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Dell FluidFS Version 6.0 Release Notes

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The Dell NAS appliances leverage the Dell Fluid File System (FluidFS) and Dell SC series storage to provide file storage to clients using the SMB, NFS, or FTP protocols. This version of FluidFS fixes issues that were present in the previous release.

Revision History

Revision	Date	Description
A	February 2017	Initial release of FluidFS v6.0.003169
B	July 2017	Maintenance release v6.0.110054
C	December 2017	Maintenance release v6.0.140010
D	May 2018	Maintenance release v6.0.300135
E	December 2018	Clarification of SCSI unmap, see SCSI Unmap Enhancement on page 2
F	September 2019	Maintenance release v6.0.400016
G	June 2021	Maintenance release v6.0.500135
H	August 2022	Maintenance release v6.0.600004

FluidFS Version 6.0 Compatibility Requirements

Make sure that the following requirements are met prior to using FluidFS version 6.0.

Component	Requirement
Supported update paths from previous versions of FluidFS	For the supported update paths to FluidFS version 6.0, see the *Dell Fluid File System Version 6.0 Support Matrix* available from dell.com/support.
Storage Center OS	Up to eight Storage Centers running version 6.5.30 or later **NOTE:** Storage Center OS version 6.6.1 or later is required to support 4 PB across two or more Storage Centers.
Dell Storage Manager	• Dell Storage Manager 2016 R3.1 or later — Dell recommends updating to the latest supported Dell Storage Manager version before updating the FluidFS software. • **Dell Storage Manager 2018 R1 or later — You must update existing FluidFS clusters to 6.0.300135 before updating to Dell Storage Manager 2018 R1.**
Supported platform	FS8600

New Features and Enhancements

The following sections summarize the new features and enhancements in each release.

FluidFS Version 6.0.500135 New Features and Enhancements

Version 6.0.500135 provides the following new features and enhancements:

- Increased the event severity of Active Directory Clock Skew events.
- Increased the event severity and added the detailed description of 'Partial' or 'No Service' events.
- Disabled Arcfour cypher for SSH by default
- Disabled TLS 1.1 by default
- Added the ability to disable or enable SSLv3 on TCP Port 9445 using a support shell. Under the following circumstances, this change does not persist, but reverts to the default setting [enable]:
  - After an upgrade
  - When changing the Management Network setting between restricted and unrestricted mode
- Added the ability for an escalation user to SSH to machine after it has been enabled from console.
- Added support in internal diagnostics for new BBU chemistry ID 4104.

FluidFS Version 6.0.300135 New Features and Enhancements

Version 6.0.300135 provides the following new features and enhancements:

- Ability to manage FluidFS systems using Dell Storage Manager version 2018 R1
- FTP command support for the size request

SCSI Unmap Enhancement

SCSI Unmap is a FluidFS attribute that controls the way deleted file space is handled. When disabled, the SCSI Unmap setting will keep deleted file storage within the FluidFS storage pool. This means that when files are deleted, their storage pages remain “used” for the Storage Center management tools. When SCSI Unmap is enabled, deleting files also frees the storage pages at the block level and the storage will be marked as white space and able to be utilized by the Storage Center system for other block clients. SCSI unmap is now enabled by default when installing a new appliance.

SCSI unmap is now enabled by default when installing a new appliance.

NOTE: If you have any systems that were deployed using a version earlier than 6.0.300135,ensure that SCSI Unmap had been enabled to prevent unnecessary space from being consumed.

To enable SCSI unmap:

1. In the Storage view, select a FluidFS cluster.
2. Click the **File System** tab.
3. In the NAS Pool Advanced Status area, click **Edit Space Reclaming Settings**.
4. To enable SCSI Unmap, select the **Enable SCSI Unmap (TRIM)** checkbox.
5. Click **OK**

FluidFS Version 6.0 Features and Enhancements

Version 6.0.003169 introduced the following features and enhancements. For more information and detailed instructions about using these features, refer to the *Dell Storage Manager Administrator’s Guide*.

Multitenancy

Multitenancy enables a single physical FluidFS cluster to be connected to several separated environments and manage each environment separately. FluidFS v6 supports up to 100 tenants.

