

HP 3PAR OS 3.2.2 Release Notes

This document describes the features and issues included in HP 3PAR OS 3.2.2 and is intended for use by HP customers, partners, and HP field representatives. This document is applicable to HP 3PAR OS 3.2.2.290.

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1 HP 3PAR OS 3.2.2 Release Notes

Online Upgrade Considerations

This feature allows upgrade of the OS concurrently with I/O activity on the attached hosts, provided certain conditions are met. For more information regarding the required order for upgrade and installation of software components, see the *HP 3PAR OS 3.2.2 Upgrade Instructions*. For further information and pre-planning of online upgrades, refer to the latest version of the *HP 3PAR OS Upgrade Pre-Planning Guide*. To obtain a copy of this documentation, go to the Storage Information Library at <http://www.hp.com/go/storage/docs>.

Supported Platforms

HP 3PAR OS release supports HP 3PAR StoreServ Storage. For details, see the Single Point of Connectivity Knowledge for HP Storage Products (SPOCK) website at <http://www.hp.com/storage/spock>.

End of Support Features

- None

Components

Component	Version
OS	3.2.2.290
CLI Client	3.2.2.290
SNMP Agent	1.8.0
File Persona	1.1.1-20150828
Drive Cage Firmware:	
DC4 Firmware	2.64
MCU Firmware (OKI)	4.8.28
MCU Firmware (STM)	5.2.49
DCN1 / DCN2 / DCS1 / DCS2 /DCS7 / DCS8 Firmware	403d
DCS5 / DCS 6 Firmware	1.90
HBA Firmware:	
QLogic QLA4052C HBA Firmware	03.00.01.77
QLogic QLE8242 CNA Firmware	04.15.05
QLogic 8300 HBA FC Firmware	08.01.05
QLogic 8300 HBA FCoE Firmware	08.01.05
QLogic 8300 HBA iSCSI Firmware	05.07.06
Emulex LP11002 HBA Firmware	02.82.x10
Emulex LPe12002 HBA Firmware	02.03.x02
Emulex LPe12004 HBA Firmware	02.03.x02
Emulex LPe16002 HBA Firmware	10.4.359.0
3PAR FC044X HBA Firmware	200A8

Component	Version
LSI 9201-16e HBA Firmware	17.11.00
LSI 9205-8e HBA Firmware	17.11.00
LSI 9300-8e HBA Firmware	07.00.00

Drive Firmware Details

Type	Capacity	HP 3PAR Drive Model	Speed	Form factor	HP 3PAR StoreServ Model supported				Encryption	Firmware
					10000	7000	8000	20000		
FC	300G	HVPC0300GBFC15K	15K	3.5"	✓					3P04
FC	300G	SEGLE0300GBFC15K	15K	3.5"	✓					3P01
FC	600G	HVPC0600GBFC15K	15K	3.5"	✓					3P04
FC	600G	SEGLE0600GBFC15K	15K	3.5"	✓					3P01
SATA	1000G	SMSKP0001TBAT07K	7.2K	3.5"	✓					3P01
SATA	2000G	HMRK0002TBAT07K	7.2K	3.5"	✓					3P01
SATA	2000G	HUA722020ALA330	7.2K	3.5"	✓					A3GG
SAS	1000G	SAVN1000S5xeN7.2	7.2K	2.5"		✓				3P01
SAS	1000G	SAWK1000S5xnE7.2	7.2K	2.5"		✓			SED	3P00
SAS	1000G	SAWK1000S5xnN7.2	7.2K	2.5"		✓				3P00
SAS	2000G	HMRP2000S5xnN7.2	7.2K	3.5"	✓	✓				3P00
SAS	2000G	HMRK2000GBAS07K	7.2K	3.5"	✓	✓				3P02
SAS	2000G	SAVN2000S5xeN7.2	7.2K	2.5"		✓	✓	✓		3P01
SAS	2000G	SMEG2000S5xnF7.2	7.2K	3.5"	✓	✓			FIPS	3P00
SAS	2000G	SMEG2000S5xnN7.2	7.2K	3.5"	✓	✓				3P01
SAS	2000G	SMKR2000S5xeN7.2	7.2K	3.5"	✓	✓	✓	✓		3P01
SAS	3000G	HMRP3000S5xnN7.2	7.2K	3.5"		✓				3P00
SAS	3000G	HMRK3000GBAS07K	7.2K	3.5"		✓				3P02
SAS	3000G	SMEG3000S5xnN7.2	7.2K	3.5"		✓				3P01
SAS	4000G	HMRP4000S5xnN7.2	7.2K	3.5"	✓	✓				3P00
SAS	4000G	SMEG4000S5xnF7.2	7.2K	3.5"	✓	✓			FIPS	3P00
SAS	4000G	SMEG4000S5xnN7.2	7.2K	3.5"	✓	✓				3P01
SAS	4000G	SMKR4000S5xeN7.2	7.2K	3.5"	✓	✓	✓	✓		3P01
SAS	6000G	SMKR6000S5xeF7.2	7.2K	3.5"		✓	✓	✓	FIPS	3P02
SAS	6000G	SMKR6000S5xeN7.2	7.2K	3.5"	✓	✓	✓	✓		3P01
SAS	300G	HKCF0300S5xeN015	15K	2.5"	✓	✓	✓	✓		3P02
SAS	300G	SYJKT0300GBAS15K	15K	2.5"	✓	✓				3P01
SAS	450G	HCBRE0450GBAS10K	10K	2.5"	✓	✓				3P02
SAS	450G	SLTN0450S5xnE010	10K	2.5"	✓	✓			SED	3P00

Type	Capacity	HP 3PAR Drive Model	Speed	Form factor	HP 3PAR StoreServ Model supported				Encryption	Firmware
					10000	7000	8000	20000		
SAS	450G	SLTN0450S5xnF010	10K	2.5"	✓	✓			FIPS	3P00
SAS	450G	SLTN0450S5xnN010	10K	2.5"	✓	✓				3P01
SAS	600G	HCBF0600S5xeN010	10K	2.5"	✓		✓	✓		3P02
SAS	600G	HKCF0600S5xeF015	15K	2.5"	✓	✓	✓	✓	FIPS	3P02
SAS	600G	HKCF0600S5xeN015	15K	2.5"	✓	✓	✓	✓		3P02
SAS	600G	SLTN0600S5xnN010	10K	2.5"		✓				3P01
SAS	900G	HCBRE0900GBAS10K	10K	2.5"	✓	✓				3P02
SAS	900G	SLTN0900S5xnE010	10K	2.5"	✓	✓			SED	3P00
SAS	900G	SLTN0900S5xnF010	10K	2.5"	✓	✓			FIPS	3P00
SAS	900G	SLTN0900S5xnN010	10K	2.5"	✓	✓				3P01
SAS	1200G	HCBF1200S5xeF010	10K	2.5"		✓	✓	✓	FIPS	3P02
SAS	1200G	HCBF1200S5xeN010	10K	2.5"	✓	✓	✓	✓		3P02
SAS	1200G	HCEP1200S5xnN010	10K	2.5"	✓	✓				3P00
SAS	1800G	HCBF1800S5xeN010	10K	2.5"	✓	✓	✓	✓		3P02
SSD	100G	HRALP0100GBASSLC	150K	3.5"		✓				3P00
SSD	100G	HRALP0100GBASSLC	150K	2.5"		✓				3P00
SSD	100G	HRALP0100GBFCSSD	150K	2.5"	✓					3P05
SSD	200G	HRALP0200GBASSLC	150K	3.5"		✓				3P00
SSD	200G	HRALP0200GBASSLC	150K	2.5"		✓				3P00
SSD	200G	HRALP0200GBFCSSD	150K	2.5"	✓					3P05
SSD	400G	HRLP0400S5xnEMLC	150K	2.5"	✓	✓			SED	3P01
SSD	400G	HRLP0400S5xnNMLC	150K	3.5"		✓				3P02
SSD	400G	HRLP0400S5xnNMLC	150K	2.5"	✓	✓				3P02
SSD	480G	DOPA0480S5xnNMRI	150K	3.5"		✓				3P03
SSD	480G	DOPA0480S5xnNMRI	150K	2.5"		✓				3P03
SSD	480G	DOPE0480S5xnNMRI	100K	3.5"		✓	✓	✓		3P04
SSD	480G	DOPE0480S5xnNMRI	100K	2.5"		✓	✓	✓		3P04
SSD	480G	HSCP0480S5xnNMRI	150K	3.5"		✓				3P02
SSD	480G	HSCP0480S5xnNMRI	150K	2.5"	✓	✓	✓	✓		3P02
SSD	480G	HSSC0480S5xnNMRI	150K	3.5"		✓				3P02
SSD	480G	HSSC0480S5xnNMRI	150K	2.5"	✓	✓				3P02
SSD	920G	DOPA0920S5xnNMRI	150K	3.5"		✓				3P03
SSD	920G	DOPA0920S5xnNMRI	150K	2.5"		✓				3P03
SSD	920G	HSCP0920S5xnFMRI	150K	2.5"	✓	✓	✓	✓	FIPS	3P02
SSD	920G	HSCP0920S5xnNMRI	150K	3.5"		✓				3P02

