Synology

Hybrid Share Deployment Guide

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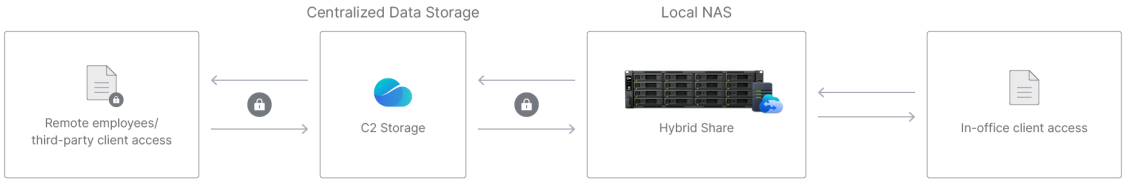
Table of Contents

What is Hybrid Share

Hybrid Share is a solution designed to seamlessly integrate on-premises storage with the cloud. It allows organizations to store frequently accessed data locally while leveraging the cloud for scalability, redundancy, and easy access to less frequently used data. This hybrid approach ensures that users experience high performance and reliability, regardless of their geographical location.

Whether it's a small business with a single office wanting to integrate cloud storage into its data storage strategy or a larger-sized enterprise with offices in multiple locations wanting to centralize its data storage, Hybrid Share can accommodate both needs.

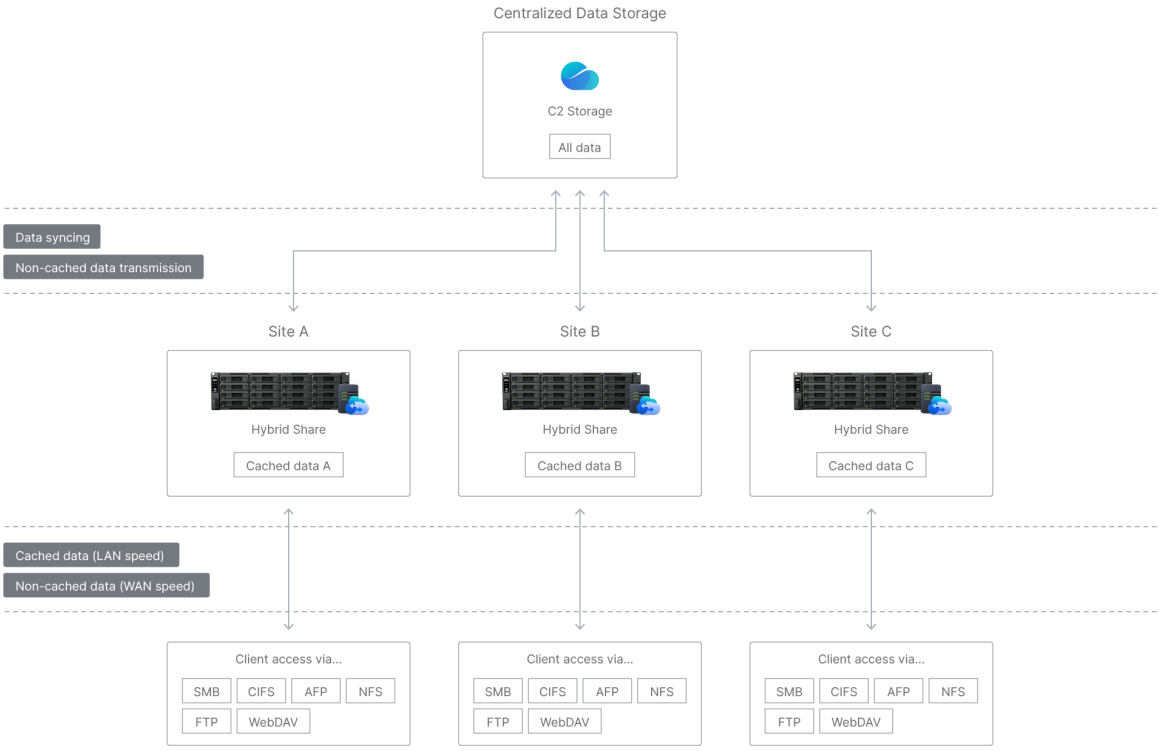
For example, a single office with a Synology NAS can utilize Hybrid Share to set up a private cloud data storage center. This setup will enable employees, regardless of their location—whether in the local office, working from home, or traveling on business—and specific third parties, to access the same version of data. All modifications will be seamlessly synchronized, ensuring that everyone has the most up-to-date information.



