is ready to use on the day of delivery. The AppSystem contains all the hardware and software components required of an enterprise grade Hadoop platform, and a comprehensive services offering to ensure fastest Time to Value. AppSystem expansion kits are pre-configured to be easy to integrate with your base system. Expansion kits for the HP AppSystem for Apache Hadoop enable you to seamlessly scale your cluster configuration, completing half rack AppSystems and allowing you to add full racks as desired.

### Base Systems

The HP AppSystem for Apache Hadoop come in two configurations:

- A half rack configuration (with 9 worker nodes) is suitable for customers seeking to run a pilot project or contain cost
- A full rack configuration (with 18 worker nodes) is suitable for a production environment

The following components are included in the HP AppSystem for Apache Hadoop:

#### Hardware

- 42U Intelligent Series Rack with modular 3PH or 1Ph PDUs
- Management Node (PN# 700214-B21) - A DL360p server is configured as a Hadoop Management node. It provides the primary interface and integration point to the AppSystem. It performs Hadoop management and monitoring functions. The node may also be used as a client node for submitting Hadoop map-reduce jobs. It may also be used as an edge node for moving data into and out of the AppSystem.
- Hadoop Head Nodes (PN# 700173-B21) - Two DL360p servers are configured as Hadoop Head Nodes. These servers are dedicated to Hadoop coordination functions. One runs the NameNode daemon and the other runs the JobTracker and Secondary NameNode services.
- Hadoop Worker Nodes (PN# 699993-B21) - The AppSystem uses either 9 (half rack) or 18 (full rack) DL380e servers configured as Hadoop Worker Nodes. The worker nodes run the Hadoop DataNode and TaskTracker daemons.
- Network Switches - Two HP A5830AF-48 switches (PN# JC691A) provide redundant networking with every node connected to both switches. The HP Switches provide deep packet buffering (1GB) that is required for good networking performance, and are configured in an HP Intelligent Resilient Framework (IRF) to accommodate NIC bonding for both increased bandwidth and resiliency.
  - IRF makes the two switches appear as a single network device. Each switch is configured with two VLANs - one is dedicated to the private Hadoop cluster network; the other is available for use within the customer's enterprise network using a port based VLAN. The two 10GbE ports on each switch's interface card are used to implement IRF between them. The four remaining 10GbE ports (two on each switch) are available for the Hadoop private network. These spare ports are used to expand the cluster and/or connect to other customer systems that need higher throughput access to the Hadoop cluster.

#### Software

- Cloudera Software - The AppSystem includes Cloudera Enterprise Core (PN# BD822A) which includes CDH4.3 and Cloudera Manager v4.6.1 The optional component Cloudera Enterprise RTD (PN# BD824A) can also be purchased for the AppSystem. Both components offer 24x7 support directly from Cloudera.
- HP Insight CMU - Insight CMU v7.1 provides both cluster management and monitoring functions. The CMU server runs on the management node. CMU is the primary management and monitoring interface for the Hadoop cluster. CMU has been configured to monitor System Metrics, Hadoop Metrics, Power and Temperature. Customers can choose between 3 year and 1 year licensing.
- Operating System - All servers in the cluster run Red Hat Enterprise Linux 6.4 64-bit. Customers can choose between 3 year and 1 year licensing.
- HP Vertica Community Edition - The HP Vertica Community Edition v6.1, along with WebHDFS connectors to Hadoop, is pre-installed on the AppSystem for evaluation purposes only. Instructions are provided to enable HP Vertica Community Edition 6.1 on a single worker node. **NOTE: HP Vertica Community Edition v6.1 is not time limited and enables users to manage up to 1TB of data.**

### Overview

#### Services

HP Factory Express service is included with all AppSystems. With HP Factory Express, the majority of the integration is performed in the HP factory. This includes custom racking, point-to-point cabling, OS and application software load and configuration. Factory Express service offers:

- Project Management services to oversee factory and customer site-installation activities, including proactive communication, planning and scheduling for a coordinated installation at the customer site
- Integration engineering to capture the specific design parameters and prepare a detailed integration package to address customer needs
- Configuring, racking, and cabling the infrastructure in a rack enclosure
- Site assessment
- Installation and start up services
- Documentation package that details the configuration and settings of the delivered solution, including diagrams of the Hardware layout and point-to-point cabling

#### Expansion Kits

Expansion kits for the HP AppSystem for Apache Hadoop are designed to make the ordering process as simple as possible, and are comprised of pre-configured Hadoop Worker Nodes and the network switches required to connect expansion racks to the base system. Expansion kits offer the same level of factory integration and configuration as the AppSystem, providing the fastest Time to Value, and include services for setup and integration into the existing base rack.