Type	Capacity	HP 3PAR Drive Model	Speed	Form factor	HP 3PAR StoreServ Model supported				Encryption	Firmware
					10000	7000	8000	20000		
SSD	920G	HSCP0920S5xnNMRI	150K	2.5"	✓	✓				3P02
SSD	920G	HSSC0920S5xnFMRI	150K	2.5"	✓	✓			FIPS	3P03
SSD	920G	HSSC0920S5xnNMRI	150K	3.5"		✓				3P02
SSD	920G	HSSC0920S5xnNMRI	150K	2.5"	✓	✓				3P02
SSD	1920G	DOPE1920S5xnNMRI	100K	3.5"		✓				3P04
SSD	1920G	DOPE1920S5xnNMRI	100K	2.5"		✓	✓	✓		3P04
SSD	1920G	HSCP1920S5xnFMRI	100K	2.5"	✓	✓	✓	✓	FIPS	3P02
SSD	1920G	HSCP1920S5xnNMRI	100K	2.5"	✓					3P02
SSD	3840G	DOPM3840S5xnNMRI	100K	2.5"		✓	✓	✓		3P03

What's New in the OS

The new features available in HP 3PAR OS 3.2.2 address improved service levels and data protection with new support for end-to-end data integrity, availability and protection optimized for flash. HP 3PAR OS 3.2.2 also addresses the need for quick response with an elastic 4-way resource pool that provides simple federated workload balancing

HP 3PAR OS 3.2.2 includes new and enhanced features in the following areas:

- Support for HP 3PAR StoreServ 20000 Storage Systems
- Support for HP 3PAR StoreServ 8000 Storage Systems
- HP 3PAR StoreServ Management Console 2.2
- Support for Higher Scalability
- Persistent Checksum on HP 3PAR StoreServ 20000
- Remote Copy Asynchronous Streaming
- Peer Persistence for RHEL
- HP StoreOnce Recovery Manager Central
- HP 3PAR File Persona
- Peer Motion Software
- Online Import Software
- Priority Optimization Software
- Adaptive Flash Cache
- iSCSI enhancements
- VMware VVOLs
- Autonomic Rebalance enhancements
- On-node System Reporter changes
- Adaptive Optimization new options
- LDAP improvements
- Smart SAN support

Hardware enablement

HP 3PAR StoreServ 20000 series

The HP 3PAR StoreServ 20000 Storage family offers enterprise flash arrays ready for massive consolidation of most demanding workloads with greater than 3 million IOPS, sub-millisecond latencies, a 4X density advantage, and scalability to 15 PB of usable capacity. The flash-first architecture features the HP 3PAR Gen5 Thin Express ASIC for silicon-based hardware acceleration of thin technologies, including inline deduplication to reduce acquisition and operational costs by up to 75% without compromising performance. A choice of models provide a range of options that support true convergence of block and file protocols, all-flash array performance, and the use of SSDs (Solid State Drives) with spinning media for unmatched versatility. Enhanced Tier-1 storage capabilities for always-on data access and fine-grained QoS (Quality of Service) controls ensure predictable service levels for all workload types. Bidirectional data mobility enables virtually limitless elastic pools of storage to support the most rigorous on-demand infrastructure.

HP 3PAR StoreServ 8000 series

HP 3PAR StoreServ 8000 Storage offers enterprise Tier-1 storage at a midrange price. HP 3PAR StoreServ 8000 Storage delivers the performance advantages of a purpose-built, flash-optimized architecture without compromising resiliency, efficiency, or data mobility. The new HP 3PAR Gen5 Thin Express ASIC provides silicon-based hardware acceleration of thin technologies, including inline deduplication, to reduce acquisition and operational costs by up to 75% without compromising performance. With unmatched versatility, performance, and density, HP 3PAR StoreServ 8000 Storage gives you a range of options that support true convergence of block and file protocols, all-flash array performance, and the use of spinning media to further optimize costs. HP 3PAR StoreServ 8000 Storage offers rich, Tier-1 data services, quad-node resiliency, seamless data mobility between systems, high availability through a complete set of persistent technologies, and simple and efficient data protection with a flat backup to HP StoreOnce Backup appliances. HP 3PAR StoreServ 8000 series provides four models to choose from: 8200, 8400, 8440, and 8450. You can start with the entry level model and upgrade easily when required.

Software innovations

HP 3PAR StorServ Management Console 2.2

HP 3PAR SSMC (StoreServ Management Console) is a new management and reporting console that offers converged management of both File and Block on HP 3PAR StoreServ systems. HP 3PAR System Reporter is fully integrated in SSMC and offers reporting templates, scheduled reports, and threshold alerts.

Support for higher scalability

HP 3PAR OS 3.2.2 enables higher scalability in terms of maximum numbers of volumes, snapshots and initiators. To know more, see HP 3PAR support matrix available on HP Storage Single Point of Connectivity Knowledge website <http://www.hp.com/storage/spock>

Persistent Checksum on HP 3PAR StoreServ 20000

HP 3PAR Persistent Checksum powered by HP 3PAR Gen5 ASIC ensures end-to-end Data Integrity via T-10 DIF (Data Integrity Field) enabled via integration with host HBAs and HP drivers. This software provides data checks from the host to HP 3PAR StoreServ back-end media drives. It eliminates media and transmission errors caused by any component in the I/O stack and provides end to end protection for all data stored on HP 3PAR StoreServ Storage systems via a completely agentless and application agnostic solution.

NOTE: This feature is available only on HP 3PAR GEN5 ASIC platforms. For a complete list of supported hosts and HBAs, see HP Storage Single Point of Connectivity Knowledge website <http://www.hp.com/storage/spock>

HP 3PAR Remote Copy

HP 3PAR Remote Copy provides solution for remote replication that enables flexible business continuity. HP 3PAR Remote Copy Asynchronous Streaming is a new remote replication mode, along with the existing Synchronous and Periodic Asynchronous modes. This mode eliminates the compromise between performance and the level of data protection. HP 3PAR Remote Copy Asynchronous Streaming helps the customer easily execute a data protection plan that includes a minimal RPO and protect data for replication distances up to 10ms round trip latency.

HP 3PAR Remote Copy Synchronous mode supports extended round trip latency of up to 5 ms using either RCFC, FCIP or RCIP transports.

NOTE: Contact your HP account representative to review the requirements for enabling the HP 3PAR Remote Copy Asynchronous Streaming feature.

HP 3PAR Peer Persistence

HP 3PAR Peer Persistence extends the support for Linux Red Hat Enterprise and provides Oracle RAC support on RHEL and Windows Server. For more details, see HP Storage Single Point of Connectivity Knowledge website <http://www.hp.com/storage/spock>

HP StoreOnce Recovery Manager Central 1.1

HP StoreOnce RMC (Recovery Manager Central) 1.1 integrates HP 3PAR StoreServ with HP StoreOnce Backup systems to provide a converged availability and flat backup service for HP 3PAR or VMware environments that augment traditional backup approaches. Combining the performance of snapshots with the protection of backups, HP StoreOnce RMC for VMware enables fast, efficient, reliable, and simple one click protection for VMDKs (VMware virtual machine disks) and data stores. Rapid online recovery allows VMware administrators to create hundreds of non-disruptive, application consistent VM (Virtual Machine) snapshots (local or remote or both) and initiate rapid online recovery. This solution provides a 17x faster backup and 5x faster restore of snapshot data with flat backup with RMC's Express Protect feature. This feature enables the flat backup of VM snapshot data from HP 3PAR to StoreOnce, independent of backup server software.

HP 3PAR File Persona

HP 3PAR File Persona is a licensed feature that enables a rich set of file protocols, file data services, and an Object Access (REST) API. It extends the spectrum of primary storage workloads natively addressed by HP 3PAR StoreServ Storage systems to include enterprise file sync and share, home directory consolidation, group and corporate shares, and select custom cloud applications. HP 3PAR OS 3.2.2 doubles the aggregate usable file capacity supported per node pair from 64 TB to 128 TB. Network connectivity is increased to 12 x 10GbE ports per node pair on 3PAR StoreServ 20000 series systems. The on-board RCIP port can be used for file access on all File Persona supported 3PAR StoreServ systems. File storage efficiency is improved with support for Thin Deduplication. Trend Micro ServerProtect for Storage is supported for virus scanning.

Peer Motion Software

Peer Motion Software brings multi-array bidirectional peer motion capabilities across multiple systems. This solution allows customers to optimize the costs by setting up an elastic pool of capacity across any HP 3PAR StoreServ system—mapping their workload to the right resources and choosing between a midrange, an all flash, or enterprise flash storage system—as the requirements for that workload can change over time. It also provides features such as concurrent migrations, prioritization of migration tasks, and data mobility from multiple sources running legacy HP 3PAR OS releases to a single destination HP 3PAR StoreServ system.

Online Import software

Online Import software allows customers to move data from legacy non-3PAR storage to HP 3PAR StoreServ systems with minimal or no disruption. HP 3PAR Online Import software provides an

easy way to modernize HP EVA, EMC VMAX, EMC VNX, VNX2, CLARiiON CX4, and HDS storage infrastructure with a simple migration process. The following HDS platforms are supported:

- HDS TagmaStore NSC
- HDS TagmaStore USP
- HDS USP V
- HDS USP VM
- HDS VSP

HP 3PAR Online Import allows data mobility from multiple source systems to a single destination system in a single configuration. Users can migrate a subset of a volume exported to the host, if they do not wish to migrate the entire host in one go. Migration tasks can be prioritized, and migration of the volumes with the critical data can be assigned a higher priority.

Priority Optimization software

Priority Optimization software enables customer to set latencies goals down to 500 microseconds on all-flash configurations.

