

Collaborative Workflows Using Projective Strawberry on PowerScale OneFS

Storage configuration and design guide

Abstract

This document describes best practices when configuring PowerScale™ OneFS™ with Projective™ Strawberry.

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Revisions

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Acknowledgments

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Executive summary

Projective's Strawberry Production Asset Management (PAM) system is designed to solve common workflow challenges faced by content creators. Strawberry automates media management tasks that slow down post production workflows. These challenges include organizing media files, controlling access to content, finding and managing raw footage, archiving or retrieving old projects and media, project sharing, and enabling cross-functional collaboration between editors and other stakeholders. Strawberry has integrations with common video editing applications such as: Avid™ Media Composer™, Apple™ Final Cut Pro X™, and Adobe™ Premiere™, enabling collaboration across all these applications on the PowerScale architecture. This paper includes a reference architecture for using PowerScale storage with Strawberry. It describes how to configure PowerScale OneFS to support Strawberry coordinated collaborative workflows. It goes into detail about the NFSv4 configurations required by Strawberry to manage permissions across SMB based Microsoft™ Windows™ and macOS™ clients. The paper assumes basic familiarity with OneFS, Linux operating systems, and command-line administration.

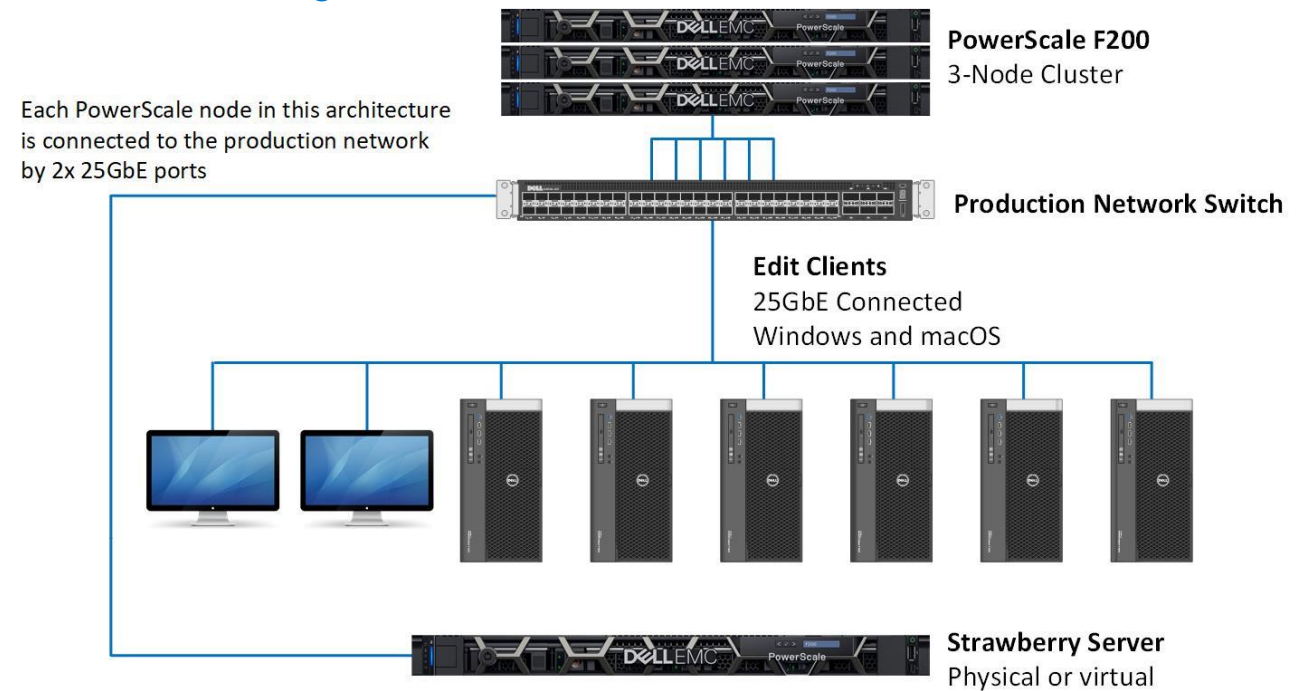
1 PowerScale and Strawberry Reference Architecture

PowerScale is scale-out network attached storage that is well suited to collaborative workflows where multiple client systems need to share media files. Strawberry can manage these workflows and notably does not sit in the data path. By acting as an out-of-band “traffic cop,” storage performance to the client systems is maintained.

Below is a typical video edit architecture featuring PowerScale F200 and Strawberry. The Strawberry server and video edit clients connect directly to the storage, typically with 10 GbE or 25 GbE. The client systems also communicate to the Strawberry server, which injects appropriate file permissions and orchestrates storage mounts on the clients.

For additional information on PowerScale F200 performance when working with compressed or uncompressed Ultra-HD media files, see [PowerScale F200 for UltraHD video workflows](#).

1.1 Architecture Diagram



Note: Management network and PowerScale backend network are omitted for clarity.

Figure 1 Architecture Diagram

In this architecture, each PowerScale node is connected to a production file-sharing network using 2x 25 GbE network ports. The client systems are connected to the production network by a single 25 GbE port. For maximum bandwidth to Windows clients, administrators may choose to use dual-ported NICs on each Windows client. In this case, connect both ports to the network in order to take advantage of Windows SMB3 multichannel support in PowerScale OneFS.

In most real-world scenarios, the client systems may be a mix of 25 GbE, 10 GbE, and 1 GbE. While these network connections offer different amounts of bandwidth, they do not impact how Strawberry and OneFS interact. However, Strawberry may be configured to create highly compressed, proxy versions of video files

for viewing, using the Strawberry web interface. For this reason, the Strawberry server should be connected to the production network using 10 GbE or higher.