Multitenancy Data Access – Access through a VIP enumerates the SMB shares and NFS exports that belong to the tenant and connect to these shares and exports. Each tenant has separate access control settings, including the ability to join the same or separate Active Directory domains.

Multitenancy and Data Protection – When the multitenancy feature is enabled on the local or partner systems, the global administrator has the ability to create a partner relation between the tenants on the source system and tenants on the remote system.

NOTE: The `NAS Volume Subnet Restriction` feature has been deprecated starting in FluidFS v6. Use the multitenancy feature instead to restrict access to NAS Volumes.

SMB3.1 and SMB3.1.1

SMB protocol 3.1.1 dialect adds pre-authentication integrity, cipher negotiation, AES-128-GCM cipher and cluster dialect fencing. Pre-authentication integrity improves protection from an attacker in tampering with SMB's connection establishment and authentication of messages. The cipher can now be negotiated during connection establishment. In addition to AES-128-CCM cipher used at SMB 3.0.x, Windows 10 (and Windows Server 2016) added AES-128-GCM cipher in SMB 3.1.1. The GCM mode offers a significant performance gain.

SMB3 Multi-Channel

FS8600 supports multi-channel for SMB 3.x clients (Windows 8 and later, Windows Server 2012 and later). This feature allows clients to create multiple TCP connections for a single SMB session. Multi-channel can improve performance by increasing the number of commands the client can transmit simultaneously, and by allowing clients to use multiple physical network interfaces. Administrators must enable SMB3.0 multi-channel if they want clients to be able to use it, as it might increase the number of TCP connections. Administrators should enable it only after verifying that the current SMB sessions are not near the supported limit for their FS8600 cluster.

SMB3 Dynamic Access Control

SMB3 dynamic access control enables administrators to apply access-control permissions and restrictions based on well-defined rules that can include the sensitivity of the resources, the job or role of the user, and the configuration of the device that is used to access these resources. Dynamic access provides tools for administrators to define privileges in a more compact way than traditional ACEs.

NOTE: Dynamic access control is supported in Windows Server 2012 and Windows 8 operating systems only.

SMB Change Notify Full Support

WATCH TREE requests enable clients, such as IIS, to cache SMB share contents locally, improving performance.

Changes to the following subscription types now trigger change notifications to the subscriber:

- Attributes – Any attribute change on any file or directory inside the subscribed folder
- Size – Any file size change (change in file size when the file is actually written to the disk
- Last write – mtime change
- Last access – atime change
- Creation – Create time change
- Security – Security-descriptor change (SetACL with DACL/SASL, SetOwner, SetGoup)
- Stream name – Alternate data stream name is added
- Stream size – Alternate data stream size change
- Stream write – Alternate data stream write operation

NOTE:

- These new change notifications are disabled by default. NAS administrators can enable or disable change notification settings using the CLI. If the new change notifications are left disabled, changes will trigger a generic notification to clients.
- NAS administrators have per-NAS volume option to enable or disable recursive notifications.

NFSv4 Advisory Locks

FluidFS NFSv4 supports mandatory byte-range locks. With multitenancy enabled, NAS administrators can configure NFSv4 to switch from mandatory to advisory locks at the tenant level using the CLI.

FTP and FTPS User Authentication and Encryption

Starting with FluidFS v6, anonymous access to FTP and FTPS is disabled by default. Only authenticated users can log in. If you are updating from FluidFS v5, with active FTP or FTPS and landing directory, you will still be able to access FTP and FTPS as anonymous like before.

NAS administrators can enable anonymous FTP and FTPS access per tenant, using the CLI. When authenticated using the user name and password, the connection is encrypted.

Display More Details On Connected SMB Sessions

NAS administrators have the ability to list currently opened SMB sessions to monitor users activities on the cluster. Session information includes a protocol version, Controller ID, User, Client IP, number of open files, connected time, idle time, whether the session is a guest session, and the connected VIP. FluidFS v6 adds the following session information for performance analysis and security verification:

- Whether the user session client-server communication is signed
- Whether the user session client-server communication encrypted
- Whether the user session is negotiated with multi-channel ability

SMB and NFS Version Configuration

Version 6.0.140010, enables you to configure supported SMB and NFS versions, including disabling SMB1 connections.