Adaptive Flash Cache

Adaptive Flash Cache will now use RAID 0 as a default layout on HP 3PAR StoreServ 7000, 8000 and 20000 series storage systems.

iSCSI enhancements

HP 3PAR OS 3.2.2 provides the following iSCSI enhancements:

- Support for Persistent Ports loss_sync recovery, automatic failover in case of a failure due to loss of signal or link down between the array and the switch.
- Enhanced SendTarget discovery to return multiple target portals.
- Support for 256 iSCSI initiators (maximum) per port on HP 3PAR StoreServ 8000 and 20000 Storage systems.
- Support for iSCSI VLAN tagging on HP 3PAR StoreServ 8000 and 20000 Storage systems.
- Support for Enterprise iSCSI (iSCSI over DCB/lossless Ethernet) on HP 3PAR StoreServ 8000 and 20000 Storage systems.
- Support for iSCSI IPv6 on HP 3PAR StoreServ 8000 and 20000 Storage systems.

VMware VVols

VMware VVols support provided in HP 3PAR OS 3.2.2 enables higher VVols scalability, provides support for multiple storage containers, and provides ability to use the same array with multiple vCenters and vCenter Clusters. With the new command line options, the storage administrator gets more visibility into the capacity and the performance for individual VMs.

Autonomic Rebalance enhancements

Autonomic Rebalance enhancements trigger automatic rebalancing of existing volumes as new drives are added on HP 3PAR 7200 systems. All other classes of system rebalance manually by running the tunesys operation. This release provides several optimizations for improving performance of rebalancing activity and reporting of the rebalancing activity.

On-Node System Reporter

On-Node System Reporter provides the ability to grow the size of the .srdata volume to allow longer retention of historical data collections. You can protect .srdata volumes using snapshots via Virtual Copy.

Adaptive Optimization

Adaptive Optimization in HP 3PAR OS 3.2.2 provides the user more control over the space distribution within AOCFG CPGs. You can define a minimum and maximum space utilization of each tier in an AOCFG. You can also define minimum space utilization of the T0 CPG (SSD tier) such that the SSDs remain mostly full, making full use of the SSD performance.

LDAP improvement

HP 3PAR OS 3.2.2 brings following LDAP improvements:

- Support for multiple LDAP servers — This version allows an unlimited numbers of LDAP servers to be defined.
- Support multiple domains — This version allows any users defined in domains that fall under the same root domain.
- Ability to lookup servers in DNS.
- Load balancer support via a new LDAP-type option.

HP 3PAR Smart SAN

HP 3PAR Smart SAN nables you to automate peer zoning which results in the creation of fewer zones and enables configuration of zones in minutes through its TDPZ (Target Driven Peer Zoning) feature. Through automation, it reduces the probability of errors and potential downtime.

Without HP 3PAR Smart SAN, an administrator must pre-configure zones on the switch before configuring hosts and VLUNs on the HP 3PAR StoreServ Storage system. With HP 3PAR Smart SAN, the administrator can configure and control zoning directly from the HP 3PAR CLI. HP 3PAR Smart SAN also supports standards-based device registrations and diagnostics data collection for better configuration visibility and diagnostic purposes.

Interoperability

HP 3PAR OS 3.2.2 is the last major HP 3PAR OS release to support Host Persona 1 with any version of Citrix XenServer 6. Subsequent HP 3PAR OS versions will exclusively use Host Persona 2 for any version of Citrix XenServer 6 and later.

Modifications to the OS

The following items are addressed in this release:

Issue ID	Description
49957	If the admin interface is non-functional, an alert is reported but management of other network ports is not affected.
80418	Addresses an issue where an SFP event/alert does not work correctly when the SFP error is cleared.
80428	Resolved an issues where details of a fully provisioned volume split between tiers by Adaptive Optimization might display the wrong RAID type and device type (SSD, FC, NL) information. This also affects the tier from which any new space is allocated to the VV using the <code>growvv</code> command. NOTE: Changing the primary CPG for a fully provisioned volume must be done by using the <code>setvv</code> command with options <code>-usr_cpg</code> or <code>-snp_cpg</code> .
83509	If repeated attempts to clean a chunklet fail, mark the chunklet as media failed and go on to the next chunklet.
92692	The TOC information for an iSCSI port might become incorrect if an FC adapter is replaced with a CNA adapter. The iSCSI port might intermittently come up in <code>config_wait</code> state following node reboot or node panic. Resetting the port clears the <code>config_wait</code> state. To resolve the inconsistency in the TOC, switch the port to FCoE mode and then switch it back to iSCSI mode.

Issue ID	Description
93554	The user can input multiple DNS addresses when running OOTB (Out-of-the-Box).
94331	Resolved an issue where the IMC Volume Raw Space pie chart on the Physical Disks Summary tab incorrectly displays value on StoreServ with Adaptive Optimization software active.
95780	The <code>updatevv</code> command algorithm is revised so that the structures around the snapshot need not be recreated and chances of losing the snapshot on failures are reduced.
96308	<p>For HP 3PAR StoreServ 7000 storage systems, the <code>locatecage</code> command turns on the enclosure LED and all the drives LEDs to locate an entire cage. To locate an entire cage for HP 3PAR StoreServ 20000 storage systems, only the enclosure LED is turned on.</p> <p>The <code>locatecage</code> command requires the <code>-t</code> option which specifies the number of seconds to turn on the LED. For HP 3PAR StoreServ 7000 storage systems, the default time is 15 minutes with a maximum of 1 hour. For all other systems, the default time is 60 seconds with a maximum of 255 seconds.</p> <p>The <code>jbod_monitor</code> checks this time every 2 minutes if it has elapsed and turns off the LED.</p> <p>To turn off LED before the time has elapsed, use 0 for seconds for the <code>-t</code> option.</p>
98668	Resolved an issue of potential deadlocks while stopping Remote copy function.
99402	The <code>controlport logout</code> command can be run for FCoE ports.
100837	For remote copy traffic, Remote copy links must have a minimum of 5 Mbps throughput available to them.
102997	Low priority rules can only throttle low priority rules, and normal priority rules can only throttle normal and low priority rules.
104176	During system manager startup, cage component state is observed for more time before posting cage component state change alerts for loop being offline.
104239	Support is provided for 10G SFPs for QLogic EP8324.
105680	Using the command <code>controlsr grow <size></code> , it is possible to grow the volume used to store SR data and increase the retention time of all SR data categories such as hires, hourly, daily, and AO ldr.
106651	Resolved an issue where a region move on a remote node could cause instability.
108365	The system manager synchronization locks are released before making remote procedure calls to the quorum announcer processes. This applies only to Peer Persistence configurations.
108932	LDCK retry speed is enhanced. When ldck failures are added to a retry queue, the whole queue is retried after a period of time instead of just the head of the queue.
109217	If the maximum number of initiators exceeds for a Qlogic CNA port, an alert is raised.
111310	For Windows Peer Persistence support, the recovery procedure must be updated to include a manual disk rescan from Windows Disk Management.
111320	Resolved an issue where local variables in the Quorum Announcer process are overwritten when error message strings from the Quorum Witness are greater than 100 characters in length. When this occurs the Quorum Announcer process restarts.
111321	Releases system manager synchronization locks before making remote procedure calls to the quorum announcer processes. This applies only to Peer Persistence configurations.
112313	During online upgrades, the execution of scheduled tasks is paused. If an upgrade fails during the load phase, the scheduled tasks remain paused even when the system indicates that no upgrade is in progress. This is resolved and the scheduled tasks resume normally if upgrade fails.
112889	Provides support for the <code><n:s:p></code> and <code><wn></code> options for the <code>servicehost remove</code> command to remove dead connections listed by the <code>servicehost list</code> command.
113074	Provides support for the Subject Alternative Name certificate extension to the certificate handling tools. SANs can be added to CSRs and self-signed certificates with the <code>-SAN</code> option. The <code>showcert</code> command can be used to view the extension.
113301	Resolved an issue where certificate generated by earlier version of HP 3PAR OS were flagged by OPENSSL as having a unsupported certificate purpose.