Not pictured in this architecture is a 1GbE management network. This management network would be the typical corporate LAN for Internet browsing, directory services, and other nonfile sharing network traffic. It is not strictly necessary to separate out file sharing traffic onto a separate network. But for latency sensitive, highly performant video workflows, having a dedicated network for file traffic reduces the possibility of packet collisions and other problems associated with chatty networks.

1.2 Extending and adapting the architecture

PowerScale is a scale-out storage platform. As additional capacity or performance is required, you can add additional nodes to the system to expand the PowerScale cluster's capabilities. Every facility has its own unique set of requirements. For this reason, PowerScale nodes come in various sizes and types: from dense archive nodes to all flash types. PowerScale allows for all nodes to participate in a single clustered file system with transparent control around what data lands on each node.

When sizing a PowerScale cluster, consider the total workload, including client system count, creative applications, and video codecs. Sizing a PowerScale cluster is out of scope of this document. Dell Sales or qualified systems integrators with media experience are the primary resources for sizing expertise.

Strawberry can be extended beyond a single server. Multiple Strawberry servers may be for high availability or to break out proxy generation onto dedicated resources. Projective (makers of Strawberry) or qualified systems integrators are the proper resources to make recommendations on specific hardware configurations.

2 Configuring OneFS to run Strawberry

The two main considerations when configuring Strawberry with OneFS are to set up user identity mapping and permissions. Strawberry runs on Red Hat Enterprise Linux or CentOS 7/8 and communicates to PowerScale using NFSv4. Client systems run Windows or macOS and communicate to PowerScale using SMB. Strawberry injects NFSv4 ACLs onto files and directories which are mapped to appropriate Windows ACLs by OneFS. At a high level, follow these steps:

- Create several Strawberry specific user accounts in OneFS
 - Bind OneFS to Directory Services
- Create NFS exports in OneFS
 - NFS Global settings configured
- Strawberry mounts the NFS export and creates its folder structure
- Create SMB shares in OneFS from the folders that Strawberry creates

2.1 Creating Strawberry system user accounts

Strawberry uses several service user and group accounts for accessing the storage and creating Strawberry-specific folders. While it is possible to create these accounts in a directory services environment, testing has shown that is far simpler to create the Strawberry service accounts directly in OneFS. Regular users can still connect to Strawberry and the OneFS file system using their directory services credentials. The accounts detailed here are strictly for Strawberry's internal use.

From the OneFS web interface, go to **Access → Membership and Roles**. From this screen, select the Group or User tab and select the **Local:System** provider.

Create the following group accounts in the **LOCAL:System** provider in OneFS:

- Group: Strawberry
 - GID: 44444
- Group: root
 - GID: <auto-generated>

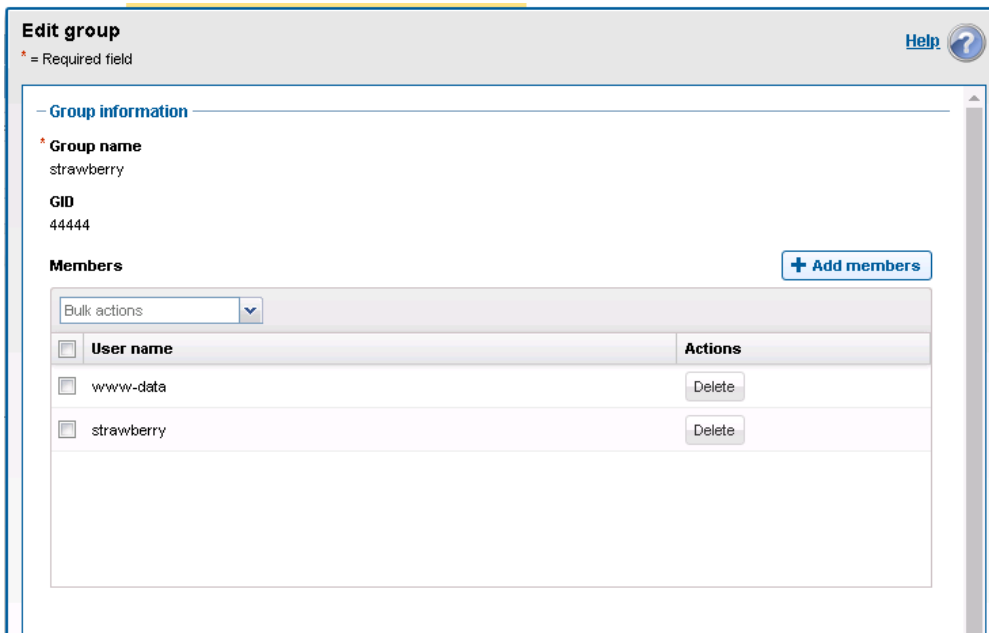


Figure 2 Edit Group

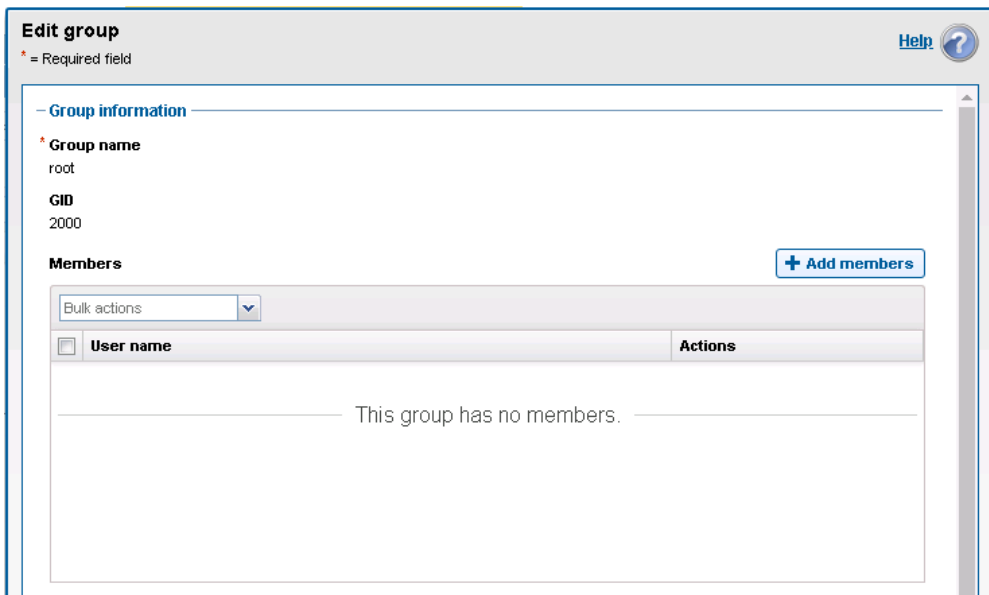


Figure 3 Edit Group 2

Create the following user accounts in the **LOCAL:System** provider in OneFS. When creating these accounts, do **not** set a password, but check the **enabled** checkbox at the bottom of the account creation window.

- User: www-data
 - UID: 44445
 - Group Membership: strawberry
- User: strawberry
 - UID: 44444
 - Group Membership: strawberry

Also, verify that in the **File:System** provider on OneFS there is a user: root (UID: 0) and that root is a member of the group wheel (GID: 0). If not, create such a user in the **File:System** provider in OneFS.

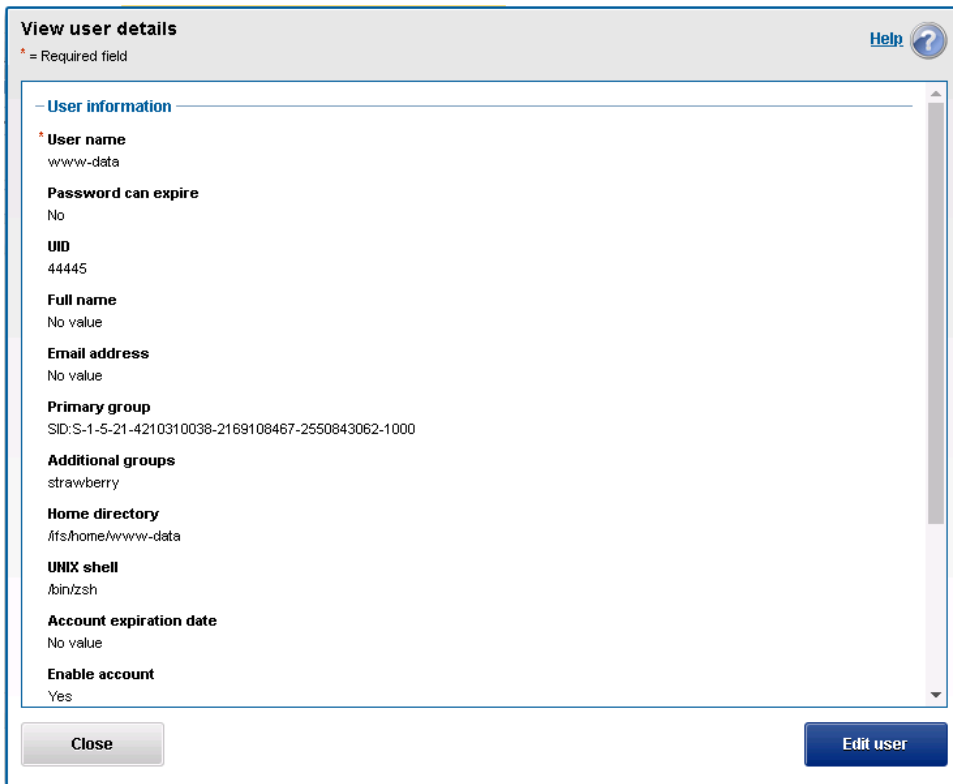


Figure 4 User details

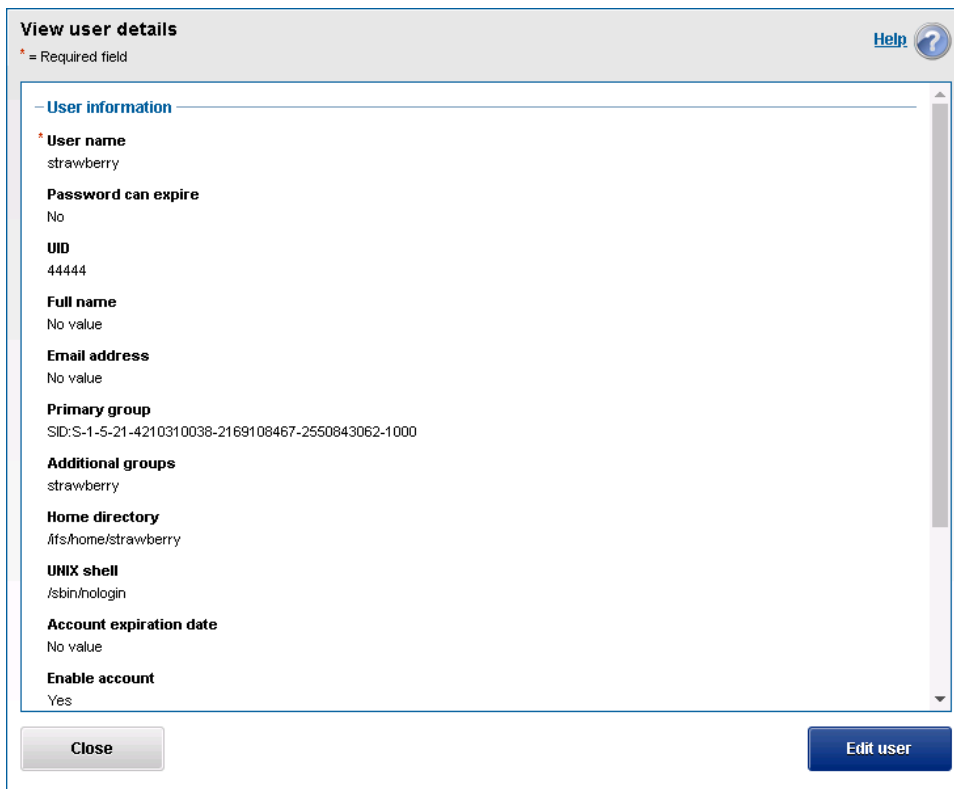


Figure 5 User details 2

2.1.1 Bind OneFS to directory services

While full documentation for binding OneFS to directory services such as Active Directory is out of scope of this paper, here are a few notable considerations.