Hybrid Share is also easily scalable for larger companies with multiple locations, with each office having its own Synology NAS for data storage purposes. By utilizing Hybrid Share, all offices will be able to access a unified version of their data. Data integrity is ensured by synchronizing all changes or modifications across all locations. Furthermore, to avoid editing conflicts, a global file locking mechanism is in place to prevent simultaneous modifications to files within your Hybrid Share folder, which is accessible on multiple Synology NAS devices.

Hybrid Share technical architecture

Hybrid Share is composed of two main components: a centralized cloud data hub called C2 Storage and a Synology NAS functioning as a local on-site server. This combination ensures that your data is both securely stored in the cloud and readily available on-site, providing a robust and flexible data management solution. Users, regardless of their location, can easily access Hybrid Share data through a variety of clients, and the data is kept secure using encryption.



C2 Storage: centralized data hub

C2 Storage is a cloud-based storage designed as the central hub for all Synology NAS sites, efficiently storing data as well as providing convenient file-level access and comprehensive restoration. The web-based C2 Storage portal allows easy management of Hybrid Share folders and their connections to each local Synology NAS host and offers detailed logs for monitoring and the auditing of file access activities. Comprehensive point-in-time copies and restoration of folders are supported through the snapshot function, protecting Hybrid Share folders from malicious attacks or accidental actions.

Synology NAS: efficient data access and cache storage

Synology NAS devices function as an on-site server, specifically designed for efficient data access and storing frequently accessed data. Local users can use various protocols (such as SMB, AFP, and NFS) to connect with C2 Storage via the local Synology NAS. This empowers direct upload, download, and editing of folders and files, ensuring seamless synchronization of changes across different sites.

Each Synology NAS also designates a part of its storage space as a local cache. This ensures users can quickly access frequently used data with minimal latency over the LAN (local area network). When the amount of locally cached data exceeds the assigned quota set by the administrator, less frequently accessed data will be automatically removed from the local cache (it will still be accessible from C2 Storage).

When the required data isn't in the local cache, users can access the specific parts of data stored in C2 Storage without downloading the entire file through Hybrid Share (if supported by the application file type). Files are divided into sections, allowing faster access to the required specific parts without requiring full downloads. Simultaneously, that data is also downloaded in the background to the local cache of the Synology NAS, ensuring smoother access for future use.

Diverse client access options

Seamless web-based data access through C2 Storage Explorer

C2 Storage Explorer is a web-based user interface that allows users to directly access and share their Hybrid Share folders. This removes the need to use a separate file transfer client to access data via a local Synology NAS within the LAN.

Effortless data access through file transfer clients

For handling large file transfers or managing multiple files simultaneously, utilizing a dedicated file transfer client may be preferable. File transfer clients excel at handling large file transfers or transferring multiple files at once, and often offer features like queuing, scheduling, and progress tracking. Hybrid Share seamlessly integrates with various existing file-sharing services (SMB, AFP, NFS, etc.). This ensures a familiar user experience across different operating systems (Windows, macOS, and Linux) without requiring any changes to users' file access habits.

Enhanced data security via encryption

Hybrid Share employs two encryption keys to ensure data security while providing convenient decryption, a client-side encryption key and a C2 encryption key.

