QTS 4.4.x

User Guide

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1. Overview

NAS Access

Method	Description	Requirements
Web browser	You can access the NAS using any computer on the same network if you have the following information: • NAS name (Example: http://example123/) or IP address • Logon credentials of a valid user account For details, see Accessing the NAS Using a Browser.	• Computer that is connected to the same network as the NAS • Web browser
Qfinder Pro	Qfinder Pro is a desktop utility that enables you to locate and access QNAP NAS devices on a specific network. The utility supports Windows, macOS, Linux, and Chrome OS. For details, see Accessing the NAS Using Qfinder Pro.	• Computer that is connected to the same network as the NAS • Web browser • Qfinder Pro
Qmanager	Qmanager is a mobile application that enables administrators to manage and monitor NAS devices on the same network. You can download Qmanager from the Apple App Store and the Google Play Store. For details, see Accessing the NAS Using Qmanager.	• Mobile device that is connected to the same network as the NAS • Qmanager
Explorer (Windows)	You can map a NAS shared folder as a network drive to easily access files using Explorer. For details on mapping shared folders, see Mapping a Shared Folder on a Windows Computer.	• Windows computer that is connected to the same network as the NAS • Qfinder Pro
Finder (macOS)	You can mount a NAS shared folder as a network drive to easily access files using Finder. For details on mounting shared folders, see Mounting a Shared Folder on a Mac Computer.	• Mac computer that is connected to the same network as the NAS • Qfinder Pro

Accessing the NAS Using a Browser

1. Verify that your computer is connected to the same network as the NAS.
2. Open a web browser on your computer.
3. Type the IP address of the NAS in the address bar.

Tip
If you do not know the IP address of the NAS, you can locate it using Qfinder Pro.
For details, see Accessing the NAS Using Qfinder Pro.

The QTS login screen appears.

4. Specify your username and password.
5. Click **Login**.
The QTS desktop appears.

Accessing the NAS Using Qfinder Pro

1. Install Qfinder Pro on a computer that is connected to the same network as the NAS.

Tip
To download Qfinder Pro, go to https://www.qnap.com/en/utilities.

2. Open Qfinder Pro.
Qfinder Pro automatically searches for all QNAP NAS devices on the network.
3. Locate the NAS in the list, and then double-click the name or IP address.
The QTS login screen opens in the default web browser.
4. Specify your username and password.
5. Click **Login**.
The QTS desktop appears.

Accessing the NAS Using Qmanager

1. Install Qmanager on an Android or iOS device.

Tip
To download Qmanager, go to the Apple App Store or the Google Play Store.

2. Open Qmanager.
3. Tap **Add NAS**.
Qmanager automatically searches for all QNAP NAS devices on the network.
4. Locate the NAS in the list, and then tap the name or IP address.
5. Specify your username and password.
6. Optional: If your mobile device and NAS are not connected to the same subnet, perform one of the following actions.

Action	Steps
Add NAS manually	**a.** Tap **Add NAS manually**. **b.** Specify the following information. • Host name or IP address of the NAS • Password of the admin account **c.** Tap **Save**.

Action	Steps
Sign in using QID	**a.** Tap **Sign in QID**. **b.** Specify the following information. • Email address that you used to create your QNAP account • Password of your QNAP account **c.** Tap **Sign in**. **d.** Locate the NAS in the list, and then tap the name or IP address.

2-step Verification

2-step verification enhances the security of user accounts. When the feature is enabled, users are required to specify a six-digit security code in addition to the account credentials during the login process.

To use 2-step verification, you must install an authenticator application on your mobile device. The application must implement verification services using the Time-based One-time Password Algorithm (TOTP). QTS supports Google Authenticator (for Android, iOS, and BlackBerry) and Authenticator (for Windows Phone).

Enabling 2-step Verification

1. Install an authenticator application on your mobile device.
   QTS supports the following applications:
   - Google Authenticator: Android, iOS, and BlackBerry
   - Authenticator: Windows Phone
2. Verify that the system times of the NAS and mobile device are synchronized.

Tip
QNAP recommends connecting to an NTP server to ensure that your NAS follows the Coordinated Universal Time (UTC) standard.

3. In QTS, go to **Options** > **2-step Verification** .
4. Click **Get Started**.
   The **2-step Verification** window opens.
5. Open the authenticator application on your mobile phone.
6. Configure the application by scanning the QR code or specifying the security key displayed in the **2-step Verification** window.
7. In the **2-step Verification** window, click **Next**.
   The **Confirm your 2-step verification settings** screen appears.
8. Specify the security code generated by the authenticator application.
9. Select an alternative verification method that will be used whenever your mobile device is inaccessible.

Method	Steps
Answer a security question.	Select one of the options or provide your own security question.

Method	Steps
Email a security code.	**a.** Go to **Control Panel** > **Notification Center** > **Service Account and Device Pairing** > **Email** . **b.** Verify that the SMTP server is correctly configured.

10. Click **Finish**.

Logging in to QTS Using 2-step Verification

1. Specify your username and password.
2. Specify the security code generated by the authenticator application installed on your mobile device.
3. Optional: If your mobile device is inaccessible, click **Verify another way**.
4. Specify the answer to the security question.
5. Click **Login**.

Disabling 2-step Verification

Situation	User Action	Steps
Users are locked out of their accounts.	Administrators can disable 2-step verification from the Control Panel.	1. Go to **Control Panel** > **Privilege** > **Users** . 2. Identify a locked out user, and then click . 3. Deselect **2-step Verification**. 4. Click **OK**.
An administrator is locked out and no other administrators can access the account.	An administrator must restore the factory settings.	Press the RESET button on the back of the NAS for three seconds. The NAS restores the default administrator password and network settings. **Note** For information on the default admin password, see Backup/ Restore. **Warning** Pressing the RESET button for 10 seconds resets all settings and deletes all data on the NAS.

About QTS

QTS is a Linux-based operating system that runs applications for file management, virtualization, surveillance, multimedia, and other purposes. The optimized kernel and various services efficiently manage system resources, support applications, and protect your data. QTS also has built-in utilities that extend the functionality and improve the performance of the NAS.

The multi-window, multitasking user interface helps you to manage the NAS, user accounts, data, and apps. Out of the box, QTS provides built-in features that allow you to easily store and share files. QTS also contains App Center, which offers additional downloadable applications for customizing the NAS and improving user workflows.

What's New in QTS 4.4.x

- Modified folder permissions and access right settings for mounted SMB and NFS shared folders.
- Malware Remover is now a built-in utility for QTS.
- Network & Virtual Switch now supports single root input/output virtualization (SR-IOV).
- Users can now send usage data to QNAP to help optimize product design and enhance user experience.
- Users can now choose to recover their password via an email notification if they forgot the password.
- File Station now supports HEIC and HEIF images.
- VJBOD Cloud now supports more cloud storage services.

For details on new features and enhancements, go to https://www.qnap.com/en/release-notes/.

QTS Navigation

Task Bar

No.	Element	Possible User Actions
1	**Show Desktop**	Click the button to minimize or restore all open windows.
2	**Main Menu**	Click the button to open the **Main Menu** panel on the left side of the desktop.
3	**Search**	• Type key words to locate settings, applications, and help content. • Click an entry in the search results to open the application, system utility, or **Help Center** window. If the application is not yet installed, QTS opens the corresponding download screen in the **App Center** window.

No.	Element	Possible User Actions

4	**Volume Control**
	
	Note
	This feature is only available on models with certain hardware specifications.
		Click the button to view the following:
		• Media Volume: Click and drag the slider thumb to adjust the audio volume for applications that use the built-in speaker or line-out jack.
		  • HD Station
		  • Music Station
		  • OceanKTV
		• Audio Alert Volume: Click and drag the slider thumb to adjust the volume of system audio alerts.

5	**Background Tasks**	• Position the mouse pointer over the button to see the number of background tasks that are running. Examples of background tasks are file backup and multimedia conversion.
		• Click the button to see the following details for each background task:
		  • Task name
		  • Task description
		  • Progress (percentage of completion)
		• Click ◼ to stop a task.

6	**External Devices**	• Position the mouse pointer over the button to view the number of external storage devices and printers that are connected to the USB and SATA ports on the NAS. • Click the button to view the details for each connected device. • Click a listed device to open File Station and view the contents of the device.

No.	Element	Possible User Actions

7	**Event Notifications**	• Position the mouse pointer over the button to see the number of recent errors, warnings, and notices.
		• Click the button to view the following details for each event:
		  • Event type
		  • Description
		  • Timestamp
		  • Number of instances
		• Click a list entry to view the related utility or application screen.
		Clicking a warning or error log entry opens the **System Logs** window.
		• Click **More>>** to open the **System Logs** window.
		• Click **Clear All** to delete all list entries.
		Tip
		You can create notification rules using Notification Center. For details, see System Notification Rules.

8	**Options**	Click your profile picture to open the **Options** screen. For details, see Options.

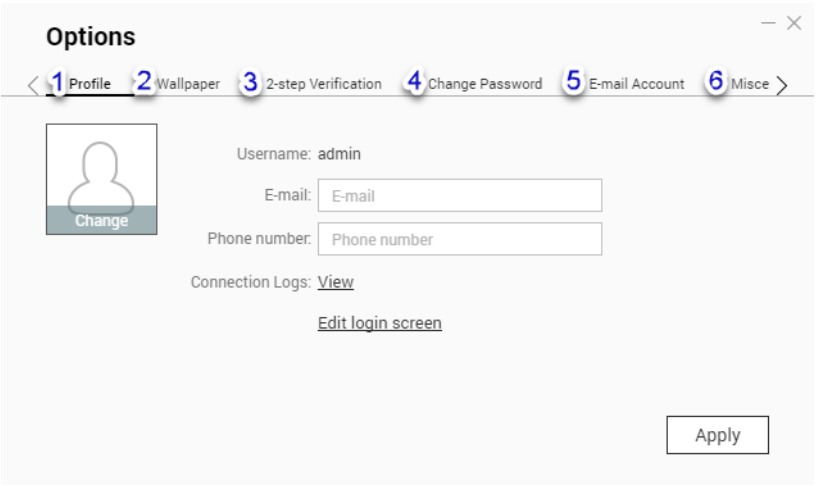
9	**[USER_NAME]**	Click the button to view the last login time and the following menu items:
		• **Options**: Opens the **Options** window
		For details, see Options.
		• **Sleep**: Keeps the NAS powered on but significantly reduces power consumption
		This feature is only available on models with certain hardware specifications.
		• **Restart**: Restarts the NAS
		• **Shutdown**: Shuts down QTS and then powers off the NAS
		Tip
		You can also power off the NAS using one of the following methods:
		  • Press and hold the power button for 1.5 seconds.
		  • Open Qfinder Pro, and then go to **Tools** > **Shut down Device** .
		  • Open Qmanager, and then go to **Menu** > **System Tools** > **System** . Tap **Shutdown**.
		• **Logout**: Logs the user out of the current session

No.	Element	Possible User Actions

10	**More**	Click the button to view the following menu items:
		• **Help**: Displays links to the Quick Start Guide, Virtualization Guide, Help Center, and online tutorials page
		• **Language**: Opens a list of supported languages and allows you to change the language of the operating system
		• **Desktop Preferences**: Opens a list of display modes and allows you to select your preferred mode of displaying the QTS desktop based on your device type
		• **Help Request**: Opens the Helpdesk window
		• **Data & Privacy**: Opens the **QNAP Privacy Policy** page
		• **About**: Displays the following information:
		  • Operating system
		  • Hardware model
		  • Operating system version
		  • Number of installed drives
		  • Number of empty drive bays
		  • System volume name
		  • Used disk space
		  • Available disk space

11	**Dashboard**	Click the button to display the dashboard. For details, see Dashboard.