Issue ID	Description
113374	The <code>compactcpg</code> command runs automatically.
113514	Temperature Under_Warning_Threshold alerts are changed to informational events.
114460	Resolves an issue where a general protection fault might occur in the SCSI code when running the <code>updatevv</code> command for a VV multiple times in a short period of time.
114947	The volume capacity limit for DR operations is increased to 4096 TB.
115302	When a remote copy volume is undergoing a region move, retry timeout period is 5 minutes. If the volume is not currently involved in a region move, the retry timeout is the default.
115505	The <code>-online</code> option is supported with the <code>creategroupvvcopy</code> command and multiple copies can be created at the same time.
115523	To simplify the configuration and setup of HP 3PAR systems, the <code>admthw</code> and <code>ootb</code> commands reconfigure the free fibre channel ports to <code>host</code> connection mode and <code>pointconnection</code> type.
116034	When running OOTB (Out-of-the-Box), the user can configure RCIP and File Persona ports.
116685	Added the capability to authenticate with multiple LDAP servers behind a load balancer.
117021	The <code>updatevv</code> command is revised so that the structures, VLUNs and VV sets, around the snapshot need not be recreated and risk of losing the snapshot on failures is reduced.
117892	The default UDID for snapshots is set to VV ID.
118170	Resolved an issue where node shuts down unexpectedly if the <code>controlport clicommands</code> are issued in a particular sequence.
118875	Downgrade to earlier version does not require the on-node System Reporter database to be recreated. Downgrading to earlier versions will still require the re-creation steps in many cases.
119221	An STSG (SendTargets Port Tag) is provided for each iSCSI port. Information of all the ports sharing the same STGT is part of the SendTargets All response.
119332, 126103	The task manager correctly processes all completed tasks regardless of the general load and the AO load on the system. All completed tasks are successfully displayed when the <code>showtask</code> command is issued.
119734	If iSCSI initiators limit is exceeded, an alert is raised.
120838	Space free up operations are made parallel and asynchronous.
120895	Resolved an issue where the <code>checkhealth host</code> commands becomes unresponsive if the SAN provides incomplete data from the port.
121146	Resolved an issue where the failover is not removed correctly if the connection mode of an FC port is changed while a persistent ports failover is active on that port.
121260	By default, the Hyper Threading is disabled.
121830	Resolved a concurrency issue between region mover and <code>nup_post_process_th</code> .
121955	For HP 3PAR StoreServ 20000 Storage Systems, use the cage info from the SES page to determine the domain of the I/O module and assign the correct LoopA / LoopB port.
122676	Resolved an issue where after a cage reset, drives in an encrypted system remain degraded for a few hours. Now, drives return to the normal state immediately after a cage reset.
122840	Invalid Region Move VL map entries are discovered and automatically removed from the system configuration database. An alert is generated to inform that the situation has been resolved, and events are generated with more specific details.
123901	The dedup garbage collector (<code>ddcscan</code>) is changed so that the master node <code>ddcscan</code> triggers <code>ddcscan</code> runs on other nodes even when there is 1 TB of reuse pages queued up on a node.
124117	Resolves an issue in node up integration that might lead to data unavailability.
124185	The ability to authenticate users in subdomains is provided.

Issue ID	Description
124232	Resolved an issues where single node goes down when recovering meta data on RO snapshot.
124528	Resolved the issues with CPG capacity efficiency displayed by the <code>showcpg -space</code> command.
124556	Resolved an issue where in certain network environments, it takes more time than the timeout period to configure the network interface making the array inaccessible from an administration standpoint.
124648	Resolved an issue of reclamation of unreferenced space in systems with dedup volumes so that snapshot creation and deletion during such activity does not cause the space reclamation to be abandoned.
125106	Resolves an issue that causes DNS resolution to fail.
125257	Provide a command to trigger the system to update the dedup statistics of any given CPG or TDVV.
125283	The WSAPI startup checks that both parts of the key pair are present and are correct.
125546	After an all nodes down node rescue, select the console option Load network configuration to reload the network configuration.
125733	Provides support for Enterprise iSCSI, iSCSI DCBX information is displayed.
125912	Resolved an issue in DDS space recycle handler that could result in unresponsive system when another thread holds the write lock.
126112	If a power event causes a two node system to go down and a hardware failure prevents one of the nodes from coming back after the power is restored, the system does not start. This is resolved and if the second node does not join the cluster 30 minutes after the first node boot, it proceeds with recovery automatically.
126134	Resolves mismanagement of a token cluster mask that might cause an invalid token consistency check across nodes.
126524	Resolved an issue where if the admin interface changes frequently, the netc process reports an error message due to an unwanted increase in memory usage.
126568	No limitation on the number of LUNs that can be exported to a given host initiator at one time.
126825	The cage firmware image size is increased.
126837	Resolved a SCSI command ID mismatch assert in the FCoE driver.
126987	A new feature is provided to check if ingress and egress DMA operations are within an address range.
127444	Resolved an issue where single node goes down when a region move and IO operation is going on
127727	P3P firmware is upgraded to 4.15.2.
127849	VASA Provider does not generate an event to notify the vSphere environment if the flash-cache configuration has changed for the VVol storage containers.
128035	When a fully provisioned volume is in an AO configuration, the primary CPG for USR space can be changed to any other AO tier CPG.
128039	The <code>createsv</code> command can be used for creating snapshots of .srdata volume. The <code>promotesv</code> command can be used to promote this snapshot after stopping SR.
128104	Addresses a data integrity issue when migrating virtual machines.
128116, 132299	Resolved an issue where rolling upgrades beyond the HP 3PAR OS 3.1.3.MU1 fail when preserved data is created during the upgrade.
128178	Default engine ID is used in ContextEngineId field in SNMPv3 scoped PDU.
128243	Support is provided for 10G ethernet port with SFP - AVAGO AFBR-703SDZ-HP1.
128312	Simple LDAP configuration is provided.
129033	Spare chunklets used as the destination for a chunklet move are unmapped after the data is moved.
129674	If less than half of the admitted disks to maintain TOC quorum are present, the <code>setssystemgr</code> command does not start the system.

Issue ID	Description
129818	Resolved an issue where a lack of resources cause host I/O to become unresponsive.
129940	Resolved an issue where completed offline copies cannot resume other operations as the temporary snapshot created is not deleted.
130063, 130654	Resolved an issue where accessing invalid memory address causes snmpagent process failure.
130118	Prior to HP 3PAR OS 3.2.2, a createsralertcrit criterion could be configured with a name that exceeds 31 characters. When the name exceeded 31 characters, no alerts were reported even if the defined criterion should have flagged the defined condition. To address this issue in HP 3PAR OS 3.2.2, new createsralertcrit definitions can no longer be created using a name that exceeds 31 characters. HP recommends that you verify the length of the name of any existing createsralertcrit definitions. When found, these must be replaced by new createsralertcrit definitions with a name not exceeding this 31 character length limit. Previous definitions must be removed manually.
130663	Both LPe16002 and LPe16004 use two new SFPs from Avago and Finisar Manufacturer : HP-A Part Number : E7Y10A Manufacturer : HP-F Part Number : E7Y10A
130677	Resolved an issue where system manager might become unresponsive when a node battery test starts on an expired battery.
130836	Resolved an issue where the SNMPAgent initialization process fails and a function checking an I/O might encounter a timing issue when a node is shutting down or becoming unavailable
131115	The showcpg -space command displays accurate CPG dedup ratio as data size stored in private space is included in CPG dedup ratio calculation.
131158	Resolved an issue where request for space from L1 bitmap might be incorrect After the volume growth, the data pattern in L1 bitmap page and L2 bitmap reserve area signature might be same. This might cause incorrect result when requesting space from L1 bitmap. This is resolved.
131239	Enhancements to the VASA Provider and VMware VVol support, including: <ul style="list-style-type: none"> • Support for multiple VVol storage containers, including new CLIs to manage them. • Support for migrating from HP 3PAR OS 3.2.1 based storage containers to the multi-storage container model. <p>NOTE: The downgrade from HP 3PAR OS 3.2.2 to an earlier release is not supported without first removing storage containers.</p> <ul style="list-style-type: none"> • Support for connecting multiple vCenters to the VASA provider simultaneously, using the server-side certificate management mode controlled with the setvasa command. • Support and certification for VASA 2.0 as a block device storage provider. • Usability enhancements into several CLIs for viewing VVols
131349	Resolved a condition where 16 Gbps FC driver code might dereference a null pointer when a request to get a node name fails. This can happen during FC link events such as link down, link up, port reset, and so on.
131378	If an SFP not listed in the database is plugged in, it is flagged as not qualified.
131549	Prevents unexpected system manager restarts when moving regions.
132350	Resolved an issue where during node reboots, a ping or statiscsi command might induce an erroneous firmware core on iSCSI ports.
132475	Resolved an issue of SNMPAgent failure due to invalid memory access.
132619	SFP database is updated for 12G SAS connectors.
132644	The internal function to create unique snapshots is modified so that 65K snapshots can be made off of VVs with a similar name.
132748	Resolved an issue where block allocation map for RW snapshots reports incorrect information when data is written to the base VV
132791	Resolved an issue where DCS1 drive cage reports incorrect status.

Issue ID	Description
133245	Resolved an issue where the VASA provider might terminate while updating vSphere trusted certificates.
133457	Resolved an issue where under heavy load, the VASA Provider might abort while performing VVol operations.
133567	The <code>checkhealth</code> and <code>eventlog</code> commands report PDs with FRU or UPG firmware.
133643	Resolved an issue where odd fields are found at the tail of the SNMP trap OIDs which might cause errors for clients when processing incoming traps.
133679	Resolved an issue where <code>rsh</code> command fails to complete during online upgrades to HP 3PAR OS 3.2.1.MU3 and later.
133844	Support is provided for HP 10Gb SR SFP+(FCI) for QLE8242
134067	To prevent issues when reading the TOC, the system ensures that the entire TOC area of a PD is readable before admitting the PD.
134292	Resolved an issue with Adaptive Optimization data movement depending on the execution limit.
134481	The VASA provider log file, inside an insplere, could generate incorrect log messages. For example: [Fri May 1 15:33:05 2015].688 session_data.cpp:966: WARN getVVFFromVvolld, getVVCache returned empty for wwn:60002ac000000000c27ea87b9ebc4033 These log messages can be ignored.
134738	SFP verification process does not use HBA serial numbers as it might make SFP disqualified.
134963	The VASA provider logs warning messages as below [Tue May 5 11:52:24 2015].088 https_gw.c:210: WARN Received premature EOF These warnings can be ignored.
134966	Resolved an issue where the VASA Provider generate incorrect log messages in the Insplore such as <code>remove_abandoned_trace_files</code> unable to find tracer parent directory.
135072	An alert is generated for 16G FC if the initiator count exceeds the maximum allowed value.
135384	Resolves an issue where certain host SCSI writes to the primary volumes receive good status, instead of a check condition UA, when Remote Copy writes cannot be replicated to the secondary volumes during a Peer Persistence automatic failover.
136536	QLE8362 CNA and QLE2662 FC HBA firmware is updated to version 5.7.3.
137079	Resolved an issue where registration of the VASA Provider with a vSphere environment might fail if the array has VV set names longer than 24 characters.
137488	Resolved an issue where after rebooting the primary node (node 0) of the array, occasionally the VASA Provider reports Rescan Error in the vCenter Storage Providers status window.
138743	Provided an ability in HP 3PAR OS 3.2.2 to use an alias to point to multiple LDAP servers in.
138816	If the system shuts down for powerfail save and no disks are visible to the system when it starts up or only a minority of the disks become visible later, it would automatically start despite having less than 60% of the disks available. This could lead to a repeated powerfail save. This is resolved and the system starts only when appropriate.
140869	Resolved a performance issue in the VASA Provider when configurations have several large VLUNs.