When binding OneFS to Active Directory, enable **Services for UNIX** with RFC2307 support and select the **Map to primary domain** checkbox:

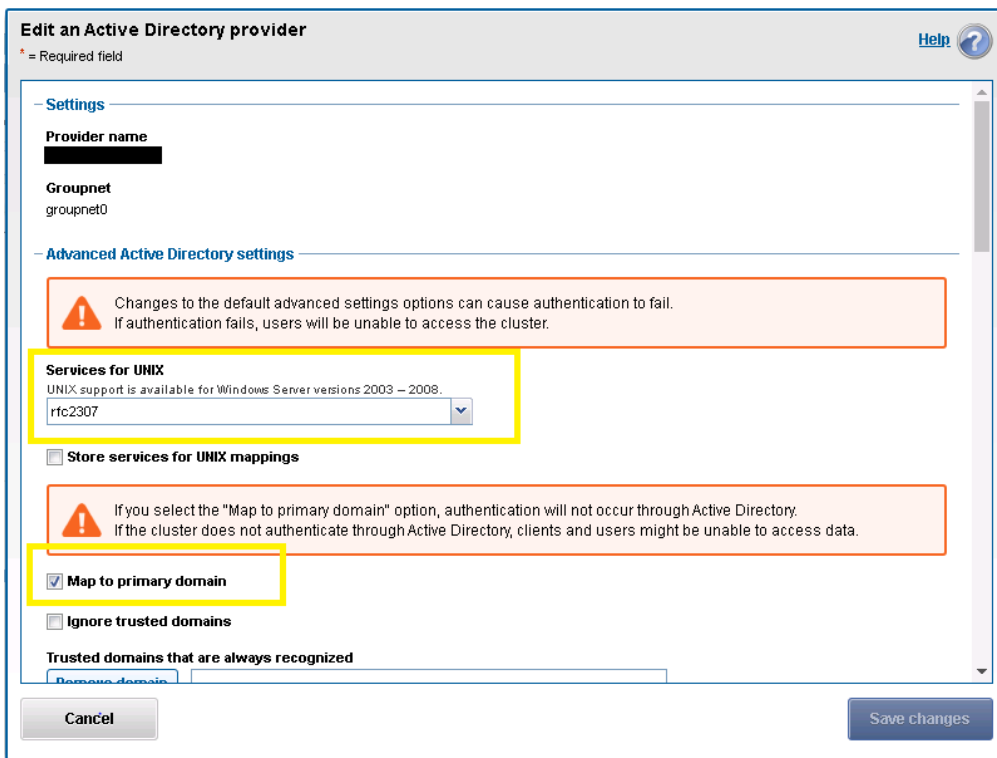


Figure 6 Active Directory

For more information about binding to directory services and authentication, see the relevant version of the Web Administration guide for your version of OneFS, such as [OneFS 9.1 Web Administration Guide](#). (In that version, this topic is covered in Chapter 5.)

For detailed information about how OneFS handles identity management, see the white paper [PowerScale OneFS: Authentication, Identity Management, and Authorization](#).

2.2 Create NFS exports in OneFS

The Linux-based Strawberry server connects to PowerScale OneFS file using NFS. You must create an NFS export and configure it with several nondefault settings. In addition, you must configure several global NFS settings.

First, use the OneFS WebUI to configure the gGlobal settings and Zone setting for NFS. Go to:

Protocols → Unix Sharing (NFS) → Global settings

From this page, verify all checkboxes are selected. The Strawberry server relies on NFSv4.

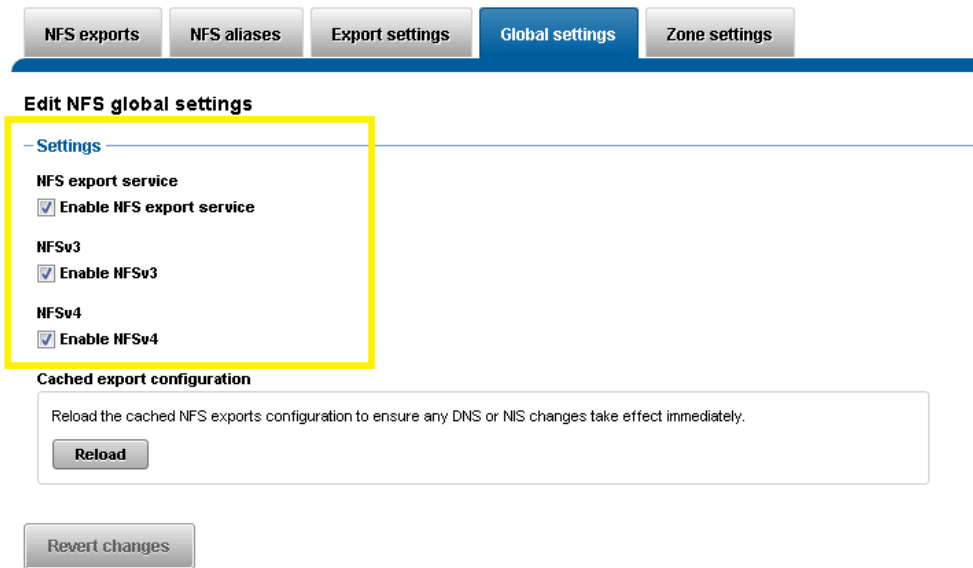


Figure 7 Global settings

Next, to configure the Zone settings, browse to:

Protocols → Unix Sharing (NFS) → Zone settings

On this page, verify the following settings:

- In the **Current access zone** field, select **System**.
- Enter the authentication provider in the **NFSv4 Domain** field.
- Make sure these checkboxes are selected:
 - **Enable NFSv4 replace domain**
 - **Enable NFSv4 no domain UIDs**
 - **Enable NFSv4 allow numeric IDs**

Optionally, you can also select the **Enable NFSv4 no names** checkbox. (Refer to [“Enable NFSv4 no names” in absence of RFC2307](#) for more details.)