One To Many and Cascaded Replication

This feature enables users to create more complicated replication topologies, enhancing their disaster recovery options:

- The same NAS volume can be replicated simultaneously to multiple destinations.
- Data can be cascaded from the production cluster to a secondary cluster, and replicated from the secondary . This option reduces the load on the production cluster.

These two options can be used together in order to comply with the organization's disaster recovery topology and requirements

Replication WAN Optimization

When enabled, this feature optimizes replication by reducing bandwidth consumption. Data is deduplicated and compressed during replication without impacting the cluster performance.

Active Directory Organizational Unit

NAS administrators can specify the organizational unit when joining any organizational units inside an Active Directory domain. This feature is beneficial for users who use organizational units inside the Active Directory domain to manage their accounts.

Control Local Account UID and GID

NAS Administrators have the ability to define and display local users UIDs and local groups GIDs using the following CLI commands:

- `CLI> client-access authentication local-users view Administrator`
- `CLI> client-access authentication local-groups view Administrators`

To display UID or GID columns in the CLI:

- `CLI> client-access authentication local-users list`

- `CLI> client-access authentication local-groups list`

Metadata Tiering

Metadata tiering provides the ability to store data and metadata in different storage tiers . When creating or expanding a NAS pool, administrators can specify the Storage Center tiers to use for data and metadata. The NAS administrator has the option to optimize the setting for metadata-intensive I/O patterns, which allocates a larger portion of the NAS pool for metadata than the non-optimized setting.

128 TB Files

The size of files supported by FluidFS has increased from 16 TB to 128 TB, starting with this release.

SNMP v3

FluidFS supports SNMP v3 (read requests) and v2, but does not support using both versions at the same time. SNMP v3 requires user authentication.

Automated Scheduled Reports

Administrators can schedule reports in Dell Storage Manager for system capacity, performance, load-balancing, and NAS volume content statistics.

Statistics on NAS Volume Contents

FluidFS v6 provides statistics about files, based on their size and age.

Improved Protocols and File Access Diagnostics

Improve support process for administrators handling data-access issues.

Fixed Issues

The following sections summarize the issues fixed in FluidFS 6.0.

Fixed Issues in FluidFS Version 6.0.600004

The following issue was fixed in FluidFS v6.0.600004:

Area	Description
System Functionality	A compatibility issue between FluidFS and Windows 11 caused SMB access to fail when using SMB3 protocol. The error occurred when the system attempted to access a manually mapped network drive on FluidFS, causing a Windows 0x80004005 error. (The temporary workaround was to use SMB2.) This version allows SMB3 traffic, fixing the compatibility issue between FluidFS and Windows 11.

Fixed Issues in FluidFS Version 6.0.500135

The following issues were fixed in FluidFS 6.0.500135:

Area	Description
NAS Volumes, Shares, and Exports	SMB access could fail if the system was authenticating against a read-only domain controller.
NAS Volumes, Shares, and Exports	Files with special UTF8 characters are not working on FluidFS share, reporting "File too large".
NAS Volumes, Shares, and Exports	Windows 10 version 2004 fails to access NAS with error 0x80070035.
System Functionality	The management layer became unresponsive when setting a preferred domain controller.
System Functionality	SMB connection limits reached with uneven low connection counts.
System Functionality	File audit notifications stopped being sent in the proper format in 6.0.400016. Added support of UTF-16LE encoding scheme.
System Functionality	In rare cases, the system failed to poll the power supply within a short interval and false events would be shown in the event log stating voltage/current problems with a PSU. The polling logic has been improved to prevent false negatives.
Data Protection	Using NFS4 with Kerberos could cause a file system process to panic.
Data Protection	PowerShell API does not report accurate replication data. Fields are empty or 0 for the `Get-DellFluidFsReplication` cmdlet.
Maintenance	The system failed to cleanup and revert debug values after failed file system diagnostics.
Maintenance	The system failed to cleanup and revert debug values after failed NDMP diagnostics.