During the initial setup of Hybrid Share, a client-side encryption key will be created for each shared folder to ensure data is secure at rest. However, this design requires the administrator to enter the client-side encryption key each time they access a Hybrid Share folder in C2 Storage. To streamline access, a C2 encryption key is used to encrypt all client-side encryption keys for Hybrid Share folders. This allows the administrator to enter the client-side encryption key only once per Hybrid Share folder, and then use only the C2 encryption key for subsequent access.

Notes:

- For more information about Hybrid Share data protection, please refer to the Hybrid Share White Paper.

Implementing Hybrid Share

System requirements

- Hybrid Share version 1.4.2 and above
- DSM 7.2.1 and above

Select a NAS

Choosing the optimal Synology NAS for your Hybrid Share deployment involves evaluating three primary factors:

- Number of shared folders
- Average file count per shared folder

To ensure consistent synchronization performance across all locations, deploying NAS devices with comparable performance characteristics is recommended.

Shared folders count

Check the selected model's specifications for details on the maximum number of supported shared folders. This information can be found at **Download Center** > the NAS model > **Documents** > **Product Specifications** > **Maximum Hybrid Share Folders**.

File count

We recommend that the file count for each shared folder does not exceed 30,000,000.

Notes:

- Synology's testing focuses on memory allocation for typical SMB and Hybrid Share usage. If you plan to leverage your NAS for other applications, consider the estimated workload and potentially increase memory capacity or select a higher-tier model for optimal performance.
- Certain models may not be available in your location. Please contact your local distributors for more information.

Allocate appropriate quota for local cache

The recommended local cache size for each site depends on two key factors: the frequency of data access and the required access speed. For LAN-speed access to frequently used "hot" data,

set the local cache size to match the estimated size of this hot data in the Hybrid Share.

While the exact size of hot data can vary, it typically falls between 1% and 14% of the total storage. Start with a local cache size set at 15% of the total Hybrid Share file size and adjust based on the actual usage.

For scenarios where all Hybrid Share files require immediate access at LAN speeds, set the local cache size to 100% of the total Hybrid Share file size. However, ensure the local NAS has sufficient storage capacity to accommodate this larger cache.

Assess initial upload times

Initial upload methods

Synology offers two methods for uploading data to C2 Storage from a Synology NAS:

- Direct Conversion: This method involves directly converting a shared folder to a Hybrid Share folder. The data is then uploaded directly via the Internet to the C2 Storage data center.
- Express Box: This is a physical data transfer service provided by Synology. Instead of uploading the data directly to C2 Storage, Synology ships a NAS pre-installed with hard drives to the office where the data is stored. The local administrator then uploads the locally stored data to the NAS over the office's local network. Once the data upload is complete, the NAS is returned to the Synology C2 data center for data transfer to C2 Storage. If you have large amounts of data (> 20 TB) to transfer, this method is ideal for locations with limited or unstable internet bandwidth.

Estimate upload time for direction conversion

1. Visit the Synology C2 Speedtest website and select the data center where you plan to store the Hybrid Share data.
2. Click **Start** to estimate your upload speed.
3. Use the following formula to estimate the initial upload time:

Upload time (by days) = Total data size you plan to upload (MB) / (Upload speed from C2 Speedtest (Mbps) / 8 * Impact factor)) / 86,400

Estimate initial upload time for C2 Express Box

The estimated time for the entire process includes the physical transport time of the C2 Express Box, the transfer time of local user data, and the transfer time of data at the Synology C2 data center.

- Physical transport time: The physical transportation time of the NAS may vary depending on the location and the selected express box plan, ranging from 3 days to 14 days. This includes

shipping to the local office and shipping it back to Synology. Contact Synology to obtain precise transportation times for your location and preferred data center.

- Data transfer time to C2 Express Box: Use the following formula to estimate the transfer rate of your local LAN network required to fill a C2 Express Box with data.