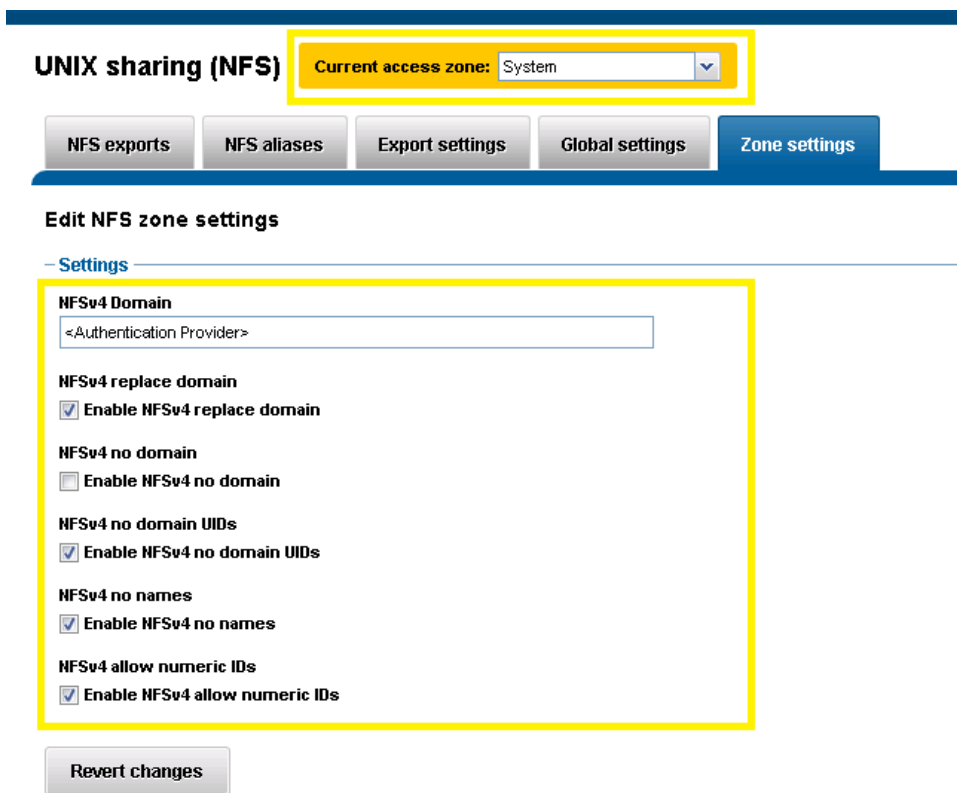


Figure 8 Zone settings

2.2.1 “Enable NFSv4 no names” in absence of RFC2307

During launch, the Strawberry *client* application writes a test file to the shared storage. The Strawberry *server* reads this test file to determine the proper user account of that client system. The Strawberry server then uses this account information to manage file system permissions for that user.

This interaction exposes a classic challenge of integrating Linux-based systems (Strawberry server) with non-Linux systems (Windows and Active Directory). The Windows clients use an Active Directory SID, while the Linux system uses a UID. In some Active Directory environments, RFC2307 UNIX Attributes are configured with Linux-style UIDs assigned to each user. Many environments, however, do not have these attributes configured, and in complex Active Directory systems, sometimes the UNIX attributes do not completely propagate.

OneFS will autogenerate a UID if RFC2307 UNIX Attributes are not present in Active Directory. The Strawberry server can use these autogenerated UIDs to inject NFSv4 ACLs. OneFS will manage the translation back to the Active Directory SID.

When using OneFS synthetic UIDs, the Strawberry server does not need to be bound to Active Directory (only the storage needs to be bound to directory services). In this scenario, when the Strawberry *client* application launches, that client system writes a file to the OneFS file system. This scenario assumes the client is connected to OneFS using an Active Directory log-in. The file will then have a real SID (as determined by Active Directory) and a synthetic UID (as autogenerated by OneFS). Next, the Strawberry *server* reads that file and extracts the OneFS synthetic UID. The Strawberry server then uses that synthetic UID to write the NFSv4 ACL. OneFS handles the translation between the real SID of the client and the synthetic UID that the

server recognizes. This interaction all happens automatically when launching the Strawberry client application -- no user interaction is needed.

