Abstract

This technical document describes how to create and manage SMB shares and home directories using OneFS.

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Introduction

In small organizations, it is easy to manually create one SMB share for each user home directory. A manual approach like this is satisfactory for organizations that have a limited number of employees. But for organizations that are large or growing, creating individual shares for each user becomes less practical; as an administrator, you would have to create and manage hundreds or thousands of SMB shares individually as people join and leave the organization.

In EMC Isilon OneFS, you can provision SMB shares and user home directories automatically by means of expansion variables. This can be useful if you administer many user accounts. Instead of creating SMB shares manually and one-at-a-time, you can create shares automatically and systematically based on user names.

You can provision SMB shares and user home directories in the following four ways:

*Use expansion variables to provision SMB shares*

- Create simulated SMB shares for each user home directory
- Dynamically create user home directories in a common share

*Manually provision SMB shares and home directories*

- Manually create SMB shares for each user home directory
- Manually create user home directories in a common share

Each of the four methods to create an SMB share has advantages and disadvantages. This document explains each method and offers suggestions for when to use one method instead of another.

**Note:** Isilon recommends that you run the latest recommended release of OneFS. At a minimum, OneFS 7.0.2.9 and OneFS 7.1.0.2 are required for the procedures labelled "OneFS 7.0.2 and later." For more information about recommended Isilon releases, see [Current Isilon Software Releases](#).

Data access control

OneFS limits access to files at the file system level. This means that even if a share grants everyone full control, users will not be granted rights to files in the share if they do not have ACLs for the files.
How to use expansion variables to manage SMB shares

SMB expansion variables in OneFS
The following table lists the expansion variables that can be used in OneFS 6.5 and later.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Replacement string</th>
<th>Supported versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>%U</td>
<td>Expands to the user name. This variable is typically included at the end of the path. For example, for a user named user_1, the path /ifs/home/%U maps to /ifs/home/user_1.</td>
<td>6.5 and later</td>
</tr>
<tr>
<td>%D</td>
<td>Expands to the user's domain name, which varies by authentication provider:</td>
<td>6.5 and later</td>
</tr>
<tr>
<td></td>
<td>• For Active Directory users, %D expands to the Active Directory NetBIOS name.</td>
<td></td>
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<tr>
<td></td>
<td>• For local users, %D expands to the cluster name in uppercase characters. For example, for a cluster named cluster1, %D expands to CLUSTER1.</td>
<td></td>
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<tr>
<td></td>
<td>• For users in the System file provider, %D expands to UNIX_USERS.</td>
<td></td>
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<tr>
<td></td>
<td>• For users in other file providers, %D expands to FILE_USERS.</td>
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<td></td>
<td>• For LDAP users, %D expands to LDAP_USERS.</td>
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<td></td>
<td>• For NIS users, %D expands to NIS_USERS.</td>
<td></td>
</tr>
<tr>
<td>%Z</td>
<td>Expands to the access zone name. If multiple zones are activated, this variable is useful for differentiating users in separate zones. For example, for a user named user_1 in the System zone, the path /ifs/home/%Z/%U maps to /ifs/home/System/user_1.</td>
<td>7.0.2 and later</td>
</tr>
<tr>
<td>%L</td>
<td>Expands to the host name of the cluster, normalized to lowercase</td>
<td>7.0.2 and later</td>
</tr>
<tr>
<td>%0</td>
<td>Expands to the first character of the user name</td>
<td>7.0.2 and later</td>
</tr>
<tr>
<td>%1</td>
<td>Expands to the second character of the user name</td>
<td>7.0.2 and later</td>
</tr>
<tr>
<td>%2</td>
<td>Expands to the third character of the user name</td>
<td>7.0.2 and later</td>
</tr>
</tbody>
</table>

**Note:** If the user name has fewer than three characters, the %0, %1, and %2 variables wrap around. For example, given a user named “ab”, the %2 variable maps to a. Given a user named “a”, all three variables map to a.
Create simulated SMB shares for each user using expansion variables

In OneFS 7.0.2 and later, you can create simulated SMB shares for each user by means of expansion variables. To do this, use the user name expansion variable, %U, for the share name. This creates a share called “%U” on the cluster. This is the only actual share that is created. When users log in to the cluster for the first time, for example by connecting to \cluster, a simulated SMB share is created for each user, with a home directory that only that user can access. A user named “user1” would see a share named \cluster\user1, and a user named “user2” would see a share named \cluster\user2, etc. Because only the %U share is created, security policies can be applied globally to the simulated SMB user shares. Also, because the user SMB shares are simulated shares, the number of user shares that can be created is unlimited.

Isilon recommends this method for provisioning SMB shares because it simplifies administration tasks.

The option to create simulated SMB shares for each user is not available in OneFS 6.5.