Known Issues with the OS

Issue ID	Description
113925	Live Migrations of Clustered VMs using vFC (virtual Fibre Channel) adapters is not supported.
114158	The <code>setlicense</code> command requires a reboot if a license key with HP SSN serial number is entered.

Issue ID	Description
119997	<p>The time period for which the <code>tunesys -cleanwait</code> command waits for cleaning of the chunklets is half of the time specified by the <code>-cleanwait</code> option.</p> <p>Workaround: Provide twice the expected time delay value to the <code>-cleanwait</code> option. The maximum cleaning delay can be 360 minutes. Provide a value of 720 to get maximum time delay of 360 minutes.</p>
125767	<p>Attempts to upgrade a StoreServ cluster running versions earlier than HP 3PAR OS 3.2.1 to version later than 3.2.1 might fail.</p> <p>Workaround: The system manager process must be restarted before the upgrade is resumed or retried. To restart the <code>sysmgr</code> process, issue the following commands from the master node:</p> <pre># setsysmgr quiet_restart # onothernodes killall -9 sysmgr</pre> <p>If the cluster contains more than two nodes, the <code>sysmgr</code> process on all other nodes must be restarted as well. From the master node, issue the following command:</p> <pre>onothernodes killall -9 sysmgr</pre>
125812	<p>If an attempt is made to tune an SA space LD on a system which has PDs of the target devtype on less than 3 cages on the owner node of the LD, the tune fails. <code>Tuneld</code> assumes that SA space is always RAID 1, set size 3, cage availability.</p>
129428	<p>The <code>statvln</code> command might not work when system has subLUN configured. It returns zero statistics if any wildcard query is used or multiple VLUN IDs are specified.</p>
131304	<p>Regular VV cannot be added to VVol storage container VVset.</p>
131710	<p>All interfaces into the on-node System Reporter reports timeout when requesting large data sets and experience slow performance.</p>
131813	<p>When an incorrect DNS is set using the Service Processor setup wizard, or if the SP and StoreServ initialization is done on a private network with any DNS settings, the SP is unable to establish a CLI connection to the StoreServ and the SP installation process fails.</p> <p>Workaround: To avoid this issue, do not configure DNS using the SP setup wizard; instead, manually configure DNS using the 3PARCUST account after successfully completing the installation:</p> <ol style="list-style-type: none"> 1. In SPOCC, click the SPMAINT tab. 2. Select Option 2 — Network Configuration. 3. Select Option 9 — DNS Configuration. <p>If you configure DNS using the SP setup wizard, you must reinstall the Service Processor software.</p>
138175	<p>Storage vMotion will become unresponsive and timeout if HP 3PAR OS system manager is restarted while storage vMotion is in progress.</p> <p>Workaround: When Storage vMotion timeouts, verify that HP 3PAR OS system manager starts successfully by running the <code>showsysmgr</code> command on array, and then initiate storage vMotion again.</p>
138582	<p>The <code>showvvols</code> and <code>showvvols -sc <storage container></code> displays incorrect information on VM in a storage container (VVol datastore) if a VM has one or more virtual disks or RDMs stored in a different storage container.</p>
140288	<p>Downgrade from HP 3PAR OS 3.2.2 must ensure that RWV snapshot is not more than 256. HP 3PAR OS 3.2.2 supports 2K snapshots.</p>
140776	<p>The 16G Emulex ports do not report the latest SFP information if the port is in a <code>loss_sync</code> state.</p>
141277	<p>vCenter and ESX 6 hosts might intermittently report 0 MB of storage capacity and free space for VVol datastores for a period of up to 20 minutes after HP 3PAR array node reboot. No user action is required to resolve the issue. vCenter will successfully re-establish full connectivity with the 3PAR VAASA provider and then update the vCenter VVol VASA storage report.</p>
142013	<p>Volumes formatted with the JFS file system cannot be migrated online via Peer Motion. Hosts using the JFS file system must stop the I/O and the file system must be unmounted before proceeding with the migration.</p> <p>JFS2 and other supported AIX file systems do not have any impact.</p>

Modifications to File Persona

Issue ID	Description
54914 (56736, 60558)	Resolved an issue where a file with actual size of 1 KB is reported as 1 MB 'Size on Disk' from an SMB3 clients and 4 KB 'Size on Disk' from SMB2 clients.
56242	Resolved an issue where quotas cannot be deleted if they are set for a deleted user or group.
57316 (57329, 61080)	Resolved an issue where LDAP user authentication fails when some nodes lose the ability to communicate with the LDAP server.
58579	Resolved an issue where if the filesystem get unmounted during an active NDMP backup or restore session, the filesystem goes in FREEZED condition as NDMP is holding file handles from the filesystem.
59013	Resolved an issue where the request to delete an object share might display <code>Request failed</code> message even if the the object share is deleted successfully.
59046	Resolved an issue where if the FPG names are not specified in correct case when creating or listing shapshots, <code>showsnap</code> displays <code>No shapshots listed</code> message instead of the FPG not found message.
59193 (61173)	Resolved an issue where if the AV scan policy is set to OFF, it might cause unwanted increase in memory leading to node going down and causing failover.
60018 (60047, 60048)	Resolved an issue where deleting and or adding a VFS with the same IP but with two different subnet masks can cause the VFS to enter a degraded state.
60526	Resolved an issue where creating or growing multiple FPGs in parallel might result in an error message.
60681 (60739, 60740)	Resolved an issue where, on some occasions such as the combination of a node failure and failover, SMB firewall ports might not be configured for a FPG upon recovery and prevent user access to shares on that FPG.
60765	Resolved an issue where an offline upgrade from 3.2.1 MU2 with Patch 08 (P08) with File Persona enabled might leave failover in a disabled state and a future failure might not trigger a failover correctly.
61460	Resolved an issue where using unsupported locale settings during file creations might cause problem during file removal operation.
61795	Resolved an issue where an upgrade might fail if an upgrade pre-check is run during the upgrade.
62025	Resolved an issue where under certain SW failure conditions, all FPGs do not fail over successfully to the backup node.
118770	The output of the <code>showfsav pol</code> command is changed to have a single consistent header for the virtual file server and file store sections.
123354	Resolved an issue where file shares might become inaccessible if multiple PDs containing File Persona volume data go offline due to disk drive failures or service operations.
126831	The <code>createfpg</code> CLI command supports the <code>-tdvv</code> option to create FPGs with thin deduplicated virtual volumes.
130873	Resolved an issue where CPG Out of Space condition causes deactivation of FPG.
134044	The <code>setfshare</code> and <code>showfshare</code> commands provide new options such as <code>-acl</code> , <code>-mode</code> , <code>-owner</code> , <code>-group</code> and <code>-dirperm</code> for file share directory permissions management. For more details, see the <i>HP 3PAR File Persona User Guide</i> .
135466	The role for the commands <code>setfs</code> , <code>setfsuser</code> , <code>setfsgroup</code> , <code>createfsuser</code> , <code>createfsgroup</code> , <code>removefsuser</code> , and <code>removefsgroup</code> is changed to SUPER.

Known Issues with File Persona

NOTE: The known issues for HP 3PAR OS 3.2.1 MU3 File persona are still present in HP 3PAR OS 3.2.2 unless otherwise listed as addressed in HP 3PAR OS 3.2.2.

