

Dell Storage Center 7.2 Release Notes

This document describes the new features, enhancements, fixed issues, and open issues in Storage Center 7.2.

Current Version: 7.2.51

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Previous Version: 7.2.50

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Document Revision History

Table 1. Revision History

Revision	Date	Description
A	February 2017	Initial release of Storage Center 7.2
B	May 2017	Updated for Storage Center 7.2.10
C	June 2017	Added supported platforms for the Live Volume with Auto Failover feature
D	July 2017	Updated for Storage Center 7.2.11
E	August 2017	Added support for SC8000, SC4020, and SCv2000 series storage systems
F	September 2017	Updated raw capacity for SC9000 storage systems
G	October 2017	Added support for SCv3000 series storage systems and SCv300, SCv320, SCv360, and SC460 expansion enclosures
H	November 2017	Updated for Storage Center 7.2.30
I	January 2018	Updated for Storage Center 7.2.31
J	April 2018	Updated for Storage Center 7.2.40
K	July 2018	Updated for Storage Center 7.2.50
L	July 2018	Updated for Storage Center 7.2.51
M	September 2018	Added SCOS-49144 to the list of issues fixed in Storage Center 7.2.40
N	October 2018	Added SQAI-7 to the list of vendor issues fixed in Storage Center 7.2.10
O	February 2019	Updated the supported maximum storage space for an SC4020

Supported Storage Systems

Storage Center 7.2.11 or later is supported on the following storage systems:

- SC9000

- SC8000
- SC7020F
- SC7020
- SC5020F
- SC5020
- SC4020
- SCv3000 Series
- SCv2000 Series

New in This Release

The following features were added to Storage Center 7.2.

Dell Storage Manager 2016

Dell Storage Manager 2016 R3.11 or later is required to manage storage systems running Storage Center 7.2.11 or later.

Drive Spare Rightsizing

When Storage Center consumes a spare drive, Drive Spare Rightsizing allows Storage Center to modify the size of a larger capacity spare drive to match the capacity of the drive being replaced in the tier. After Storage Center modifies the size of the drive, the drive cannot be modified to its original size without assistance from technical support. Drive Spare Rightsizing is enabled by default for all controllers running Storage Center version 7.2.11 or later.

This feature allows technical support to dispatch larger capacity drives of the same disk class when the same size drive is not available, providing faster delivery times.

Live Volume with Auto Failover Support

In Storage Center 7.2.10, the Live Volume Auto Failover feature is supported on Windows Server 2016 Hyper-V.

The Live Volume Auto Failover feature is also supported on the following platforms:

- Windows Server 2012 Hyper-V
- Windows Server 2012 R2 Hyper-V
- VMware vSphere 5.5
- VMware vSphere 6.0
- VMware vSphere 6.5

SC7020F All-Flash Storage Systems

Storage Center 7.2 introduces support for SC7020F all-flash storage systems.

The SC7020F consists of a 3U chassis with dual storage controllers, redundant power supplies, and up to 30 internal 2.5-inch hot swappable SSDs. The SC7020F can be expanded up to 500 drives using SC420F all-flash expansion enclosures.

 **NOTE: The SC7020F must be updated to Storage Center 7.2.11 or later when it is installed.**

SC7020 Storage System Update

Storage Center 7.2 performs the reallocation of SC7020 system resources from file and block to block only. The system resources that are reallocated include the CPUs, memory, and front-end iSCSI ports. An SC7020 running Storage Center 7.2 allows access to block storage from all the iSCSI ports on the SC7020 mezzanine cards.

 **NOTE: In Storage Center 7.1, access to block storage was limited to the right two iSCSI ports on the SC7020 mezzanine cards.**

SC5020F All-Flash Storage Systems

Storage Center 7.2 introduces support for SC5020F all-flash storage systems.

The SC5020F consists of a 3U chassis with dual storage controllers, redundant power supplies, and up to 30 internal 2.5-inch hot swappable SSDs. The SC5020F can be expanded up to 222 drives using SC420F all-flash expansion enclosures.

NOTE: The SC5020F must be updated to Storage Center 7.2.11 or later when it is installed.

SC5020 Storage Systems

Storage Center 7.2 introduces support for SC5020 storage systems.

The SC5020 consists of a 3U chassis with dual storage controllers, redundant power supplies, and up to 30 internal 2.5-inch hot swappable SAS hard drives. The SC5020 can be expanded up to 222 drives using SC400, SC420, and SC460 expansion enclosures.

NOTE: The SC5020 must be updated to Storage Center 7.2.11 or later when it is installed.

SC460 Expansion Enclosures

Storage Center 7.2.11 introduces support for SC460 expansion enclosures.

The SC460 consists of a 4U chassis with redundant EMMs, redundant power supplies, and up to 60 3.5-inch hot swappable SAS hard drives.

The SC460 expansion enclosure is supported on SC5020, SC7020, and SC9000 storage systems.

SCv3000 Series Storage Systems

Storage Center 7.2.11 introduces support for SCv3000 series storage systems.

The SCv3000 series consists of a 3U chassis with dual storage controllers and redundant power supplies. The SCv3000 storage system includes up to 16 3.5-inch hot swappable SAS hard drives and the SCv3020 storage system includes up to 30 2.5-inch hot swappable SAS hard drives.

SCv3000 series storage systems can be expanded up to 222 drives using SCv300 and SCv320, and SCv360 expansion enclosures.

SCv300, SCv3020, and SCv360 Expansion Enclosures

Storage Center 7.2.11 introduces support for SCv300, SCv320, and SCv360 expansion enclosures.

SCv300, SCv320, and SCv360 expansion enclosures are supported on SCv3000 series storage systems.

- The SCv300 consists of a 2U chassis with redundant EMMs, redundant power supplies, and up to 12 3.5-inch hot swappable SAS hard drives.
- The SCv320 consists of a 2U chassis with redundant EMMs, redundant power supplies, and up to 24 2.5-inch hot swappable SAS hard drives.
- The SCv360 consists of a 4U chassis with redundant EMMs, redundant power supplies, and up to 60 3.5-inch hot swappable SAS hard drives.