Estimated time to upload (in days) = Total size of data to be uploaded (in MB) / (Site's local LAN speed (in Mbps) / 8 * 0.9) / 86,400

- Transfer time at Synology C2 Storage data center:

Estimated time to upload (in days) = Total size of data to be migrated (in MB) / 100) / 86,400

Notes:

- The impact factor may vary from 0.5 to 0.7, depending on file size allocation and system occupancy level. Both 0.5 and 0.7 can be used to calculate the time and consider it as the estimated range.
- Local users can continue accessing and working with folders designated for future conversion to Hybrid Share folders while the C2 Express Box is being processed. Synology will provide comprehensive step-by-step instructions to ensure all changes made during this interim period are synchronized seamlessly with your C2 Storage upon completion.
- The minimum storage requirements for the local NAS is the total size of the data to be migrated, plus the planned local cache capacity (at least 500 GB).

Convert to Hybrid Share folder

A Hybrid Share folder is a designated space for you to store files and folders on C2 Storage. You can convert an existing shared folder on the NAS and if necessary, migrate its data to a Hybrid Share folder on C2 Storage.

1. Sign in to DSM and go to **Control Panel** > **Shared folder**.
2. Select the shared folder you wish to convert.
3. Right-click and select **Action**, then select **Convert to Hybrid Share Folder**.
4. Follow the on-screen instructions to migrate the data to C2 Storage.

Initial upload tips

- Ensure that your C2 Storage has sufficient quota for all files.
- We recommend deploying an UPS (uninterruptible power supply) to provide a stable electricity supply.

- Folders and files will be uploaded sequentially. Once the data is successfully uploaded to C2 Storage, other sites can access it either through the web-based C2 Storage Explorer or through their NAS (if they have mounted the Hybrid Share folder to their NAS).

Data syncing time across sites

Estimate file syncing time

After deploying a Hybrid Share folder, folder changes will sync across all sites. The sync time mainly depends on how long it takes for files to upload to C2 Storage.

If only changes are being synced, then that data will be available across all sites almost instantly (depending on the bandwidth available).

If you are uploading new files to C2 Storage, then use this formula to estimate the upload time required:

Estimated data upload time (in hours) = File size of data to be uploaded (in MB) / (Upload speed from C2 Speedtest (in Mbps) / 8 * Impact factor) / 3,600

The impact factor, used to calculate time, may vary from 0.5 to 0.7.

In the event of abnormal power outages or a lack of server connection exceeding six months, a resynchronization process may begin. C2 Storage will review and re-sync all data from the local NAS to fix any discrepancies. During the re-sync process, simultaneous downloads may experience increased download times.

Optimize sync speeds

Ensuring optimal synchronization speed is crucial for a seamless user experience. The following section discusses various ways to improve access speeds between the local NAS and C2 Storage.

Pin frequently accessed files

If there are specific files and folders within your Hybrid Share directory that are frequently accessed, consider pinning them to the local cache. Pinned items won't be removed from the cache, even if storage capacity is limited.

Change local cache size

Set the local cache size to 100% of your total Hybrid Share file size and ensure your local NAS has sufficient capacity. By doing so, all files in the local cache will be retained and no evictions will happen. All Hybrid Share files will be readily available for quick access at LAN speed.

Adjust your global file locking settings

Global file locking is designed to prevent concurrent modifications from different sites using SMB or NFS connections with a local NAS. If there is only a single site with one local Synology NAS, there is no need to enable this function, as SMB provides it natively. Hybrid Share utilizes this function for cross-regional and cross-NAS operations, so it is only necessary to enable it when there are multiple sites with multiple Synology NAS devices. If upload speeds are slow, try disabling this function to improve performance. If you do enable it, apply it selectively to specific applications to maintain data integrity and optimize performance.

Increase your bandwidth

Increasing your bandwidth will lead to faster file download speeds. Note that file upload time depends on file size, quantity, and folder structure. If your upload speed is less than 1 Mbps and your upload time exceeds 3 hours, consider increasing the upload bandwidth.

