Dell Storage Designed for Scality RING Deployment Guide



Regulatory Model: E26S Series Regulatory Type: E26S001

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

MARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Overview

This solution is a storage building block based on PowerEdge servers and Dell Storage enclosures, which enables deployment of an ultra-dense storage platform paired with Scality software, for object-based storage or file-based storage on the petabyte scale. Supported services include object level protocols: Scality REST; RS2/Amazon; Openstack Swift; and Cloud Data Management Interface (CDMI). Supported file level services include NFS; Server Message Block (SMB) Openstack; Openstack Cinder; and local Linux FS via FUSE. For more information, see **Dell.com/sdscalityseriesmanuals**.

Documentation resources

For a complete list of supported Dell and Scality documentation, see the Support Matrix for this release.

Scality provides you with login credentials to access the Scality documentation on purchase of Scality RING software.

NOTE: If you are not provided with login credentials, contact your Scality Account Representative.

These credentials are required to access Scality RING documentation, which is delivered in a version specific WIKI format.

For information about top-level documentation, go to http://docs.scality.com.

You can view the documents on the Scality documentation page based on the selected version. The latest version is selected by default.

To view an earlier version, select the version number from the drop-down list, and then click Go.

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Setting up the Dell Storage Designed for Scality RING solution

Overview

Any Dell Storage Solution Designed for Scality RING can support both file and object protocols simultaneously. The two options, File Service and Object Storage solutions, are provided based on best practices for an initial configuration. Customers can choose to add dedicated Connector servers at any time, which is most common with file based protocols. Because object-based protocols are most often installed directly onto the Physical Server, that configuration does not contain dedicated Connector servers.

The primary components of this solution are:

- One or more Connector (servers) that interface between applications and storage data.
- Physical Servers for hosting the storage nodes, which form a Scality RING that provides a high capacity storage for server data.
- A Supervisor, which is the central management console for the Scality RING.

Connectors

Connector servers are the interface between outside applications and storage data. Depending on your solution, Connectors reside on a Dell SD630-S server or hosted by one or more of the Dell SD7000-S servers. Connectors are configured for a specific protocol depending on the services provided by the Scality RING.

Physical Servers

The Scality RING is a distributed storage solution that aggregates capacity from Dell x86 servers without any bottleneck or single point of failure.

The Dell SD7000-S Single Node server contains one independent Physical Server, which includes dual processors based on the Intel Xeon EP E5-2600 v3 or v4 family, 12 DIMMs, and two HDD slots reserved for the operating system (OS) disk, all housed in a removable module referred to as a sled. The chassis contains 90 HDD/SSD slots with all slots assigned to the single node.

The Dell SD7000-S Dual Node server contains two independent Physical Servers, with each server comprised of dual processors based on the Intel Xeon EP E5-2600 v3 or v4 family, 12 DIMM, and two HDD slots reserved for the OS disk, all housed in a removable module referred to as a sled. The chassis contains 90 HDD/SSD, 45 HDD/SSD slots for each Physical Server, for processing server data.

A minimum of six Dell SD7000-S Single Node or three Dell SD7000-S Dual Node servers are required to form a storage RING consisting of six Physical Servers. Additional Dell SD7000-S servers can be added in any increment.

Supervisor

In both solutions, a Dell SD630-S server functions as a central management console that monitors and configures the Scality RING solution, referred to as the Supervisor.

The Supervisor operates passively and is independent from the Physical Servers and Connectors, allowing the storage operations to continue even when the Supervisor is being serviced.

File Services solution

In the File Services solution, an additional Dell SD630-S server is required for each Connector. As shown in the following figures, a Dell SD630-S server is configured as a Connector. Supported file level services include:

- Network File System (NFS)
- Server Message Block (SMB) OpenStack
- OpenStack Cinder
- Local Linux FS via FUSE

You can add additional Dell SD630-S servers configured as a Connector, at any time in order to provide additional services or improve performance.



Figure 1. Physical diagram of a File Server solution—Single Node



Figure 2. Physical diagram of a File Server solution-Dual Node

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Object Storage solution

The Object Storage solution differs from the File Server solution. In this solution, the Dell SD7000-S Physical Servers not only host storage nodes, but each Physical Server can optionally host a Connector. Each Connector provides an interface for disk storage and outside applications, receive requests, and dispatch objects.