Storage Center 7.2 Feature Availability and Licenses

The core licenses and support for optional licensed features varies depending on the storage system.

SC9000 Features and Licenses

SC9000 storage systems provide the following licensed features and optional value-added bundles.

Core Software Bundle

- Data Reduction (Compression and Deduplication)

- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Multi-VLAN Tagging
- Virtual Ports
- Volume QoS
- VVols

Optional Licenses

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback

Storage Optimization Bundle

- Data Progression
- Fast Track

Storage Protection Bundle

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager

Total Feature Bundle

- SED FIPS Secure Data
- Storage Manager Chargeback
- Storage Optimization Bundle
- Storage Protection Bundle

SC8000 Features and Licenses

SC8000 storage systems provide the following licensed features:

Core Licenses

- Data Reduction (Compression and Deduplication)
- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Multi-VLAN Tagging
- Virtual Ports
- Volume QoS
- VVols

Optional Licenses

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback

SC7020F and SC5020F Features and Licenses

SC7020F and SC5020F all-flash storage systems provide the following licensed features.

Total Feature Bundle

- Data Progression
- Data Reduction (Compression and Deduplication)
- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Live Volume and Live Volume with Auto Failover
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Multi-VLAN Tagging
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback
- Virtual Ports
- Volume QoS
- VVols

SC7020 and SC5020 Features and Licenses

SC7020 and SC5020 storage systems provide the following licensed features and optional value-added bundles.

Core Software Bundle

- Data Reduction (Compression and Deduplication)
- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Multi-VLAN Tagging
- Virtual Ports
- Volume QoS
- VVols

Optional Licenses

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication

- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback

Storage Protection Bundle

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager

Storage Optimization Bundle

- Data Progression
- Fast Track

Total Feature Bundle

- SED FIPS Secure Data
- Storage Manager Chargeback
- Storage Optimization Bundle
- Storage Protection Bundle

SC4020 Features and Licenses

SC4020 storage systems provide the following licensed features:

Core Licenses

- Data Reduction (Compression and Deduplication)
- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Multi-VLAN Tagging
- Virtual Ports
- Volume QoS
- VVols

Optional Licenses

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback

Performance/Optimization Bundle

- Data Progression
- Fast Track

Remote Data Protection Bundle

- Remote Instant Replay (Replication), including Cross-Platform Replication

Remote Data Protection with Live Volume Bundle

- Remote Instant Replay (Replication), including Cross-Platform Replication
- Live Volume and Live Volume with Auto Failover

SCv3000 Series Features and Licenses

SCv3000 series storage systems provide the following licensed features and optional value-added bundles.

Core Software Bundle

- Data Compression
- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers
- Live Migrate
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Virtual Ports
- Volume QoS
- VVols

Optional Licenses

- Live Volume and Live Volume with Auto Failover
- Replay Manager
- SED FIPS Secure Data
- Storage Manager Chargeback

Storage Protection Bundle

- Live Volume and Live Volume with Auto Failover
- Remote Instant Replay (Replication), including Cross-Platform Replication
- Replay Manager

Storage Optimization Bundle

- Data Progression
- Fast Track

Total Feature Bundle

- SED FIPS Secure Data
- Storage Manager Chargeback
- Storage Optimization Bundle
- Storage Protection Bundle

SCv2000 Series Features and Licenses

SCv2000 series storage systems provide the following licensed features:

Core Licenses

- Dell Storage Manager
- Dynamic Capacity
- Dynamic Controllers

Optional Licenses

- Flex Port
- Local Data Protection
 - Data Instant Replay (Snapshots)
 - Manual Replay (Snapshots)
- Remote Data Protection (Asynchronous replication only)

Storage Center 7.2 Scalability

The following scalability guidelines apply to Storage Center 7.2.

Storage System Scalability Guidelines

The following scalability guidelines apply to SC9000, SC8000, SC7020F, SC7020, SC5020F, SC5020, SC4020, SCv3000 Series, and SCv2000 Series storage systems.

i **NOTE: Raw storage space is expressed in decimal units (for example, 1 TB = 10¹² bytes). Addressable storage space is expressed in base 2 units (for example, 1 TB = 2⁴⁰ bytes). Therefore, a 1 TB drive measured in decimal units is equal to 0.909 TB base 2 units.**

Storage System	Supported Maximum
SC9000 (Dual-Controller) with 128 GB or 256 GB of memory per controller	<ul style="list-style-type: none">• 3.2 PB raw and 2.0 PB addressable storage space using the standard 2 MB page size• 750 TB raw and 500 TB addressable storage space using a 512 KB page size
SC8000 (Dual-Controller) with 64 GB of memory per controller	<ul style="list-style-type: none">• 3.1 PB raw and 2.0 PB addressable storage space using the standard 2 MB page size• 750 TB raw and 500 TB addressable storage space using a 512 KB page size
SC8000 (Dual-Controller) with 16 GB of memory per controller	<ul style="list-style-type: none">• 750 TB raw and 500 TB addressable storage space using the standard 2 MB page size• 400 TB raw and 300 TB addressable storage space using a 512 KB page size
SC7020F or SC7020 with 128 GB of memory per controller	<ul style="list-style-type: none">• 3.1 PB raw and 2.0 PB addressable storage space using the standard 2 MB page size• 750 TB raw and 500 TB addressable storage space using a 512 KB page size
SC5020F or SC5020 with 64 GB of memory per controller	<ul style="list-style-type: none">• 2 PB raw and 1350 TB addressable storage space using the standard 2 MB page size• 0.5 PB raw and 338 TB addressable storage space using a 512 KB page size
SC4020 with 16 GB of memory per controller	<ul style="list-style-type: none">• 1054 TB raw and 700 TB addressable storage space using the standard 2 MB page size• 263 TB raw and 175 TB addressable storage space using a 512 KB page size
	i NOTE: In previous versions of the Storage Center 7.2 Release Notes, the supported maximum storage space for an SC4020 using a 512 KB page size was incorrectly calculated as 500 TB raw and 400 TB addressable. The correct supported maximum storage space for an SC4020 using a 512 KB page size is 263 TB raw and 175 TB addressable.
SCv3000 Series with 16 GB of memory per controller	<ul style="list-style-type: none">• 2 PB raw and 1350 TB addressable storage space using a 4 MB page size• 1 PB raw and 675 TB addressable storage space using the standard 2 MB page size
SCv2000 Series with 8 GB of memory per controller	<ul style="list-style-type: none">• 672 TB raw and 450 TB addressable storage space using the standard 2 MB page size

Storage Center Scalability Guidelines

The following scalability guidelines are the maximum recommended design guidelines for storage systems running Storage Center 7.2.