Expansion kits for the AppSystem for Apache Hadoop also come in two configurations, to support a variety of cluster size goals:

- A half rack configuration (9 worker nodes) to complete existing half rack AppSystems
- A full rack configuration (18 worker nodes) to add greater compute capacity to full rack AppSystems

The following components are included in expansion kits for the HP AppSystem for Apache Hadoop:

#### Hardware

- 42U Intelligent Series Rack with modular 3PH or 1Ph PDUs
  - **NOTE:** half rack AppSystems do not include a rack enclosure or PDUs, as these nodes are assumed to be added to an existing enclosure.
- Hadoop Worker Nodes (PN# 699993-B21) - Expansion kits consist of either 9 (half rack) or 18 (full rack) Worker Nodes, connectable to base systems for easy expansion.
- Full rack expansion kits only - Two HP A5830AF-48 switches (PN# JC691A) provide redundant networking with every node connected to both switches.
- Aggregation Switches (Optional) - Aggregation switches are required to connect expansion racks to base systems. The HP 5900AF is highly recommended as it is tested for compatibility and supported in the solution. Customers may use other aggregator switches, but this could require TS Consulting services to integrate.
  - The HP 5900AF-48XG-4QSFP+ Switch (PN#JC772A) is an optional component of the full rack expansion kit. These high-density ultra-low latency top-of-rack (ToR) data center switches are well suited for deployment either at the enterprise server access layer or the data center core layer. The HP 5900AF offers high-density 48x10GbE ports delivered in a 1RU design. This high server port density is backed by 4x40GbE uplinks to ensure availability of needed bandwidth for demanding applications. Redundant power and replaceable fan trays deliver highest availability.
    - **NOTE:** An aggregator switch is required to connect the first expansion rack to the base system; subsequent expansion racks may use the same aggregation switch.

#### Software

Expansion kits come equipped with the same software package as the base AppSystem. Note that shipping software versions iterate - if there is a time gap between purchase of the AppSystem and integration of additional racks, software versions may need to be commonized across the cluster.

### Overview

Hadoop Worker Nodes included in the AppSystem expansion kits contain the following software solution:

- Cloudera Software - Cloudera Enterprise Core (PN# BD822A) which includes CDH4.3 and Cloudera Manager v4.6.1. The optional component Cloudera Enterprise RTD (PN# BD824A) can also be purchased with expansion kits, if installed on the base AppSystem. Both components offer 24x7 support directly from Cloudera.
- HP Insight CMU - Insight CMU provides both cluster management and monitoring functions. One year and three year licenses are available.
- Operating System - All servers in the cluster run Red Hat Enterprise Linux 6.4 64-bit. One year and three year licenses are available.
- HP Vertica Community Edition - The HP Vertica Community Edition v6.1, along with WebHDFS connectors to Hadoop, is pre-installed for evaluation purposes only.
  - **NOTE: HP Vertica Community Edition v6.1 is not time limited and enables users to manage up to 1TB of data.**

### Services

Expansion kits include the same Factory Express services as the Base System. Factory Express includes custom racking, point-to-point cabling, OS and application software load and configuration. Expansion kit services include onsite installation and integration into existing base system.

For more information about the HP Hadoop Solutions see: <http://www.hp.com/go/hadoop>

For more information about HP ProLiant servers see: <http://h18004.www1.hp.com/products/servers/platforms>

For more information about HP Insight CMU, see: <http://www.hp.com/go/cmu>

For more information about HP Racks see: <http://h18004.www1.hp.com/products/servers/proliantstorage/racks/index.html>

For more information on HP Vertica Community Edition, see: <http://my.vertica.com/community>

### How to Order

#### How to order HP AppSystem for Apache Hadoop

The method for purchasing the HP AppSystem for Apache Hadoop is simple. It is a solution bundle with all Hardware and Software components predetermined.

1. Start by ordering either a half-rack or a full-rack configuration of the Base Model.
  2. Decide if you need to include the optional product "Cloudera Enterprise RTD" in your order.
  3. Choose the desired level of HP Care Pack Support
- HP Care Packs are available for periods of 1 or 3 years, with a variety of response times to meet your business objectives. Please see Services section below, or visit: [hp.com/services/proactivecare](http://hp.com/services/proactivecare) and [hp.com/services/proactiveselect](http://hp.com/services/proactiveselect) for more detail.

