Hardware User Guide

Active Archive System
Version 1.0
12 March 2015
1ET0040

Long Live Data ™
www.hgst.com

Copyright

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law: HGST a Western Digital company PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer or express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. HGST may make improvements or changes in any products or programs described in this publication at any time.

It is possible that this publication may contain reference to, or information about, HGST products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that HGST intends to announce such HGST products, programming, or services in your country.

Technical information about this product is available by contacting your local HGST representative or on the Internet at: www.hgst.com/support

HGST may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents.

© 2015 HGST, Inc. All rights reserved.

HGST, a Western Digital company
3403 Yerba Buena Road
San Jose, CA 95135
Produced in the United States

Long Live Data™ is a trademark of HGST, Inc. and its affiliates in the United States and/or other countries.

HGST trademarks are authorized for use in countries and jurisdictions in which HGST has the right to use, market and advertise the brands.

Other product names are trademarks or registered trademarks of their respective owners.

One MB is equal to one million bytes, one GB is equal to one billion bytes, one TB equals 1,000GB (one trillion bytes) and one PB equals 1,000TB when referring to storage capacity. Usable capacity will vary from the raw capacity due to object storage methodologies and other factors.

References in this publication to HGST products, programs or services do not imply that HGST intends to make these available in all countries in which HGST operates.

Product information is provided for information purposes only and does not constitute a warranty.

Information is true as of the date of publication and is subject to change. Actual results may vary. This publication is for general guidance only. Photographs may show design models.

Contents

List of Figures....6

List of Tables....7

1 Document Summary....8
1.1 Scope....8
1.2 References....8
1.3 Power Distribution Unit Specifications....8
1.4 Physical Dimensions and Capacities....8
1.4.1 Dimensions....8
1.4.2 Weight....9
1.4.3 Active Archive System Configuration....10

2 For More Information....12
2.1 Points of Contact....12

3 Product Overview....13
3.1 Introduction....13
3.2 Controller Nodes, Storage Servers, and Storage Nodes....15
3.2.1 Controller Node Configuration....15
3.2.2 Storage Server Configuration....16
3.2.3 Switches....18

4 Disclaimers....20
4.1 Regulatory Statement of Compliance....20
4.1.1 Safety Compliance....20

5 Active Archive System Components....21
5.1 Controller Node....21

5.2 Storage Node....21
5.3 TOR Switch....22
5.3.1 Port Reservations....22
5.4 Storage Device....22
5.5 Cables....23

6 Cabinet and Power Distribution Unit Specifications....24
6.1 Power Distribution Unit Specification....24

7 Environmental Requirements....25
7.1 Operating Environment....25

8 Field Replaceable Units....26
8.1 Controller Node Parts....26
8.2 Storage Node Parts....26
8.3 Storage Interconnect Parts....26
8.4 Storage Enclosure Basic Field Replaceable Units....27

9 Active Archive System Hardware Installation....28

10 Appliance Configuration....29
10.1 Appliance Configuration Resources....29

11 HGST Regulatory Statements....30
11.1 FCC Class A Notice....30
11.2 FCC Verification Statement (USA)....30
11.3 ICES-003 Class A Notice—Avis NMB-003, Classe A....31
11.4 CE Notices (European Union), Class A ITE....31
11.5 Europe (CE Declaration of Conformity)....31
11.6 Japanese Compliance Statement, Class A ITE....31
11.7 Taiwan Warning Label Statement, Class A ITE....31
11.8 KCC Notice (Republic of Korea Only), Class A ITE....32

Glossary....33
A....33
B....33
C....33
D....33
E....33
F....34
G....34
H....34
I....34
J....34
K....35
L....35
M....35
O....35
P....35
R....36
S....36
T....36
U....36
V....36
W....37
X....37

List of Figures

Figure 1: Active Archive System....10

Figure 2: Active Archive System Components and Interconnections....14

Figure 3: Populated Active Archive System....15

Figure 4: Active Archive System Layout Network....19

Figure 5: Controller Node HDD Configuration....21

Figure 6: Controller Node HDD Configuration....21

Figure 7: Storage Interconnect Front View....22

Figure 8: Storage Interconnect Switch Rear View....22

Figure 9: Switch Port Reservations....22

List of Tables

Table 1: Power Distribution Unit Specifications....8

Table 2: Active Archive System Dimensions....8

Table 3: Active Archive System Weight....9

Table 4: Active Archive System Full Configuration....10

Table 5: Controller Node Configuration....15

Table 6: Storage Server Configuration....16

Table 7: Controller Node and Storage Server Configuration....17

Table 8: Product Safety Compliance....20

Table 9: Approved Cables....23

Table 10: Power Budget....24

Table 11: Operating Environment....25

Table 12: Controller Node....26

Table 13: Storage Node....26

Table 14: Controller Node....26

Table 15: Controller Node....27

1 Document Summary

Topics:

- Scope
- References
- Power Distribution Unit Specifications
- Physical Dimensions and Capacities

The following chapter defines the *scope*, *intended audience*, and *references* related to the Active Archive System Hardware User Guide.

1.1 Scope

The HGST Active Archive System is a highly integrated Object Storage Server addressing cloud scale storage growth.

The Active Archive System rack is a HGST designed storage appliance containing components, servers, and switches within a 42U rack.

1.2 References

- *Document name*: Revision

1.3 Power Distribution Unit Specifications

Table 1: Power Distribution Unit Specifications

Component	Basic	Standard
Power Supply	Redundant intelligent PDUs	Redundant intelligent PDUs
Power consumption - typical	5,079 Watts	7,890 Watts
Power consumption - max	6,884 Watts	10,484 Watts

1.4 Physical Dimensions and Capacities

The following section provides a description of the physical dimension and capacities.