SC9000, SC8000, SC7020F, SC7020, SC5020F, SC5020, and SC4020 Storage Systems

The following scalability guidelines are the maximum recommended design guidelines for storage systems running Storage Center 7.2.

Storage Center Object	Supported Maximum
Disk Folder	10 disk folders
Server	<ul style="list-style-type: none"> 500 servers (Total number of servers includes physical servers, virtual servers, and server clusters) 500 server folders 1000 server HBA initiator ports (Total number of HBA initiator ports includes all physical and virtual ports that are visible to the SAN)
Volume	<ul style="list-style-type: none"> 500 TB maximum volume size (or the maximum addressable storage space, whichever is less) 2000 volumes 500 volume folders
Deduplication	1 PB data ingestion limit (SC4020 – 500 TB data ingestion limit)
Live Volume	100 Live Volumes
Thin Import	10 volumes (maximum simultaneous imports)
QoS Profiles	<ul style="list-style-type: none"> 100 Volume QoS Profiles 100 Group QoS Profiles 100 Volumes per Group QoS Profile
Data Instant Replay (Snapshots)	<ul style="list-style-type: none"> Snapshots: <ul style="list-style-type: none"> SC9000 – 32,000 snapshots SC8000 – 16,000 snapshots SC7020F or SC7020 – 16,000 snapshots SC5020F or SC5020 – 8000 snapshots SC4020 – 8000 snapshots 1000 snapshot profiles 100 snapshot history profiles 200 consistency groups 100 volumes per consistency group (SC4020 – 40 volumes per consistency group)
Replications	<ul style="list-style-type: none"> Source replications: <ul style="list-style-type: none"> SC9000 – 1000 source replications SC8000 – 500 source replications SC7020F or SC7020 – 1000 source replications SC5020F or SC5020 – 500 source replications SC4020 – 500 source replications 2000 target replications (SC4020 – 1000 replications for FC and 230 replications for iSCSI)

SCv3000 Series Storage Systems

The following scalability guidelines are the maximum recommended design guidelines for SCv3000 series storage systems running Storage Center 7.2.

Storage Center Object	Supported Maximum
Disk Folder	10 disk folders

Storage Center Object	Supported Maximum
Server	<ul style="list-style-type: none"> • 250 servers (Total number of servers includes physical servers, virtual servers, and server clusters) • 250 server folders • 500 server HBA initiator ports (Total number of HBA initiator ports includes all physical and virtual ports that are visible to the SAN)
Volume	<ul style="list-style-type: none"> • 500 TB maximum volume size (or the maximum addressable storage space, whichever is less) • 1000 volumes • 500 volume folders
Live Volume	100 Live Volumes
Thin Import	10 volumes (maximum simultaneous imports)
QoS Profiles	<ul style="list-style-type: none"> • 100 Volume QoS Profiles • 100 Group QoS Profiles • 100 Volumes per Group QoS Profile
Data Instant Replay (Snapshots)	<ul style="list-style-type: none"> • 4000 snapshots • 1000 snapshot profiles • 100 snapshot history profiles • 200 consistency groups • 25 volumes per consistency group
Replications	<ul style="list-style-type: none"> • 250 source replications • 250 target replications

SCv2000 Series Storage System

The following scalability guidelines are the maximum recommended design guidelines for SCv2000 series storage systems running Storage Center 7.2.

Storage Center Object	Supported Maximum
Disk Folder	4 disk folders
Server	<ul style="list-style-type: none"> • 100 servers (Total number of servers includes physical servers, virtual servers, and server clusters.) • 100 server folders • 200 server HBA initiator ports (Total number of HBA initiator ports includes all physical and virtual ports that are visible to the SAN.)
Volume	<ul style="list-style-type: none"> • 500 TB maximum volume size (or the maximum addressable storage space, whichever is less) • 1000 volumes • 500 volume folders
Thin Import	10 volumes (maximum simultaneous imports)
QoS Profiles	<ul style="list-style-type: none"> • 100 Volume QoS Profiles • 100 Group QoS Profiles • 100 Volumes per Group QoS Profile
Data Instant Replay (Snapshots)	<ul style="list-style-type: none"> • 2000 snapshots • 1000 snapshot profiles • 100 snapshot history profiles • 100 consistency groups • 25 volumes per consistency group
Replications	<ul style="list-style-type: none"> • 124 source replications • 500 target replications

 **NOTE: Data Instant Replay is a licensed feature.**

Fixed Issues

The following sections summarize the issues fixed in Storage Center 7.2.

 **NOTE: Storage Center 7.2.11 contains all the issues fixed in Storage Center 7.1.12 and earlier. For more information, see the *Storage Center 7.1 Release Notes*.**

Fixed Issues Related to Alerts and Reporting

The following alerts and reporting issues are fixed in Storage Center 7.2:

Table 2. Fixed Alert and Reporting Issues in Storage Center 7.2.40

Issue	Description
SCOS-44972	If a storage system or storage controller reset is initiated from Storage Manager, the reset might not be recorded in Storage Center logs.
SCOS-44159	The logs for the peer storage controller might not be sent when the Send SupportAssist Information Now option is initiated from Storage Manager.

Table 3. Fixed Alert and Reporting Issues in Storage Center 7.2.30

Issue	Description
SCOS-45091	The SNMP service might stop unexpectedly and require a restart.

Table 4. Fixed Alert and Reporting Issues in Storage Center 7.2.10

Issue	Description
SCOS-29664	The storage system might report hundreds of Log Corrupt Page Address error messages during a RAID restripe.
HPEM-493	The syslog daemon might restart and cause an SC7020 or SC5020 storage system to reset unexpectedly due to a large number of false temperature, power supply, or fan alerts.