Options



No.	Tab	Possible User Actions

1	**Profile**	• Specify the following optional information:
		  • Profile picture
		  • Email address
		  • Phone number
		• Click **View** to display the **System Connection Logs** screen.
		• Click **Edit login screen** to open the **Login Screen** configuration screen in the **Control Panel** window.
		• Click **Apply** to save all changes.

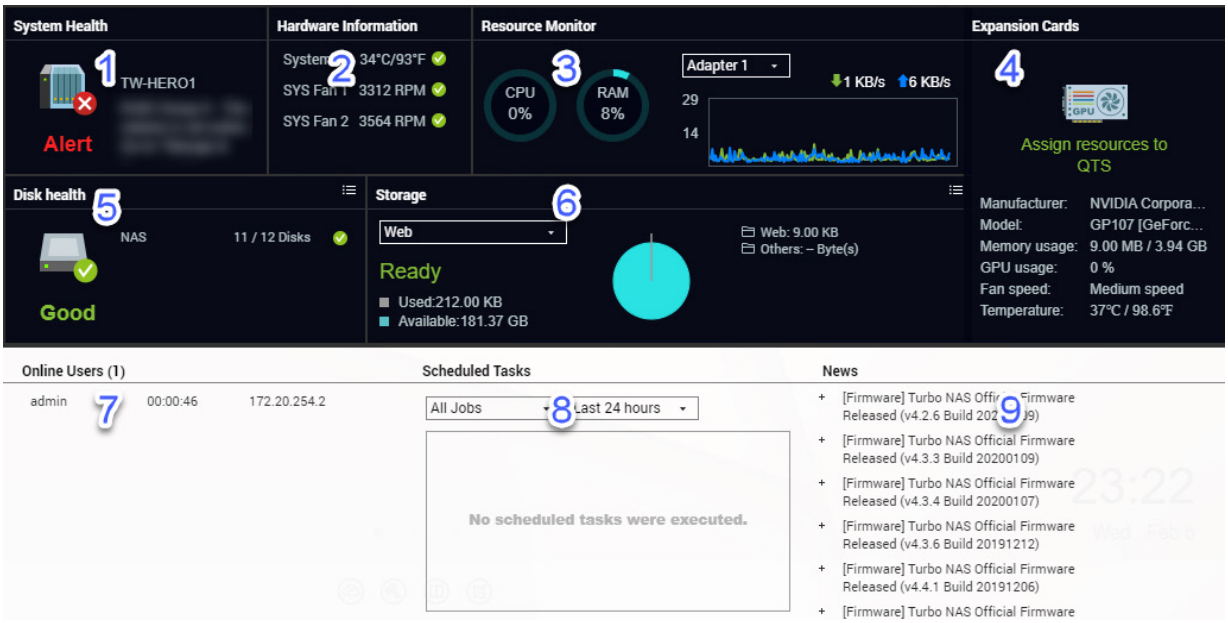
2	**Wallpaper**	• Select a wallpaper from the built-in options or upload a photo. • Click **Apply** to save all changes.
3	**2-step Verification**	Click **Get Started** to open the configuration wizard. For details, see Enabling 2-step Verification.

4	**Change Password**	• Specify the following information to change your password.
		  • **Old password**
		  • **New password**: Specify a password with a maximum of 64 characters. QNAP recommends using passwords with at least 6 characters.
		• Specify an email address to receive a notification email to recover your password if you forgot the password.
		You need to configure SMTP settings in Notification Center to use this feature.
		• Click **Apply** to save all changes.

5	**E-mail Account**	• Add, edit, and delete email accounts to use when sharing files. • Click **Apply** to save all changes.

No.	Tab	Possible User Actions
6	**Miscellaneous**	• Enable the following settings as necessary. • **Auto logout after an idle period**: Specify the duration of inactivity after which the user is automatically logged out. • **Warn me when leaving QTS**: When enabled, QTS prompts users for confirmation whenever they try to leave the desktop (by clicking the Back button or closing the browser). QNAP recommends enabling this setting. • **Reopen windows when logging back into NAS**: When enabled, the current desktop settings (including all open windows) are retained until the next session. • **Show the desktop switching button**: When enabled, QTS displays the desktop switching buttons **< >** on the left and right sides of the desktop. • **Show the link bar on the desktop**: When enabled, QTS displays the link bar on the bottom of the desktop. • **Show the Dashboard button**: When enabled, QTS displays the button to show the dashboard on the taskbar. • **Show the NAS time on the desktop**: When enabled, QTS displays the current NAS time, day, and date at the bottom-right of the desktop. • **Keep Main Menu open after selection**: When enabled, QTS keeps the main menu pinned to the desktop after you open it. • **Show a list of actions when external storage devices are detected**: When enabled, QTS displays an **Autoplay** dialog box whenever an external storage device is inserted into a USB or SATA port. • Click **Apply** to save all changes.

Dashboard



The dashboard opens in the lower right corner of the desktop.

Tip
You can click and drag a section onto any area of the desktop.

No.	Section	Displayed Information	User Actions
1	System Health	• NAS name • Uptime (number of days, hours, minutes and seconds) • Health status	Click the heading to open **Control Panel** > **System** > **System Status** > **System Information** . If disk-related issues occur, click the heading to open **Storage & Snapshots**.
2	Hardware Information	• System temperature • CPU fan speed • System fan speed • System fan speed	Click the heading to open **Control Panel** > **System** > **System Status** > **Hardware Information** .
3	Resource Monitor	• CPU usage in % • Memory usage in % • Network upload and download speeds for each adapter.	Click the heading to open **Control Panel** > **System** > **Resource Monitor** > **Overview** .

No.	Section	Displayed Information	User Actions
4	Expansion Cards	For each expansion card: • Assignment (or "Ready" if unassigned) • Manufacturer • Model • Memory usage • GPU usage • Fan speed • Temperature	Click the heading to open **Control Panel** > **System** > **Hardware** > **Expansion Cards** .

5	Disk Health	• Number of installed disks
		• Health status of installed disks
		• Number of VJBOD disks
		• Health status of VJBOD disks
			• Click the heading to open the **Disk Health** screen in **Storage & Snapshots**.
			• Click to switch between disk and NAS information.
			• Click a disk name to view the following information for each installed disk:
			  • Capacity/size
			  • Temperature
			  • Health status
			• Click **Details** to open **Storage & Snapshots** > **Overview** > **Storage** .

6	Storage	For each volume: • Status • Used space • Available space • Folder size For each storage pool: • Status • Used space • Available space • Volume size	• Click the heading to open the **Storage Resource** screen in the **Resource Monitor** window. • Click to switch between volume and storage pool information.

No.	Section	Displayed Information	User Actions
7	Online Users	• User name • Session duration • IP address	Click the heading to open **Control Panel** > **System** > **System Logs** > **Online Users** .
8	Scheduled Tasks	• Task type • Task summary • Task name • Timestamp • Status	Use the filters to view tasks that were executed within a specific period.
9	News	Links to QNAP announcements	Click the heading to open the relevant pages on the QNAP website.

Main Menu

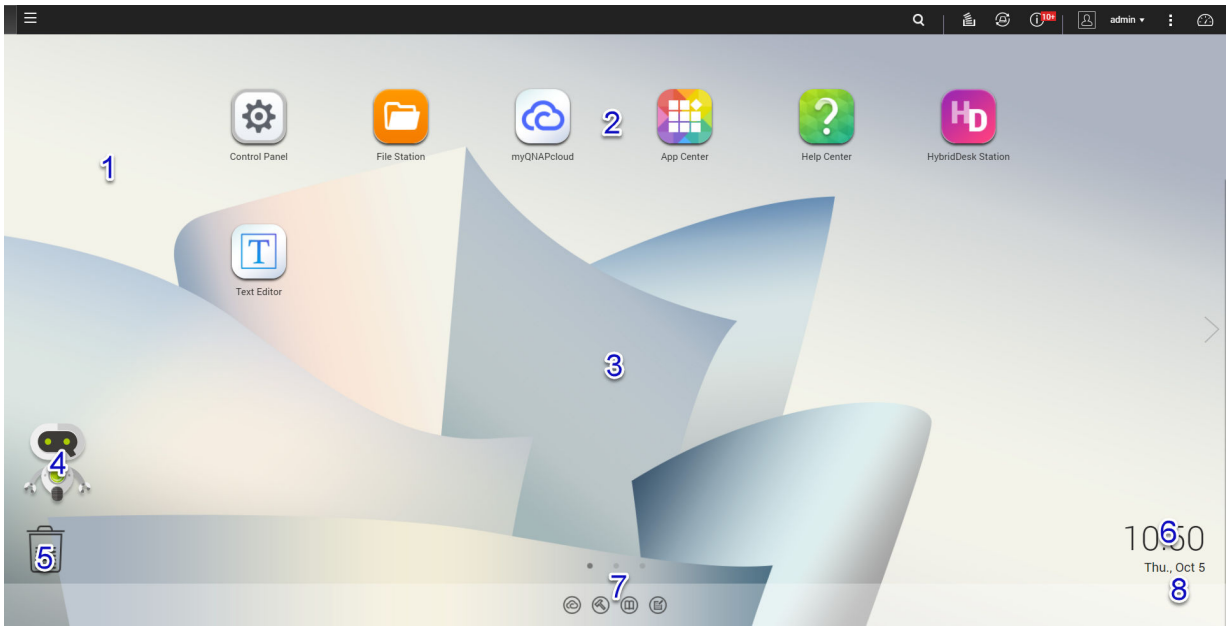
No.	Section	Description	Possible User Actions
1	NAS Information	Displays the NAS name and model number.	N/A

No.	Section	Description	Possible User Actions

2	System	Displays a list of system utilities and other programs that enable you to manage the NAS.
		The following are the default system utilities:
		• Control Panel
		• Storage & Snapshots
		• iSCSI & Fibre Channel
		• Users
		• Network & Virtual Switch
		• myQNAPcloud
		• Resource Monitor
		• App Center
		• Help Center
		• Qboost
		• HDMI Display Applications
		Note
		This menu item only appears on models with certain hardware specifications.
			• Open a system utility or application in the QTS desktop
			  • Click a menu item.
			  • Right-click a menu item and then select **Open**.
			• Open an application in a new browser tab (only for certain apps)
			  • Right-click a menu item and then select **Open in new browser tab**.
			• Create a shortcut on the desktop
			  • Right-click a menu item and then select **Create shortcut**.
			  • Click and drag a menu item to the desktop.

3	Applications	Displays a list of applications developed by QNAP or third-party developers. When an app is installed, it is automatically added to the applications list. The following are the default applications: • Backup Station • File Station • Helpdesk • License Center • Multimedia Console • Notification Center • QTS SSL Certificate	

Desktop



#	Element	Description	Possible User Actions
1	Wallpaper	This is a digital image that is used as a background for the QTS desktop. Users can either select from one of the provided wallpapers or upload an image	Change the wallpaper in the **Options** window.

2	Shortcut icons	This opens an app or a utility. When you install an application, QTS automatically creates a shortcut on the desktop. The following are the default shortcuts:
		• Control Panel
		• File Station
		• Storage & Snapshots
		• App Center
		• Help Center
			• Click an icon to open the application window.
			• Right-click an icon and then select one of the following:
			  • **Open**: Opens the application window
			  • **Remove**: Deletes the icon from the desktop
			• Click and drag an icon to another desktop.