To function properly, the Strawberry server must be able to use a numerical value for the UID (as opposed to a name) when injecting the NFSv4 ACL. For OneFS to allow it, you must select the **Enable NFSv4 no names** checkbox:

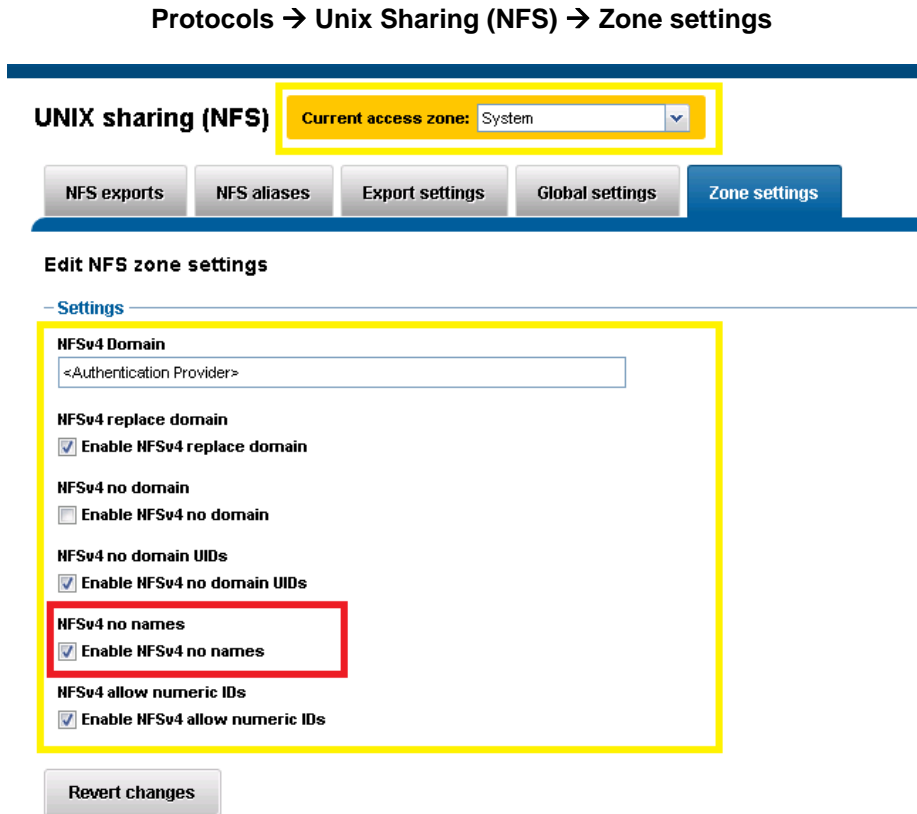


Figure 9 Zone settings 2

You must also configure the Strawberry server for Strawberry to use UIDs instead of short names. Projective.io deployment services should be consulted for this configuration but in short, it requires editing the **/opt/sb4/app/fsbase/config/strawrage.yml** file.

Add the following lines to the bottom of the **strawrage.yml** file. Indent the lines by two spaces in the .yml file or they will not be recognized.

```

acls: nfs4

  acls_nfs4_id_preference: acls_uid
    
```

2.2.2 Disable root squashing

By default, OneFS implements “root squashing” on newly created NFS exports. This behavior is a common security precaution that prevents NFS users from using root privileges to access files on the NFS export to which they otherwise would not. Because Strawberry needs to interact as root with the NFS export, you must disable root squashing on the NFS export for Strawberry. OneFS allows you to restrict which clients can have root privileges, as described here.

When creating an NFS export in OneFS, you must create the export directory ahead of time. You can create this directory using the OneFS Command Line Interface (CLI) or the File System Explorer WebUI tool (**File System → File System Explorer**). To avoid any unexpected inherited settings from propagating to the Strawberry export, we recommend placing this folder in **/ifs/strawberry**.

After you create the NFS export directory, any ACLs on that folder need to be stripped away and the POSIX settings should be root:wheel with 755 permissions. SSH into the OneFS cluster and run:

```
chown root:wheel /path/to/strawberry/export/
chmod -b 755 /path/to/strawberry/export/
```

After you create the directory, and set the owner:group and mode bits, you can configure the NFS export back in OneFS WebUI.

Using the OneFS WebUI, navigate to: **Protocols → Unix Sharing (NFS)**

Select **+Create Export**.

Point the path to where the Strawberry export will be on the OneFS file system.

NFS Export Settings:

- Root Clients: <IP addresses of Strawberry Server(s)>
- Root User Mapping:
 - Select **Browse** and then the **File:System** identity provider
 - User: root
 - Primary Group: wheel
- Advanced Settings:
 - Map UID: Yes