#### How to order expansion kits for the AppSystem for Apache Hadoop

1. Start by understanding the base AppSystem configuration, and the desired number of nodes in the expanded cluster.
  - a. If the base AppSystem is half rack and the desire is to complete the rack, simply order the half rack expansion kit. The additional nodes will arrive without an enclosure, to be added to the existing rack. The correct numbers of Cloudera, Linux, and HP software licenses are pre-configured in the expansion kit.
  - b. If the base AppSystem is a full rack and the desire is add additional full racks, simply order the desired amount of full rack expansion kits. The additional nodes will arrive fully racked and cabled. The correct numbers of Cloudera, Linux, and HP software licenses are pre-configured in the expansion kit.
  - c. You may add additional Worker Nodes to any cluster by manually ordering the desired number of Hadoop Worker Nodes, switches, PDUs, cabling, and enclosure if required. A whiteboard will be generated for this unique order to ensure that all necessary components are included. Aggregation switches will be required if expanding beyond one rack.
2. Determine whether you need to include the Cloudera Enterprise RTD for management of Apache HBase in your order.
  - Confirm that Cloudera Enterprise RTD is deployed in the base AppSystem - this is a requirement for deployment in the expansion nodes.
3. Determine which PDU to order with the expansion racks
  - The PDUs used in expansion racks must be consistent to the ones deployed in the AppSystem. You must know which PDU is currently being deployed to ensure the right PDUs are ordered with expansion kits.
4. Determine whether an aggregation switch is required
  - If you are adding an additional rack to the cluster, an aggregation switch is required for the first additional rack (if you are completing a half rack AppSystem, you are not adding additional racks and therefore you do not require an aggregation switch). The same switch can be used for subsequent expansions (until capacity is reached).
  - The HP 5900AF aggregation switch is pre-tested, configured, and integrated with the expansion rack - this is the recommended switch to use with your Hadoop expansion, for the most streamlined experience. If you have an existing aggregator switch in your environment, additional consulting services may be required to achieve integration, as HP has not tested and is not supporting third party switches. HP Technical Services is available for advanced network integrations.
    - **NOTE:** that the HP 5900AF aggregation switch is selected by default when placing your order. Ensure that this option is de-selected if necessary.
5. Choose the desired level of HP Care Pack Support
  - HP Care Packs are available for periods of 1 or 3 years, with a variety of response times to meet your business objectives. Please see below, or visit [hp.com/services/proactivecare](http://hp.com/services/proactivecare) and [hp.com/services/proactiveselect](http://hp.com/services/proactiveselect) for more detail.
6. Determine whether additional TS Consulting services will be required for integration of the

### How to Order

expansion nodes.

- There are three main criteria for determining the need for advanced integration services:
  1. . Are the versions of Cloudera Enterprise Core consistent between the base AppSystem and the expansion racks?
    - a. A script will be provided to check component versions - run this script to confirm consistency.
    - b. If versions do not match, an update on the AppSystem software will be required to gain consistency. See [www.cloudera.com](http://www.cloudera.com) for instructions. Engage TS Consulting if needed to assist in the update.
  2. Are AppSystem configuration settings consistent with golden values provided by the factory at shipment?
    - a. Run Compliance Checker to evaluate.
    - b. We recommend that any non-compliant values are reverted back to golden values as supplied. Instructions will be provided to achieve this. If this does not meet customer needs, or if the customer needs guidance on this, engage TS Consulting to assist.
  3. Is the recommended aggregator switch being used?
    - a. If any aggregator switch other than the HP 5900AF-48XG-4QSPF+ Switch is to be used in the expanded cluster, we recommend that TS Consulting is engaged for advanced network integration to ensure proper configuration.

### HP Services & Support Options

#### HP Care Packs and Additional services

*The recommended HP support level is HP Proactive Care plus the HP Personalized Support Option; the minimum required support level is HP Support Plus 24. The available Care Pack durations are 1yr or 3yr to match the software subscription duration choice for the solution. Choose from the following support offers:*

#### **HP Proactive Care - 1yr or 3yr**

HP Proactive Care - HP Proactive Care begins with providing all of the benefits of proactive monitoring and reporting along with rapid reactive care. You also receive enhanced reactive support, through access to HP's expert reactive support specialists. You can customize your reactive support level by selecting either 6 hour call-to-repair or 24x7 with 4 hour onsite response.