Configure Hybrid Shared folder permissions

Join the same domain to maintain consistent permissions

To maintain consistent permissions across all sites, the best practice is to join the local Synology NAS of each site to the same domain or LDAP (Lightweight Directory Access Protocol) server. Mounting the same Hybrid Share folder to multiple Synology NAS devices can risk losing the ACL (Access Control List) permissions. Hybrid Share will synchronize permission inheritance and remove inherited permissions (including local and domain users) for subfolders in all mounted Hybrid Share folders across all NAS devices. By joining all Synology NAS devices to the same domain or LDAP server, you ensure synchronized file permissions across all devices.

Manage permissions on C2 Storage

C2 Storage permissions are managed via a user's Synology Account instead of local NAS user accounts. To access Hybrid Share folders in C2 Storage, users need to create a free Synology Account, and administrators can then configure permissions for each account from C2 Storage.

To manage Hybrid Share folder permissions:

- Sign in to C2 Storage > **Hybrid Share** > Click the shared folder you plan to set permissions for > **Edit** > **Permission** > Specify the email of the user you want to grant permissions to
- The following permissions can be granted:
  - View and edit this Hybrid Share folder.
  - Mount this Hybrid Share folder on Synology NAS.

To manage individual folder or file permissions:

- Sign in to C2 Storage Explorer. Right-click on the folder or file, click **Share**, and specify the email in the invitee list.

- Users can be specified with folder or file permissions as either viewers or editors under the "Shared with me" section in their C2 Storage Explorer.

Notes:

- Shared folder permissions on the local NAS are managed separately from C2 Storage permissions. Disabling a user's permissions on the local NAS will not disable their permissions for Hybrid Share folders in C2 Storage.

Configure throttling

To ensure fair allocation of network resources, it may be necessary to consider throttling bandwidth for Hybrid Share.

Go to **Control Panel** > **Network** > **Traffic control** and select **Hybrid Share** to configure throttling. A low maximum bandwidth setting may prevent files from being uploaded or downloaded on time and result in slow sync speeds.

Default throttle setting on local cache

Write speed is throttled when volume usage reaches 80% (for a volume smaller than 1 TB) or when volume space is less than 200 GB (for a volume larger than 1 TB)

Minimum write speed (128 KB/s) is applied when the volume usage reaches 95% (for a volume smaller than 1 TB) or when volume space is less than 50 GB (for a volume larger than 1 TB)

Read speed is unaffected.

Integrate with Synology Drive Team Folder

Hybrid Share not only supports user access to data via file protocols but also allows access via Synology Drive. You can convert existing Synology Drive Team Folders to Hybrid Share folders or enable Synology Drive Team Folders on existing Hybrid Share folders.

When converting from a Team Folder to a Hybrid Share folder, be aware that this process will result in losing previous file versions and attributes (e.g., labels, stars, sharing privileges). Additionally, all previously established Synology Drive client lists will need to be recreated. After completing the Hybrid Share conversion, all data will be re-downloaded for all MAC users and for all Windows users who do not have the On-demand Sync option enabled.

To optimize user experience, we recommend the following configurations:

- Join the local NAS of all sites to the same domain or LDAP server to maintain consistent permissions.

- Enable version control in the Synology Drive Admin Console for better file management flexibility.
- Consider granting users that access Synology Drive data from different countries or regions Direct Access permissions to accelerate access speed.

Notes:

- Windows users can refer to the Synology Drive Mass Deployment Guide for instructions on deploying multiple clients simultaneously. Currently, there is no mass deployment mechanism for Mac users.
- Hybrid Share folders cannot be set as Synology Drive ShareSync sync folders.
- Collaborating on Synology Office files in the same Hybrid Share folder that is mounted on different NAS is not recommended as this may result in file conflicts and unexpected synchronization results.