Fixed Issues in FluidFS Version 6.0.400016

The following issues were fixed in FluidFS 6.0.400016:

Area	Description
NAS Volumes, Shares, and Exports	After installing Windows 10 update 1903, SMB shares are not accessible using the UNC path.
System Functionality	The system incorrectly reports that duplicate IP addresses are in use for nodes on the cluster.
	The system incorrectly reports battery failures during the battery calibration process.

Fixed Issues in FluidFS Version 6.0.300135

The following issues were fixed in FluidFS 6.0.300135:

Area	Description
Data Protection	FS8600 could not join or leave Active Directory if a trusted domain name contained an apostrophe, for example, `John's.`
	Active Directory status failed if the Domain Controller name contained an underscore.
	Dell Storage Manager (DSM) administrators with Active Directory accounts could not manage the FluidFS system after their Active Directory passwords changed and differed from the ones stored in DSM.
NAS Volumes, Shares, and Exports	NFS access rules did not work for host names starting with a digit.

Area	Description
	Volume space alerts were sent to the volume administrator only, unless the system administrator was added as volume/tenant administrator.
System Functionality	Network management was suboptimal due to occasional Link Layer Discovery Protocol (LLDP) communication failures with neighboring network devices.
	FTP did not function correctly if the user or group name contained a space character.
	Expanding a 24 GB appliance with a 48 GB appliance failed under specific conditions.
	Attaching a replacement controller failed if a subnet restriction was configured for a volume.

Fixed Issues in FluidFS Version 6.0.140010

The following issues were fixed in FluidFS v6.0.140010:

Area	Description
System Functionality	User authentication failed with Windows 2008 R2 domain controllers when the functional level was set to `Windows Server 2003` and the encryption type was AES-128 or AES-256.
	Some applications, such as Novell Storage Manager, requesting to enumerate open files in a given folder or directory (basepath) received faulty results.
	Changing ownership (chown) of a file using NFS4 did not reflect in space usage (quota).
	When applications requested to lock a byte-range and to ignore the lock sequence, file locks were not honored when using SMB3.
Data Protection	Under rare conditions, NDMP backup failed.
NAS Volumes, Shares, and Exports	Automatic failback sometimes hung for SMB clients. This release introduces a 5-minute delay in automatic failback to ensure the process completes.
	NFS users could not delete `.AppleDouble` directories because permissions were too strict. This release implements the following Support Shell commands: `set-appledouble-access - set default permissions for new .AppleDouble directories` and `fix-appledouble-access - modify existing directory permissions to current default`.
	When a client belonged to multiple netgroups, NFS export access was evaluated alphabetically, by netgroup name, and led to unexpected behavior. NFS export access is now evaluated in the order the netgroups are listed.
	Failover times for NFS sessions were sometimes longer than expected.

Fixed Issues in FluidFS Version 6.0.110054

The following issues were fixed in FluidFS v6.0.110054:

Area	Description
Account Management and Authentication	The preferred Domain Controller setting was not strictly enforced.
	Duplicate iSCSI IP addresses were falsely reported on multiple-appliance iSCSI systems.
Data Protection	Following a Firmware update from v5 to v6, incremental NDMP backups failed frequently.
	NetVault backups could not be partially restored after a firmware update to version 5.0.300109.
	SACL events were not displayed in Dell Storage Manager, but could be seen when using the CLI.
	In rare cases, replication from FluidFS v5 to FluidFS v6 failed.

Area	Description
	Creating duplicate share names was not always rejected.
	Copying or cloning files using VAAI might not have worked on non-default tenants.
	Quota directory did not apply size change following a NFSv4 move operation.
	When a hard quota was exceeded, writes to existing file was truncated but did not generate an error.
	User started Dell Storage Manager in English and switched to another language. After resizing a NAS volume, displaying NAS volumes generated a non-English popup message.
	User could not edit folder security permissions using Dell Storage Manager 2016 R3.
	Sometimes, snapshots could not be deleted using the GUI or the CLI.
System Management	The standby controller did not reattach to the cluster after replacement.
	The cluster status wrongly showed `critical` when the Admin subnet state was enabled or restricted, but was configured to use the client network.
	During a battery calibration cycle, the following alert was falsely generated: `BPS on NAS controller X is not operating properly. Battery reports failed state.`
	After a Firmware update to v6, the following event was falsely generated: `The forced battery cycle in NAS controller X is no longer required.`
	After a Firmware update to v6, capacity trends and statistics only showed 48 hours of historical data.