HP Proactive Care with the HP Personalized Support Option - Adding the Personalized Support Option for HP Proactive Care is highly recommended. The Personalized Support option builds on the benefits of HP Proactive Care Service, providing you an assigned Account Support Manager who knows your environment and delivers support planning, regular reviews, and technical and operational advice specific to your environment. These proactive services will be coordinated with Microsoft's proactive services that come with Microsoft Premier Mission Critical, if applicable.

#### **HP Support Plus 24 - 1yr or 3yr**

For a higher return on your server and storage technology, our combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

HP Proactive Select - And to address your ongoing/changing needs, HP recommends adding Proactive Select credits to provide tailored support options from a wide menu of services, designed to help you optimize capacity, performance, and management of your SAP environment. These credits may also be used for assistance in implementing updates for the solution. As your needs change over time you flexibly choose the specific services best suited to address your current IT challenges.

#### **NOTES:**

1. Cloudera software support is provided directly by Cloudera. HP support covers the HP components, including Linux.
2. Each of these support levels include hardware and software reactive support and are available with DMR (defective media retention).

#### **Custom Services**

The following additional HP services are available on a custom service basis:

##### Roadmap and planning:

- Identify possible use of Hadoop, categorize sources and volumes of input data, and spotlight potential data transformations.
- Capture potential opportunities, risks, and mitigations based on current best practices for managing, operating, and maintaining Hadoop clusters
- Configuration and process recommendations for the implementation of Hadoop, based on HP reference architectures, assessments, and best practices.
- Conduct a risks gap analysis as part of a roadmap and plan for a successful Hadoop implementation.



### HP Services & Support Options

Complex network integration:

- Connecting the AppSystem to the production/management networks
- Creating secure ingress/egress points
- Connecting to partner or federated networks

Changes to the configuration:

- Changing the internal cluster IP Addresses
- Adding disks to servers and configuring them in Hadoop
- Adding more servers and configuring them in Hadoop

Integration:

- Integrating the Hadoop cluster into the enterprise management suite
- Creating an operations guide and operational procedures for the Hadoop environment

In addition, HP highly recommends HP Education Services (for customer training and education) and additional Technical Services, as well as in-depth installation or implementation services as may be needed.

For additional information please visit:

HP Education Services: <http://h10076.www1.hp.com/education/bigdata.htm>

HP Technology Consulting Services: <http://www.hp.com/services/bigdata>

Deployment Services: [www.hp.com/services/deployment](http://www.hp.com/services/deployment)

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### Warranty Services

The HP AppSystem for Apache Hadoop is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. As the AppSystem for Apache Hadoop is a solution made up of many components, the warranty across the different components will vary.

The HP AppSystem for Apache Hadoop requires customers purchase a minimum of 1 year Support Plus 24 (24x7 hardware/software support with 4 hour onsite hardware response), bringing the support service level of all components to a consistent level of 24x7. In addition, we recommend that customers upgrade to Proactive Care support.

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### HP Financial Services

To support customers' transition, HP Financial Services (HPFS) can help in a way that you may not have considered. HPFS can help you invest in your business while preserving precious capital.

For more information, contact your local HP Financial Services Representative. In the United States, call 1-888-277-5942. In Canada, dial 1-800-HP-LEASE. For more information please visit: [www.hp.com/hpfinancialservices](http://www.hp.com/hpfinancialservices) for links to HP Financial Services around the world.

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### HP Services & Support Options

#### **Rack Airflow Requirements**

##### HP 642 1075mm Shock Intelligent Series Rack

The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The HP 642 1075mm Shock Intelligent Series Rack s provide enhanced airflow for maximum cooling (81% total open area on HP rack front doors), allowing these racks to be fully loaded with servers using the latest processors.

- Front and rear doors: You must allow 830 square inches (5,350 sq cm) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to a required 64 percent open area for ventilation).
- The clearance from face of rack to inside of the front door needs to be a minimum of 1.75".
- Side: The clearance between the installed rack component and the side panels of the rack needs to be a minimum of 2.75 inches (7 cm).