Monitoring and Safeguarding Data

Monitor Hybrid Share

Efficient monitoring of your Hybrid Share environment is crucial for optimal performance and resource management. Utilization information is available on both your local Synology NAS as well as on C2 Storage. By understanding and leveraging this data, administrators can ensure their Hybrid Share setup operates smoothly and efficiently.

View shared folder information in local NAS

In **Control Panel** > **Shared folder**, administrators can monitor the status of both local and cloud storage and view the following information about the Hybrid Share folder.

- Folder Quota: View how much storage capacity is allocated from your C2 Storage plan to the corresponding Hybrid Share folder.
- Folder Usage: View the current usage of the corresponding Hybrid Share folder.
- Reserved Local Cache Size: View how much of the volume's capacity is reserved for the local cache.
- Local Cache Usage: View the current usage of the local cache. When your volume usage is more than 80%, inbound write operations will be throttled.
- Upload Queue: View the size of the data in the local cache not yet uploaded to the Hybrid Share folder.
- Upload Status: View the speed of the data in the local cache being uploaded to the Hybrid Share folder.

Administrators can view overall volume utilization information at **Storage Manager**.

Volume usage should be kept to less than 80%. If volume capacity is low, Hybrid Share may reduce write speed (read speed will remain unaffected). As a rule:

- Write speed is throttled when volume usage reaches 80% and free space is under 200 GB.
- Minimum write speed (128 KB/s) is applied when volume usage is at 95% and free space is under 50 GB.

Administrators can also enable notifications regarding Hybrid Share. This will allow DSM to send administrators notifications in the event of specific Hybrid Share events or errors. Notification can be configured by going to **Control Panel** > **Notification** > **Rules** > **Hybrid Share**.

View C2 Storage utilization information

From the C2 Storage web portal, administrators can view current C2 Storage usage and the folder usage information for each Hybrid Share folder.

From the C2 Storage web portal, administrators can overview how many and which NAS has mounted the Hybrid Share folder, folder usage, the snapshot taken of C2 Storage's usage, the folder quota, and the following information:

- Connected NAS: Shows how many and which NAS has mounted the Hybrid Share folder
- Folder Usage: Shows the current usage of the corresponding Hybrid Share folder.
- Snapshot Usage: Shows the usage of the snapshot taken in C2 Storage. We recommend enabling the snapshot function in C2 Storage.
- Folder Quota: Shows how much storage capacity is allocated from your C2 Storage plan to the corresponding Hybrid Share folder.
- Recovery Point: Shows how many recovery points you had taken from snapshot to recovery
- Global File Locking: Enable or deactivate global file locking. To avoid editing conflicts across different sites, we suggest enabling the global file locking function. On the other hand, if editing conflicts are not a concern, we recommend deactivating this function to make syncing efficiency even better.

Additionally, we recommend enabling the log function on C2 Storage. Through the log function, administrators can track and audit Hybrid Share operations via the **C2 Storage web portal** > **Hybrid Share** > **Logs**. The logs are retained for 6 months and will then be deleted automatically. You can use the export function to download records of the logs.

Safeguarding data via snapshots

To minimize data loss impact, we recommend enabling snapshots on C2 Storage. Snapshots allow Hybrid Share folders to be restored to a specified point-in-time version in case of data loss. Only shared folder-level restorations are possible, with all files in the folder restored to a previous version. You can also choose to view the contents of a snapshot taken at a specific time and download specific files and folders from that snapshot.

Administrators can manually take an unlimited number of snapshots, or a schedule can be configured to automatically take a snapshot on a specified day and time of the week. Up to 32 snapshots can be kept (once the limit is reached the oldest snapshot will be deleted unless locked). The snapshot schedule can be customized at: **C2 Storage web portal** > **Hybrid Share** > **Snapshot** > **Snapshot policy** > **Snapshot schedule**.