Supported Object level services include the following object level protocols:

- Scality REST
- RS2/Amazon S3
- OpenStack Swift
- Cloud Data Management Interface (CDMI)

The following image is a physical diagram for an Object Storage solution. One or more Physical Servers can host storage nodes and also function as a Connector. Dell recommends that redundant HTTP load balancers interface the application network to the storage network to proxy requests evenly across the Physical Servers as shown in the following figures.



Figure 3. Physical diagram of a Object Storage solution—Single Node



Figure 4. Physical diagram of an Object Storage solution-Dual Node

Installation prerequisites

The following sections outline the installation prerequisites.

Rack space

Use the following images to configure the rack.



Figure 5. Rack space—Single Node

- 1. Switches for management, application, and storage networks
- 3. One or more Dell SD630-S (Connector– file server only)
- 2. Dell SD630-S (Supervisor)
- 4. Minimum six Dell SD7000-S Single Node servers



Figure 6. Rack space—Dual Node

- 1. Switches for management, application, and storage networks
- 2. Dell SD630-S (Supervisor)
- 3. One or more Dell SD630-S (Connector- file server only)
- 4. Minimum three Dell SD7000-S Dual Node

Dell Storage Designed for Scality RING requires racks with a minimum depth of 1200 mm (48 inches). Ensure that there is enough contiguous rack space in the rack for your solution, as shown in the following table. The requirements listed in the table here do not include space for switches.

A minimum configuration has three Dell SD7000-S Dual Node or six Dell SD7000-S Single Node Physical Servers, each requiring 4U of vertical rack space. You can add an additional Dell SD7000-S Physical Server to expand the storage capacity of the Scality RING at any time.



NOTE: A 1200 mm rack (48 inches deep with a minimum of 130 mm extension) may be required to accommodate power distribution units and cable management arms that are located internal to the rack because the Dell SD7000-S (Single or Dual Node) Physical Storage Server is 1098.4 mm (43.2 inches) deep and fills the space extending from the front door to the back door.



NOTE: If a cable management arm is used, a minimum of 130 mm extension is required.

Table 1. Rack space for Dell Storage Designed for Scality RING SD7000-S Single Node server

File Server			Object Storage		
Minimum solution with one Connector	Additional rack space for each added Connector	Additional rack space for each added Dell SD7000-S server	Minimum solution with one Connector	Additional rack space for each added Connector	Additional rack space for each added Dell SD7000-S server
26U	1U	4U	25U	None	4U

File Server			Object Storage		
Minimum solution with one Connector	Additional rack space for each added Connector	Additional rack space for each added Dell SD7000-S server	Minimum solution with one Connector	Additional rack space for each added Connector	Additional rack space for each added Dell SD7000-S server
14U	1U	4U	13U	None	4U

Network settings and IP addresses

The table here lists the minimal quantity of IP addresses required for Scality RING solution. The requirements for File Server solutions vary from Object Storage solutions.

	File Server (with o	ne Connector)	Object Storage (with one Connector)		
	Static or DHCP	Quantity	Static or DHCP	Quantity	
IDRAC server management	Either	11	Either	10	
Server management	Either	10	Either	8	
Storage network	Static	16	Static	14	
Application network	Static	2	Static	2	

Table 3. IP address requirements for SD7000-S Single Node minimal solutions

Table 4. IP address requirements for SD7000-S Dual Node minimal solutions

	File Server (with one	e Connector)	Object Storage (with one Connector)	
	Static or DHCP	Quantity	Static or DHCP	Quantity
IDRAC server management	Either	8	Either	7

	File Server (with one	e Connector)	Object Storage (wit	h one Connector)
Server management	Either	10	Either	8
Storage network	Static	16	Static	14
Application network	Static	2	Static	2

NOTE: The Dell SD7000-S (Single or Dual Node) server requires two management IP addresses for each Physical Server. The iDRAC port for each Physical Server provides concurrent access to iDRAC and the OS. A Dell SD630-S server requires three management IP addresses including one for the iDRAC port, which is not exposed to the OS, and two separate redundant connections for accessing the OS.

For File Server solutions, each Connector requires two dual port PCI NICs.

The table here lists the quantity of IP addresses required for each additional Connector added to the solution.

Table 5. IP a	address req	uirements	for minima	l solutions
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	File Server (with o	ne Connector)	Object Storage (with one Connecto	
	Static or DHCP	Quantity	Static or DHCP	Quantity
IDRAC server management	Either	1	Either	0
Server management	Either	2	Either	0
Storage network	Static	2	Static	0
Application network	Static	2	Static	0

Switch requirements

This section defines the switch requirements for the management, application, and storage networks.