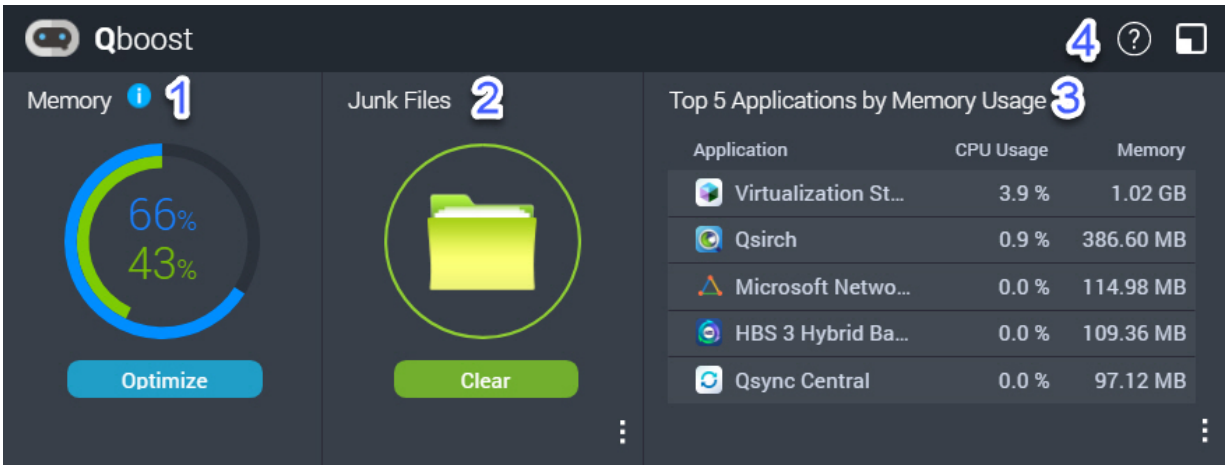
3	Desktop	This area contains open system utilities and applications. The desktop consists of three separate screens.	Click **<** or **>** to move to another desktop.
4	Qboost	This enables you to manage and monitor memory consumption.	• Click or to display the memory status and open the Qboost panel. • Click or to hide the memory status and close the Qboost panel.

#	Element	Description	Possible User Actions

5	Recycle Bin	This displays the list of files that the currently active user moved to the Recycle Bin.
		The following applications provide users a choice between permanently deleting files and moving files to the Recycle Bin.
		• File Station
		• Music Station
		• Photo Station
		• Video Station
			• Click to open the **Recycle Bin** screen in the **File Station** window.
			• Right-click and then select one of the following:
			  • **Open**: Opens the **Recycle Bin** screen in the **File Station** window
			  • **Empty All**: Permanently deletes files in the Recycle Bin
			  • **Settings**: Opens the **Network Recycle Bin** screen in the **Control Panel** window

6	Date and time	This displays the date and time that the user configured during installation of the operating system.	N/A
7	Link bar	This displays shortcut links to myQNAPcloud, utility and app download pages, feedback channels, and the Helpdesk.	Click any of the following buttons: • : Opens the myQNAPcloud website in another browser tab • : Opens the download page for mobile applications and utilities • : Provides links to the QNAP Wiki, QNAP Forum, and Customer Service portal • : Opens the Helpdesk utility
8	Notifications	This notifies the user about important system events that may or may not require user action. Notifications appear in the lower right corner of the desktop.	Click the notification to open the corresponding utility or app.

Qboost



Qboost is a system utility that monitors and enables you to manage memory consumption. It provides the following information:

#	Section	Description	User Actions
1	Memory	A graphic showing memory usage on the NAS. • Blue: Available memory, expressed as a percentage. Available memory is the sum of free memory, buffer memory, cache memory, and other reclaimable memory. • Green: Free memory, expressed as a percentage. Free memory is memory that is currently unused and unallocated.	Click **Optimize** to clear the buffer memory (block level) and cache memory (file level). Hover the pointer over the memory widget to see the amount of available memory and free memory in MB, GB, or TB.

#	Section	Description	User Actions
2	Junk Files	Junk files are unnecessary system files and files in the Recycle Bin, which consume disk space and memory.	• Click **Clear** to permanently delete junk files. By default, clicking **Clear** only deletes unnecessary system files, such as files that the operating system and applications create while performing certain tasks. • Click to select other types of files to delete. Select **Empty Recycle Bin** to include files that were moved to the Recycle Bin by the currently active user.
3	Top 5 Applications by Memory Usage	Top five applications and services that consume the most memory	Click to display all applications and services that can be enabled and disabled from either the Control Panel or the App Center. For details, see Application Management.
4	Qboost taskbar	Taskbar for the Qboost widget	Click to view the Qboost help. Click to close the Qboost widget.

Application Management

Application Management displays the following information.

Item	Description
Application	Displays the application name
CPU Usage	Displays the percentage of consumed processing power
Memory	Displays the amount of memory consumed
CPU Time	Displays the amount of time the CPU requires to process an application request
Status	Displays one of the following statuses: • Always Enabled • Always Disabled • Scheduled
Action	Displays icons for the possible actions

You can perform the following actions.

Objective	Action
Enable or disable an application or service.	• Click to change the status to Always Enabled. • Click to change the status to Always Disabled.

Objective	Action
Create a schedule for enabling and disabling an application or service. **Warning** Setting a schedule may force an application to stop in the middle of a task.	1. Click to open the scheduling screen. 2. Select **Enable Schedule**. The calendar is activated. All days and hours are enabled by default. 3. Select the hours during which the application or service should be enabled or disabled. Hours are filled with one of the following colors or patterns. • Blue: The application or service is enabled. • Gray: The application or service is disabled. • Striped: The NAS is scheduled to sleep or shut down. 4. Optional: If you want to enable the app at a certain time, specify the number of minutes after the hour when the application is enabled or disabled. Example: To enable an application only after half an hour, type 30. 5. Perform one of the following actions. • Click **Apply**: Applies the schedule to the selected application or service • Select **Auto-apply**: Applies the schedule to all applications and services
Delete a schedule.	Click to delete the schedule and disable an application or service.
Remove an application.	Click . This function applies only to applications that are available in App Center.

Getting Started

1. Log in to the NAS as an administrator.
   The default administrator account is `admin`.
   For details, see NAS Access.
2. Plan how you want to combine or divide the available storage space.
   For details, see Volume Configuration.
3. Optional: Create one or more storage pools.
   You must create at least one storage pool in order to create multiple volumes.
   For details, see Creating a Storage Pool.
4. Create one or more volumes.
   You must create at least one volume in order to store files on the NAS.
   For details, see Volume Creation.
5. Create user accounts.
   QNAP recommends creating a user account for each person that requires access to the NAS.
   For details, see Creating a Local User.
6. Optional: Create user groups.

User groups help you to easily manage user accounts.
For details, see Creating a User Group.

7. Optional: Create shared folders.
   QTS creates four default shared folders.
   For details, see Shared Folders.

8. Edit shared folder permissions.
   Permissions enable you to control who can view and modify files in a shared folder.
   For details, see Shared Folder Permissions.

9. Map the shared folders as network drives on your computer.
   For details, see Shared Folder Access.

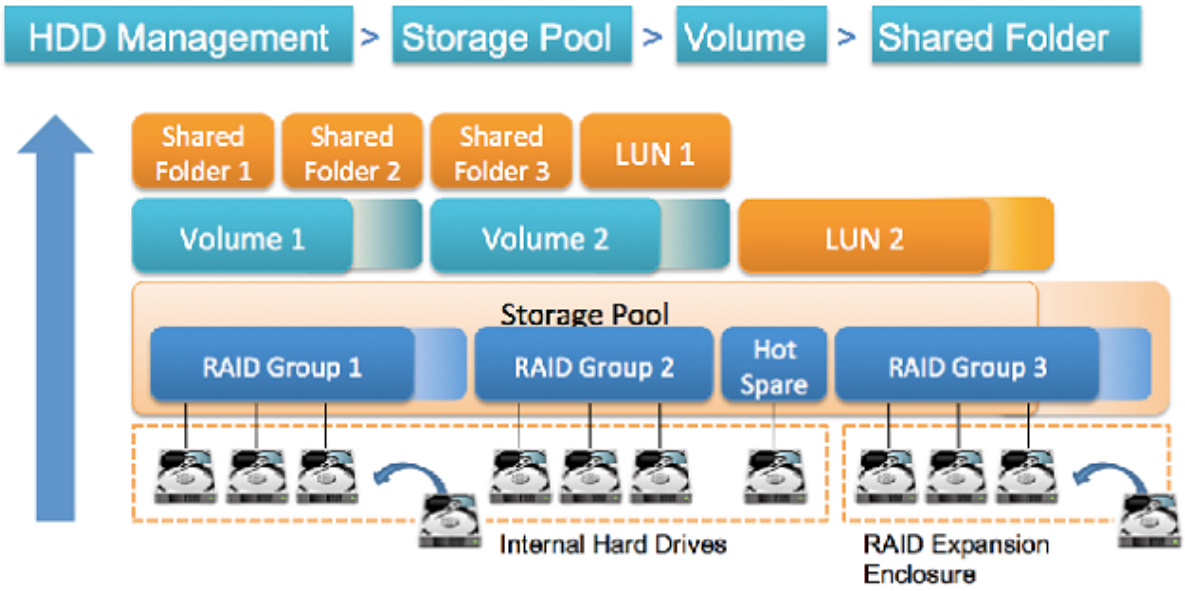
10. Store and manage files.
    For details, see File Station.

2. Storage & Snapshots

Storage & Snapshots is a QTS utility that helps you create, manage, and monitor storage on your NAS. With Storage & Snapshots you can perform the following tasks:

- Create RAID groups, storage pools, and shared folders.
- Monitor storage usage and access speeds.
- Back up data using snapshots.
- Accelerate the performance of your NAS by creating an SSD cache.
- Specify which hosts (computers, servers, other NAS devices) are allowed to access the NAS.

QTS Flexible Volume Architecture



QTS Flexible Volume Architecture

Object	Description	Details
Disk	A physical device that stores and retrieves data.	QTS restricts which type of disk can be used for SSD cache and storage space (static volumes and storage pools). For details, see Disk Types.
RAID group	A group of one or more disks combined into one logical disk. RAID groups usually contain disks that are of the same type and capacity.	Data is distributed across the disks in a RAID group. Each RAID type offers a different combination of reliability, performance, and capacity. For details, see RAID.
Storage pool	A pool of storage space consisting of one or more RAID groups.	Storage pools can aggregate RAID groups that consist of disks of different types and capacities. Storage pools enable easier storage space management and features such as snapshots.

Object	Description	Details
Volume	A portion of storage space that is used to divide up and manage space on the NAS.	You can create volumes by dividing up storage pool space, or using the space of a RAID group. QTS offers three different volume types, with different combinations of performance and flexibility. **Important** You must create at least one volume before the NAS can start storing data.
iSCSI LUN (logical unit number)	A portion of storage space that can be used by other NAS devices, servers and desktop computers using the iSCSI protocol.	QTS offers two LUN types. • Block-based LUN: Created from a storage pool. It is similar to a volume, except that it has no file system and must be linked to an iSCSI host. • File-based LUN: Created on a volume. It is similar to an ISO image file.
Shared folder	A folder that is used for storing and sharing files.	Shared folders are created on volumes. QTS automatically creates a set of default shared folders. You can create more shared folders and configure permissions for each.

Global Settings

You can access global settings by clicking in the Storage & Snapshots window.