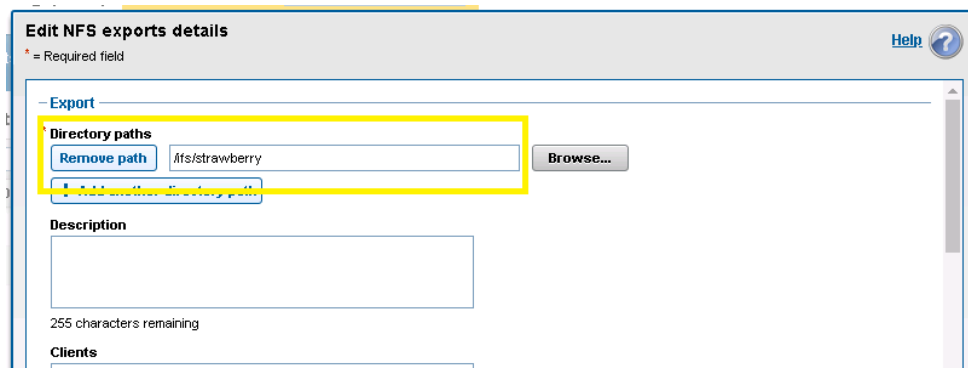


Figure 10 NFS export details

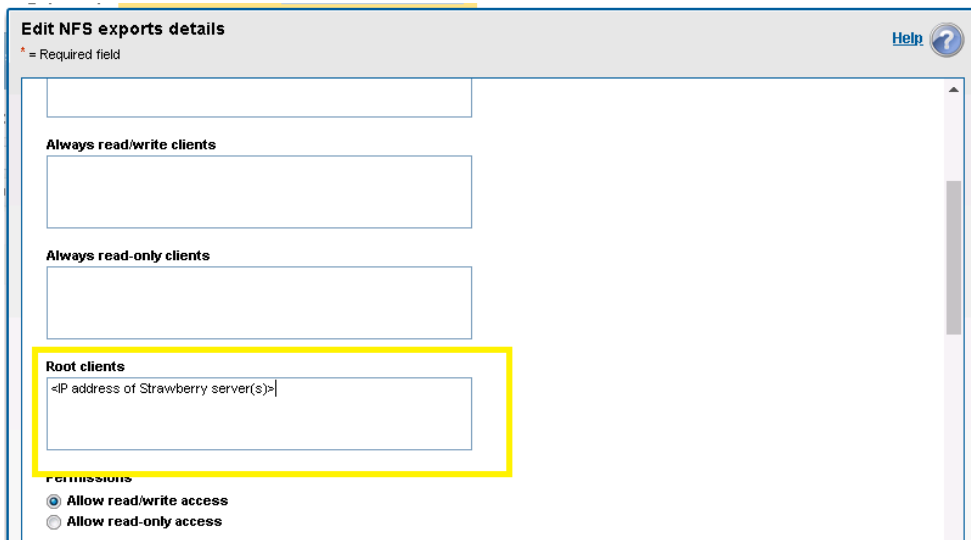


Figure 11 NFS export details 2

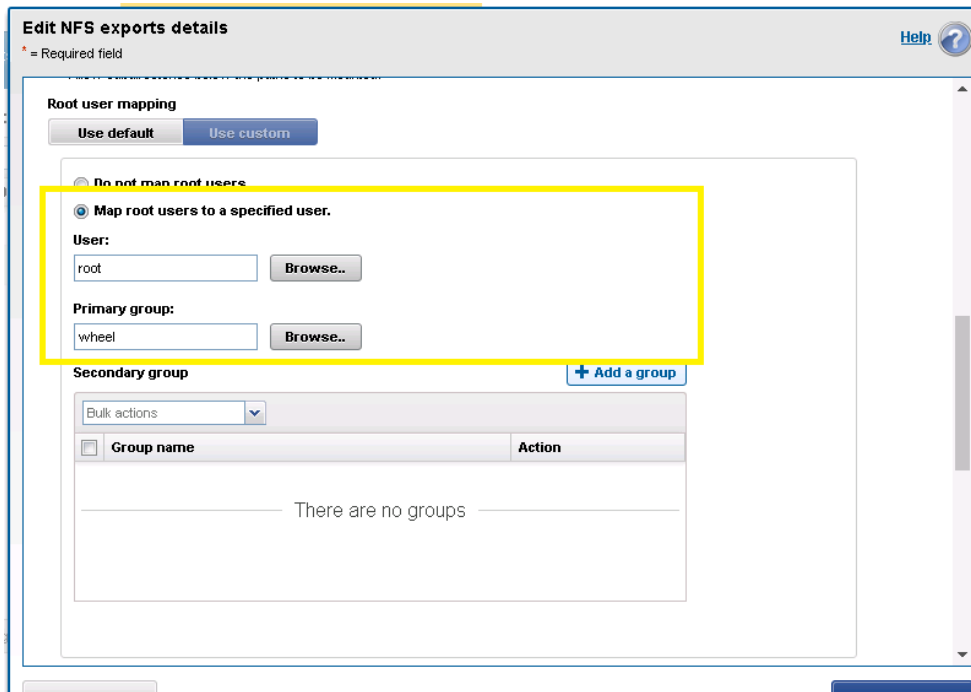


Figure 12 NFS export details 3

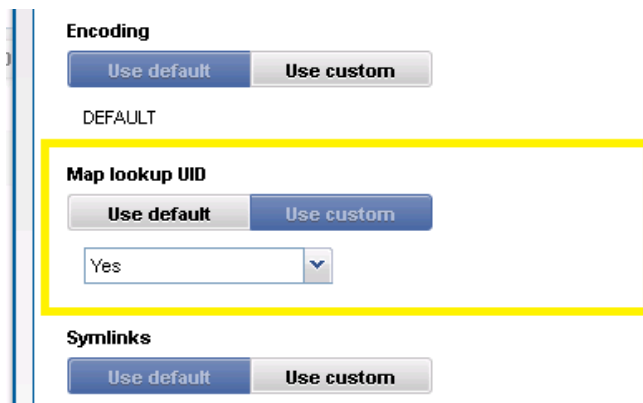


Figure 13 NFS export details 4

2.2.3 Mount the NFS export and start Strawberry

Before creating the SMB file shares that Windows and macOS clients will use, mount the NFS export on the Strawberry server and start Strawberry. Strawberry will then build the file structure which will be used for SMB sharing. When Strawberry launches successfully, it indicates that the NFS export has been configured correctly. (Strawberry will fail to start if it cannot interact with the storage as expected.)

For support and documentation for installing and configuring Strawberry, refer to these [Downloads & Resources](#) from Projective.

2.3 Create SMB shares for Strawberry clients

Now that Strawberry is up and running and has created its folder structure, the SMB shares for client systems can be configured in the OneFS WebUI.

Go to: **Protocols → Windows Sharing (SMB)**

Three shares need to be created on different directories, each with the same configuration settings.

Share path # share name:

- /ifs/strawberry/ # sb-global
- /ifs/strawberry/media_1/media/ # sb-media
- /ifs/strawberry/projects/projects/ # sb-projects

Apply the following SMB share settings when creating these shares:

- Directory ACLs: Do Not Change Existing Permissions
- Members: Everyone, Specify permission level: Full Control
- Advanced Settings:
 - Use create mask and mode
 - NTFS ACL: No (cleared)
 - Access-based enumeration: Yes
 - Directory create *mask*: All checkboxes selected for rwx
 - Leave Directory create mode at default
 - File create *mask*: All checkboxes selected for rwx
 - Leave File create mode at default

Settings

*** Name**
Share names can contain up to 80 characters, and may not contain the following: " \ / [] : | < > + = ; , . * ?
sb-media

Description
Create a description to help identify the purpose of your share when you come back to it later.