Advantages

- The number of simulated SMB user shares that can be created is unlimited.
- Each user gets an individual SMB share.
- Each SMB share is unique, so client-side caching is possible if multiple users log in to the cluster from the same client computer.
- Folder and profile redirection are easy to configure in Active Directory using the %username% environment variable.

Disadvantages

- Users cannot access other users' home directories. This may or may not be desirable.

OneFS 7.0.2 and later

1. In the OneFS web administration interface, click Protocols > Windows Sharing (SMB).
2. On the SMB Shares tab, click Add a share.
3. In the Share Name field, type %U.
4. In the Directory to Be Shared field, type the full path of the share, beginning with /ifs, or click Browse to locate the share. You can use one or more expansion variables in the path. For example, the path /ifs/home/%U expands to /ifs/home/<user name>.
5. Select Apply Windows default ACLs to apply a default ACL to the SMB shares. Important: Do not apply this setting to the /ifs directory. Doing so may make the cluster inoperable.
6. Select the Allow Variable Expansion check box.
7. Select the Auto-Create Directories check box.
8. In the Users & Groups area, select the Everyone check box. Then click the Edit link to update the user permissions.
9. Select the Full Control check box.
10. Click Save.
11. Optional: Apply advanced SMB share settings. For more information about these settings, see the OneFS 7.1 Web Administration Guide.
12. Click Create.
Examples

When users connect to the cluster, they see the list of shares that they have access to. In this example, the share called "user1" is the simulated SMB share that was created for the user named "user1."

Users have access only to their own files and folders in their simulated SMB shares. For example, only the user named "user1" can access the files and folders in the simulated SMB share called "user1."
Dynamically create user home directories in a common SMB share

You can create SMB shares for groups of users. For example, a university's cluster might have home directories for professors, staff, and students. Instead of creating an SMB share for each user, you can create a "Staff Home Directories" share for professor and staff home directories that points at /ifs/home/staff/%U. Then create a “Student Home Directories” share for all student home directories that points at /ifs/home/students/%U.

Home directories are created automatically when users log in to the cluster for the first time. Each user has access only to his or her home directory.

Advantages

- One SMB share is created for multiple user home directories. The share is easy to create and configure.
- The SMB share is common for all users, but user home directories are unique for each user.
- Access-based Enumeration is not required to restrict access to users' files and folders.

Disadvantages

- Client-side caching is not possible if multiple users log in to the cluster from the same client computer because client-side caching requires the share to be unique for each user.
- Users cannot access other users' home directories. This may or may not be desirable.

OneFS 7.0.2 and later

1. In the OneFS web administration interface, click Protocols > Windows Sharing (SMB).
2. On the SMB Shares tab, click Add a share.
3. In the Share Name field, type a name for the share. For example, Student Home Directory.
4. In the Directory to Be Shared field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the share. You can use one or more expansion variables in the path. For example, the path /ifs/home/students/%U expands to /ifs/home/students/<user name>.
5. Select Apply Windows default ACLs to apply a default ACL to the SMB shares.
   Important: Do not apply this setting to the /ifs directory. Doing so may make the cluster inoperable.
6. Select the Allow Variable Expansion check box.
7. Select the Auto-Create Directories check box.
8. In the Users & Groups area, select the Everyone check box. Then click the Edit link to update the user permissions.
9. Select the Full Control check box.
10. Click Save.
11. Optional: Apply advanced SMB share settings. For more information about these settings, see the OneFS 7.1 Web Administration Guide.
12. Click Create.
OneFS 6.5

1. In the OneFS web administration interface, click File Sharing > SMB > Add Share.
2. In the Share name field, type a name for the share. For example, Student Home Directory.
3. In the Directory to share field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the share. You can use one or more expansion variables in the path. For example, the path /ifs/home/students/%U expands to /ifs/home/students/<user name>.
4. Select the Allow Username Expansion check box.
5. Select the Automatically Create User Directory check box.
6. In the Users and Groups area, select the Everyone check box. Then click the Edit permissions link to update the user permissions.
7. In the Allow column, select the Full Control check box.
8. Click OK.
9. **Optional:** Apply advanced SMB share settings. For more information about these settings, see the OneFS 6.5 User Guide.
10. Click Submit.

Examples

When users connect to the cluster, they see the list of shares that they have access to. In this example, the share called "Student Home Directory" is the common share that was created for student home directories.
When users open the common share, they see only the files and folders that belong to them. For example, when opening the share called "Student Home Directory," the student named "user1" sees only the files that belong to her.
How to manually provision SMB shares and home directories

Manually create SMB shares for each user home directory
If you administer a small number of user accounts, you can manually create an SMB share for each user. This can be an easy way to provision SMB shares and to designate permissions, performance, and security settings. Manually provisioning SMB shares, however, can become burdensome if the number of user accounts increases too much.