Storage Global Settings

Setting	Description
RAID Resync Priority	Specify the minimum speed of the following RAID operations: • Rebuild • Migration • Scrubbing • Sync You can select one of the following priorities: • **Service First**: QTS performs RAID operations at lower speeds in order to maintain NAS storage performance. • **Default**: QTS performs RAID operations at the default speed. • **Resync First**: QTS performs RAID operations at higher speeds. Users may notice a decrease in NAS storage performance while RAID operations are in progress. **Important** This setting only affects RAID operation speeds when the NAS is in use. When the NAS is idle, all RAID operations are performed at the highest possible speeds.

Setting	Description
RAID Scrubbing Schedule	Enable this feature to periodically scan for and fix bad sectors on RAID 5 and RAID 6 groups.
Auto Reclaim and SSD Trim Schedule	Enable this feature to periodically run the following operations on all thin volumes and SSDs: • Auto Reclaim: QTS returns unused storage space to the parent storage pool when files are deleted from thin volumes. • SSD Trim: QTS tells the SSD firmware which data blocks it is safe to erase when performing garbage collection. This helps maintain the SSD's write performance and lifespan. By default, the operations are scheduled to run daily at 2:00 AM. SSD Trim is only performed on solid state drives that belong to a RAID 0, RAID 1, or RAID 10 group. **Tip** You should enable this feature if you have one or more of the following storage items: • Thin volumes • SSD RAID groups of type: Single, RAID 0, RAID 1, RAID 10 **Note** To reclaim space on a thin LUN, the reclaim must be run on the iSCSI client.
Scheduled File System Check	Enable this feature to scan and automatically fix all volumes that have file system errors at a later date.

Disk / Device Global Settings

Setting	Description
Activate Predictive S.M.A.R.T. Migration	Enable this feature to regularly monitor disk health. If S.M.A.R.T. errors are detected on a disk, QTS displays a warning and then begins migrating data from the faulty disk to a spare disk. After the migration is finished, the healthy disk is used in place of the faulty disk. This process is safer than manually initiating a full RAID rebuild after a disk has failed.
Use SSD estimated remaining life with S.M.A.R.T. disk migration	Enable this feature to migrate data from an SSD to a spare disk and rebuild the RAID group when the SSD's estimated remaining life falls below 5%.
S.M.A.R.T. polling time	Specify how often QTS checks disks for S.M.A.R.T. errors in minutes.
Disk Temperature Alarm	Enable this feature to monitor the disk temperatures. QTS displays a warning when the disk temperature is equal to or above the specified threshold. You can set separate thresholds for hard disk drives and solid state drives.

Setting	Description
TLER/ERC Timer	Enable this feature to specify a maximum response time of all disks in seconds. When a disk encounters a read or write error, it may become unresponsive while the disk firmware attempts to correct the error. QTS might interpret this unresponsiveness as a disk failure. Enabling this feature ensures that a disk has sufficient time to recover from a read or write error before QTS marks it as failed and initiates a RAID group rebuild. **Tip** • This setting is also known as Error recovery control (ERC), Time-limited error recovery (TLER) or Command completion time limit (CCTL). • When this feature is disabled, QTS uses the default TLER/ERC settings specified by the disk manufacturer.
Check for expansion unit firmware updates at login	Automatically check online for newer firmware for each expansion unit connected to the NAS. If QTS detects newer firmware, it will ask whether you want to install it.
Share my disk analysis data with QNAP	Send anonymous disk analysis data and NAS system information to QNAP to improve future products. QNAP does not collect any user data. You can opt out of this program at any time.

Snapshot Global Settings

Setting	Description
Smart Snapshot Space Management	Enable this feature to automatically delete the oldest snapshots when the available snapshot storage space (guaranteed snapshot space plus free storage pool space) is less than 32GB. You can choose to exclude the most recent snapshot, or snapshots that were created with the setting **Keep this snapshot permanently**. **Important** If QTS is unable to create 32GB of free snapshot space, it will not create any new snapshots.
Enable File Station Snapshot Directory for administrators	Enable this feature to consolidate all available snapshots into a centralized folder in File Station. You can restore files and folders from the snapshot directory by copying them into another folder.
Make snapshot directory (@Recently-Snapshot) visible in shared folder root	Enable this feature to show a read-only folder `@Recently-Snapshot` at the root level of each shared folder, containing all of the shared folder's snapshots. You can restore files and folders from `@Recently-Snapshot` by copying them into another folder.
When the number of snapshots reaches maximum	Specify the default QTS behavior after a volume, LUN, or NAS reaches its maximum number of snapshots. You can choose one of the following behaviors: • Overwrite the oldest snapshot when taking a new one. • Stop taking snapshots.

Setting	Description
Use timezone GMT+0 for all new snapshots	Enable this feature to use the GMT+0 time zone in the file names of new snapshots. This file naming convention can simplify snapshot management especially when working with snapshots from NAS devices located in different time zones. This setting only applies to new snapshots. Existing snapshots are not renamed.
Show hidden files in Snapshot Manager	Enable this feature to display hidden files in Snapshot Manager. This setting does not affect files inside the File Station Snapshot Directory.
Enable Windows Previous Versions	When enabled, Windows users can view and restore files from snapshots using the Previous Versions feature in Windows. You can disable this feature for individual folders by modifying the folder's properties.

Storage

QTS provides a flexible storage architecture that enables you to easily manage, store, and share files.

Disks

Disk Types

QTS restricts which type of disk can be used to create SSD cache, storage pools, and static volumes.

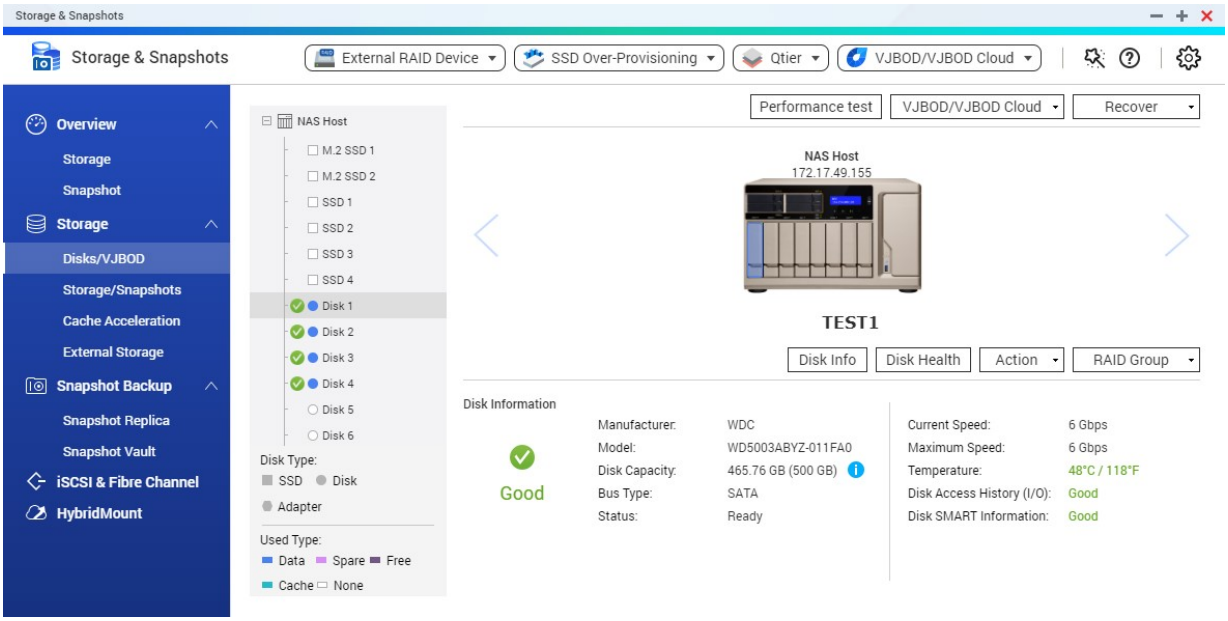
Important

- For compatibility reasons, PCIe form-factor SSDs and PCIe M.2 SSDs installed in third-party adapter cards cannot be used to create storage pools and static volumes.
- If you are already using NVMe PCIe SSDs for data storage, then your existing storage configuration will not be affected after upgrading to the latest version of QTS.

Disk Type	Installation Method	SSD Cache	Storage Pools/Static Volumes
SATA/SAS/NL-SAS 3.5” HDD	NAS drive bay	No	Yes
SATA/SAS 2.5” HDD	NAS drive bay	No	Yes
SATA/SAS 2.5” SSD	NAS drive bay	Yes	Yes
PCIe NVMe M.2 SSD	QM2 card	Yes	Yes
PCIe NVMe M.2 SSD	Third-party M.2 to PCIe adapter card	Yes	No
SATA M.2 SSD	QM2 card	Yes	Yes
SATA M.2 SSD	NAS internal M.2 slot	Yes	Yes
PCIe form-factor SSD	PCIe slot	Yes	No

Disk Management

You can manage disks at **Storage & Snapshots** > **Storage** > **Disks/VJBOD** . Select a disk to view its status and hardware details.



Disk Status

Status	Description
Data	The disk is being used for data storage.
Spare	The disk is configured as a hot spare.
Free	The disk is not in use.
Cache	The disk is being used in the SSD cache.
None	There is no disk in the drive bay.
Warning	QTS has detected S.M.A.R.T. errors. Run a full S.M.A.R.T. test and a disk scan.
Error	QTS has detected I/O errors. You must replace the disk immediately.
Safely Detached	The disk's storage pool or expansion unit was safely detached from the NAS.

Disk Information

Information	Description
Disk Health Status	The general health status of the disk • Good: The disk is healthy. • Warning: QTS has detected an error. Run a full S.M.A.R.T. test and a disk scan. • Error: QTS has detected a critical error. You must replace the disk immediately.
Manufacturer	The manufacturer of the disk
Model	The disk model

Information	Description
Disk Capacity	The capacity of the disk, in both binary and decimal formats **Note** • Binary format assumes that 1 GB = 1,073,741,824 bytes. This is the true capacity of the disk and is used by computers and operating systems such as QTS. • Decimal format assumes that 1 GB = 1,000,000,000 bytes. This format is used by disk manufacturers and appears in advertising, on the disk's box, and in the disk's hardware specifications. • Due to differences in the number of bytes per gigabyte, a disk's binary capacity will be slightly lower than its decimal capacity. For example, a disk advertised as 500 GB (decimal) has a true capacity of 456 GB (binary).
Bus Type	The interface that the disk uses
Status	The hardware status of the disk
Current Speed	The speed at which the disk is connected to the enclosure
Maximum Speed	The maximum transfer speed supported by the drive bay or slot that the disk is installed in
Temperature	The current temperature of the disk Disk temperature is retrieved from the disk's firmware using S.M.A.R.T.
Disk Access History (I/O)	• Good: QTS has not detected any I/O errors on the disk. • Error: QTS has detected one or more I/O errors on the disk.
Disk SMART Information	**Important** If any of the S.M.A.R.T. attribute values reach the threshold set by the disk manufacturer or a predefined threshold determined by QTS, this field will change to `Warning`.
Estimated Life Remaining	The remaining life of the disk, as calculated by the disk's firmware. When the value reaches 0, you should replace the disk. This information is only available for solid-state drives (SSDs).

Disk Actions

Action	Description
Disk Info	Displays disk details, including the disk manufacturer, model, serial number, disk capacity, bus type, firmware version, ATA version, and ATA standard.
Disk Health	Displays disk S.M.A.R.T information. For details, see Disk Health Information.