1.4.1 Dimensions

Rack:

The following table displays the dimensions of the Active Archive System:

Table 2: Active Archive System Dimensions

Hardware	Dimensions (height x width x depth)
Active Archive System	82.52 inches x 23.62 inches x 40.35 inches 2,041 millimeters x 600 millimeters x 1,025 millimeters

1.4.2 Weight

Rack:

The following table displays the weight of the Active Archive System:

Table 3: Active Archive System Weight

Hardware	Dimensions (Width x Height x Depth)
Active Archive System	2,250 lbs. 1,020 kg.

1.4.3 Active Archive System Configuration

The following table displays the configuration for the Active Archive System:

Figure 1: Active Archive System

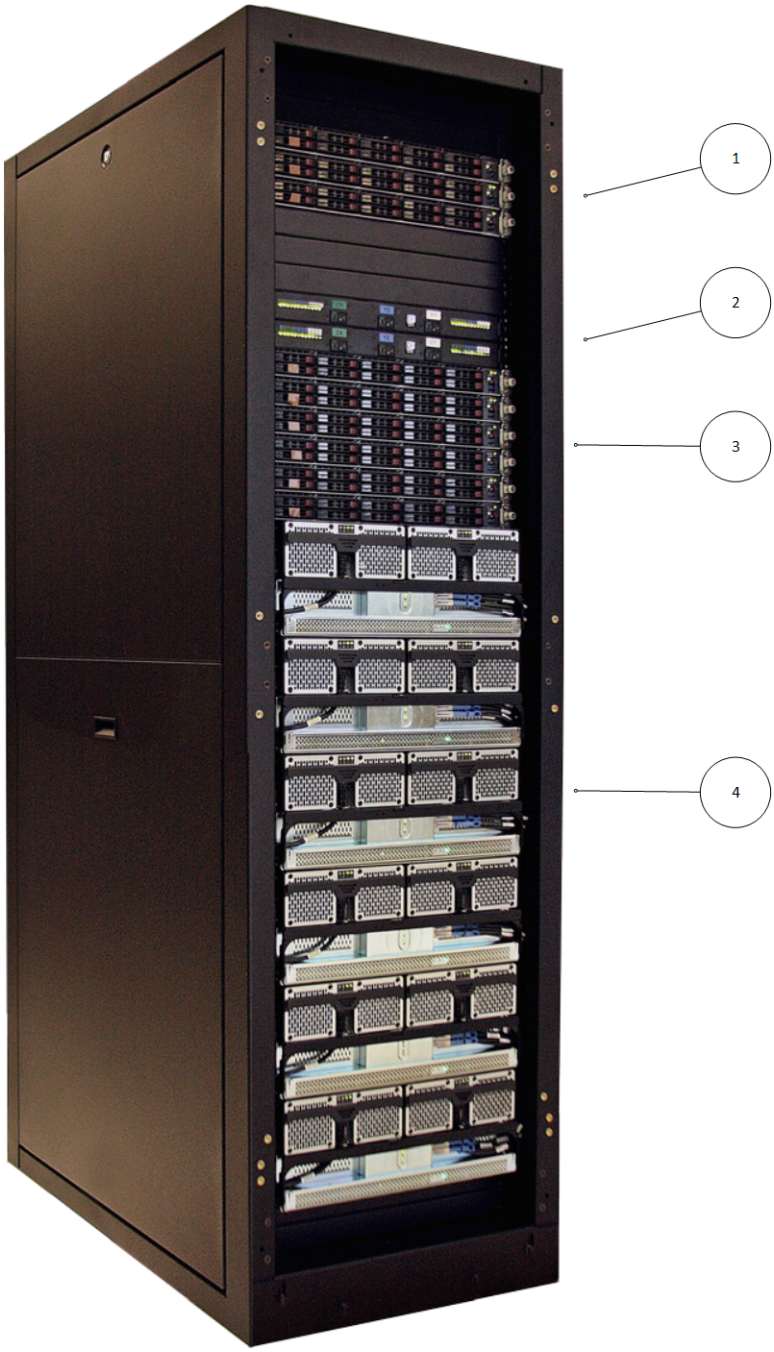


Table 4: Active Archive System Full Configuration

Hardware	Details	Number of Product
(1) Controller Nodes	N/A	3
(2) Storage Interconnect	N/A	2

Hardware	Details	Number of Product
(3) Storage Nodes	N/A	6
(4) Storage Enclosure Basic	For the basic configuration, there are 98 drives per Storage Enclosure Basic.	6

2 For More Information

Topics:

- Points of Contact

The following chapter provides points of contact for the HGST Active Archive System.

2.1 Points of Contact

For further assistance with the Active Archive System, contact Elastic Storage Platforms support. Please be prepared to provide the following information: serial number (S/N), product name, model number, and a brief description of the issue.

Telephone:

Region	Telephone Numbers	Support Hours and Additional Information
United States/International	1-408-717-7766	24 hours a day, 7 days a week
North America	1-844-717-7766	24 hours a day, 7 days a week Toll-free

Email:
support@hgst.com

Website:
http://www.hgst.com/

3 Product Overview

Topics:

- Introduction
- Controller Nodes, Storage Servers, and Storage Nodes

The following chapter provides a product overview of the Active Archive System.

3.1 Introduction

The Active Archive System is a hyper-scale rack level storage appliance. The hardware includes multiple 1U servers configured as Controller Nodes and Storage Nodes, HGST Storage Enclosure Basic storage arrays, and converged client, data, and management Storage Interconnect integrated with HGST software in a 42U rack with all supporting cables, power, and mechanical infrastructure.