Issue ID	Description
37406,37422	SMB and FPG read and write statistics reported in the <code>stats</code> command do not account for the data transferred via ODX.
42322	HP 3PAR File Persona does not currently support NBNS (NetBIOS Name Server) resolution. The NetBIOS name of a File Persona cluster node cannot be resolved from Windows clients using the <code>nbtstat</code> command. Issuing the <code>nbtstat - A <HP SMB server IP address></code> command from a Windows client returns a <code>host not reachable</code> error.
58601	If the VSD is not up (or <code>VENDOR_TYPE</code> not set), the files are served irrespective of AV unavailable policy. Files must be served as per AV unavailable policy if AV is ON irrespective of whether VSD is responding or not.
59906	On rare occasion, a request to stop file services on a node might result in restarting of file services instead of going to a stopped state. Workaround: Try again to stop file services on that node and it generally succeeds on the second attempt.
58905 (60564)	Windows and Linux NFSv3 use significantly different methods to process permissions. Windows combine access from <i>all</i> of the ACEs on the file to determine if the user has the requested access. In NFSv3, Linux proceeds through a hierarchy and determines the user's permissions from <i>one</i> of the mode bit fields – user, group, or other. In the NFSv3 Linux behavior, it is possible to get inverted priorities – where others have more permissions than the owner. In Windows' ACL implementation, it is not possible to get such an inversion.
60985	Restarting HP SMB server multiple times in quick succession causes daemon to become unresponsive, if Active Directory cache contains large number of entries. This occurs when the HP SMB server is stopped while the Active Directory cache is still being loaded.
52552 (61082)	If both NFS and SMB share refer to the same file system path, then <code>mkdir</code> command issued on the NFSv3 mount from client displays error: <code>mkdir: cannot create directory <dir_name> : invalid argument</code> . But, directory is created. NOTE: HP does not recommend cross protocol access to the same share for Unity version 1.
43596 (61247)	When user quota is enabled for hard Inode limit on a Roaming profile user, one less file is allowed to be created on the HP-SMB share, after logging off. Any attempt to write a file further causes <code>No space on the disk</code> error during logoff.
56895 (61253)	If a share of the .admin file store is set up to copy the configuration backup file to the VFS, the restore might fail if that share is still in place and the share conflicts with a share being restored. Workaround: Before attempting a restore, delete all shares. If the issue has already occurred, delete the FPG and try the restore again.
61706	Only users added to the <code>B-LOCAL_CLUSTER\Administrators</code> group of server can access C\$ share. <code>LOCAL_CLUSTER\Administrator</code> is added to this group, by default. If a server is joined to an AD domain, then <code>Domain Admins</code> group of the AD server gets added to <code>B-LOCAL_CLUSTER\Administrators</code> . Other users must be added to this group to access C\$ share.
61897 (61913)	Setting an access control entry via UID or GID succeeds only if the ID can be properly resolved to a user or group name.
61920	The configuration backup has an added validation checksum to ensure integrity of the configuration during the configuration restore process. Therefore, a configuration backup taken in the HP 3PAR OS version 3.2.2 is incompatible for restore in the HP 3PAR OS 3.2.1 MU3. If HP 3PAR OS is reverted to 3.2.1 MU3, you must create a new configuration backup compatible with that release.
62719 (62722)	While configuring LDAP provider, if passive node has network issue and cannot contact LDAP server, only the active node gets configured. This causes error in the 3PAR CLI report.

Issue ID	Description
	Workaround: Resolve the passive node networking issue and then reconfigure the LDAP provider.
62799	<p>When a forced failover of an FPG is required, the VVs associated with the FPG are isolated from being used by the node on the source side of the failover. The time required to isolate the volumes is proportional to the number of volumes, with each volume taking around 2 seconds to isolate. For an FPG of maximum size of 32 TB, grown 1 TB at a time, the forced failover time could be extended by more than a minute.</p> <p>Workaround: Grow FPGs in larger increments to minimize the number of volumes in use. Avoid conditions that require a forced failover of the FPG.</p>
62843 (62848)	As nodes in the cluster are in transition, the health monitor indicates an issue with these nodes. After the nodes are back on-line, they are reported as healthy. Acknowledge the alerts after the update or install of the cluster is complete.
62959 (62976)	Invalid Everyone@somedomain ace is not blocked at the input.
63352	If file store quota is deleted, then every time quota configuration changes, user receives the alert message Quota Event:Unable to persist quota limits on Virtual Server <vfs_name> logged to STaTS . But, quota functionality is not affected due to this alert message logged.
63852	<p>When using bond mode 6, if node fs ports are shut down using the <code>controlport fs state down</code> command or the associated Ethernet switch ports are disabled, I/O might become unresponsive for several minutes depending on the ARP cache timeout when the ports are once again enabled.</p> <p>Workaround: If a client is unable to connect to a share after manipulating the network interfaces, use a client OS specific mechanism to purge the relevant entry from the ARP cache. On some OS, this can be done using the <code>arp -d</code> command.</p>
63901	Because of the POSIX nature of the backing file system, groups cannot be the owners of directories or files. This is an expected behavior.
64221 (64223)	<p>During failover with SMB shares and control port changes, SMB shares loose contact and error on server RDRSocketRead.</p> <p>Workaround: All clients must unmount the SMB share and the cluster must leave the AD domain. Reset the node and then cluster can rejoin the AD domain.</p> <p>If HP support is doing the repair, a single node can leave and join the AD domain.</p>
64359	When running an on demand or scheduled virus scan of a large set of files, the expected maximum processing rate is 2 million files per day, depending on load.
64610 (64952)	<p>If the new VFS is created and assigned the IP address of the VFS which is temporarily offline, the two VFS conflict over the IP address when the offline VFS is activated. When the IP address of the newly created VFS is changed with the <code>setfsip</code> command, the <code>showfsip</code> command does not indicate any conflict but conflict exists. This usually manifests as a complaint that the address of one of the pair cannot be activated for the one that shows a different one, because it's already in use on a different policy ID (the ID field displayed by the <code>showfsip</code> command) - the one for the other VFS in the affected pair.</p> <p>Workaround: Remove the IP address of the conflicting VFSs using the <code>removefsip</code> command. Create the addresses on the VFSs again with the <code>createfsip</code> command.</p>
65139	<p>If an attempt to modify a VFS IP fails due to a condition such as a duplicate IP address, the modification are rolled back. However, the reconfiguration of shares for the original IP configuration might not complete and shares remain unavailable.</p> <p>Workaround: Failover the FPG to its backup node and then failback the FPG to the original node using the <code>setfpg -failover <fpgname></code> command.</p>
65346	The directory structure of File Persona share is not visible in windows explorer after system upgrade from Windows 7_64 to SP1.
65289 (65360)	SuSE SLES11 and SLES11 SP1 client do not support NFS4 ACL.

Issue ID	Description
65204 (65441)	If a group name is reused with a different GID, and that group has a quota, the output of the <code>showfsquota</code> command shows the group name only after about an hour.
65779	If TrendMicro is set as AV vendor, it can not be changed or the policy cannot be removed after remote copy from HP 3PAR OS 3.2.2 to HP 3PAR OS 3.2.1MU3.
118467	Under rare circumstances, the <code>startfs</code> command might fail after printing 'Executing "createfsvm fs_cpg"'. An alert is generated which indicates that the <code>createfsvm</code> task has failed. Workaround: Run the <code>startfs</code> command again.
124078	Creating and editing an FPG, VFS, file store or file share with special characters in the comment field can fail or the comment may not be displayed correctly. Error messages include but are not limited to the following: <ul style="list-style-type: none"> Failed: status=500, exception Failed: unmatched open brace in list Failed: list element in braces followed by "\" instead of space FAILED : Command contains unprintable characters: Workaround: Avoid using special characters in comment fields.
128699	File Persona does not support names with only the "-" character. This is prevented in the HP 3PAR OS CLI for 3.2.2, but is allowed in the GUI. Workaround: Avoid creating File Persona objects with the name "-".
128847	The <code>createsched</code> command has a limit of 127 characters for the command being scheduled. If the combination of the FPG/VFS/FStore names and the tag selected is too long, scheduling of snapshots for File Stores with long paths and tags might not be possible. Workaround: Use shorter names for the FPG/VFS/FStore/Tag, or schedule snapshots using an external client invoking the <code>createfsnap</code> CLI command. (for example, using cron).
133389	File Persona does not support multi-byte characters in the name or description of objects, including FPG, VFS, file store and file share. File share paths created in other tools containing multi-byte characters are shown in the CLI with the string "[international data]".
133596	File Store names containing curly braces { or } can cause SSMC (HP 3PAR StoreServ Management Console) to display incorrect information associated with that File Store. Workaround: Avoid creating File Stores with names that contain { or }.
136787	Under scenarios where a significant block workload exists, FPGs (File Provisioning Group) on a controller node might be automatically migrated to the partner node. This can lead to a temporary disruption in client access, depending on the protocols in use. The load on the system must be reduced either through the addition of more hardware (disks/nodes) or by the reduction of client workload. The FPGs must return to their primary node with the use of the <code>setfpg -failover</code> command. For the purposes of this issue, significant block workload is defined as either of the following: <ul style="list-style-type: none"> VLUN service times of greater than 150 ms, as reported by the <code>statvlun</code> or <code>srstatvlun</code> command Occurrences of DelAck (delayed acks), as reported by the <code>statcmp</code> or <code>srstatcmp</code> command.

2 HP 3PAR OS 3.2.2 CLI Release Notes

Installation Notes for the CLI

Virus Checking

Virus checking is known to slow down and potentially cause issues with installation of the CLI. Before attempting an install or uninstall of the Remote CLI client, shut down all running applications and disable virus-checking software.

Deprecated Commands and Options

The deprecated options for the `cli`, `createuser`, and `setpassword` commands have been removed from the documentation.

Compatibility Changes in this Release

Remote CLI client versions earlier than Remote CLI client 3.2.2 cannot connect to the HP 3PAR OS, without using `-nosockssl` option.

Compatibility Changes in Next Release

The following options will be removed:

`cli`: `-pwf`, `-user`, `-password`, and variable `TPDPWFILE`

`createuser`: `-e`

`setpassword`: `-save`, `-saveonly`, `-file`

Installation Directory

Windows 32-bit: `C:\Program Files\Hewlett-Packard\HP 3PAR CLI`

Windows 64-bit: `C:\Program Files (x86)\Hewlett-Packard\HP 3PAR CLI`

UNIX and Linux: `/opt/hp_3par_cli`

Supported Operating Systems

For the list of supported operating systems, see the *HP 3PAR CLI Remote Client* document under Single Point of Connectivity Knowledge for HP Storage Products (SPOCK) website at <http://www.hp.com/storage/spock>.