Fixed Issues in FluidFS Version 6.0.003169

This following issues were fixed in FluidFS v6.0.003169:

Area	Description
Account Management and Authentication	Dell Storage Manager listed NAS volumes for each volume folder in inconsistent or random order.
Data Protection	Scheduled replications defined from Dell Storage Manager did not adhere to Quality of Service (QoS) definitions.
	If the NDMP backup user's password contained a single quote ('), NDMP configuration modification hung.
	NDMP snapshot creation failed when the NAS volume name contained spaces.
	IBM Tivoli Storage Manager NDMP DMA randomly failed during a job restore operation.
Maintenance	Frequent power down activity might have prevented the cluster from starting up.
	If the `Add Appliance` procedure failed, the appliance could not be deleted.
	When renaming a UNIX file to the same name with different (upper/lower) case, Windows listed the file name with extra characters.
	Access to files originated in FluidFS v2 was denied, specifically if files pointed to hard links where the original entry was deleted.
	Windows sessions using continuous availability did not always fail back from node1 to node0 after a failover.
	Removing virtual IPs using Dell Storage Manager or the CLI did not affect actual system configuration.

Area	Description
	When choosing a directory to store diagnostics output on a NAS volume, Dell Storage Manager hung and eventually returned the following message: `FluidFS Communication Failure`.
NAS Volumes, Shares, and Exports	FluidFS LDAP monitoring might have impacted Active Directory systems with a large number of users, also serving LDAP (extended schema config), and degraded the performance of the FluidFS system.
	Cloned NAS volume root directory lost permissions.
	On systems bound to LDAP, If a FluidFS system was bound to LDAP and had local users defined, NFS4 file ownership might have displayed as `nobody`.
	Quota usage was not updated properly when ADS files were removed.
	Users could not set snapshot schedule in Dell Storage Manager if the display language was not English.
	Saving Microsoft Office files with SACL attributes resulted in the following message: `There has been a network or file permission error.`
	Kerberos Encryption types AES256-CTS and AES128-CTS were not supported.
	NFSv4 ACL inheritance on UNIX volume did not function properly on subfolders created from SMB clients.
	Users were unable to set/get ShareLevelPermissions attributes with PowerShell API.
	Copying using Finder and NFS4 did not work on Mac OSX, but it worked from terminal.
	NAS pool could not be expanded in system with multiple storage arrays if new size was not divisible by the number of storage arrays.
	When trying to expand a NAS pool in a system with one controller down, the following misleading message was generated: `Controller0 cannot reach LUNs` . NAS pool expansion was not supported in degraded mode.
	Restoring configuration of a volume failed if a share existed on both volumes, differing only by share-name case letters.
Networking	When the admin network MTU was set to 1500, the following false event was generated: `NAS Controller 0 Cannot reach (using jumbo frames) host node1 on admin subnet.`
	DNS suffix validation in Dell Storage Manager sometimes failed when names were valid.
	Users reported slow replication throughput over WAN.
System Management	Dell Storage Manager and CLI use opposite terminology for Lease and Oplock settings. Dell Storage Manager enables/disables the Leases and Oplocks, while the CLI enables/disables *restriction* of Leases and Oplocks.
	The size-on-disk attribute for sparse files was sometimes incorrect.

Limitations in FluidFS Version 6.0

The following limitations exist in FluidFS v6.0.

Area	Description
System Management	When you issue the `hardware NAS-appliances status <ApplianceID>` CLI command, it can take up to a minute for the information to be displayed. NIC status is not acquired directly from the operating system but from the relevant collector service agent, which has a polling interval of 60 seconds. Therefore, it is normal to have a one-minute delay in the CLI after an actual status change.