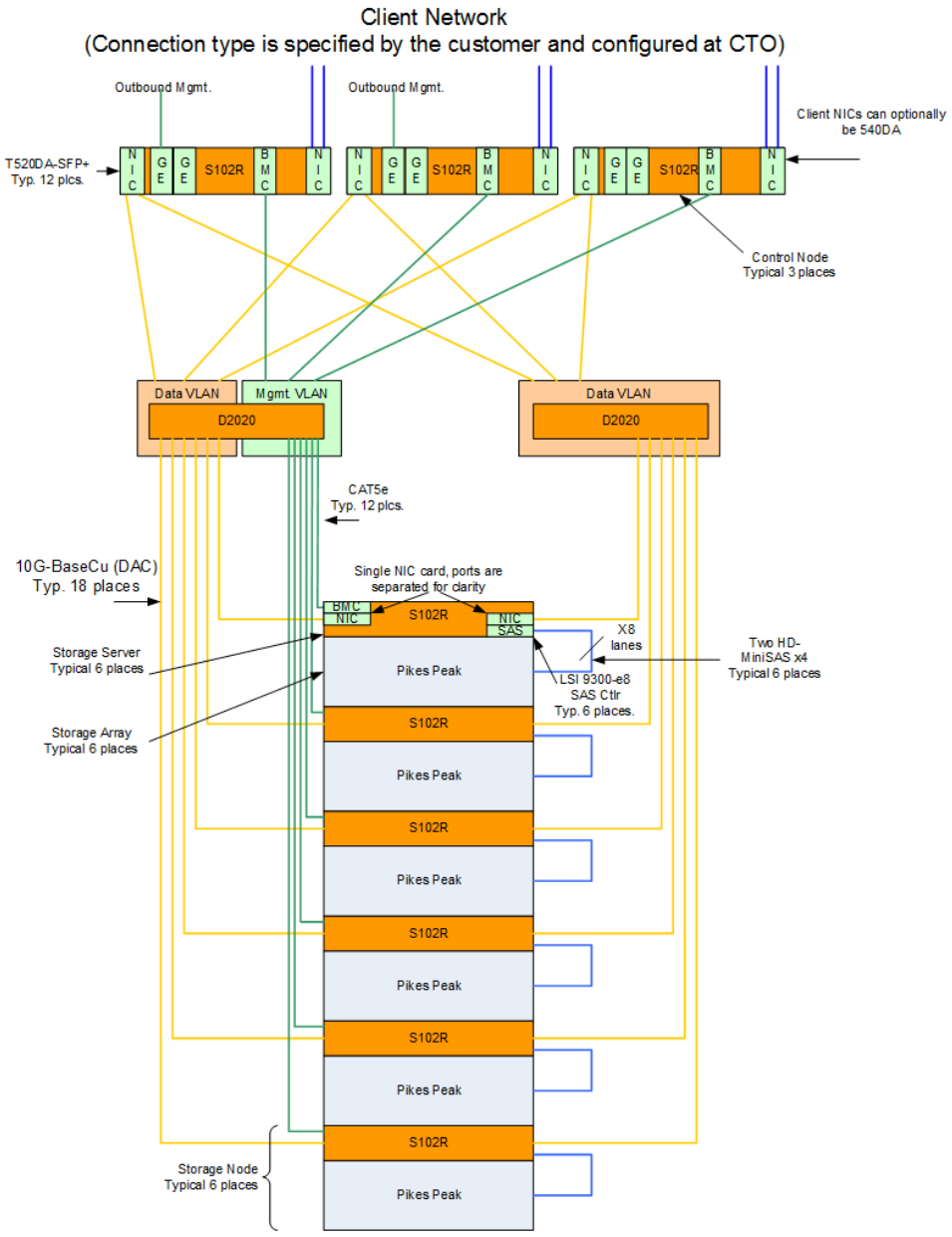
The Active Archive System is comprised of the following major components, all of which have a number of replaceable units:

- Controller Nodes
- Storage Nodes
- Storage Interconnect
- Power Distribution Units (PDUs)
- Storage Enclosure Basic Storage Arrays

Note: In addition to the major components, the system includes the rack, power distribution units, cables, rack panels, hardware, labels, power cords, and sleds.

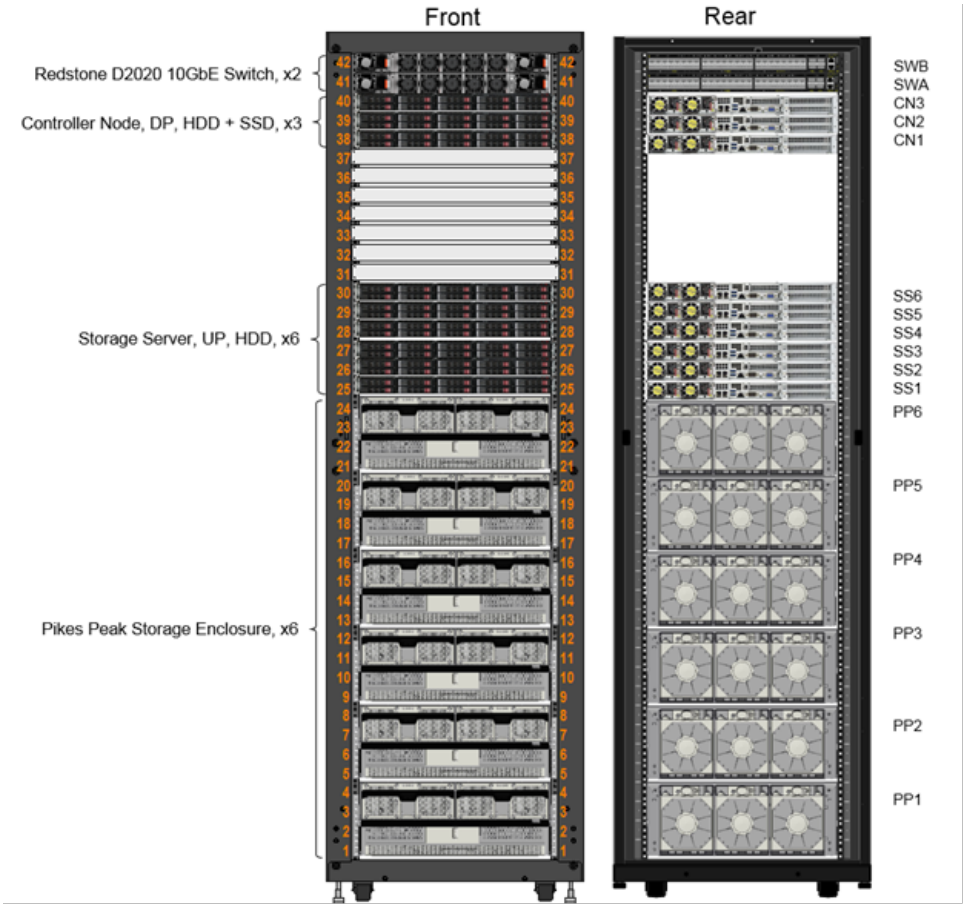
The following figure displays the rack components and interconnections that formulate the Active Archive System:

Figure 2: Active Archive System Components and Interconnections



The following figure displays a physical view of the Active Archive System rack populated with components:

Figure 3: Populated Active Archive System



3.2 Controller Nodes, Storage Servers, and Storage Nodes

The controller nodes run the HGST object-based storage file system which is responsible for the virtualization and management of the physical storage and all host related accesses. Each Active Archive System contains three controller nodes. The controller nodes interface to the external client network and internal data and management networks.

The Storage Server interfaces to the controller nodes and Storage Enclosure Basic storage arrays and is responsible for managing the physical storage contained in the Storage Enclosure Basic storage array, as well as, the monitoring and reporting of the status of the Storage Enclosure Basic storage enclosure components (for example, the fans, power supplies, drive FRUs, and so on).

A storage node consists of a single storage server and a single Storage Enclosure Basic storage array. There are six storage nodes in the Active Archive System.

3.2.1 Controller Node Configuration

The Controller Nodes are 1U servers. Each server used as Controller Node is configured as follows:

Table 5: Controller Node Configuration

Storage	Quantity	Configuration
Intel E5-2650L v3 Haswell processor	2	

Storage	Quantity	Configuration
64GB of DDR4 2133MHz memory	4	Implemented as four 16GB DIMMS with two DIMMs populated per processor. This results in 32GB per processor.
PCIe Gen3 x8 riser cards	2	To support two PCIe add-in cards (AIC).
X520-DA2 SFP+ dual-port 10G NIC	2	Populated in one of the two x8 PCIe Gen 3 AIC slots mentioned previously. The port with high MAC address of each NIC will connect to the internal DATA VLAN on each of the two Celestica D2020 Redstone switches. One port with low MAC address of each NIC will connect to the external client network.
Local storage devices	6	• Two 1TB enterprise class 6Gbps SATA HDD for the Controller Node O/S and application storage • Four 240GB 6Gbps SATA SSDs for metadata storage.
1G RJ45 Ethernet management port	1	Connected to the baseboard management controller (BMC). This port is reserved for future use.
1G RJ45 on-board Ethernet ports	4	• One of the 1G on-board Ethernet ports is reserved for connection to external management network. Two of the three Controller Nodes will connect to the external management network via the reserved port. • One of the 1G on-board Ethernet ports is dual functioned for BMC/IPMI and standard TCP/IP traffic. This port is connected to management VLAN on one of the two Celestica D2020 Redstone switches. • The remaining 1G on-board Ethernet ports are reserved for future use.
Ubuntu 12.04 Linux operating system	N/A	
HGST storage appliance application software.	N/A	

3.2.2 Storage Server Configuration

The storage servers are based on 1U. Each server used as storage server is configured as follows:

Table 6: Storage Server Configuration

Storage	Quantity	Configuration
Intel E5-2650L v3 Haswell processor	1	
64GB of DDR4 2133MHz memory	4	Implemented as four 16GB DIMMS with one DIMM populated per memory

Storage	Quantity	Configuration
		channel per processor to facilitate maximum memory bandwidth.
PCIe Gen3 x8 riser cards	2	To support two PCIe add-in cards (AIC).
X520-DA2 SFP+ dual-port 10G NIC	1	Populated in one of the two x8 PCIe Gen 3 AIC slots mentioned previously. **Note:** These ports will be connected to the DATA VLAN on the two Celestica D2020 Redstone switches.
LSI 12G SAS HBA LSI9300-8e	1	Populated in the remaining x8 PCIe Gen 3 AIC slot. **Note:** Both SAS ports of the HBA will connect to the miniSAS HD host ports of the associated HGST Storage Enclosure Basic storage enclosure.
500GB enterprise class 6Gbps SATA HDD	2	Local storage devices for the O/S and Storage Server software
1G RJ45 Ethernet management port	1	Connected to the baseboard management controller (BMC). This port is reserved for future use.
1G RJ45 on-board Ethernet ports	2	• One of the 1G on-board Ethernet ports is dual functioned for BMC/IPMI and standard TCP/IP traffic. This port is connected to management VLAN on one of the two Celestica D2020 Redstone switches. • The remaining 1G on-board Ethernet port reserved for future use.
Ubuntu 12.04 Linux operating system	N/A	
HGST storage appliance application software.	N/A	

The following table summarizes the server configurations and the rack architecture and component interconnections:

Table 7: Controller Node and Storage Server Configuration

Hardware	Controller Node	Storage Server
Processor	2x E5-2640 v3	1x E5-2650L v3
Memory	64GB DDR4 2133 Mhz	64GB DDR4 2133Mhz
Expansion slots	2x8 Gen3	2x8 Gen3