What's New in the CLI

The following new commands are added in HP 3PAR CLI 3.2.2:

Command	Description
<code>controlsr</code>	Make changes to the System Reporter
<code>controlrecoveryauth</code>	Control the method used to authenticate recovery accounts
<code>setvvols</code>	Create and remove Storage Containers for VVols
<code>showvvols</code>	Show information about VVol storage containers in the system

Changed commands

Command	Options added (unless stated otherwise)
admithw	-notune
admitpd	-nopatch
admitrcopyvv	-noown
controliscsiport	-vlan <vlan_tag>, checkhealth -svc; subcommand: stgt
checkhealth	-svc
createaocfg	-t#min, -t#max
createflashcache	-t
createfpg	-tdvv
createfsshare	-f
creategroupvvcopy	-online, -tdvv, -tpvv, and -snp_cpg
createhost	-port
createsralertcrit	-rpm
createvfs	-tdvv, -full
createvv	-minalloc
createvvcopy	-wwn
histvlun	-p, -vmname, -vmid, -vmhost, -vvolstate, -vvolsc (VVol filters)
histvv	-p, -vmname, -vmid, -vmhost, -vvolstate, -vvolsc (VVol filters)
importvv	-pri, -nocons
locatecage	-t limits changed
movech	-perm functionality change
movepdtospare	-ovrd
removehost	-port
removevlun	-set
setaocfg	-t#min, -t#max
setauthparam	LDAP changes
setclient	matchbulkobjs
setcim	-pol one_hwid_per_view
setfsav	-vendor (Trendmicro support)
setfshare	-acl, -mode, -owner, -group
setsralertcrit	-comment, -all, and pattern support
setsys	new parameter: <i>HostDIF DisableDedup</i>
setsysmgr	system_ID and disk_quorum options removed.
setvasa	-certmgmt

Command	Options added (unless stated otherwise)
setvfs	-certgen
showfshare	-dirperm
showld	-degraded
shownode	-drive displays different result
showport	-iscsivlans
showportdev	subcommand: tzone
showsrr	-ldrg
showsralertcrit	-critical
showsys	-wwnbase, -snformat
showvv	-p, -vmname, -vmid, -vmhost, -vvolstate, -vvolsc (VVol filters)
showvvolv	-binding, -d, -domain, -listcols, -sc [required option], -sp, -showcols, -summary, -p [-vmhost, -vmid, -vmstate], -vv
srhistpd	-rpm
srpdspace	-rpm
srstatpd	-rpm
srstatrcopy	-port
srstatvlun	-port
startao	-t#min, -t#max
statvlun	-p, -vmname, -vmid, -vmhost, -vvolstate, -vvolsc (VVol filters)
statvv	-p, -vmname, -vmid, -vmhost, -vvolstate, -vvolsc (VVol filters)
tunesys	-fulldiskpct, -devtype
tunevv	-tdvv, -src_cpg

Removed and Deprecated Commands and Options

The following commands are removed or deprecated in the OS 3.2.1 release.

Removed Commands and Options	
cli -pwf	Replace remote CLI access by ssh access
cli -password	Replace remote CLI access by ssh access
cli -user	Replace remote CLI access by ssh access
controliscsiport dhcp	DHCP is not supported on iSCSI ports.
movepdto spare	use -ovrd instead of -vacate.
setauthparam	use importcert instead of ldap-ssl-cacert.
setpassword -save	Replace remote CLI access by ssh access
setpassword -saveonly	Replace remote CLI access by ssh access

Removed Commands and Options	
setpassword -file	Replace remote CLI access by ssh access
setsysmgr	-system_ID, -disk_quorum are removed.
srstatqos	Options -vvset and -all_others are deprecated.
tunesys -diskpct	No equivalent command.
setcim	Options -httpport and -httpsport are removed.

Modifications to the CLI

Issue ID	Description
18662	All open connections for a given user are removed when that user is removed. When a user's connection is removed, any running commands are aborted. To examine open connections, use the showuserconn command.
25837	A -degraded option is provided in the showld command.
64697	The original location of the chunklet is cleared without actually moving the data in following cases: <ul style="list-style-type: none"> • If -perm option is used on a non-spare chunklet and it is moved to itself • If the destination is left blank and the system chooses a destination on the same disk.
79398	The servicecage remove CLI command is available for users with service privileges.
95593	The alignment of the columns for output of showcage -d command is changed.
97804	The showsr command provides an option to show LD region samples for user specified time intervals.
100967	A large nodepct value set in the tunesys -nodepct command suppresses inter-node checks and tune generation.
101623	New -pauseduration option is provided for the setsched -suspend and setsched -suspend all command.
102239	Multiple NTP servers can be configured using the setnet ntp command options -add, -remove, and -set.
102813	The tunesys task cancellation might take a long time under some circumstances.
113390	The tunesys PD analysis shows accurate information for the available disks and percentage used for each node.
105155	VVol storage containers (VVol datastores) must be created by the storage administrator. For more details, see the <i>HP 3PAR VMware ESX/ESXi Implementation Guide</i> .
107758	Resolved an issue where if a tune is performed on a VV which is in an AO configuration, the tune removes all AO optimizations. A check is introduced to warn the user to use -src_cpg option which allows the AO optimizations to be maintained after tuning.
109435	The showsys -space command displays Bulk VVs usage separately.
110417	The -rpm option is provided for the srpdspace, srhistpd, srstatpd, and createsralertcrit commands. The rpm option allows the user to specify the information displayed based on the RPM, the rpm values are 7 (NL), 10 (FC), 15 (FC), 100 (SSD) and 150 (SSD).
114032	Resolved an issue where the CLI help text for the tunesys command shows incorrect default value for the maxchunk option.
114069	A new option is added to the tunesys command to enable rebalancing of a single devtype using intranode tuning.

Issue ID	Description
114528	Using the <code>showvln -host set:hset</code> command on a system with more than 8K VLUNs might give internal error as follows: Internal CLI error: tableSetWidth line has 8 columns but tableWidth has 6 columns This can occur if the <code>showvln</code> command is repeated several times in the same session. Add the <code>-t</code> option to the command, <code>showvln -t -host set:hset</code> .
115747	Resolved an issues where <code>showcage -d</code> command output incorrectly swaps the node cage link speeds for the DP1 and DP2 connectors.
116368	The <code>checkhealth pd</code> command is revised so that it does not report an issue if the columns of a LFF disk cage did not contain all SSD or all HDD disks.
116727	On rare occasions, the remote CLI client on Windows becomes unresponsive when exiting.
116830	The <code>showcage</code> command displays form factor information.
117425	Resolved an issue where the <code>tunesys -f</code> command does not display failed and degraded PDs and spindle count imbalance warnings.
118928	CLI uses the TLS handshake to establish an encrypted socket with the StoreServ. SSL is disabled.
119145	Resolved an issue where the <code>tpdtcl</code> process aborts if the VV names passed to the <code>statvv</code> or <code>histvv</code> commands are separated by commas.
120159	Resolved an issue where the <code>tunevv restart</code> option does not apply to DeDup TDVV volumes.
122872	Resolved an issue where an error failed to link privilege file might occur if many SSH connections are open at the same time.
124315	Resolved an issue where the <code>tuneld</code> command might fail sometimes if the LD region map changes between retrieval and use.
125568	Resolved an issue where use of <code>statvv</code> or <code>histvv</code> commands with VV names longer than 26 characters cause <code>tpdtcl</code> to fail.
125636	Removed the service alert and report in <code>checkhealth</code> about <code>/altroot</code> file system.
126153	Resolved an issue where if large number of tunes are scheduled, <code>tunesys</code> terminates unexpectedly in the internode analysis phase.
126969	While creating new TPVVs, default allocation size can be modified using <code>-minalloc</code> option with the <code>createvv</code> command. Allocation size must be specified in MB.
127082	The <code>createvvcopy</code> command supports <code>-wwn</code> option.
128948	Resolved an issue where the <code>tuneld</code> command reports a failure condition for a tune if it needs to retry some region moves.
128984	Resolved an issue where the intra node tuning phase of <code>tunesys</code> might terminate if it encounters an LD with a malformed creation pattern <code>(-p)</code> string.
130625	The optional <code>sysid</code> argument to <code>setsysmgr wipe</code> is removed as it is not required with 10 digit serial number.
130888	Resolved an issue where if a volume is included in more than one volume sets, Flash Cache policy of the volume might not display enabled state if one of the volume sets is not Flash Cache enabled.
131533	To remove a <code>bulkvv</code> or to remove a <code>bulkvv</code> from a VVol storage container VVset, use the <code>-matchbulkobjs</code> option with the <code>removevv</code> command. NOTE: To prevent vSphere configuration integrity issues, use the vSphere environment to remove the associated VMs. To remove a vSphere VVol storage container from the array, see the <code>setvvolisc</code> command. Do not remove individual VVols from the array.
137344	With the introduction of File Persona, the adjusted memory size is used to compute the number of TPDCL connections available.