Advantages

- Each user gets his or her individual share.
- Each share is unique, so client-side caching is possible if multiple users log in to the cluster from the same client computer.
- Folder and profile redirection are easy to configure in Active Directory using the %username% environment variable.

Disadvantages

- The quantity of SMB shares can become difficult to manage as people join and leave the organization.
- Users cannot access other users' home directories. This may or may not be desirable.

OneFS 7.0.2 and later

1. In the OneFS 7.x web administration interface, click Protocols > Windows Sharing (SMB).
2. On the SMB Shares tab, click Add a share.
3. In the Share Name field, type the user name for the user. For example, user1.
4. In the Directory to Be Shared field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the directory. For example, /ifs/home/user1.
5. Select Apply Windows default ACLs to apply a default ACL to the SMB shares.
   Important: Do not apply this setting to the /ifs directory. Doing so may make the cluster inoperable.
6. In the Users & Groups area, click Add a user or group, and then select the names of the user and group accounts that are allowed to access the share.
7. Optional: Apply advanced SMB share settings. For more information about these settings, see the OneFS 7.1 Web Administration Guide.
8. Click Create.

OneFS 6.5

1. In the OneFS web administration interface, click File Sharing > SMB > Add Share.
2. In the Share name field, type a name for the share. For example, user1.
3. In the Directory to share field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the share.
4. In the Users and Groups area, click Add, and then select the names of the user and group accounts that are allowed to access the share.
5. Click **Choose**.
6. **Optional**: Apply advanced SMB share settings. For more information about these settings, see the [OneFS 6.5 User Guide](#).
7. Click **Submit**.

**Examples**

When users connect to the cluster, they see the list of shares that they have access to. In this example, the share called "user1" is the home directory that was manually created for the user named "user1."
Users have access only to their own files and folders in their home directories. For example, only the user named "user1" can access the files and folders in the home directory called "user1."
Manually create a common SMB share for all user home directories

Creating a single, common SMB share to be used by all users is the easiest way to set up a Microsoft Windows environment. By default, all users have access to the common SMB share, and can access other users' files that have a home directory in the common SMB share. If stricter access permissions are desired, Access-based Enumeration can be enabled to list only the files and folders to which each user has access when browsing content on the file server. Enabling Access-based Enumeration can slow system performance.

Advantages

- Only one SMB share is created. The share is easy to create and configure.
- Folder and user profile redirection are easy to configure in Active Directory using the %username% environment variable.

Disadvantages

- Users can access other users' home directories if Access-based Enumeration is not enabled. This may or may not be desirable.
- Client-side caching is not possible if multiple users log in to the cluster from the same client computer because client-side caching requires the share to be unique for each user.
- Access-based Enumeration can slow system performance if there are many files on the file server.

OneFS 7.0.2 and later

1. In the OneFS web administration interface, click Protocols > Windows Sharing (SMB).
2. On the SMB Shares tab, click Add a share.
3. In the Share Name field, type the user name for the user. For example, Home Directory.
4. In the Directory to Be Shared field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the directory. For example, /ifs/home/
5. Select Apply Windows default ACLs to apply a default ACL to the simulated SMB shares.
   Important: Do not apply this setting to the /ifs directory. Doing so may make the cluster inoperable.
6. Create subdirectories for each user, owned by the user, in the SMB share. These subdirectories become the users' home directories.

OneFS 6.5

1. In the OneFS web administration interface, click File Sharing > SMB > Add Share.
2. In the Share name field, type a name for the share. For example, Home Directory.
3. In the Directory to share field, type the full path of the home directory location, beginning with /ifs, or click Browse to locate the share. You can use one or more expansion variables in the path. For example, /ifs/home/.
4. Create subdirectories for each user, owned by the user, in the SMB share. These subdirectories become the users' home directories.

With the default settings, everyone who connects to the common SMB share has permission to access to all the folders and files in the share. If you enable Access-based Enumeration, users will see only the files and directories that they have permissions for.
Examples

When users connect to the cluster, they see the list of shares that they have access to. In this example, the share called “Home Directory” is the common share that was created for user home directories.

When users open the common home directory share, they can access all the files and folders in the share. A user named “user1,” for example, can access the folders and files in the home directory that were created by users “user2,” “user3,” “user4,” and so on.
Additional Resources
For more information about SMB variable expansion, see the following resources:

OneFS 7.1 and 7.2
- [OneFS Web Administration Guide](#), see the "Home directory creation through SMB," "Supported expansion variables," and "Managing SMB shares" sections.

OneFS 7.0
- [OneFS 7.0 Administration Guide](#), see the "Home directory creation through SMB," "Supported expansion variables," and "Create an SMB share" sections.

OneFS 6.5
- [OneFS 6.5 User Guide](#), see the "SMB share management" section.