### Technical Specifications

#### HP AppSystem for Apache Hadoop Configurations

The base model for the HP AppSystem for Apache Hadoop comes in two configurations - Half Rack and Full Rack

#### Full Rack Configuration of Base System

The full rack configuration of the base model of HP AppSystem for Apache Hadoop includes the following:

One (1) HP 642 1075mm Shock Intelligent Series Rack includes:

- One (1) Management node includes:
  - One (1) HP ProLiant HP DL360p Gen8 Server (2x E5-2667 ) includes:
    - Eight (8) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - Eight (8) HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC ENT Hard Drive
    - HP Smart Array P420i Controller
    - HP Ethernet 1Gb 4-port FIO Adapter
- Two (2) Head nodes each includes:
  - One (1) HP ProLiant HP DL360p Gen8 Server (2x E5-2667 ) includes:
    - Eight (8) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - Four (4) HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC ENT Hard Drive
    - HP Smart Array P420i Controller
    - HP Ethernet 1Gb 4-port FIO Adapter
- Eighteen (18) Worker nodes each includes:
  - One (1) HP ProLiant HP DL380e Gen8 Server (2x E5-2440 ) includes:
    - Six (6) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - 2 (2) HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - 12 (12) HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - HP Smart Array P420 Controller
    - HP Ethernet 1Gb 4-port FIO Adapter
- Two (2) HP A5830AF-48G Switch
- Three phase Modular Power Distribution Unit (PDU)
  - Three-phase (8 PDUs per rack):
    - HP 14.4kVA 40A Three Phase NA/JP Modular Power Distribution Unit
- Red Hat Enterprise Linux (RHEL) 6.4 on each node
- Cloudera Enterprise Core 1 year 24x7 Flex License
- Cloudera Enterprise RTD 1 year 24x7 Flex License (Optional)
- HP Insight CMU v7.1
- HP Vertica Community Edition v6.1 (for evaluation purposes only)
- Factory services to default configure, rack, and cable the infrastructure in a rack
- Site assessment
- Installation and start up

#### Half-Rack Configuration of Base System

The Half Rack configuration of the HP AppSystem for Apache Hadoop includes the following:

One (1) HP 642 1075mm Shock Intelligent Series Rack includes:

- One (1) Management node includes:
  - One (1) HP ProLiant HP DL360p Gen8 Server (2x E5-2667 ) includes:
    - Eight (8) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - Eight (8) HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC ENT Hard Drive
    - HP Smart Array P420i Controller
    - HP Ethernet 1Gb 4-port FIO Adapter

### Technical Specifications

- Two (2) Head nodes each includes:
  - One (1) HP ProLiant HP DL360p Gen8 Server (2x E5-2667 ) includes:
    - Eight (8) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - Four (4) HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC ENT Hard Drive
    - HP Smart Array P420i Controller
    - HP Ethernet 1 Gb 4-port FIO Adapter
- Nine (9) Worker nodes each includes:
  - One (1) HP ProLiant HP DL380e Gen8 Server (2x E5-2440 ) includes:
    - Six (6) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - 2 (2) HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - 12 (12) HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - HP Smart Array P420 Controller
    - HP Ethernet 1 Gb 4-port FIO Adapter
- Two (2) HP A5830AF-48G Switch
- Three phase Modular Power Distribution Unit (PDU)
  - Three-phase (4 PDUs per rack):
    - HP 14.4kVA 40A Three Phase NA/JP Modular Power Distribution Unit
- Red Hat Enterprise Linux (RHEL) 6.4 on each node
- Cloudera Enterprise Core 1 year 24x7 Flex License
- Cloudera Enterprise RTD 1 year 24x7 Flex License (Optional)
- HP Insight CMU v7.1
- HP Vertica Community Edition v6.1 (for evaluation purposes only)
- Factory installation services to configure, rack, and cable the infrastructure in a rack per HP Best Practices
- Site assessment
- Installation and start up

User Data Capacity	Racks Ordered	
Topology	Half	Full
12 2TB LFF Disks	192TB (usable HDFS)	384TB (usable HDFS)

**NOTE:** User data capacity is calculated based on 12 LFF disks allocated to HDFS file system on the Worker nodes, not factored in the formatted capacity and RAID1 for the 2 LFF disks for OS.

### Expansion Kit Configurations

Expansion kits for the HP AppSystem for Apache Hadoop come in two configurations - Half Rack and Full Rack

#### Full Rack Configuration Expansion Kit

The full rack expansion kit for the HP AppSystem for Apache Hadoop includes the following:

One (1) HP 642 1075mm Shock Intelligent Series Rack includes:

- Eighteen (18) Worker nodes each includes:
  - One (1) HP ProLiant HP DL380e Gen8 Server (2x E5-2440 ) includes:
    - Six (6) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
    - 2 (2) HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - 12 (12) HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
    - HP Smart Array P420 Controller
    - HP Ethernet 1Gb 4-port FIO Adapter
- Two (2) HP A5830AF-48G Switch
- Three phase Modular Power Distribution Unit (PDU)