3 HP 3PAR OS 3.2.2 CIM API Release Notes

What's new with HP 3PAR CIM API

- Support for HP 3PAR StoreServ 20000 Storage Systems
- Support for HP 3PAR StoreServ 8000 Storage Systems
- Replication Services
 - New remote Replication Services indications:
 - Lifecycle indications for rcopy group and volume:
 - TPD_RemoteGroupSynchronizedInstCreation
 - TPD_RemoteGroupSynchronizedInstDeletion
 - TPD_StorageSynchronizedInstCreation
 - TPD_StorageSynchronizedInstDeletion
 - TPD_RemoteGroupSynchronizedInstModification (CopyState and ProgressStatus changes only)
 - Alert indications for rcopy group and volume up/down:
 - TPD_RemoteGroupSynchronizedCopyStateAlert
 - TPD_StorageSynchronizedCopyStateAlert
 - TPD_RemoteGroupSynchronizedCopyStateClear
 - TPD_StorageSynchronizedCopyStateClear
 - Added capability to `CreateGroupReplicaFromElements` in `ReplicationService` class to create Async Streaming remote copy group. This is done by specifying the `DesiredRPO` value within the `ReplicationSettingData` parameter. Depending on the value set

for this parameter, either an async streaming or periodic mode rcopygroup is created. For details, see 3.2.2 CIM API Programming Guide.

- Block Services
 - Added vendor extension extrinsic method `TPD_EnumerateVMWareVolumes` in `TPD_StorageConfigurationService` to enumerate VVols (VMWare Volume).

Interface changes

- None

Removed and Deprecated Commands and Options

- The `-httpport` and `-httpsport` options for the `setcim` CLI command are removed.

Modifications to the HP 3PAR CIM API

Issue ID	Description
110819	The <code>-httpport</code> and <code>-httpsport</code> options for the <code>setcim</code> CLI command are removed. The <code>StoreServ</code> blocks all connections to TCP/UDP ports with non-default values.
112588	The SMI-S cimserver ReplicationServices function <code>CreateGroupReplica</code> is corrected for the <code>SyncType</code> Clone as follows: <ol style="list-style-type: none"> 1. Check if the group specified via the <code>TargetGroup</code> parameter is in the same domain as the <code>SourceGroup</code>. 2. If no <code>TargetGroup</code> is specified, create a new group in the same domain as the <code>SourceGroup</code>. The name of the newgroup is taken from the <code>RelationshipName</code> parameter, or the <code>ElementName</code> in the <code>TargetSettingGoal</code> parameter, or is automatically generated.
114238	Async streaming and Recovery Point Objective support is added to CIMServer Replication Services.
120225	The SMI-S cimserver function <code>ReplicationServices::GetPeerSystems</code> is corrected to return the World Wide Name (WWN) of systems that are only reachable via RCIP connections.
121825	Resolved an issue where no <code>StorageVolume</code> instances are returned if a client specifies an empty value for <code>PropertyList</code> in the <code>Associator</code> request of a volume-related <code>CIM_ConcreteJob</code> .
127861	The <code>CreateGroupReplicaFromElements</code> function uses the <code>-nowwn</code> option of the <code>admitrcopyvv</code> command when it adds volumes to the newly created Rcopy groups.
128205	MOF includes the status 12 which indicates degraded state for <code>otheroperationalstatus</code> property.
133791	The SMI-S cimserver is updated with a <code>StorageSetting</code> that allows creation of TDVV volumes with <code>TPD_StorageConfigurationService::CreateOrModifyElementFromStoragePool()</code> . The <code>StorageSetting</code> is defined for SSD based <code>DynamicStoragePools</code> . The <code>TPD_ReplicationService::CreateGroupReplicaFromElements()</code> and <code>CreateElementReplica()</code> Clone operations are improved to create TDVV clones.
135327	Resolved an issue where enumerating <code>TPD_LUNStatisticalData</code> and <code>StatisticTime</code> property contains incorrect value.
135667	The extrinsic method <code>TPD_StorageConfigurationService::TPD_EnumerateVMWareVolumes</code> is added which returns an embedded list of VMware bulk VVs. The optional filter parameter is a comma separated list: <code>name=name1 name2 ...</code> <code>wvolstate=<bound unbound></code> <code>vmid=id1 id2 ...</code> <code>vmhost=host1 host2 ..</code> <code>wvolsc=vvset1 vvset2 ...</code> <code>vmname=vmnam1 vmnam2 ...</code>

Issue ID	Description
138472	Resolved an issue where cimserver process may get into a situation in which a thread servicing a request becomes unresponsive while holding on to a mutex lock, thus making other threads that are trying to service subsequent requests to line up in queue.
140441	CIMserver reports Async Streaming enablement and RPO value for Async Groups.

4 HP 3PAR OS 3.2.2 Web Services API Release Notes

What's New with the HP 3PAR Web Services API Software

- Support for HP 3PAR StoreServ 20000 Storage Systems
- Support for HP 3PAR StoreServ 8000 Storage Systems
- Added support for the following on-node System Reporter metrics:
 - physicaldiskstatistics
 - physicaldiskcapacity
 - physicaldiskspacedata
 - volumespacedata
 - cpgspacedata
 - vlunstatistics
 - portstatistics
 - cachememorystatistics
 - cpgstatistics – actually logical disk statistics pertaining to a CPG.
- Added support for GET of AO configurations and volume space distribution (equivalent to showvvcpg)
- Added support for configuring async streaming mode
- Added support for creating snapshots off rcopy volumes
- Added license information to system object
- Added support for creategroupsv and updatevv
- Added support for system parameter GET and PUT:
 - remoteSyslog
 - remoteSyslogHost
 - portFailoverEnabled
 - failoverMatchedSet
 - allowWrtbackSingleNode (GET only)
 - allowWrtbackUpgrade (GET only)
 - disableDedup (GET only)

Interface Changes

- None

Modifications to the HP Web Services API

Issue ID	Description
117675	Resolved an issue in WSAPI where it leaks file descriptor if it fails to connect to the WSAPI socket on another node due to node failure.
123431	Resolved an issue where certain characters like ' ' are rejected when setting volume objectKeyValue via WSAPI.
124935	Host persona can be queried by the OS assigned ID and filtered by WSAPI assigned ID. The link to the host persona query by the WSAPI assigned ID is added to the result of the host query.
125889	Resolved an issue where communication with WSAPI server using IPv6 address of the array fails
126230	POST and DELETE of /remotecopygroup/volumes map to admitrcopyvv and dismissrcopyvv commands respectively: POST /remotecopygroup/<rcgroup name>/volumes DELETE /remotecopygroup/<rcgroup name>/volumes/<vv name>
126233	Added WSAPI support for system reporter for physical disk, port, VLUN, CPG, CMP statistic and physical disk, CPG, volume space information.
126234	New iSCSI port fields SendTarget and vlan are added to ports object.
126490	AO configuration support is added to WSAPI.
126491	WSAPI supports the GET operation on following: <ul style="list-style-type: none">• /v1/remotecopygroups/<groupname>/targets• /v1/remotecopygroups/<groupname>/targets/<targetname>• /v1/remotecopygroups/<groupname>/volumes• /v1/remotecopygroups/<groupname>/volumes/<volumename>
137036	A flag is added to cpg object to indicate whether it is dedup capable.
139321	Resolved an issue where updating comment for volumeset or hostset via PUT fails.
140426	A Boolean flag is added in /remotecopy to indicate if the system supports async streaming mode.

Known Issues

Issue ID	Description
106458	Certain values are not included in response from GET /cpgs if they are default values.

5 Support and Other Resources

Contacting HP

For worldwide technical support information, see the HP support website:

<http://www.hp.com/support>

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Specify the type of support you are requesting:

HP 3PAR storage system	Support request
HP 3PAR StoreServ 7000 Storage	StoreServ 7000 Storage
HP 3PAR StoreServ 8000 Storage	StoreServ 8000 Storage
HP 3PAR StoreServ 10000 Storage	3PAR or 3PAR Storage
HP 3PAR StoreServ 20000 Storage	StoreServ 20000 Storage

HP 3PAR documentation

For information about:	See:
Supported hardware and software platforms	The Single Point of Connectivity Knowledge for HP Storage Products (SPOCK) website: SPOCK (http://www.hp.com/storage/spock)
Locating HP 3PAR documents	The HP Storage Information Library: Storage Information Library (http://www.hp.com/go/storage/docs/) By default, HP 3PAR Storage is selected under Products and Solutions .
Customer Self Repair procedures (media)	The HP Customer Self Repair Services Media Library: Customer Self Repair Services Media Library (http://h20464.www2.hp.com/index.html) Under Product category , select Storage . Under Product family , select 3PAR StoreServ Storage for HP 3PAR StoreServ 7000, 8000, 10000, and 20000 Storage systems.
All HP products	HP Support Center: HP Support Center (http://h20564.www2.hp.com/portal/site/hpsc)

Typographic conventions

Table 1 Document conventions

Convention	Element
Bold text	<ul style="list-style-type: none">• Keys that you press• Text you typed into a GUI element, such as a text box• GUI elements that you click or select, such as menu items, buttons, and so on
Monospace text	<ul style="list-style-type: none">• File and directory names• System output• Code• Commands, their arguments, and argument values
<Monospace text in angle brackets>	<ul style="list-style-type: none">• Code variables• Command variables
Bold monospace text	<ul style="list-style-type: none">• Commands you enter into a command line interface• System output emphasized for scannability



WARNING! Indicates that failure to follow directions could result in bodily harm or death, or in irreversible damage to data or to the operating system.



CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.

NOTE: Provides additional information.

Required

Indicates that a procedure must be followed as directed in order to achieve a functional and supported implementation based on testing at HP.

Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (docsfeedback@hp.com). Include the document title and part number, version number, or the URL when submitting your feedback.