Hardware	Controller Node	Storage Server
HDD	2x 1TB SATA 6Gbps	2x 500GB SATA 6Gbps
NIC	2x X520-DA2 SFP+	1x X520-DA2 SFP+
BMC/IPMI Managament Port	1G RJ45 BMC management port	1G RJ45 BMC management port
SSD	SSD Metadata 4x240GB SATA 6Gbps	N/A
SAS HBA	N/A	LSI 9300-8e x8 PCIe Gen3
Operating System	Ubuntu 12.04	Ubuntu 12.04

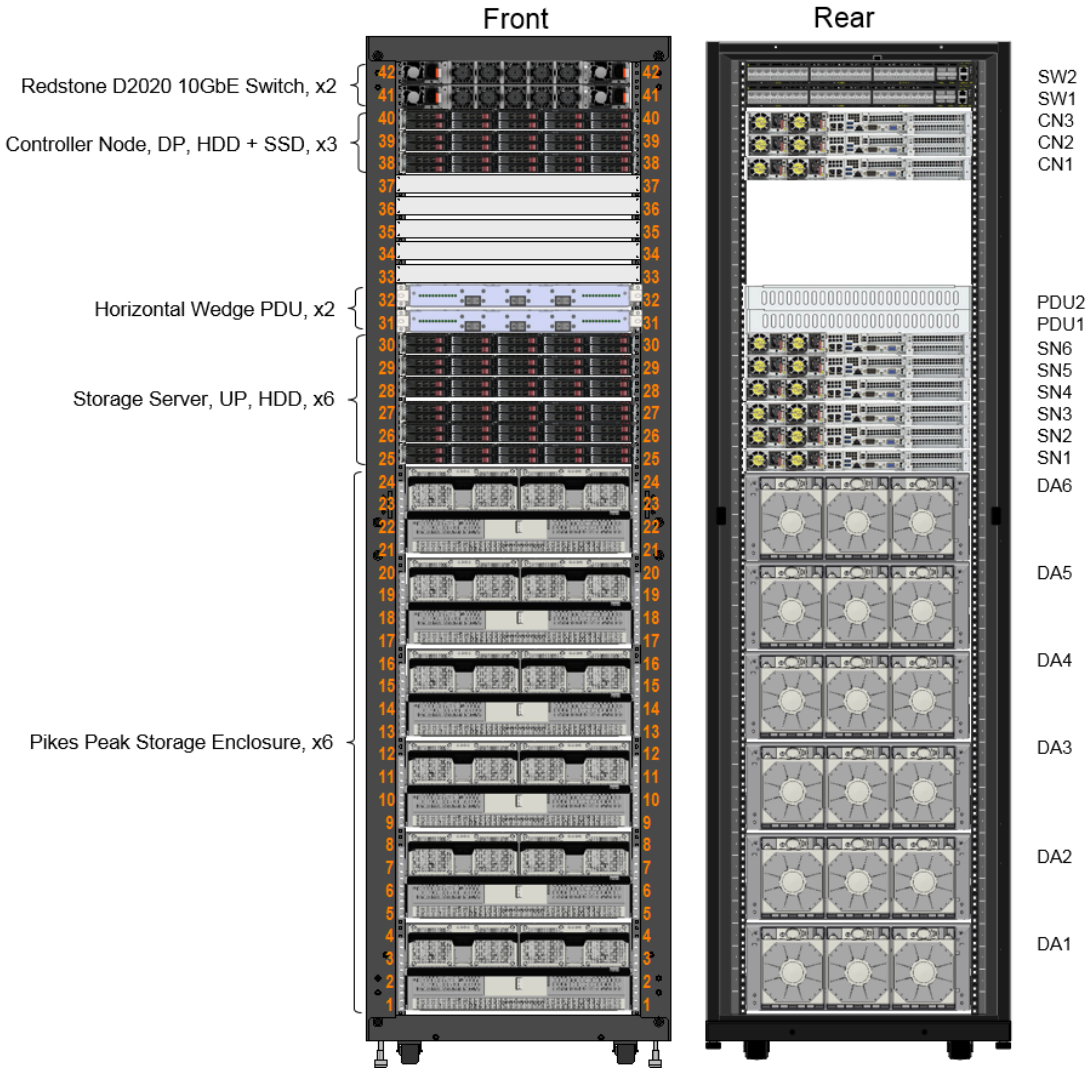
3.2.3 Switches

There are two Celestica Redstone D2020 10GE switches in a redundant configuration. There are 48 10GE ports and 4 40GE uplink ports on each switch. The 10GE ports on the switches are SFP+ and can be individually configured for copper or optical connections.

There are two VLANS configured on at least one switch: a Data VLAN and a Management VLAN. All data and data related control traffic between the Controller Nodes and Storage Nodes is routed over the data VLAN. All enclosure management data and related control traffic are routed over the Management VLAN.

The following figure displays the physical placement of the components in the Active Archive System rack. The two Redstone D2020 switches will be placed at top of the cabinet, followed by three 1U Controller Nodes, followed by 7U of reserved space, followed next by six Storage Servers, and lastly, six Storage Enclosure Basic storage arrays.

Figure 4: Active Archive System Layout Network



4 Disclaimers

Topics:

- Regulatory Statement of Compliance

The following chapter describes the Regulatory Statement of Compliance and Safety Compliance for the Active Archive System.

4.1 Regulatory Statement of Compliance

Marketing Name: **HGST Storage Enclosure**
Regulatory Model: **1ES0**
Regulatory Type: **1ES0001**
EMC Emissions: **Class A**

This product has been tested and evaluated as Information Technology Equipment (ITE) at accredited third-party laboratories for all safety, emissions and immunity testing required for the countries and regions where the product is marketed and sold. The product has been verified as compliant with the latest applicable standards, regulations and directives for those regions/countries. The suitability of this product for other product categories other than ITE, may require further evaluation.

The product is labeled with a unique regulatory model and regulatory type that is printed on the label and affixed to every unit. The label will provide traceability to the regulatory approvals listed in this User Guide. The User Manual applies to any product that bears the regulatory model and type names including marketing names other than those listed in this manual.