### Technical Specifications

- Three-phase (8 PDUs per rack):
  - HP 14.4kVA 40A Three Phase NA/JP Modular Power Distribution Unit
- Red Hat Enterprise Linux (RHEL) 6.4 on each node
- Cloudera Enterprise Core 1 year 24x7 Flex License
- Cloudera Enterprise RTD 1 year 24x7 Flex License (Optional)
- HP Insight CMU v7.1
- HP Vertica Community Edition v6.1 (for evaluation purposes only)
- Factory installation services to default configure, rack, and cable the infrastructure in a rack per HP Best Practices
- Site assessment
- Installation and start up

### Half Rack Configuration Expansion Kit

The full rack expansion kit for the HP AppSystem for Apache Hadoop includes the following:

- Nine (9) Worker nodes each includes:
    - One (1) HP ProLiant HP DL380e Gen8 Server (2x E5-2440 ) includes:
      - Six (6) HP 8GB (1x8GB) Single Rank PC3-12800R Memory
      - 2 (2) HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
      - 12 (12) HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC MDL Hard Drive
      - HP Smart Array P420 Controller
      - HP Ethernet 1Gb 4-port FIO Adapter
  - Two (2) HP A5830AF-48G Switch
  - Three phase Modular Power Distribution Unit (PDU)
    - Three-phase (8 PDUs per rack):
      - HP 14.4kVA 40A Three Phase NA/JP Modular Power Distribution Unit
  - Red Hat Enterprise Linux (RHEL) 6.4 on each node
  - Cloudera Enterprise Core 1 year 24x7 Flex License
  - Cloudera Enterprise RTD 1 year 24x7 Flex License (Optional)
  - HP Insight CMU v7.1
  - HP Vertica Community Edition v6.1 (for evaluation purposes only)
  - Factory installation services to default configure, rack, and cable the infrastructure in a rack per HP Best Practices
  - Site assessment
  - Installation and start up
-

### Technical Specifications

<b>Technical Specifications</b>	<b>Dimensions</b>	Height	42U, 78.816 in (200.19cm)
	(per rack)	Width	23.535 in (59.78 cm)
		Depth	42.741in (108.56 cm)
	<b>Shipping Dimensions</b> (per rack, with packaging materials)	Height	85.35 in (216.80 cm)
		Width	35.43 in (90cm)
		Depth	50.87 in (129.20 cm)
	<b>Maximum load</b>	Full Rack	1600 lb (726kg)
		Half Rack	900 lb (408kg)
	<b>Color</b>	Doors	Black with Silver extrusion
		Frame	Black
	<b>Clearance</b> (for air flow and access)	Front	48 in (121.9 cm)
		Rear	30 in (76.2 cm)
	<b>Temperature range</b>	Operating	50° to 90° F (10° to 35° C)
		Non-Operating	-22° to 140° F (-30° to 60° C)
	<b>Relative humidity</b>	Operating	15 to 85% relative humidity (Rh)
	<b>Altitude</b>	Operating	3000 meters maximum.
	<b>Power Usage -Operating</b>	Full Rack	9.7kW (47A at 208V)
		Half Rack	5.4kW (26A at 208V)
	<b>BTU rating, maximum</b>	Full Rack	35000 BTU/hr
		Half Rack	20000 BTU/hr
	<b>Power Connections</b>	<b>Three-Phase Power</b>	NA/Japan or International Option
		Full Rack	(2) CS8365C or (2) IEC60309 4 pole, 5wire
		Half Rack	(2) CS8365C or (2) IEC60309 4 pole, 5wire
		<b>Single-Phase Power</b>	NA/Japan or International Option
		Full Rack	(2) NEMA L6-30p or (2) IEC60309-32A
		Half Rack	(4) NEMA L6-30p or (4) IEC60309-32A
	<b>External Network Connections</b>	<b>Location</b>	Connection Speed/Connection Type
		Management Node	1 GbE / RJ45
		Head Node 1	1 GbE / RJ45
		Head Node 2	1 GbE / RJ45
		iLO Management Node 1	1 GbE / RJ45

**NOTE:** No direct sustained sunlight.

**NOTE:** The maximum load for the HP Intelligent Series Rack is 3000 lb (907.18kg).

### Technical Specifications

**Environment-friendly  
Products and Approach****End-of-life Management  
and Recycling**

Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <http://www.hp.com/go/green>. To recycle your product, please go to: <http://www.hp.com/go/green> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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