Action	Description
Scan for Bad Blocks	Scan the disk for bad blocks. **Tip** Run this scan if the disk's status changes to `Warning` or `Error`. If QTS does not detect any bad blocks, the status changes back to `Ready`. To view the number of bad blocks, see **Disk Health** > **Summary** .
Locate	Prompt the drive LEDs to blink so that you can locate the drive in a NAS or expansion unit.
Detach	Remove the disk from its RAID group. The group must be of type: RAID 1, RAID 5, RAID 6, RAID 10.
Set as Enclosure Spare	Assign the disk as a global hot spare for all RAID groups within the same enclosure (NAS or expansion unit). For details, see Configuring an Enclosure Spare Disk.
Disable Spare	Unassign the disk as a global hot spare.
New Volume	Create a new volume. For details, see Volume Creation.
Secure Erase	Permanently erase all data on a disk. For details, see Secure Erase.
RAID Group	Select a RAID group to view its RAID type, capacity, and member disks.

Disk Health Information

Tab	Description	Actions
Summary	Displays an overview of S.M.A.R.T. disk information and the results from the most recent disk scan and S.M.A.R.T. test.	No actions
IronWolf Health Management	IronWolf Health Management (IHM) monitors environment and usage conditions, such as temperature, shock, and vibration, and suggests preventative actions to ensure optimal performance for Seagate IronWolf disks. Run an IHM test to view the disk's IHM status.	Click one of the following buttons: • **Test**: Run an IHM test now. • **Set Schedule**: Run the IHM test periodically on a schedule. • **Statistics**: View IHM data read/write statistics.
SSD Features List	Displays all supported SSD ATA features.	No actions

Tab	Description	Actions
SMART Information	Displays S.M.A.R.T. disk information and supported attributes. **Important** If the value of a S.M.A.R.T. attribute reaches the threshold set by the disk manufacturer or a predefined threshold determined by QTS, the SMART attribute's status will change to to `Warning`.	No actions
Test	Run a S.M.A.R.T. disk self-test.	Select one of the following options: • **Rapid Test**: Tests the electrical and mechanical properties of the disk, and a small portion of the disk surface. The test takes approximately one minute. • **Complete Test**: Tests the electrical and mechanical properties of the disk, and the full disk surface. This test duration varies depending on the storage environment.
Settings	Disk settings can be applied individually, or to multiple disks at once.	Configure the following settings: • **Enable temperature alarm**: QTS displays a warning when the disk temperature is equal to or above the specified threshold. • **S.M.A.R.T. Test schedule**: Schedule periodic rapid and complete S.M.A.R.T. disk tests. The results are displayed on the **Summary** screen. • **IronWolf Health Management**: Schedule a daily IHM test for the disk. The results are saved in the selected shared folder, and are displayed on the**IronWolf Health Management** screen. **Tip** You can apply these settings to the current disk, all disks, or to disks with the same type as the current disk (HDD or SSD).

Disk Performance Tests

QTS can test the sequential and random read speeds of your disks.

Important

- The results provided by these tests are specific to the NAS being tested.

- For accurate results, do not use any resource-intensive applications while the tests are running.

Testing Disk Performance Manually

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Click **Performance Test**.
   The **Performance Test** screen appears.
3. Select one or more disks.
4. Click **Performance Test** and then select a test type.

Test Type	Description	Test Results Format
Sequential read	Test sequential read speed.	MB/s
IOPS read	Test random read speed.	IOPS

   A confirmation message appears.
5. Click **OK**.

QTS runs the test and then displays the results on the **Performance Test** screen. To see detailed results for the IOPS read test, select one or more disks and then select **Result** > **IOPS read result** .

Testing Disk Performance on a Schedule

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Click **Performance Test**.
   The **Performance Test** screen appears.
3. Set **Weekly Test** to **On**.
   A confirmation message appears.
4. Click **OK**.

QTS runs a sequential read test for all disks every Monday at 6.30am, and then displays the results on the **Performance Test** screen.

Secure Erase

Secure erase permanently deletes all data on a disk, ensuring that the data is unrecoverable. Using secure erase on an SSD also restores the disk's performance to its original factory state.

Securely Erasing a Disk

Important
Do not disconnect any disks or power off the NAS while secure erase is running.

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Select a free disk.
3. Click **Action**, and then select **Secure Erase**.
   The **Secure Erase** window opens.

4. Optional: Select additional disks to erase.
5. Click **Next**.
6. Select an erase mode.

Mode	Description
Complete	QTS writes over all blocks on the disk with zeros or ones. This mode is the most secure but can take a long time to finish. Select **Customized** to configure the following the erase settings. • Number of rounds: QTS writes over all blocks on the disk the specified number of times. • Overwrite with: Overwrite all blocks with zeros, ones, or a random zero or one.
SSD	QTS issues a solid state drive (SSD) secure erase ATA command. The SSD firmware then erases all data and restores the disk to its original factory performance. **Important** This feature is only supported on specific SSD models.
Fast	QTS overwrites the partition and RAID configuration data on the disk with zeros. This mode is the quickest but is less secure than the other modes.

7. Click **Next**.
8. Enter the administrator password.
9. Click **Apply**.

QTS starts erasing the disk. You can monitor the progress in **Background Tasks**.

Volumes

A volume is a storage space created from a storage pool or RAID group. Volumes are used to divide and manage your NAS storage space.

Tip

- QTS supports the creation of three types of volume. For more information, see Thick, Thin, and Static Volumes.
- When organizing your storage space, you can either create one large volume or multiple smaller volumes. For more information, see Volume Configuration.

Volume Types

Thick, Thin, and Static Volumes

	Volume Type		
	Static	Thick	Thin
Summary	Best overall read/write performance, but does not support most advanced features	Good balance between performance and flexibility	Enables you to allocate storage space more efficiently

	Volume Type		
	Static	**Thick**	**Thin**
Read/write speed	Fastest for random writes	Good	Good
Flexibility	Inflexible A volume can only be expanded by adding extra drives to the NAS.	Flexible A volume can easily be resized.	Very flexible A volume can be resized. Also unused space can be reclaimed and added back into the parent storage pool.
Parent storage space	RAID group	Storage pool	Storage pool
Volumes allowed in parent storage space	One	One or more	One or more
Initial size	Size of the parent RAID group	User-specified	Zero Storage pool space is allocated on-demand, as data is written to the volume. This is called thin provisioning.
Maximum size	Size of the parent RAID group	Size of the parent storage pool	Twenty times the amount of free space in the parent storage pool The size of a thin volume can be greater than that of its parent storage pool. This is called over-allocation.
Effect of data deletion	Space is freed in the volume	Space is freed in the volume	QTS can reclaim the space and add it back into the parent storage pool.
Method of adding storage space	• Add disks to the NAS • Replace existing disks with higher capacity disks	Allocate more space from the parent storage pool	Allocate more space from the parent storage pool
Snapshot support (fast backup and recovery)	No	Yes	Yes
Qtier (automatic data tiering) support	No	Yes	Yes

Legacy Volumes

A legacy volume is a volume created in QTS 3.x or earlier, before QTS had storage pools. A NAS will contain legacy volumes in the following situations:

- A volume was created on a NAS running QTS 3.x or earlier, and then the NAS was updated to QTS 4.0 or later.
- A volume was created on a NAS running QTS 3.x or earlier, and then the disks containing the volume were moved to a different NAS running QTS 4.0 or later.

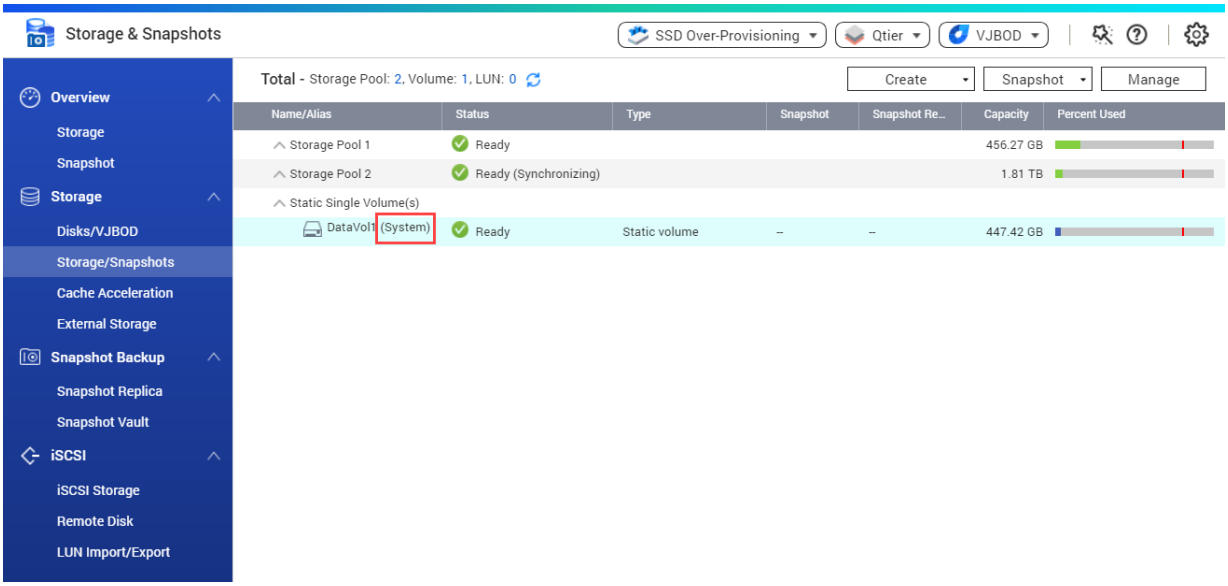
You can use legacy volumes for data storage, but their behavior and status will not be consistent with other volume types. They also cannot use newer QTS features such as snapshots.

Tip
QNAP recommends replacing legacy volumes with newer volumes. To replace a legacy volume, back up all data, create a new thick, thin, or static volume, and then restore the data to the new volume.

The System Volume

The system volume is a regular static or thick volume that QTS uses to store system data such as logs, metadata, and thumbnails. By default, applications are installed to the system volume. If no system volume exists, either because the NAS has recently been initialized or the system volume was deleted, QTS will assign the next static or thick volume that you create as the system volume.

Important
QNAP recommends creating a system volume of at least 10GB. This is to prevent errors caused by insufficient system volume space



Volume Configuration

Volumes divide the NAS storage space into separate areas. You can create one large volume or multiple smaller volumes. Each volume can contain one or more shared folders, which are used to store and share files.

Configuration	Advantage	Description

Single Volume
Example:
• Volume 1
  • Shared Folder 1
  • Shared Folder 2
  • Shared Folder 3
  • Shared Folder 4
	Simplicity	Creating one volume is quick and easy. After the initial setup, you do not have to worry about changing volume sizes or creating new volumes.

	Speed	Single static volumes are faster because they do not require a storage pool.

Configuration	Advantage	Description

Multiple Volumes
Example:
• Volume 1
  • Shared Folder 1
• Volume 2
  • Shared Folder 2
• Volume 3
  • Shared Folder 3
  • Shared Folder 4
	Storage space limits	Each volume functions like a separate container. If a user or an app writes a large amount of files to a volume, only the specified volume is filled. Other volumes remain unaffected.

	Multiple snapshot schedules	Snapshots protect files from accidental deletion or modification. Snapshot creation requires time, memory resources, and storage space. QTS takes snapshots of individual volumes. Using multiple volumes means you can have different snapshot schedules for different file types. For example, you can take hourly snapshots of the volume containing important documents, and weekly snapshots of the volume contain photos and movies.
	Faster file system repair	In certain circumstances such as after a power outage, QTS may encounter errors in the file system of a volume. While QTS can scan the volume and automatically repair errors, this process can take a long time. The required time depends on the volume size. Files on the volume cannot be accessed during the scanning process.