*** Path**
/ifs/strawberry/media_1/media **Browse...**

Home directory provisioning

Figure 14 sb-media export

Create SMB share directory if it does not exist

Directory ACLs

Apply Windows default ACLs

Do not change existing permissions

Home directory provisioning
Include one or more of the following expansion path variables in the share directory path: %U, %L, %D, or %Z

Edit member [Help ?](#)

* = Required field

Member information

*** Member name**
Everyone **Select member**

Member permission

Run as root

Specify permission level

Full control

Read-write

Read

Cancel **Apply**

Figure 15 sb-media member information

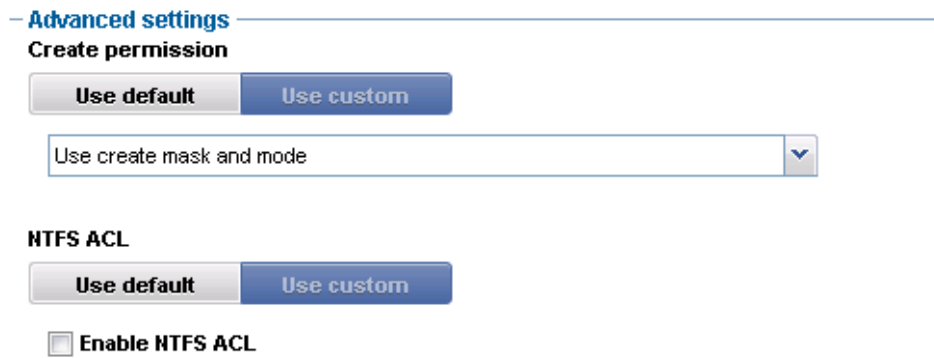


Figure 16 sb-media advanced settings



Figure 17 Access based enumeration

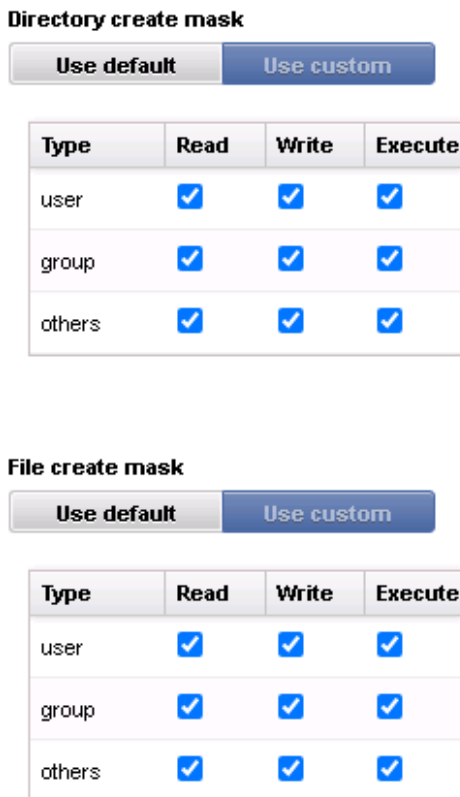


Figure 18 Create masks

After you have created the SMB file shares, a final directory mode adjustment is required for Strawberry to interact as expected with those directories. To make this adjustment, use the OneFS CLI:

```
chmod -R 775 /ifs/strawberry/media_1/media  
chmod -R 775 /ifs/strawberry/projects/projects
```

3 Troubleshooting notes

If the Strawberry server fails to start, the most likely culprit is that Strawberry is unable to manipulate permissions or add NFSv4 ACLs to the directories it manages. Do the following:

1. SSH onto that server and attempt to manually make ownership or permission modifications to directories on the NFS mount point to verify if there is a problem.
2. Carefully recheck the directory services and NFS settings in this document.

If the Strawberry *client* cannot create or open a project, it is likely that the Strawberry *server* cannot resolve UID/GID or there is an issue with adding NFSv4 ACLs.

There have been instances when the Strawberry server shows inconsistent results when examining the POSIX owner:group of directories or files on the OneFS file system. In these cases, the mostly likely scenario is that an Active Directory SID has been stored as the owner the file or directory. If this scenario occurs, it can only be seen on the Isilon cluster itself. Do the following:

1. Connect to the Isilon cluster CLI and run:

```
ls -len /path/to/file/
```

The output of this command will show a SID as the file owner.

2. To resolve the issue, manually change the owner:group of file to the wanted user with the `chown` command from Isilon and strip any inheriting permissions form the parent directory.
3. Next rerun the **ls -len** command from the Isilon CLI and verify that a UID now owns the file and not a SID. If the problem keeps occurring, contact support.

4 Conclusion

The PowerScale cluster is now configured for Strawberry. You have joined the cluster to directory services, created the Strawberry-specific user accounts, and configured the file shares (NFS+SMB). You can now install the Strawberry client application onto client machines and mount the shared storage.

When working with Strawberry, editors work from a virtual media volume. Strawberry links the needed assets and project structure from the central Isilon storage to the virtual volume. Admins can create templates with preset folder and project structure to ensure consistency and provide editors with a clean workspace. Templates can be created to include project files from various applications, such as Media Composer, Premiere, and Final Cut Pro. Editors work freely with this workspace, and Strawberry automatically organizes the content on the central Isilon storage.

The seamless integration of PowerScale and the Strawberry editing workflow eliminates the complexity of maintaining fast-growing, dynamic storage environments for video postproduction.

A Related resources

[OneFS 9.1 documentation hub](#)

[Dell EMC PowerScale: OneFS NFS Design Considerations and Best Practices](#)

[Dell EMC PowerScale: Solution Design and Considerations for SMB Environments](#)

[PowerScale OneFS: Authentication, Identity Management, and Authorization](#)

[PowerScale F200 for UltraHD video workflows](#)

[Projective Support Site](#)