4.1.1 Safety Compliance

The following table outlines how the Storage Enclosure Basic is being designed to pass the product safety requirements:

Table 8: Product Safety Compliance

Country/Region	Authority or Mark	Standard
Australia/New Zealand	CB report, CB certificate	AS/NZS 60950.1
Canada/North America	NRTL	CSA C22.22 No. 60950-1-07
Customs Union/Russia, Kazakhstan, Belarus, Armenia	EAC	TR CU 004/2011
European Union	CE	EN 60950-1
International		IEC60950, CB report and Certificate to include all country national deviations
United States/North America	NRTL	UL 60950-1
Mexico	NYCE or NOM	NOM-019-SCFI-1998
Brazil	INMETRO	IEC 60950-1
Taiwan	BSMI	CNS14336
Ukraine	UKrTEST or equivalent	4467-1:2005
Moldova	INSM	SM SR EN60950-1
Serbia	KVALITET	SRPS EN60950:2010
India	BIS	IS 13252 (Part 1):2010

5 Active Archive System Components

Topics:

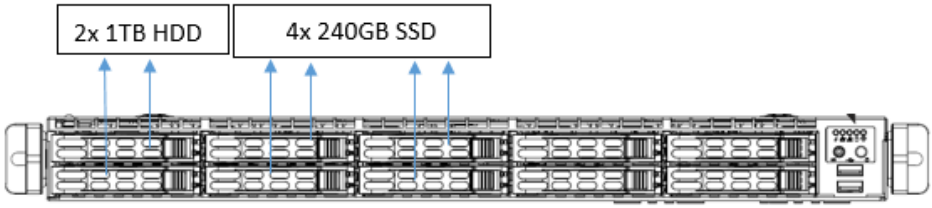
- Controller Node
- Storage Node
- TOR Switch
- Storage Device
- Cables

The following chapter provides a description of each of the Active Archive System components.

5.1 Controller Node

The controller node is a 1U. The main features include two Intel Haswell processors, 64GB DDR4 memory and 6x SATA HDD/SSD drives for the operating system, application, and metadata storage.The following figure displays the front view of controller node. The first two drive slots are populated with two 1TB SATA HDD. Four 240GB SSDs are populated in the following four slots.

Figure 5: Controller Node HDD Configuration



5.2 Storage Node

The storage node is a 1U. It is configured with a single Intel Haswell processor, 64GB DDR4 memory and 2x SATA drive for OS and storage server software. The following figure displays the storage server front view and the HDD configuration:

Figure 6: Controller Node HDD Configuration

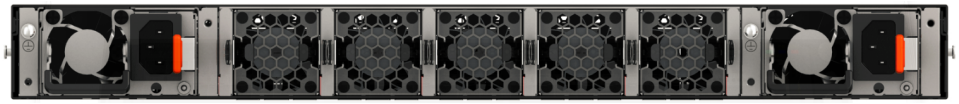
5.3 TOR Switch

The TOR Switch uses the Storage Interconnect 10G Switch. Refer to the Storage Interconnect specification for detail information. The Storage Interconnect provides up to 48 SFP+ 10GbE ports and 4 QSFP+ 40GbE ports. The following figure displays the front view of Storage Interconnect Switch:

Figure 7: Storage Interconnect Front View

The following figure displays the rear view of D2020 Switch:

Figure 8: Storage Interconnect Switch Rear View



The Switch is intended to be rear mounted in the rack, such that the cables will come out from rear of the rack and the power will be situated in the front of the rack. This configuration facilitates simplified cable management within the rack.

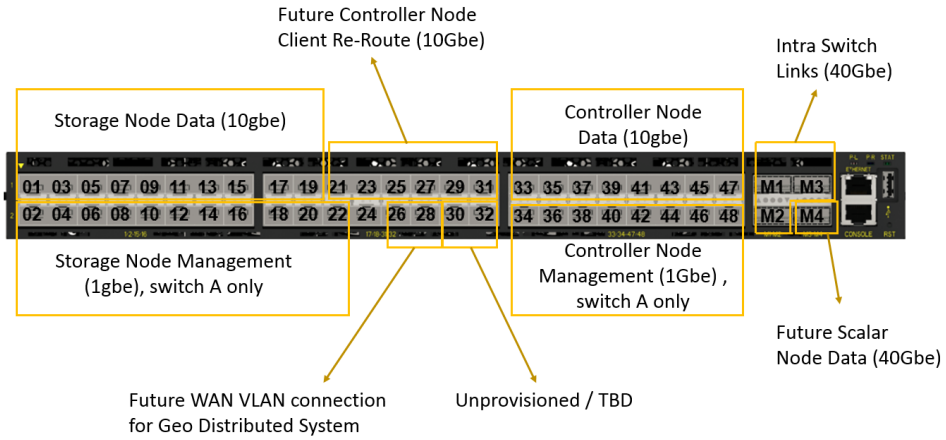
5.3.1 Port Reservations

This approach reserves port ranges on the switch for V1 as well as anticipating future port consumption:

- Allows for up to 10 Storage Nodes per rack – entire rack for storage nodes
- Allows for up to 8 Controller Nodes per rack – additional performance
- Allows for Amplidata Scalar Layer to be added including uplink and rerouting of controller nodes
- Provisions for 1Gbit management
- Provisions for WAN connection for Geo distributed use case

The following figure displays the details port reservations on switches:

Figure 9: Switch Port Reservations



5.4 Storage Device

This section is under development.