Volume Configuration Examples

Users often purchase NAS devices to store a combination of documents, media, and backups.

The following table compares the advantages and disadvantages of creating a single large volume or multiple smaller volumes.

Requirement	User Goal	Single Volume	Multiple Volumes
Simplicity	Store files	Users create one large thin volume if they want to use snapshots, or one large static volume if they do not. They then create three shared folders on the volume, for documents, movies, and backups.	Users create three separate volumes for documents, movies, and backups. Users must decide how much space to initially allocate to each volume.
Speed	Edit video and audio files	Users create one large single static volume on the NAS. The files are backed up daily to another NAS, or to an external disk.	Users create a thick volume to store the movie files. Random-write performance is slightly lower than a single static volume.
Containerizing storage space	Copy a large number of movie files to the NAS	Users copy the movie files to the movies shared folder. However, they must pay attention to much data they have in the movies folder. If they copy too many files, the volume will become full.	Users copy the movie files to the movies volume. When the volume becomes full, they can increase the volume size.

Requirement	User Goal	Single Volume	Multiple Volumes
Multiple snapshot schedules	Protect document files using snapshots	Users create a daily snapshot schedule for a single volume. The snapshots record all changes made to document files. However, the snapshots also record changes to movie and backup files which wastes resources and storage space.	Users create a daily snapshot schedule for the document volume only.
File system repair	Fix file system errors	QTS must scan the entire single volume, which can take a long time. The volume cannot be accessed during the scanning process, making the entire NAS unusable.	QTS only needs to scan the volume that has an error. Each volume is small, so scanning is relatively quick. Users can still access files on other volumes while the scan is in progress.

Volume Creation

Creating a Static Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Volume**.
One or more volumes or storage pools	Click **Create** > **New Volume** .

   The **Volume Creation Wizard** window opens.

3. Select **Static Volume**.
4. Click **Next**.
5. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.
- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

6. Select one or more disks.

Important

- For data safety, you cannot select disks that have the status `Warning`.
- The status `In Use` means that a disk is currently formatted as an external disk, and may contain current user data.

- If you select a disk with the status `In Use`, QTS will temporarily stop all disk storage services on the NAS in order to unmount the disk, and then delete all data and partitions on the disk.

Warning
All data on the selected disks will be deleted.

7. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
One	Single	Single
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 6, RAID 10 **Important** RAID 10 requires an even number of disks.	RAID 5
Five	JBOD, RAID 0, RAID 5, RAID 6	RAID 6
Six or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50	RAID 6
Eight or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60	RAID 6

Tip
Use the default RAID type if you are unsure of which option to choose.
For details, see RAID Types.

8. Optional: Select the disk that will be used as a hot spare for this RAID group.
   The designated hot spare automatically replaces any disk in the RAID group that fails.
   For details, see RAID Spare Disks.

9. Optional: Select the number of RAID 50 or RAID 60 subgroups.
   The selected disks are divided evenly into the specified number of RAID 5 or 6 groups.

   - A higher number of subgroups results in faster RAID rebuilding, increased disk failure tolerance, and better performance if all the disks are SSDs.
   - A lower number of subgroups results in more storage capacity, and better performance if all the disks are HDDs.

Warning
If a RAID group is divided unevenly, the excess space becomes unavailable. For example, 10 disks divided into 3 subgroups of 3 disks, 3 disks, and 4 disks will provide only 9 disks of storage capacity.

10. Click **Next**.

11. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:

    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen (-), underscore (_)

12. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

> **Tip**
> To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

13. Specify the number of bytes per inode.
    The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.

14. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	• Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. • Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions

Setting	Description	User Actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	• Specify a folder name. • Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

15. Click **Next**.
16. Click **Finish**.
    A confirmation message appears.

Warning
Clicking **OK** deletes all data on the selected disks.

QTS creates and initializes the volume, and then creates the optional shared folder.

Creating a Thick or Thin Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Volume**.
One or more volumes or storage pools	Click **Create** > **New Volume** .

   The **Volume Creation Wizard** window opens.

3. Select the volume type.
   - Thick Volume
   - Thin Volume

   For details, see Volumes.

4. Select a storage pool.
   You can select an existing storage pool or create a new storage pool immediately.
5. Optional: Create a new storage pool.
   a. Click .
      The **Create Storage Pool Wizard** window opens.
   b. Click **Next**.
   c. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important
- You cannot select disks from multiple expansion units.

- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

d. Select one or more disks.

Warning
All data on the selected disks will be deleted.

e. Select a RAID type.
QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
One	Single	Single
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 6, RAID 10	RAID 5
Five	JBOD, RAID 0, RAID 5, RAID 6	RAID 6
Six or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50 **Note** RAID 10 requires an even number of disks.	RAID 6
Eight or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60	RAID 6

Tip
Use the default RAID type if you are unsure of which option to choose.
For details, see RAID Types.

f. Optional: Select the disk that will be used as a hot spare for this RAID group.
The designated hot spare automatically replaces any disk in the RAID group that fails.
For RAID 50 or RAID 60, a spare disk must be configured later. You should configure a global spare disk so that all subgroups share the same spare disk.

g. Click **Next**.

h. Optional: Configure SSD over-provisioning.
Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

i. Configure the alert threshold.
QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.

j. Click **Next**.

k. Verify the storage pool information.

l. Click **Create**.
A confirmation message appears.

Warning
Clicking **OK** deletes all data on the selected disks.

m. Click **OK**.

QTS creates the storage pool. The **Create Storage Pool Wizard** window closes.

6. Click **Next**.
7. Optional: Specify an alias for the volume.
The alias must consist of 1 to 64 characters from any of the following groups:
   - Letters: A to Z, a to z
   - Numbers: 0 to 9
   - Special characters: Hyphen (-), underscore (_)
8. Specify the capacity of the volume.
The volume type determines the maximum volume capacity.

Volume Type	Maximum Size
Thick	Amount of free space in the parent storage pool.
Thin	Twenty times the amount of free space in the parent storage pool

Setting the maximum size of a thin volume to a value that is greater than the amount of free space in the storage pool is called over-allocation.

9. Specify the number of bytes per inode.
The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.
10. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.

Setting	Description	User Actions
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	• Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. • Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	• Specify a folder name. • Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

11. Click **Next**.
12. Click **Finish**.

QTS creates and initializes the volume, and then creates the optional shared folder.

Volume Management

Deleting a Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a volume.

Warning
All data on the selected volume will be deleted.

3. Click **Manage**.
4. Select **Remove** > **Remove Volume** .
   The **Volume Removal Wizard** window opens.
5. Click **Apply**.

Configuring a Volume Space Alert

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a volume.
3. Click **Manage**.
   The **Volume Management** window opens.
4. Click **Actions**, and then select **Set Threshold**.
   The **Alert Threshold** window opens.
5. Enable space alerts.
6. Specify an alert threshold.
   QTS issues a warning notification when the percentage of used space is greater than or equal to the specified threshold.
7. Click **Apply**.

Volume File System Check

A file system check scans for and automatically repairs errors in the file system of a thick, thin, or static volume. QTS will prompt you to start a file system check if it detects file system errors on one or more volumes. You can also run a file system check manually or schedule a one-time check.

Running a File System Check Manually

Warning

- A volume is unmounted and becomes inaccessible while its file system is being checked.
- This process might take a long time, depending on the size of the volume.

Important
QTS will scan the specified volume, even if QTS has not detected any errors on the volume's file system.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a volume.
3. Click **Manage**.
   The **Volume Management** window opens.
4. Click **Actions**, and then select **Check File System**.
   The **Check File System** window opens.
5. Click **OK**.

QTS creates a background task for the file system check. The status of the volume changes to `Checking...`.

Running a One-Time File System Check on a Schedule

Warning

- A volume is unmounted and becomes inaccessible while its file system is being checked.
- This process might take a long time, depending on the size of the volume.

Important
QTS will only scan the specified volume if it has detected errors on the volume's file system.

1. Open **Storage & Snapshots**.
2. Click .
   The **Global Settings** window appears.
3. Click **Storage**.
4. Enable **Scheduled File System Check**.
5. Specify a date and time.
6. Click **Apply**.

Volume Expansion

Expanding a volume increases its maximum capacity so that it can store more data.

Resizing a Thick or Thin Volume

The maximum capacity of thick and thin volumes can be increased or decreased.

Operation	Details
Expand Volume	• The operation can be performed while the volume is online and accessible to users. • For a thick volume, additional space is allocated from the volume's parent storage pool.
Shrink Volume	• Users and applications will be unable to access the volume until the operation is finished. • For a thick volume, the freed space is returned to the volume's parent storage pool.

Volume Type	Maximum Allowed Capacity
Thick	Amount of free space in the parent storage pool.
Thin	Twenty times the amount of free space in the parent storage pool. **Important** Setting the maximum size of a thin volume to a value that is greater than the amount of free space in the storage pool is called over-allocation.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

3. Click **Manage**.
4. Click **Resize Volume**.
   The **Volume Resizing Wizard** opens.
5. Specify a new capacity for the volume.
   Capacity can be specified in megabytes (MB), gigabytes (GB) or terabytes (TB).
6. Optional: Click **Set to Max**.
   Sets the new volume capacity to the maximum available size. This option is only available for thick volumes.
7. Click **Apply**.
   If you are shrinking the volume, a confirmation message appears.
8. Click **OK**.
   The **Volume Resizing Wizard** closes. The volume status changes to `Expanding...` or `Shrinking...`.

After expansion is complete, the volume status changes back to `Ready`.

Expanding a Static Volume by Adding Disks to a RAID Group

The total storage capacity of a static volume can be expanded by adding one or more additional disks to a RAID group in the static volume. This extra capacity can be added online, without any interruption to data access.

Important

- Adding disks to a RAID 1 group changes the RAID type of the group to RAID 5.
- To expand a RAID 50 or RAID 60 group, every sub-group must be expanded with the same number of disks.

1. Verify the following:
   - The storage pool you want to expand contains at least one RAID group of type: RAID 1, RAID 5, RAID 6, RAID 50 or RAID 60.
   - The NAS contains one or more free disks. Each free disk must be the same type as the other disks in the RAID group (either HDD or SSD), and have a capacity that is equal to or greater than the smallest disk in the group.
   - The status of the RAID group that you want to expand is `Ready`.
2. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
3. Select a static volume.
4. Click **Manage**.
   The **Volume Management** window opens.
5. Click **Expand**.
   The **Expand Static Volume Wizard** window opens.
6. Select **Add new disk(s) to an existing RAID group**.
7. Select a RAID group.
   The group must be of type: RAID 1, RAID 5, RAID 6, RAID 50, RAID 60.

8. Click **Next**.
9. Select one or more disks.

Warning
All data on the selected disks will be deleted.

10. Click **Next**.
11. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

12. Click **Next**.
13. Click **Expand**.
    A confirmation message appears.
14. Click **OK**.
15. Optional: For a RAID 50 or RAID 60 volume, repeat these steps for each sub-group.

QTS starts rebuilding the RAID group. The storage capacity of the volume increases after RAID rebuilding is finished.

Expanding a Single Static Volume By Adding a New RAID Group

The storage capacity of a static volume can be expanded by creating a new RAID group and then adding it to the volume. This operation can be performed while the volume is online and accessible to users. QTS writes data linearly to storage pools containing multiple RAID groups. This means that QTS writes data to a RAID group until the group is full before writing data to the next RAID group.