Management network

The Dell Storage Designed for Scality RING solution requires a switch for the storage network. The selection depends on the Network Daughter Cards (NDCs) selected for the Dell SD7000-S and Dell SD630-S servers, which include BT, SFP and SR Ethernet network interface options.

Application network

Dell recommends having two bonded network connections from each server to application network through two separate redundant switches.

Storage network

The Dell Storage Designed for Scality RING solution requires a switch for the storage network. The selection depends on the NDCs selected for the Dell SD7000-S and Dell SD630-S servers.

Dell recommends having two bonded network connections from each server to the application network routed through two separate, redundant switches.

Installing hardware

Installation summary

About this task

To install the Dell Storage for Scality RING solution, complete the following steps:

Steps

- 1. Unpack the Dell SD630-S and Dell SD7000-S servers.
- 2. Install the Dell SD630-S and Dell SD7000-S servers into the rack. For more information about installing the server into the rack, see the *Rack Installation* document included with your solution.
- 3. Install the HDDs and SSDs in the Dell SD7000-S servers.
- 4. Connect the network interface connections to the appropriate network switches.
- 5. Connect each server to an electrical outlet.
- 6. Turn on the system by pressing the power button.

Unpacking the servers

Before you begin, read through the following documentation:

- Rack installation instructions shipped with your Dell servers.
- Dell Storage Designed for Scality RING Getting started Guide
- Dell Storage Designed for Scality RING Owner's Manual

Installing the Dell SD7000-S servers into the rack space

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NOTE: For weight stability, always load the rack by using a bottom-up approach. Locate the Dell DS7000-S server near the bottom of the rack.

Before installing the servers, ensure that the space allocated for the Dell SD7000-S server does not contain a power strip installed internal to the rack because the server completely fills the space from the front to back doors.

Installing the hard drives into the Dell SD7000-S server

The hard drives are packed in separate boxes from the server. To remove the top cover from the Dell SD7000-S server and install the drives, follow the instructions in the Owner's Manual.

Installing the hard drives into the Dell SD7000-S Single Node server

Install HDDs and SSDs into the open slots in each Dell SD7000-S server as shown in the figures here. The Physical Server located in the lower sled A connects to all 90 slots. Install the SSDs in the highest numbered slots and install the HDDs in the lowest numbered slots. Insert the drive blanks in all remaining slots.



NOTE: Sled B is blank in single node configurations.

For example, if you have a configuration that contains 20 HDDs and two SSDs, install the HDDs in drive slots 0 through 9 in Expander A and Expander B, and install the SSDs in slot 44 for Expander A and Expander B. Install the drive blanks in slots 10 through 43.



Figure 7. Dell SD7000-S server with the cover off to show HDD and SSD placements



Figure 8. Installing HDDs and SSDs into open slots on the Dell SD7000-S server

- 1. HDD Carrier
- 2. Carrier Handle

3. Release button

Installing the hard drives into the Dell SD7000-S Dual Node server

Install drives into the open slots in each Dell SD7000-S server as shown in the figures here. The Physical Server located in the lower sled A connects to the 45 slots in dark grey and the Physical Server located in upper sled B connects to the 45 slots shown in light grey. Install the SSDs in the highest numbered slots and install the HDDs in the lowest numbered slots. Insert drive blanks in all remaining slots.

For example, if you have a configuration that contains 10 HDDs and one SSD, install the HDDs in drive slots 0 through 9, and install the SSD in slot 44. Install the drive blanks in slots 10 through 43.

T.		A				
0	7	14	21	28	35	
1	8	15	22	29	36	
2	9	16	23	30	37	
3	10	17	24	31	38	
4	11	18	25	32	39	
5	12	19	26	33	40	
6	13	20	27	34	41	
42	43	44	42	43	44	
0	7	14	21	28	35	
1	8	15	22	29	36	
2	9	16	23	30	37	
3	10	17	24	31	38	
4	11	18	25	32	39	
5	12	19	26	33	40	
6	13	20	27	34	41	
		В				

Figure 9. Dell SD7000-S server with the cover off to show HDD and SSD placements



Figure 10. Installing HDDs and SSDs into open slots on the Dell SD7000-S server

- 1. HDD Carrier 2. Carrier Handle
- 3. Release button

Installing the Dell SD630-S servers into the rack space



NOTE: For weight stability, always load the rack by using a bottom-up approach. Before you install the Dell SD630-S, you must first install the Dell DS7000-S near the bottom of the rack.