The Storage Enclosure Basic is a 4U, high density Hard Disk Drive enclosure designed by HGST. The following figure displays the Storage Enclosure Basic:

5.5 Cables

The following table displays the approved cables for Active Archive System:

Table 9: Approved Cables

Description	Connection	Length	Quantity
10G SFP+ to SFP+ DAC Cable, 30AWG	Connect switch and 10G NIC on servers (controller node or storage server) for data network	1 and 1.5 meters	18
1G RJ45 Cable, CAT5E, 26AWG	Connect switch and BMC ports of servers (controller node and storage server) for management network Connect PDU management port to controller nodes	1 and 1.5 meters	9
12G miniSAS HD 4x external cable, 28 AWG	Connect Storage Enclosure Basic and miniSAS ports of storage servers	2.5 and 3 meters	12
IEC 60320 C14 to C13 Power Cord, 18AWG	Connect power inlets on PSUs of each devices to PDU outlets	1, 1.5, and 3 meters	34

6 Cabinet and Power Distribution Unit Specifications

Topics:

- Power Distribution Unit Specification

The following chapter provides a description of cabinet and power distribution unit specifications of the Active Archive System.

6.1 Power Distribution Unit Specification

The Active Archive System requires approximately 10KW of external power. The following table displays the estimated power budget:

Table 10: Power Budget

Hardware	Description	Maximum Power (Watts)	Quantity	Amps (per)	Amps @ 208 (Volts)
Redstone	D2020, 10GbE Switch	220	2	1.06	2.1
Controller Node	Dual Socket Controller Node	540	3	2.60	7.8
Storage Server	Single Socket Storage Server	420	6	2.02	12.1
Storage Enclosure Basic	Storage Array	850	6	4.09	24.5
	Total	9,680			46.5

7 Environmental Requirements

Topics:

- Operating Environment

The following chapter displays the operating and storage environmental requirements.

7.1 Operating Environment

The following table displays the operating conditions of the Active Archive System.

Table 11: Operating Environment

Operating	Active Archive System
Temperature	20° to 40°C de-rated 2% per 1,000 feet altitude increase
Humidity	8% to 90% (non-condensing)

8 Field Replaceable Units

Topics:

- Controller Node Parts
- Storage Node Parts
- Storage Interconnect Parts
- Storage Enclosure Basic Field Replaceable Units

8.1 Controller Node Parts

The Controller Node contains the following FRUs:

Table 12: Controller Node

Field Replaceable Unit	Hot-Swapable
Server (containing NIC, CPU, memory, motherboard, and fan)	?
Hard Disk Drive (HDD)	?
Solid State Disk (SSD)	?
Power Supply Unit (PSU)	?

8.2 Storage Node Parts

The Storage Node contains the following FRUs:

Table 13: Storage Node

Field Replaceable Unit	Hot-Swapable
Server (containing NIC, CPU, memory, motherboard, and fan)	?
Hard Disk Drive (HDD)	?
Power Supply Unit (PSU)	?

8.3 Storage Interconnect Parts

The Storage Interconnect contains the following FRUs:

Table 14: Controller Node

Field Replaceable Unit	Hot-Swapable
Switch	?
Power Supply Unit (PSU)	?

Field Replaceable Unit	Hot-Swapable
Fan	?

8.4 Storage Enclosure Basic Field Replaceable Units

The Storage Enclosure Basic storage appliance contains the following core hardware and contents:

Table 15: Controller Node

Field Replaceable Unit	Hot-Swapable
Rear Fans	Yes
I/O Module	No
Power Supply Unit (PSU)	Yes
Sled	No
Hard Disk Drive (with drive carrier)	No
Sled Blank	No
Chassis	No
Rail Kit	No

9 Active Archive System Hardware Installation

This section is under development.

10 Appliance Configuration

Topics:

- Appliance Configuration Resources

The following chapter displays the resources for configuration of the Active Archive System.

10.1 Appliance Configuration Resources

To configure the Active Archive System storage appliance, refer to the following software documentation:

- Add names of software documents here.
- Add names of software documents here.
- Add names of software documents here.

11 HGST Regulatory Statements

Topics:

- FCC Class A Notice
- FCC Verification Statement (USA)
- ICES-003 Class A Notice—Avis NMB-003, Classe A
- CE Notices (European Union), Class A ITE
- Europe (CE Declaration of Conformity)
- Japanese Compliance Statement, Class A ITE
- Taiwan Warning Label Statement, Class A ITE
- KCC Notice (Republic of Korea Only), Class A ITE

The following chapter provides regulatory statements for the Storage Enclosure Basic.

HGST Storage Enclosures are marked to indicate compliance to various country and regional standards.

Note: *Potential equipment damage:* Operation of this equipment with cables that are not properly shielded and not correctly grounded may cause interference to other electronic equipment and result in violation of Class A legal requirements. Changes or modifications to this equipment that are not expressly approved in advance by HGST will void the warranty. In addition, changes or modifications to this equipment might cause it to create harmful interference.

11.1 FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Any modifications made to this device that are not approved by HGST may void the authority granted to the user by the FCC to operate equipment.

11.2 FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates and can radiate radio frequency energy, and if not installed and used in accordance with the Storage Enclosure Basic User Guide, it may cause harmful interference to radio communications.

11.3 ICES-003 Class A Notice—Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numerique de la classe A est conforme à la norme NMB-003 du Canada.

11.4 CE Notices (European Union), Class A ITE

Marking by the symbol indicates compliance of this system to the applicable Council Directives of the European Union, including the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC). A “Declaration of Conformity” in accordance with the applicable directives has been made and is on file at HGST Europe.

11.5 Europe (CE Declaration of Conformity)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of the Canadian Department of Communications.

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques”, NMB-003 édictée par le Ministre Canadian des Communications.

11.6 Japanese Compliance Statement, Class A ITE

The following Japanese compliance statement pertains to VCCI EMI regulations:

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

English translation:

This is a Class A product based on the Technical Requirement of the Voluntary Control Council for Interference by Information Technology (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions.