Table 5. Fixed Alert and Reporting Issues in Storage Center 7.2.1

Issue	Description
SCOS-21331	The Storage Center email process might stop and fail to restart. Because of this issue, the Storage Center alert email queue fills up, which might cause a controller to reset.

Fixed Issues Related to Data Reduction

The following data reduction issues are fixed in Storage Center 7.2:

Table 6. Fixed Data Reduction Issues in Storage Center 7.2.50

Issue	Description
SCOS-49069	In rare instances, increased latency might occur on a storage system if a pagepool consolidation process is active.
SCOS-47507	Slow deduplication ingest rates might occur when multiple Storage Center processes are working on the same volume at the same time.
SCOS-46684	A controller might reset because of multiple small memory allocation requests.
SCOS-46391	On a storage system in an unbalanced state that has volumes with deduplication or compression enabled, rebalancing the local ports might fail after creating a Copy Mirror Migrate to new volumes with deduplication or compression enabled.
SCOS-44165	Increased data progression run times might occur if a storage system is using deduplication and switches to compression only because of delays in freeing metadata space.

Issue	Description
SCOS-42286	Deduplication ingest might fail to occur when expected on an unbalanced storage system after a Rebalance Local Ports operation is performed.

Table 7. Fixed Data Reduction Issues in Storage Center 7.2.40

Issue	Description
SCOS-49144	Data progression might stop running or the Storage Center might reset when a payload checksum failure occurs due to table entries being read incorrectly from memory.
SCOS-44137	Storage Center data optimization might fail to stop after 72000 seconds (20 hours).
SCOS-42026	Deduplication and compression might continually skip some volumes due to reaching the 20 hour runtime limit.

Table 8. Fixed Data Reduction Issues in Storage Center 7.2.31

Issue	Description
SCOS-45843	A large number of events might be generated in the Storage Center system log if a Storage Profile is modified to no longer include the RAID level/tier of the original Storage Profile.

Table 9. Fixed Data Reduction Issues in Storage Center 7.2.30

Issue	Description
SCOS-43864	A storage system might experience read latency spikes while deduplication is running.
SCOS-42569	A storage system might experience read latency during ingestion of data on a volume with deduplication enabled.
SCOS-42446	Data ingestion might fail if a number of drives are removed from a storage system during a RAID restripe operation.
SCOS-42281	Controllers in a storage system might reboot due to stale metadata pointer access.
SCOS-42024	In rare instances, increased latency might occur because of high CPU utilization while performing data progression on a storage system with deduplication enabled volumes.
SCOS-38263	A storage system might report more used drive space than actual used drive space after the rehydration of compressed data.
SCOS-21857	A storage system might experience high CPU utilization during data ingestion.

Table 10. Fixed Data Reduction Issues in Storage Center 7.2.11

Issue	Description
SCOS-42157	Performing a non-service affecting update of a dual-controller storage system to Storage Center 7.2.10 might result in I/O timeouts for some volumes when the controllers are running different versions of the Storage Center software.

Table 11. Fixed Data Reduction Issues in Storage Center 7.2.10

Issue	Description
SCOS-40135	A storage system with deduplication enabled might display a false positive metadata validation failure message in the Storage Center console and generate validation failure alerts in the deduplication map table.
SCOS-39128	A storage system with deduplication enabled might experience increased latency while expiring deduplicated data or during Data Progression.
SCOS-34642	A controller might reset if too many storage system resources are consumed during deduplication and snapshot expiration of deduplicated pages.
SCOS-27942	A storage system with deduplication enabled might fail to remove page pool devices during a RAID rebalance because of performance issues.
SCOS-24830	A controller might reset during lost space recovery in the deduplication page manager.

Issue	Description
SCOS-24167	A storage system with deduplication enabled volumes might experience performance issues during the deduplication page manager clean-up process.
SCOS-22379	The compression and deduplication page manager defragmentation process might cause high CPU utilization and impact system performance.
SCOS-21671	Rehydration of deduplicated or compressed data does not place the data in the tier specified by the volume storage profile.

Table 12. Fixed Data Reduction Issues in Storage Center 7.2.1

Issue	Description
SCOS-31054	Enabling deduplication on a volume that is part of a replication might result in hundreds of <code>Ingestion failure due to SecondaryStorage infrastructure is not ready</code> log messages.
SCOS-22590	A storage system running Storage Center 7.1.3 with deduplication enabled might experience performance issues during the defragmentation portion of Data Progression.
SCOS-21275	After updating from Storage Center 7.1.1, a storage system might fail to enable deduplication on some volumes.
SCOS-21160	On a storage system with compression enabled, the secondary storage deactivate process might fail to flush prefetch pages.
SCOS-21129	A storage system might incorrectly report snapshot bad pages when the system is low on memory.
SCOS-20960	The IOPS of a storage system might decrease and I/O latency might increase significantly because of high CPU usage during the Data Progression defragmentation process.
SCOS-20449	A controller reset might occur because of out of range memory access during the Data Progression defragmentation process.
SCOS-20240	Data Progression might fail to move pages to tier 3 for volumes that are larger than 32 TB. If a specific history has multiple view volumes, Data Progression might fail to move pages for volumes smaller than 32 TB.
SCOS-20075	A storage system with Flash Optimized storage types and deduplication enabled might suffer an outage during On Demand Data Progression if the system is low on space in tier 1 RAID 10.
SCOS-19570	A storage system running Storage Center 7.1 with compression enabled and over 25 TB of data ingested into the deduplication process might suffer from I/O delays because of high CPU usage at the end of Data Progression.
SCOS-19002	Enabling deduplication on a storage system while one controller is in a failed state might result in volumes that appear to be deduplicated, when in fact they are not deduplicated.
SCOS-14931	On Demand Data Progression might fail to complete successfully when deduplication is enabled on a volume.
SCOS-13649	Volumes on separate controllers might show the same deduplication reduction rates when the deduplication reduction rates are different.
SCOS-13159	Deduplication and compression might take volumes offline when responses to storage type status are incorrect.