Cabling the network connections

This section shows how to connect the Dell SD630-S server or a Dell SD7000-S server to a network.

NOTE: Port 0 refers to left port and Port 1 refers to the right port as viewed from the back. The ports referred as Port 0 and Port 1, are functionally interchangeable and may not reflect the actual default port names assigned by the NIC manufacturers.

Dell SD630-S Connector (File Server Solution)

The following image shows how to connect the Dell SD630-S Connector to a network in a File Server solution.



Figure 11. Connecting the Dell SD630-S Connector to a network (Connector in a File Server solution)

Table 6. Connections for a Dell SD630	-S Connector in File Server solution
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Label	Network port	Network
1	Dedicated iDRAC8 Ethernet port (not exposed to OS)	Management
2	PCI expansion card, Slot 1, dual Ethernet NIC, Port 0	Management
3	PCI expansion card, Slot 1, dual Ethernet NIC, Port 1	Application
4	LOM1, on integrated network daughter card.	Management

Label	Network port	Network
5	LOM2, on integrated network daughter card, 10GbE	Storage
6	PCI expansion card, Slot 2, dual Ethernet NIC, Port 0	Storage
7	PCI expansion card, Slot 2, dual Ethernet NIC, Port 1.	Application

Connecting a Dell SD630-S Supervisor to the network

The following image shows how to connect a Dell SD630-S Supervisor to the network.



Figure 12. Connecting a Dell SD630-S Supervisor to the network

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Designator	Network Port	Network
1	Dedicated iDRAC8 Ethernet port (not exposed to OS)	Management
2	LOM1, on integrated network daughter card,	Management
3	LOM2, on integrated network daughter card, 10GbE	Storage
4	PCI expansion card, Slot 2, dual Ethernet NIC, Port 0	Management
5	PCI expansion card, Slot 2, dual Ethernet NIC, Port 1	Storage

Connecting Dell SD7000-S Dual Node servers to network

The following image shows how to connect a Dell SD7000-S Dual Node server to network.



Figure 13. Connecting a Dell SD7000-S Dual Node server to network (Physical Servers)

Network connections for the Dell SD7000-S Dual Node server are shown for the Sled B (top Physical Server). Configure Sled A (lower Physical Server) identically to the Sled B.

NOTE: The Dell SD7000-S Single Node server consists only Sled A. A dummy sled is installed in place of Sled B.

Table 8. Connections for a Dell SD7000-S Dual Node server

Designator	Network port	Network
1	Ethernet connector 1, Integrated Network port	Management
2	Ethernet connector 3, Integrated Network port	Storage
3	PCI expansion card, Slot 2, dual Ethernet NIC, Port 0	Storage
4	PCI expansion card, Slot 2, dual Ethernet NIC, Port 1	Management

Connecting servers to electrical outlets

To ensure that each Dell SD7000-S Physical Server has a redundant power source, connect the power cables from each Physical Server to separate power sources such as an uninterruptible power supply (UPS) or a power distribution unit (PDU).

Turning on the servers

Press the power button on the server being configured. The buttons are on the front of the Dell SD630-S and Dell SD7000-S servers. The power LEDs illuminate when the system is turned on.

Installing the OS

The operating system (OS) installation steps vary depending on the particular OS being installed. To install your OS, see the OS vendor for instructions.

OS installation summary

About this task

To install the OS, complete the following steps:

Steps

- 1. Attach monitor, keyboard, and mouse to the server.
 - You can configure all Dell SD630-S servers and each of the two Physical Servers within each Dell SD7000-S server to enable a virtual console to launch the iDRAC8 web interface, which provides remote access to the servers. (Optional)
 - (Optional) Log in to iDRAC8 from a remote system.
- 2. Initiate the OS install.
- **3.** Configure the OS partitions.
- 4. Install required packages (yum update).

Configuring iDRAC8 for remote network access (optional)

About this task

Use the following optional procedure to configure iDRAC8 network settings to enable remote access. **Steps**

- 1. As the server restarts, when prompted, to enter System Setup, press the F2 key.
- 2. From the System Setup menu, click iDRAC Settings.
- 3. From the iDRAC Settings menu, click Network.
- 4. To the right of NIC selection, from the drop-down menu, select LOM1.
- 5. Scroll down the iDRAC settings menu and configure the IPV4 settings.

Logging in to Dell iDRAC8 (optional)

About this task



NOTE: The steps here describe the OS installation using a remote virtual console launched from the iDRAC web interface. In addition, you can use a direct attached monitor to configure each server and to directly start on a bootable USB device with an ISO file to install an OS.