Area	Description
	Do not use the following names. These names are reserved for internal FluidFS cluster functions: **NAS Volumes (Containers)** . .. .snapshots acl_stream cifs (or smb) int_mnt unified Any name starting with locker_ **NAS Snapshots** rep_* rollback current Attempts to create or modify reserved names will be denied.
Account Management and Authentication	FluidFS shows open files of SMB and NFSv4 protocols only. Open files for NFSv3 are not displayed.
	If you have a cluster joined to Active Directory and NIS domains, the Domain drop-down list displays the UNIX and Windows user names in different windows.
	To use Metadata tiering, you must have an even number of Storage Centers.
NAS Volumes, Shares, and Exports	If you enter a value as a Unicode character string, fewer characters are accepted because Unicode characters take up a variable number of bytes.
Maintenance	Attaching a v5 controller to a v4 cluster is not supported.
	If you enter the EULA (end-user license agreement) approver name and approver title as a Unicode character string, note that fewer characters are accepted because Unicode characters take up a variable number of bytes.

Known Issues in FluidFS Version 6.0

The following known issues exist in FluidFS v6.0.

Area	Description
System Functionality	The current vSphere Web Client plugin, Compellent Integration Tools for VMware (CITV 3.1), does not support FluidFS v6 systems. A plugin that supports FluidFS v6 is planned for an upcoming release.
	The Dell Storage Manager client might lose connection to the Data Collector if it has been up and running for a period of time. If a connection loss occurs, the following error is generated: `Unable to obtain Jdbc connection from DataSource.` Workaround: Apply the Microsoft fix, which can be downloaded from https://support.microsoft.com/kb/2577795
	Certain Internet Explorer versions (for example, IE 11.0.9600 running on Windows 2008 R2) cannot retrieve MIB files from the management FTP.
	If the firmware update stalls at 0% and other management operations are not available, contact Dell Technical Support and reference KB SLN302683.

Area	Description
	During a controller reboot, errors similar to `Internal hard error occurred` might display on the Dell Storage Manager client. These errors can be ignored and should not display again after all the controllers are available.
System Management	Clusterization cannot be performed if IPv6 multicast packets are not passed through the switch on the interconnect network.
	The **Directory Quota Edit Rule** online help page is missing. If you click **Help** on that page, an error similar to `Help Not Found` is generated. See the *Dell Storage Manager Administrator's Guide*, which contains the same help information.
Troubleshooting	General diagnostics summary files larger than 200 MB might not transfer using SupportAssist and might need to be downloaded from the FluidFS cluster.

Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services might not be available in your area. To contact Dell for sales, technical support, or customer service issues, go to dell.com/support.

Related Publications

The publications listed in the following sections comprise the core Dell FluidFS documentation set. These publications are sorted by target audience.

Documents for Dell Customers

- *Dell Storage Manager Administrator's Guide* – Provides information about using the Dell Storage Manager software to manage FS appliances, and provides information about FS appliance monitoring and troubleshooting.
- *Dell FluidFS Version 6.0 CLI Reference Guide* – Provides information about the FS command-line interface.
- *Dell FluidFS Version 6.0 Firmware Update Guide* – Provides information about updating the FluidFS software from version 5.0 and v5.0 service packs to v6.0.
- *Dell Storage Manager Installation Guide* – Provides information about installing and configuring the Dell Storage Manager Data Collector and Dell Storage Manager Client.
- *Dell Storage Manager Release Notes* – Provides information about Dell Storage Manager releases, including new features and enhancements, open issues, and resolved issues.

Documents for Dell Installers and Certified Business Partners

- *Dell FluidFS Version 6.0 FS8600 Appliance Pre-Deployment Requirements* – Provides a checklist that assists in preparing to deploy an FS8600 appliance before a Dell installer or certified business partner arrives onsite to perform an FS8600 appliance installation.
- *Dell FluidFS Version 6.0 FS8600 Appliance Deployment Guide* – Provides information about deploying an FS8600 appliance, including cabling the appliance to one or more Storage Centers and the network, and deploying the appliance using the Dell Storage Manager software.
- *Dell FS8600 Appliance Service Guide* – Provides information about FS8600 appliance hardware, system component replacement, and system troubleshooting.
- *Dell NAS Appliance SFP+ Replacement Procedure* – Provides information about replacing SFP+ transceivers on an inactive system.
- *Dell FluidFS FS8600 Appliance 1Gb to 10Gb Upgrade Procedure* – Provides information about upgrading a Fibre Channel FS8600 appliance from 1Gb Ethernet client connectivity to 10Gb Ethernet client connectivity.

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.