Fixed Issues Related to Hardware

The following hardware issues are fixed in Storage Center 7.2:

Table 13. Fixed Hardware Issues in Storage Center 7.2.40

Issue	Description
SCOS-45629	If unsupported drives were added to a storage system by technical support using CLI commands, the drives might go offline when the Storage Center software is updated on the storage system.
SCOS-45155	While attempting to gather enclosure logs from an SC400 and SC420 expansion enclosure, the expansion enclosure might unexpectedly reset.

Issue	Description
SCOS-43848	On SCv2000 series, SCv3000 series, SC4020, SC5020, and SC7020 storage systems that are destinations for replications using the embedded iSCSI ports, if the source system uses 10 GbE iSCSI host bus adapters, replication performance may significantly drop until the source system 10 GbE iSCSI HBAs are restarted.
SCOS-43703	On SCv2000 series and SC4020 storage systems, the write cache might to go down if one of the redundant power supply fails.
SCOS-43176	On SCv3000 series, SC5020, and SC7020 storage systems, the PCIe Link Reset command might fail for 10 GbE iSCSI host bus adapters, which causes the HBA to go down.
SCOS-42250	When an initiator performs an iSCSI login to a 10 GbE iSCSI host bus adapter, the HBA might reset and fail to exit the hibernate mode.

Table 14. Fixed Hardware Issues in Storage Center 7.2.30

Issue	Description
SCOS-41806	Storage system iSCSI ports might hibernate when a failed TCP checksum is received on an inbound packet.
SCOS-41452	Larger than normal Ping payloads might cause a storage system iSCSI I/O card to hibernate.
SCOS-16813	A single disk with failing I/Os might cause storage system-wide performance degradation.

Table 15. Fixed Hardware Issues in Storage Center 7.2.11

Issue	Description
SCOS-42111	An SC7020 or SC5020 storage system might lock access to drives connected to the Storage Enclosure Processor (SEP) if the storage system is unable to read the chassis signature for the SEP firmware.

Table 16. Fixed Hardware Issues in Storage Center 7.2.10

Issue	Description
SCOS-41017	An iSCSI I/O card might fail to exit hibernate mode after a reset.
SCOS-40207	On storage systems running Storage Center 7.1.3 or 7.1.4, an iSCSI I/O card might reset because of an IORP timeout that is 10 seconds greater than the IORP requested timeout.
SCOS-36797	A target port on a storage system with Fibre Channel host bus adapters might fail to respond to an incoming login attempt.
SCOS-20800	In certain degraded conditions, data miscompares might occur when running software FCoE on an Intel X520 adapter in an ESXi 5.5 or 6.0 host.
SCOS-18759	The QLe246x Fibre Channel I/O Card takes longer to rebalance in Storage Center 7.1 than it did in previous versions of Storage Center.
HPEM-507	An SC7020 or SC5020 storage system might unexpectedly reset because of false temperature, power supply, or fan alerts.

Table 17. Fixed Hardware Issues in Storage Center 7.2.1

Issue	Description
SCOS-18490	When connected directly to the Storage Center using the Storage Manager Client, an error occurs in the hardware change wizard while performing a hardware migration from an SC040 running Storage Center 6.7 to an SC8000 running Storage Center 7.1.
SCOS-18174	On SC7020 storage systems, the status of a new Liebert UPS is not changing from DC to AC in the Storage Manager Client when power is restored to the UPS.
SCOS-10427	In rare instances, an SCv2000 series or SC4020 storage system may not initialize following a reset or power cycle.

Fixed Issues Related to Licensing, SupportAssist, and Updating

The following licensing, SupportAssist, and updating issues are fixed in Storage Center 7.2:

Table 18. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.51

Issue	Description
SCOS-49445	After updating an SCv2000 series or SC4020 storage system to Storage Center 7.2, a down cache device might be displayed for slot 0 because the cache device moved to slot 32. This issue required intervention from technical support to allow future Storage Center updates to occur.

Table 19. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.50

Issue	Description
SCOS-46480	On a dual-controller storage system, if a Storage Center ISO update is performed on controller 2 and the storage system fails over to controller 1 before it is updated, the Storage Center software version on controller 2 might be downgraded to the version on controller 1, which can damage the Storage Center configuration.

Table 20. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.40

Issue	Description
SCOS-44945	When updating a dual-controller storage system, controller resets might occur during iDRAC firmware updates.

Table 21. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.30

Issue	Description
SCOS-40558	A storage system with SupportAssist enabled that is unable to successfully complete the sending of SupportAssist information might be unable to manage new drives or manually remove drives safely.

Table 22. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.11

Issue	Description
SCOS-42056	After updating a storage system to Storage Center 7.2.10, the storage system might stop sending SupportAssist information to technical support on a regular schedule.
SCOS-18488	The Storage Center System Manager user interface is not disabled after updating a dual-controller storage system from Storage Center 6.6.5 to Storage Center 7.1.1.

Table 23. Fixed Licensing, SupportAssist, and Updating Issues in Storage Center 7.2.10

Issue	Description
SCOS-40141	After updating a storage system to Storage Center 7.1.4, controllers might reset while processing the Link Configuration initialization step.
SCOS-35674	An SC4020 storage system might suffer an outage after updating from Storage Center 6.7 to 7.1 if the storage system exceeds the maximum number of snapshots.
SCOS-35458	Applying a core license might fail when the storage system tries to validate a feature set that does not exist in the Storage Center software.

Fixed Issues Related to Replication and Live Volume

The following replication and Live Volume issues are fixed in Storage Center 7.2:

Table 24. Fixed Replication and Live Volume Issues in Storage Center 7.2.50

Issue	Description
SCOS-46819	On a storage system with Automatic Fail Over Live Volumes, a Live Volume fail over might cause an error because IORP codes are not transferred back to the originating controller over IPC.
SCOS-46572	The source and destination volumes associated with a replication might become different sizes if the source volume fails to expand due to Storage Center scalability limitations.

Table 25. Fixed Replication and Live Volume Issues in Storage Center 7.2.40

Issue	Description
SCOS-45553	Storage Center might be able to manage replication volumes as physical drives.
SCOS-18102	The status of a cross-platform replication partner changes to down when the number of snapshots exceed 1025.