Use the following procedure to launch a Virtual Console.



NOTE: This procedure requires Java Runtime Environment (JRE) to be installed on the system you are using to remotely manage the connected Dell servers. If the console does not launch with default settings, select **Settings** and select the **Java** option.

Steps

- 1. To log in to iDRAC, open a web browser on a management station, and then type the iDRAC IP address in the address bar.
- 2. On the **iDRAC Login** page, type the default login credentials:
 - a. In the **Username** box, type root.
 - b. In the **Password** box, type calvin.
- **3.** On the **System Summary** page, in the **Properties** tab, under the **Virtual Console Preview** section, click **Launch**.

NOTE: Configure the Virtual Console "Plug-In Type" for native or Java. Depending on your IT settings, it may require additional steps to gain remote access. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

Using virtual media to start the OS installation (optional)

About this task

Use the following procedure to create a Virtual DVD using the ISO installation file for the OS to be installed:

Steps

- 1. Place the ISO file on a directory of the system used to remotely manage the connected Dell servers.
- 2. In virtual console session, in the top menu of the console window, click Virtual Media.
- 3. From the drop-down menu, click Connect Virtual Media.
- 4. Click Virtual Media, and then from the drop-down menu, select Map CD/DVD.
- 5. In the Virtual Media Map CD/DVD dialog box, click Browse.
- 6. You can either enter the path to the ISO or locate the ISO, and then click Open.
- 7. Select Map Device.
- 8. Click Next Boot, and then from the drop-down menu, select Virtual CS/DVD/ISO \rightarrow OK.
- 9. Click Macros menu, and then press Ctrl+Alt+Del.

The server restarts and the OS installation begins after the BIOS loads.

For information about installation on Centos/Redhat, go to http://docs.scality.com.

Installing the OS

To install an OS, follow the instructions in this section.



NOTE: If Dell representative has installed your OS, the user name is root and password is Passw0rd!. Change the password when you log in.

For information about the supported OS, see the Dell Storage Designed for Scality RING Support Matrix.



NOTE: Repeat all the tasks in this section on each Dell SD630-S and Dell SD7000-S servers.

Determining OS disk partition sizes

Use the table here to determine the partition size for the specific OS disk capacity. For latest information about recommended partition size, see Scality documentation at <u>http://docs.scality.com</u>, and the section Setting Up for Installation on Centos/Redhat.

Device	Mount	Partition type	File system type	Size	Minimum	Options
/dev/sda1	/boot	GPT	ext4	4 GB	1 GB	Bootable
/dev/sda2	/	GPT	ext4	20 GB	20 GB	NA
/dev/sda3	/var	GPT	ext4	Grow to fill disk	32 GB	NA
/dev/sda4	Swap	GPT	Linux Swap	1.5 multiplied times the size of physical memory, up to 32 GB	16 GB	NA

Table 9. Recommended partition sizes

Preparing for Scality software installation

To prepare for Scality software installation, configure the network interfaces.

Configuring network interfaces

To configure network interfaces, verify the network interface configuration.

Verifying the network interface configuration

All components in the ring (Physical Servers, Connectors, and Supervisors) are required to have network connectivity. The network requirements depend on your specific implementation but the following credentials must be met:

- All Physical Servers must communicate with each other.
- All Connectors must communicate with all Physical Servers.
- The Supervisor must communicate with the Physical Servers and the Connectors.

NOTE: If you cannot establish a connection between the Supervisor and the Storage servers or Connectors, ensure that the firewall is configured correctly. For more information, see the Scality documentation for *Requirements and Recommendations for Installation* at http://docs.scality.com.

How the Scality installation process works

The technical services team from Scality is automatically notified when your purchase is completed. The regional services project manager will schedule a project kick-off meeting with your primary contact to plan for all implementation work.

Getting help

Contacting Dell

Dell provides several online and telephone-based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer-service issues:

- 1. Go to Dell.com/support.
- 2. Select your country from the drop-down menu on the lower right corner of the page.
- **3.** For customized support:
 - a. Enter your system Service Tag in the Enter your Service Tag field.
 - b. Click Submit.

The support page that lists the various support categories is displayed.

- 4. For general support:
 - a. Select your product category.
 - b. Select your product segment.
 - c. Select your product.

The support page that lists the various support categories is displayed.

- 5. For contact details of Dell Global Technical Support:
 - a. Click <u>Global Technical Support</u>.
 - b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

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Quick Resource Locator



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