11.7 Taiwan Warning Label Statement, Class A ITE

警告使用者:

此為甲類資訊技術設備，於居住環境中使用時，

可能會造成射頻擾動，在此種情況下，使用者會

被要求採取某些適當的對策。

English translation:

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

11.8 KCC Notice (Republic of Korea Only), Class A ITE

기 종 별	사 용 자 안 내 문
A급 기기 (업무용 정보통신기기)	이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

English translation:

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you may exchange it for a non-business device.

Glossary

A

AC	**Alternating Current**
ACMA	**Australian Communications and Media Authority**

Top of A | Top of Glossary

B

BIOS	**Basic Input/Output System**
BIS	**Business Information System**
BIST	**Built-In Self-Test**
BM	Spell out acronym here
BMC	**Baseboard Management Controller**
BME	Spell out acronym here
BOM	**Bill of Materials**
BSMI	**Bureau of Standards, Metrology and Inspection**

Top of B | Top of Glossary

C

CDB	**Computer Data Bus**
CLI	**Command Line Interface**
CS	**Climate Saver**
CSA	Spell out acronym here

Top of C | Top of Glossary

D

DC	**Direct Current**

Top of D | Top of Glossary

E

EC	**Engineering Change**
EEPROM	**Electrically Erasable Programmable Read-Only Memory**
EMC	Spell out acronym here
EMI	**Electromagnetic Interference**
ESD	**Electrostatic Discharge**

EVPD	**Enable Vital Product Data**

Top of E | Top of Glossary

F

FCC	**Federal Communications Commission**
FRU	**Field Replaceable Unit**
FW	**Firmware**

Top of F | Top of Glossary

G

GBE	**Gigabit Ethernet**
GPIO	**General-Purpose Input/Output**
GUI	**Graphical User Interface**

Top of G | Top of Glossary

H

HD	**Hard Drive**
HDD	**Hard Disk Drive**

Top of H | Top of Glossary

I

ICT	**In-circuit Test**
IEC	**International Electrotechnical Commission**
INMETRO	Spell out acronym here
I/O	**Input/Output**
IOC	**Input/Output Controller**
IOM	**I/O Module**
IPMI	**Intelligent Platform Management Interface**

Top of I | Top of Glossary

J

JBOD	**Just a Bunch of Disks**

Top of J | Top of Glossary

K

KVALITET	Spell out acronym here

Top of K | Top of Glossary

L

LED	**Light-Emitting Diode**
LPC	**Low Pin Count**
LPH	**Low Profile Hybrid**
LUN	**Logical Unit Number**

Top of L | Top of Glossary

M

MAC	**Media Access Control**
miniSAS	**Mini Statistical Analysis System**

Top of M | Top of Glossary

O

OS	**Operating System**
OUI	**Organizationally Unique Identifier**

Top of O | Top of Glossary

P

PCB	**Printed Circuit Boards**
PCI	**Peripheral Component Interconnect**
PDB	**Power Distribution Board**
PDU	**Power Distribution Unit**
PMBus	**Power Management Bus**
POST	**Power On Self Test**
PSU	**Power Supply Unit**
PHY	**Physical Layer**
PWM	**Pulse-Width Modulation**
PWR	**Power**

Top of P | Top of Glossary

R

ROC	**Recovery Oriented Computing**
RTC	**Real Time Clock**

Top of R | Top of Glossary

S

SAS	**Serial Attached SCSI**
SATA	**Serial Advanced Technology Attachment**
SBB	**Storage Bridge Bay**
SCSI	**Small Computer System Interface**
SDK	**Software Development Kit**
SEP	**SCSI Enclosure Processor**
SES	**SCSI Enclosure Services**
SMART	**Self-Monitoring, Analysis and Reporting Technology**
SMP	**Server Message Block**
SMB	**Server Message Block**
SPI	**Serial Peripheral Interface**
SRPS	Spell out acronym here
SSP	**Serial SCSI Protocol**

Top of S | Top of Glossary

T

TCA	**Telecommunications Computing Architecture**

Top of T | Top of Glossary

U

UART	**Universal Asynchronous Receiver/Transmitter**

Top of U | Top of Glossary

V

VBOD	**Virtualized Bunch of Disks**
VPD	**Vital Product Data**

Top of V | Top of Glossary

W

WOL	**Wake On LAN**
WOS	**Wake On SAS**

Top of W | Top of Glossary

X

XDP	**XML Data Package**

Top of X | Top of Glossary

Index

A

acronyms 33
appliance 29
  configuration 29
  resources 29

C

cabinet 24
  PDU 24
  specification 24
cable 23
CE 31
  notice 31
    european union 31
    class a ITE 31
configuration 10
controller 21
  node 21
controller node 15
configuration 15
  storage server 15
  storage node 15
copyright 2
notice 2

D

dimension 8
disclaimer 20
document 8
summary 8

E

environmental 25
requirement 25

F

FCC 30
  class a 30
  notice 30
  verification 30
    statement 30
    USA 30
for more information 12
FRU 26

I

ICES-003 31
Canada 31
  class a 31
    notice 31
      Avis NMB-003 31
      classe a 31
introduction 13

J

Japanese 31
  compliance statement 31
  class a ITE 31

K

KCC 32
  notice 32
    republic of Korea 32
    class a ITE 32

O

object storage server 28
  hardware 28
  installation 28
operating 25
environment 25

P

PDU 8, 24
specification 8, 24
physical 8
  dimension 8
  capacity 8
points of contact 12
port 22
reservation 22
product 13
overview 13

R

references 8
regulatory 20, 30
  statement 20, 30
  compliance 20

replace 26
storage 26
node 26
FRU 26
replacing 26
switch 26
replacement 26
procedure 26

S

safety 20
compliance 20
scope 8
storage 21–22
appliance 21
component 21
device 22
node 21
storage enclosure basic 27
FRU 27
storage server 16
configuration 16
switches 18

T

Taiwan 31
warning label 31
statement 31
class a ITE 31
TOR 22
switch 22

W

weight 9