Table 26. Fixed Replication and Live Volume Issues in Storage Center 7.2.10

Issue	Description
SCOS-40210	When performing an update from Storage Center 6.7.5 to 7.1.4 on a storage system with a secondary Live Volume, I/O might become stuck on volumes on the source system.
SCOS-36665	A controller reset might occur while attempting to fail over a Windows cluster on an RDM volume mapped to non-unified ESXi hosts when using Live Volume High Consistency.
SCOS-35656	Live Volume proxy disk space might be counted towards the total available system disk space.
SCOS-32134	Access to a volume might be lost if out of memory errors occur before the replication enters the suspending state.
SCOS-7793	A storage system might fail to delete a replication when the QoS node is blocked and there is outstanding I/O.

Table 27. Fixed Replication and Live Volume Issues in Storage Center 7.2.1

Issue	Description
SCOS-22156	The VVols feature in ESXi 6.0 Update 2 fails to work properly with Storage Center 7.1.2.

Fixed Issues Related to Security

The following security issues are fixed in Storage Center 7.2:

Table 28. Fixed Security Issues in Storage Center 7.2.40

Issue	Description
SCOS-24991	Removed support for SSL 3.0 and TLS 1.0 from the Storage Center to address security vulnerabilities.

Table 29. Fixed Security Issues in Storage Center 7.2.10

Issue	Description
SCOS-40490	Updated the OpenSSL version on the Storage Center to OpenSSL 1.0.1u to address security vulnerabilities.
SCOS-40083	Clickjacking vulnerability found on web server ports in Storage Center.

Fixed Issues Related to Storage Management

The following storage management issues are fixed in Storage Center 7.2:

Table 30. Fixed Storage Management Issues in Storage Center 7.2.51

Issue	Description
SCOS-49683	When iSCSI TCP connections are unstable on embedded iSCSI ports, the Max Burst Window might be reduced, which could result in read performance degradation.

Table 31. Fixed Storage Management Issues in Storage Center 7.2.50

Issue	Description
SCOS-49969	After updating to Storage Center 7.2.31, LDAP users are unable to log in to the Storage Center using Data Collector 2016 R2.30.
SCOS-47784	A dual controller reset might occur following the VMotion of a VM from a VVol container to regular Storage Center datastore.
SCOS-45304	Storage Center is unable to create a mapping profile for a volume mapped to a Linux server without a HBA.
SCOS-44898	If a pagepool is in the process of creating a device and progression prune evaluation logic works on the same device at the same time, data progression might identify the device as being too small and mark the device for pruning.

Table 32. Fixed Storage Management Issues in Storage Center 7.2.40

Issue	Description
SCOS-46365	A controller might reset because of excessive memory consumption during a RAID rebuild. In addition, a RAID rebuild might fail to start due to excessive memory consumption caused by a rebuild read failure.
SCOS-45755	The volume space consumption limit cannot be set above 2 TB using Storage Manager.
SCOS-45181	On SCv2000 series, SCv3000 series, SC4020, SC5020, and SC7020 storage systems, a controller might reset if a boot personality is detached and then the IPv6 address is removed from the embedded iSCSI ports.
SCOS-45042	A controller might reset because of a double delete on an alert object.
SCOS-43176	On SCv3000 series, SC5020, and SC7020 storage systems, the PCIe Link Reset command might fail for 10 GbE iSCSI host bus adapters, which causes the HBA to go down.
SCOS-43076	SSD initialization allocations might cause disk queuing, resulting in a possible server time outs.
SCOS-42985	A Storage Center user with privileges based on a Directory Group might be unable to set some user preferences.
SCOS-41309	A controller might reset because of out of space secondary storage get page aborts.

Table 33. Fixed Storage Management Issues in Storage Center 7.2.30

Issue	Description
SCOS-41405	An SSD with an endurance life that extends beyond February 2106 displays a premature end of endurance life.
SCOS-41036	A single large raid device consumes all SSD drive space when adding only a small amount of drives.
SCOS-41018	A controller might reboot when deleting a very large number of objects such as volumes, servers, or volume mappings.
SCOS-40063	A replacement drive cannot be managed in the same enclosure slot as a failed drive that could not complete the system archiving process.
SCOS-2658	A rare timing window in which rebalancing local ports at the same time as volume level operations (view volume creation, mapping/unmapping to a server, etc.) leads to the rebalance not completing.

Issue	Description
SCOS-1392	When upgrading from a 3G SAS I/O card to a 6G SAS I/O card using the hardware change wizard, the new I/O card is displayed in slot 100x, where x is the slot number.

Table 34. Fixed Storage Management Issues in Storage Center 7.2.10

Issue	Description
SCOS-40999	Metadata on inconsistent RAID mirrors/stripes might cause Data Progression failures and lead to inefficient system space usage and performance degradation.
SCOS-40856	A controller might reset if the iSCSI initiator is redirected to an IPv4 address of 0.0.0.0.
SCOS-40725	A controller might reset when updating statistics for page moves between classes if the source page is on a device marked for deletion.
SCOS-40677	When setting up an SC7020 storage system using Storage Manager, the "Launch Initial Configuration" link might be redisplayed after clicking finish in the initial setup wizard.
SCOS-40529	A controller reset might occur if there are a large number of metadata space allocation requests at the same time for a volume.
SCOS-40491	SNMP management queries might fail to function properly on storage systems running Storage Center 7.1.
SCOS-37561	A controller might reset unexpectedly under certain rare timing conditions.
SCOS-40094	Storage Center might delay Data Progression/restripe activity to unacceptable levels if there are other higher priority background processes.
SCOS-37719	A controller might reset after updating to Storage Center 7.1.3, 7.1.4, or 7.1.5. because of an issue with memory fragmentation.
SCOS-36475	A storage system might encounter high CPU usage during page validation stage of Data Progression. This issue is limited to pages consumed from the storage type.
SCOS-36534	Storage Center is unable to create more than a single spare drive on an SC280 enclosure if an SC220 and SC280 were connected to the storage system during the initial system configuration.
SCOS-36336	A controller might reset when the lock associated with a particular message type cannot be found. Due to variable timing conditions within the platform, messages can arrive out of order.
SCOS-36319	On storage systems that only have spinning drives and have large volumes with a large number of new page writes, existing snapshots take a very long to expire.
SCOS-35648	Removing a port from a fault domain while a controller is down might result in storage system configuration issues.
SCOS-32925	In rare instances, a storage system might experience performance degradations due to a mismatch in a virtualization threshold value.
SCOS-31707	Importing multiple volumes from an external device using Thin Import causes the volumes to appear as external devices with the following error: <pre>illegal character found for Attribute: Name [Illegal Chracters: [<, >, &]]]</pre>
SCOS-18247	Drives in the archived disk folder might count against the total number of managed drives in the storage system.
SCOS-4797	If QoS limiting is not enabled, system latency might increase when writing to volumes using RAID 5 or RAID 6.