Warning

- If a static volume contains multiple RAID groups and one RAID group fails, all data on the volume will be lost. Ensure that you have a complete data backup plan.
- To expand a RAID 50 or RAID 60 pool, you must create a new RAID 50 or 60 group with the same number of disks and sub-groups as the original pool. It is not possible to add additional sub-groups.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a static volume.
3. Click **Manage**.
   The **Volume Management** window opens.
4. Click **Expand**.
   The **Expanding Static Volume Wizard** window opens.
5. Select **Create and add a new RAID group**.
6. Click **Next**.

7. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important
If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

8. Select one or more disks.

Warning
All data on the selected disks will be deleted.

9. Select a RAID type.
QTS displays all available RAID types and automatically selects the most optimized RAID type.

Important

- If the storage pool contains a RAID 1, RAID 5, RAID 6 or RAID 10 group, the new RAID group must also have one of the mentioned RAID types.
- For RAID 50 or RAID 60, you cannot select a different RAID type.

10. Optional: Select the disk that will be used as a hot spare for this RAID group.
For details, see Configuring a RAID Group Hot Spare.

11. Click **Next**.

12. Optional: Configure SSD over-provisioning.
Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

13. Click **Next**.

14. Click **Expand**.
A confirmation message appears.

15. Click **OK**.

QTS creates the new RAID group and then starts rebuilding the volume. The capacity of the volume increases after RAID rebuilding is finished.

Storage Pools

A storage pool combines many physical disks into one large pool of storage space. Disks in the storage pool are joined together using RAID technology to form RAID groups. Storage pools may contain more than one RAID group.

Using storage pools provides the following benefits:

- Multiple volumes can be created in a storage pool, enabling you to divide the storage space among different users and applications.
- Disks of different sizes and types can be mixed into one large storage space.

- Disks from connected expansion units can be mixed with disks installed in the NAS to form a storage pool.
- Extra disks can be added while the storage pool is in use, increasing storage capacity without interrupting services.
- Qtier provides auto-tiering when a storage pool contains a mix of SATA, SAS, and SSD disks. Qtier automatically moves frequently accessed hot data to the faster SSDs, and infrequently accessed cold data to the slower disks.
- Snapshots can be used with storage pools. Snapshots record the state of the data on a volume or LUN at a specific point in time. Data can then be restored to that time if it is accidentally modified or deleted.
- Multiple RAID 5 or RAID 6 groups can be striped together using RAID 0 to form a RAID 50 or RAID 60 storage pool.

Creating a Storage Pool

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Storage Pool**.
One or more volumes or storage pools	Click **Create**, and then select **New Storage Pool**.

   The **Create Storage Pool Wizard** window opens.

3. Click **Next**.
4. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.
- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

5. Select one or more disks.

Important

- For data safety, you cannot select disks that have the status `Warning`.
- The status `In Use` means that a disk is currently formatted as an external disk, and may contain current user data.
- If you select a disk with the status `In Use`, QTS will temporarily stop all disk storage services on the NAS in order to unmount the disk, and then delete all data and partitions on the disk.

Warning
All data on the selected disks will be deleted.

6. Select a RAID type.

QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
One	Single	Single
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 6, RAID 10	RAID 5
Five	JBOD, RAID 0, RAID 5, RAID 6	RAID 6
Six or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50 **Note** RAID 10 requires an even number of disks.	RAID 6
Eight or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60	RAID 6

Tip
Use the default RAID type if you are unsure of which option to choose.
For details, see RAID Types.

7. Optional: Select the disk that will be used as a hot spare for this RAID group.
   The designated hot spare automatically replaces any disk in the RAID group that fails.
   For RAID 50 or RAID 60, a spare disk must be configured later. You should configure a global spare disk so that all subgroups share the same spare disk.
8. Optional: Select the number of RAID 50 or RAID 60 subgroups.
   The selected disks are divided evenly into the specified number of RAID 5 or 6 groups.
   - A higher number of subgroups results in faster RAID rebuilding, increased disk failure tolerance, and better performance if all the disks are SSDs.
   - A lower number of subgroups results in more storage capacity, and better performance if all the disks are HDDs.

Warning
If a RAID group is divided unevenly, the excess space becomes unavailable. For example, 10 disks divided into 3 subgroups of 3 disks, 3 disks, and 4 disks will provide only 9 disks of storage capacity.

9. Click **Next**.
10. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

11. Optional: Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
12. Click **Next**.
13. Click **Create**.

A confirmation message appears.

14. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Storage Pool Management

Deleting a Storage Pool

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool.
3. Click **Manage**.
4. Click **Remove**, and then select **Remove Pool**.
   A notification window opens.
5. Select **Confirm the removal of every volume/iSCSi LUN/Snapshot Vault on this storage pool**.

Warning
All data in the storage pool will be deleted.

6. Click **OK**.
   The **Remove Pool** window opens.
7. Enter the admin password.
8. Click **OK**.

Configuring a Storage Pool Alert Threshold

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool.
3. Click **Manage**.
4. Select **Actions** > **Set Threshold** .
5. Enable or disable volume space alerts.
6. Specify an alert threshold.
   QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
7. Click **Apply**.

Storage Pool Status

Status	Description
Ready	The storage pool is working normally. All RAID groups in the pool have the status `Ready`.
Warning (Degraded)	One or more RAID groups in the storage pool have the status `Degraded`. There are not enough spare disks available to QTS to rebuild all of the RAID groups.

Status	Description
Warning (Rebuilding)	One or more RAID groups in the storage pool have the status `Degraded (Rebuilding)`. QTS is currently rebuilding them due to disk failure.
Warning (Read-Only)	One or more RAID groups in the storage pool have the status `Not Active`. **Note** It might be possible to recover some data from volumes and LUNs.

Storage Pool Expansion

Expanding a Storage Pool by Adding Disks to a RAID Group

The total storage capacity of a storage pool can be expanded by adding one or more additional disks to a RAID group. This operation can be performed while the pool is online and accessible to users.

Important

- Adding disks to a RAID 1 group changes the RAID type of the group to RAID 5.
- To expand a RAID 50 or RAID 60 group, every sub-group must be expanded with the same number of disks.

1. Verify the following:
   - The storage pool you want to expand contains at least one RAID group of type: RAID 1, RAID 5, RAID 6, RAID 50 or RAID 60.
   - The NAS contains one or more free disks. Each free disk must be the same type as the other disks in the RAID group (either HDD or SSD), and have a capacity that is equal to or greater than the smallest disk in the group.
   - The status of the RAID group that you want to expand is `Ready`.
2. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
3. Select a storage pool.
4. Click **Manage**.
   The **Storage Pool Management** window opens.
5. Select **Expand Pool** > **Expand Pool** .
   The **Expanding Storage Pool Wizard** window opens.
6. Select **Add new disk(s) to an existing RAID group**.
7. Select a RAID group.
   The group must be of type: RAID 1, RAID 5, RAID 6, RAID 50, RAID 60.
8. Click **Next**.
9. Select one or more disks.

Warning
All data on the selected disks will be deleted.

10. Click **Next**.

11. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

12. Click **Next**.
13. Click **Expand**.
    A confirmation message appears.
14. Click **OK**.
15. Optional: For a RAID 50 or RAID 60 pool, repeat these steps for each sub-group.

QTS starts rebuilding the RAID group. The storage capacity of the pool increases after RAID rebuilding is finished.

Expanding a Storage Pool By Adding a New RAID Group

The storage capacity of a storage pool can be expanded by creating a new RAID group and then adding it to the pool. This operation can be performed while the pool is online and accessible to users. QTS writes data linearly to storage pools containing multiple RAID groups. This means that QTS writes data to a RAID group until a group is full before writing data to the next RAID group.

Warning

- If a storage pool contains multiple RAID groups and one RAID group fails, all data in the storage pool will be lost. Ensure that you have a complete data backup plan.
- To expand a RAID 50 or RAID 60 pool, you must create a new RAID 50 or 60 group with the same number of disks and sub-groups as the original pool. It is not possible to add additional sub-groups.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool.
3. Click **Manage**.
   The **Storage Pool Management** window opens.
4. Select **Expand Pool** > **Expand Pool** .
   The **Expand Storage Pool Wizard** window opens.
5. Select **Create and add a new RAID group**.
6. Click **Next**.
7. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.
- You cannot use the disks from a QNAP JBOD enclosure to expand a storage pool which is located on a different enclosure.

- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

8. Select one or more disks.

Warning
All data on the selected disks will be deleted.

9. Select a RAID type.
QTS displays all available RAID types and automatically selects the most optimized RAID type.

Important

- If the storage pool contains a RAID 1, RAID 5, RAID 6 or RAID 10 group, the new RAID group must also have one of the mentioned RAID types.
- For RAID 50 or RAID 60, you cannot select a different RAID type.

10. Optional: Select the disk that will be used as a hot spare for this RAID group.
The designated hot spare automatically replaces any disk in the RAID group that fails.
11. Click **Next**.
12. Optional: Configure SSD over-provisioning.
Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

13. Click **Next**.
14. Click **Expand**.
A confirmation message appears.
15. Click **OK**.

QTS creates the new RAID group and then starts rebuilding the storage pool. The capacity of the pool increases after RAID rebuilding is finished.

Storage Pool Migration

Storage pool migration enables you to safely remove a storage pool and move it to another QNAP NAS. The following data is retained:

- Files and folders
- Storage configuration
- Snapshots

Storage Pool Migration Requirements

The following requirements apply when migrating a storage pool to a new NAS.

- The two NAS devices must both be running QTS, or both be running QuTS hero. QTS to QuTS hero migration is not possible.
- The version of QTS or QuTS hero running on the new NAS must be the same or newer than the version running on the original NAS.

Migrating a Storage Pool to a New NAS

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool.
3. Click **Manage**.
   The **Storage Pool Management** window opens.
4. Click **Action**, and then select **Safely Detach Pool**.
   A confirmation message appears.
5. Click **Yes**.
   The storage pool status changes to `Safely Detaching...` After QTS has finished detaching the pool, it disappears from Storage & Snapshots.
6. Remove the drives containing the storage pool from the NAS.
7. Install the drives in the new NAS.
8. On the new NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
9. Click **Recover**, and then select **Attach and Recover Storage Pool**.
   A confirmation message appears.
10. Optional: Enter the SED password.
    You must enter this password if you were using self-encrypted drives (SEDs) with encryption enabled.
11. Click **Attach**.
    QTS scans the disks and detects the storage pool.
12. Click **Apply**.

The storage pool appears in Storage & Snapshots on the new NAS.

RAID

Redundant array of independent disks (RAID) combines multiple physical disks into a single storage unit, and then distributes data across the disks in one of several predefined methods.

The following features make RAID ideal for use with data storage and NAS applications.

RAID Feature	Description	Advantages	Disadvantages
Grouping	Disks that are combined using RAID form a RAID group, which QTS considers one large logical disk.	Managing the storage space of one large disk is simpler and more efficient than multiple small disks.	Initial configuration can be more complicated.

RAID Feature	Description	Advantages	Disadvantages
Striping	Data is split into smaller pieces. Each piece is stored on a different disk in the RAID group. QTS can then access that data by reading from or writing to multiple disks simultaneously, increasing read and write speeds.	• Greater read/write speeds, compared to a single disk • Speeds can be increased further by adding disks	If one disk in the RAID group fails, and the RAID group has no redundancy, all data will be lost.
Redundancy	Each disk in the RAID group can store the following: • Complete copy of the stored data • Metadata that allows reconstruction of lost data	• Disks can fail or be removed from the RAID group without any loss of data • Users can access data while failed disks are being replaced	Total storage capacity of the RAID group is reduced.