Table 35. Fixed Storage Management Issues in Storage Center 7.2.1

Issue	Description
SCOS-21562	In Storage Center 7.1, manual and scheduled restripes are restricted to 12 hours per day.
SCOS-21399	A controller might reset during cross-platform replication initialization with a PS Series array.
SCOS-20142	A controller might reset when the settings of a new Fault Domain are modified.
SCOS-18899	A storage system might incorrectly report snapshot bad pages when the system is low on memory.

Issue	Description
SCOS-18540	A controller revert might take several minutes to complete while deactivating the history of a large volume (several TBs) if the storage system has space management snapshots.
SCOS-14111	Secondary storage deactivation process is not flushing prefetch pages.

Fixed issues Related to Vendors

The following issue is fixed in Storage Center 7.2.

Table 36. Fixed Vendor Issues in Storage Center 7.2.10

Issue	Description
SQAI-7	Emulex 8 Gb Fibre Channel host bus adapters (for example, LPe1200x, LPe1205, and OEM equivalents) are unable to boot from SAN when using Emulex boot code 7.x.

Open Issues

The following sections summarize the open issues in Storage Center 7.2.

Open Issues Related to Data Reduction

The following open issues are related to Data Reduction:

Table 37. Open Data Reduction Issues

Issue	Description
SCOS-13237	The Storage Type Data Reduction statistics might be incorrect if the amount of data eligible for Data Reduction contains fewer than 256 pages. Workaround: None

Open Issues Related to Hardware

The following open issues are related to hardware:

Table 38. Open Hardware Issues

Issue	Description
SCOS-6516	In rare instances, the internal boot device on an SC9000 controller may become unusable following an unexpected power event and the controller will not boot. Workaround: Contact technical support.

Open Issues Related to Replications and Live Volumes

The following open issues are related to replications and Live Volumes:

Table 39. Open Replication and Live Volume Issues

Issue	Description
SCOS-41280	Using a cluster shared volume (CSV) on a Storage Center within a Windows 2016 cluster solution might result in an I/O failure during an infrastructure fault condition where one of the Windows hosts is isolated from both its peer and its quorum witness. Workaround: Use redundant physical switches to reduce the possibility of the I/O failure.
SCOS-41191	When the Dell Storage Manager Client is directly connected to a Storage Center, the option to delete a volume associated with a Live Volume or Live Migration is displayed, but it is not supported.

Issue	Description
SCOS-17981	<p>Workaround: Connect to the Storage Center through the Storage Manager Data Collector, and delete the Live Volume or Live Migration before deleting the volume.</p> <p>Server mappings may not be completely removed when a server is removed from an OS cluster using Dell Storage Manager before the server is removed from the OS cluster.</p> <p>Workaround: Remove the server from the cluster through the OS first. After the server is rebooted, remove the server object using Dell Storage Manager.</p> <p>When a server is removed from one Storage Center only, or a volume is un-mapped on one Storage Center only, the persistent reservations might not stay consistent between primary volume and secondary volume.</p> <p>Workaround: When removing a server from a cluster or simply un-mapping a volume, follow the below order</p> <ol style="list-style-type: none"> 1. Remove/un-map on the server side prior to make changes on the Storage Centers. 2. Delete the server on both Storage Centers, or un-map the volume on both Storage Centers using Dell Storage Manager.
SCOS-12067	<p>When importing a volume, Storage Manager does not allow you to select 0 as the LUN number.</p> <p>Workaround: None</p>

Open Issues Related to Reporting

The following open issues are related to hardware:

Table 40. Open Reporting Issues

Issue	Description
SCOS-38226	<p>In rare instances, a Sync LiveVolume Auto Failover alert is not cleared when the condition is corrected.</p> <p>Workaround: Use Dell Storage Manager to manually acknowledge and clear the alert.</p>
SCOS-38023	<p>The email alert message that provides the location of a failed drive might be confusing.</p> <p>Workaround: In the email alert message, the physical location of the drive is displayed after the [StatusAlert] text and is shown as the Disk xx-yy, where xx is the enclosure ID and yy is the enclosure drive slot.</p>

Open Issues Related to Storage Management

The following open issues are related to storage management:

Table 41. Open Storage Management Issues

Issue	Description
SCOS-41547	<p>This issue is limited to a storage system on which a new version of the Storage Center software has been downloaded, but not yet installed. When a storage controller is replaced in the storage system, the storage system might fail to automatically update the low-level firmware to the same version as the active storage controller. As a result, the storage controllers in the storage system might end up with different versions of the low-level firmware.</p> <p>Workaround: Install the downloaded Storage Center updates immediately after completing the storage controller replacement process.</p>
SCOS-41051	<p>When connected to a Storage Center through a Data Collector, Dell Storage Manager does not allow you to change the name of an enclosure and asset tag.</p> <p>Workaround: Use the Dell Storage Manager Client to connect directly to the Storage Center, then change the name of the enclosure and the asset tag.</p>
SCOS-40668	<p>Importing a volume from a Dell PowerVault MD-Series iSCSI storage array might take longer than expected.</p>

Issue	Description
	Workaround: Use Dell Storage Manager to change the MTU on the iSCSI fault domain from 1500 to 1472.
SCOS-40311	If a portable volume USB device is connected to the lead controller and the lead controller fails over, a portable volume copy might fail to resume when the storage system fails back to the original lead controller. Workaround: Disconnect and reconnect the portable volume USB device to resume the copy.
SCOS-22260	iSCSI I/O cards fail to honor an MTU value change made on a router. Workaround: Contact technical support.
SCOS-22150	In very rare instances, a controller failover on an SC7020 or SC5020 storage system might prevent Secure Console access. Workaround: Contact technical support.
SCOS-22026	Removing an HBA or deleting a server object before unmapping it from volumes could result in the server losing access to volumes and a controller failover will not complete properly. Workaround: Remove volume mappings from the HBA prior to removing the HBA or server object from the system.
SCOS-14951	After deleting volumes and snapshots, Storage Center does not immediately report the deleted volume space as free space for a disk folder. Workaround: Contact technical support.
SCOS-8627	AIX servers cannot boot from SAN using Dell Storage Software Suite for AIX version 2.2.0.17. Workaround: Update to Dell Storage Software Suite for AIX version 3.0.1.6.
HPEM-541	In rare instances, SC7020 updates do not complete successfully and the Storage Center might indicate that updates are still required. Workaround: Contact technical support.

Open Issues Related to User Management

The following open issues are related to Storage Center user management:

Table 42. Open User Management Issues

Issue	Description
SCOS-11192	Storage Center cannot authenticate directory service users that are configured to use an alternate DNS suffix. Workaround: None

Open Issues Related to Vendors

The following open issues are related to vendors:

Table 43. Open Vendor Issues

Issue	Description
SQAI-9	An ESXi 5.5 (Update 3b) host using FCoE and QLogic 8262 converged network adapters (CNAs) might cause the host to fail during controller failovers. Workaround: Update the QLogic firmware on the adapter. The QLogic firmware is available at http://www.dell.com/support/home/us/en/19/Drivers/DriversDetails?driverId=6RGDW .
SQAI-3	Software FCoE timeouts might occur when using QLogic CNAs in NIC mode.

Issue	Description
	Workaround: Update the QLogic firmware on the adapter. The QLogic firmware is available at http://www.dell.com/support/home/us/en/19/Drivers/DriversDetails?driverId=6RGDW
SQAI-2	An ESXi 5.5 or 6.0 host with an Emulex FC/FCoE HBA running driver version 11.0.x.x might crash during a controller failover. Workaround: Update to the latest Dell custom images of ESXi 5.5, 6.0, or 6.5.
SCOS-27133	Server bandwidth to the onboard 10 Gb Ethernet ports on an SC7020 drops significantly on reads when the server iSCSI initiator has interrupt moderation set to default (enabled). Workaround: From the server, disable interrupt moderation on the iSCSI cards as described in Dell EMC SC Series Storage: Microsoft Multipath I/O Best Practices .
SCOS-18123	Fibre Channel volumes that are mapped to a Hyper-V virtual machine using NPIV are not discovered by the virtual machine when the server has a QLogic HBA with out-of-date drivers. Workaround: Update the HBA to the latest version of the QLogic driver listed in the <i>Dell Storage Compatibility Matrix</i> .
SCOS-10166	Emulex FC and FCoE driver version 10.7.170.0 might cause an ESXi 5.5 or 6.0 host to fail during controller failovers. Workaround: Use the latest recommended driver version for the Emulex adapters. See the <i>Dell Storage Compatibility Matrix</i> .
CQ00358236	ESXi 5.x hosts with QxE82xx iSCSI adapters using QLA4xxx driver version 634.5.18 (ESXi 5.1) or 6.34.55.20 (ESXi 5.5) might fail to log in to the Storage Center after a controller reset or failover. Workaround: Use the latest recommended driver version for the QLogic adapters. See the <i>Dell Storage Compatibility Matrix</i> .
CQ00252780	On a storage system with iSCSI front-end ports, if a controller or port is in a failover process when a Windows boot from SAN is requested, the boot might fail. Workaround: Subsequent boot from SAN requests succeed when the controller or port is up.

Storage Center Update Information

Contact technical support to determine the Storage Center software version that is required to update to Storage Center 7.2.

NOTE: When updating both the Storage Center and Storage Manager software, update the Storage Manager software before updating the Storage Center software. A storage system that is running a newer version of the Storage Center software cannot be managed by an older version of Storage Manager software.

Support Resources

The following section provides resources for finding more information on using a Storage Center storage system.

Related Documentation

The following documents are available for a storage system running Storage Center 7.2.

- *Dell Storage Center Software Update Guide*
Describes how to update Storage Center software from an earlier version to the current version.
- *Dell Storage Center Update Utility Administrator's Guide*
Describes how to use the Storage Center Update Utility to install Storage Center software updates. Updating Storage Center software using the Storage Center Update Utility is intended for use only by sites that cannot update Storage Center using standard methods.
- *Dell Storage Manager Installation Guide*
Provides installation and setup instructions.
- *Dell Storage Manager Administrator's Guide*

Provides instructions for using the Data Collector Manager and the Dell Storage Manager Client.

- *Dell Storage Manager Online Help*

Provides context-sensitive help for the Dell Storage Manager Client, Data Collector Manager, and Storage Manager Server Agent.

- *Dell Storage Manager Release Notes*

Provides information about Dell Storage Manager releases, including new features, enhancements, fixed issues, and open issues.

- *Dell Storage REST API Release Notes*

Provides information about the Dell Storage REST API, which allows you to manage the Storage Manager Data Collector and Storage Centers.

Finding Documentation

The following locations contain documentation for Storage Center products:

- *Dell Support*

Provides documentation for Storage Center storage systems. Go to www.dell.com/support.

- *Dell TechCenter*

Provides technical white papers, best practice guides, and frequently asked questions about Storage Center storage systems. Go to <http://en.community.dell.com/techcenter/storage/>.

Notes, cautions, and warnings

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

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

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

To contact Dell for sales, technical support, or customer service issues, go to www.dell.com/support.

- For customized support, type your system service tag on the support page and click **Submit**.
- For general support, browse the product list on the support page and select your product.