RAID Types

QTS supports several RAID types. Each type provides a different combination of performance and redundancy.

Important

- If disks with different capacities are combined in one RAID group, all disks function according to the capacity of the smallest disk. For example, if a RAID group contains five 2 TB disks and one 1 TB disk, QTS detects six 1 TB disks.
  QNAP recommends the following when mixing disks of different capacities.
  a. Create a separate RAID group for each capacity.
  b. Combine the RAID groups using storage pools.
- If different types of disk (HDD, SSD, SAS) are combined in one RAID group, the RAID group will function according to the speed of the slowest disk.

RAID Type	Number of Disks	Disk Failure Tolerance	Capacity	Overview
Single	1	0	Total disk capacity	• Uses a single disk for storage. • Provides no disk failure protection or performance benefits. • Suitable for single disk configurations that have a data backup plan in place.

RAID Type	Number of Disks	Disk Failure Tolerance	Capacity	Overview
JBOD (just a bunch of disks)	≥ 2	0	Total combined disk capacity	• Combines disks together in a linear fashion. QTS writes data to a disk until it is full before writing to the next disk. • Uses the total capacity of all the disks. • Not a real RAID type. It provides no disk failure protection or performance benefits. • Unless you have a specific reason to use JBOD, you should use RAID 0 instead.
RAID 0	≥ 2	0	Total combined disk capacity	• Disks are combined together using striping. • RAID 0 offers the fastest read and write speeds, and uses the total capacity of all the disks. • Provides no disk failure protection. This RAID type must be paired with a data backup plan. • Recommended for high-performance applications such as video editing.
RAID 1	2	1	Half of the total combined disk capacity	• An identical copy of data is stored on each disk. • Half of the total disk capacity is lost, in return for a high level of data protection. • Recommended for NAS devices with two disks.
RAID 5	≥ 3	1	Total combined disk capacity minus 1 disk	• Data and parity information are striped across all disks. • The capacity of one disk is lost to store parity information. • Striping means read speeds are increased with each additional disk in the group. • Recommended for a good balance between data protection, capacity, and speed.

RAID Type	Number of Disks	Disk Failure Tolerance	Capacity	Overview
RAID 6	≥ 4	2	Total combined disk capacity minus 2 disks	• Data and parity information are striped across all disks. • The capacity of two disks are lost to store parity information. • Recommended for critical data protection, business and general storage use. It provides high disk failure protection and read performance.
RAID 10	≥ 4 (Must be an even number)	1 per pair of disks	Half of the total combined disk capacity	• Every two disks are paired using RAID 1 for failure protection. Then all pairs are striped together using RAID 0. • Excellent random read and write speeds and high failure protection, but half the total disk capacity is lost. • Recommended for applications that require high random access performance and fault tolerance, such as databases.
RAID 50	≥ 6	1 per disk subgroup	Total combined disk capacity minus 1 disk per subgroup	• Multiple small RAID 5 groups are striped to form one RAID 50 group. • Better failure protection and faster rebuild times than RAID 5. More storage capacity than RAID 10. • Better random access performance than RAID 5 if all of the disks are SSDs. • Recommended for enterprise backup with ten or more disks.

RAID Type	Number of Disks	Disk Failure Tolerance	Capacity	Overview
RAID 60	≥ 8	2 per disk subgroup	Total combined disk capacity minus 2 disks per subgroup	• Multiple small RAID 6 groups are striped to form one RAID 60 group. • Better failure protection and faster rebuild time than RAID 6. More storage capacity than RAID 10. • Better random access performance than RAID 6 if all of the disks are SSDs. • Recommended for business storage and online video editing with twelve or more disks.

RAID Spare Disks

Configuring a RAID Group Hot Spare

Assigning a hot spare gives extra protection against data loss. In normal conditions, a hot spare disk is unused and does not store any data. When a disk in the RAID group fails, the hot spare disk automatically replaces the faulty disk. QTS copies the data to the spare disk in a process called RAID rebuilding.

1. Verify that the NAS contains one or more free disks.
2. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
3. Select a storage pool or single static volume.
4. Click **Manage**.
5. Select a RAID 1, RAID, 5, RAID 6, or RAID 10 group.
6. Select **Manage** > **Configure Spare Disk** .
7. Select one or more disks.

Warning
All data on the selected disks will be deleted.

8. Click **Apply**.
   A confirmation message appears.
9. Click **OK**.

The spare disks are added to the RAID group. The disk appears as a green `Spare` in the disks summary at **Disks/VJBOD**.

Configuring an Enclosure Spare Disk

An enclosure space disk acts as a hot spare for all RAID groups within a single enclosure (NAS or expansion unit). Under normal conditions, the enclosure space disk is unused and does not store any data. When a disk in any RAID group fails, the hot spare disk automatically replaces the faulty disk.

Important
Storage enclosures (the NAS and expansion units) cannot share enclosure space disks. A unique spare disk must be assigned to each storage enclosure.

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD**
2. Optional: Select a connected expansion unit.
3. Select a free disk.

Warning
All data on the selected disk will be deleted.

4. Click **Action**, and then select **Set as Enclosure Spare**.
   A confirmation message appears.
5. Click **OK**.

The disk appears as a `Spare` on the **Disks/VJBOD** screen.

RAID Bitmaps

If a disk is temporarily disconnected from its RAID group and then reconnected, the RAID group must synchronize all of its data. This process may take a long time. If the RAID group has a bitmap then only changes that were made after the disk was disconnected need to be synchronized, greatly speeding up the process.

A disk can become temporarily disconnected in the following situations.

- A disk is accidentally removed from the NAS while the NAS is powered on.
- The NAS unexpectedly shuts down because of a hardware or software error.
- A user presses the power button for 10 seconds or disconnects the power cable while the NAS is powered on.

Important

- You can only create bitmaps for RAID 1, RAID 5, RAID 6, and RAID 10 groups.
- Enabling a RAID bitmap may slightly decrease the read and write performance of the RAID group.
- A bitmap improves synchronization time only if the same disk is disconnected then reconnected. Having a bitmap does not improve synchronization time when a new disk is added to the RAID group.

Creating a RAID Bitmap

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool or single static volume.
3. Click **Manage**.
4. Select a RAID 1, RAID 5, RAID 6, or RAID 10 group.
5. Select **Manage** > **Enable Bitmap** .
   A confirmation message appears.

QTS creates a bitmap for the RAID group.

RAID Management

Expanding a RAID Group by Replacing all Disks

You can increase the maximum storage capacity of a RAID group by replacing all member disks with higher-capacity disks. This operation can be performed while the RAID group is online and accessible to users.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool or static volume.
3. Click **Manage**.
4. Select a RAID group of type: RAID 1, RAID 5, RAID 6, RAID 10.
5. Disable all hot spares and global hot spares assigned to the RAID group.
6. Select **Manage** > **Replace Disks One by One** .
7. Select a disk to replace.
   Ensure that the capacity of the new disk is greater than the capacity of the disk that it is replacing.
8. Click **Change**.
   The disk description changes to `Please remove this drive`.
9. Remove the disk from the NAS drive bay.
   The NAS beeps twice. Then the disk description changes to `Please insert the new disk`.
10. Insert a new disk into the same bay.
    The NAS beeps twice. Then the status of the disk and RAID group change to `Rebuilding`.
11. Wait for rebuilding to finish.

    Warning
    Do not remove any disks while the RAID group is rebuilding.

    The disks status changes back to `Good`.
12. Repeat the previous steps until all disks in the RAID group have been replaced.
    The **Expand Capacity** button is enabled after all disks have been replaced and rebuilding has finished.
13. Click **Expand Capacity**.
    A confirmation message appears.
14. Click **OK**.
    The NAS beeps and the RAID group status changes to `Synchronizing`.

Warning
Do not power off the NAS or remove any disks while synchronization is in progress.

The RAID group status changes to `Ready`.

Changing the RAID Type of a RAID Group

You can change the RAID type of an existing RAID group online, without losing access to data or any interruption to NAS services. Changing the RAID type of a RAID group is called RAID migration. QTS allows the following migrations.

Original RAID Type	New RAID Type	Additional Disks Required
Single	RAID 1	One
RAID 1	RAID 5	One or more
RAID 5	RAID 6	One or more

Tip
Migration from a single disk to RAID 6 is performed in stages. First migrate the group to RAID 1, then to RAID 5, and then finally to RAID 6.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Verify the following:
   - The NAS contains one or more available disks.
   - The capacity of each available disk is greater than or equal to the smallest disk in the RAID group.
3. Select a storage pool or static volume.
4. Click **Manage**.
5. Select a RAID group.
6. Select **Manage** > **Migrate** .
7. Select one or more disks.

Warning
All data on the selected disks will be deleted.

8. Click **Apply**.
   A confirmation message appears.
9. Click **OK**.
   The RAID group status changes to `Rebuilding...`.

The RAID type changes to the new type and the RAID group status changes to `Ready` after migration has finished.

Recovering a RAID Group with an Error Status

RAID recovery enables you to recover a RAID group in the event of accidental disk removal or SATA connector failure. When several disks are removed or disconnected from a RAID group:

- The status of the group changes to `Error`.
- The statuses of all volumes and storage pools using the RAID group change to `Inactive`.
- All data on the affected volumes and LUNs becomes inaccessible.

Important
RAID recovery only helps when disks are temporarily disconnected and then reconnected. It does not help in the event of disk failure.

1. Reconnect all disconnected disks.

Important
Ensure that each disk is reinserted into its original drive bay.

2. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
3. Select a storage pool or single static volume with the status `Inactive`.
4. Click **Manage**.
   The **Storage Pool Management** or **Volume Management** window opens.
5. Select a RAID group with the status `Error`.
6. Click **Manage**, and then select **Recover RAID**.

QTS starts to rebuild the RAID group.

Recovering a RAID Group with a Degraded Status

If one of more disks fail in a RAID group, but the number of disk failures is within the tolerance of the group's RAID type,then the following events occur:

- The statuses of the RAID group and its storage pool change to `Degraded`.
- Data on the RAID group and affected storage pool remains accessible.

1. Ensure you have one or more free disks in the NAS.
2. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
3. Select a storage pool or single static volume with the status `Degraded`.
4. Click **Manage**.
   The **Storage Pool Management** or **Volume Management** window opens.
5. Select a RAID group with the status `Degraded`.
6. Click **Manage**, and then select **Rebuild RAID Group**.
   The **Rebuild RAID Group** window opens.
7. Click **Rebuild**.
8. Select one or more disks.
   QTS displays the number of disks that you must select, according to the number of disk failures.
9. Click **Apply**.

QTS starts to rebuild the RAID group.

RAID Scrubbing

RAID scrubbing helps maintain the consistency of data on the NAS. QTS scans the sectors of a RAID 5 or RAID 6 group and automatically attempts to repair any detected errors. You can run RAID scrubbing manually, or on a schedule.

Tip
QNAP recommends performing RAID scrubbing at least once a month to maintain system health and prevent data loss.

Running RAID Scrubbing Manually

Warning
The read/write speeds of the RAID group may decrease while RAID scrubbing is in progress.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a storage pool or static volume.
3. Click **Manage**.
4. Select a RAID 5 or RAID 6 group.
   The RAID group status must be `Ready`.
5. Select **Manage** > **RAID Scrubbing** .

The RAID group status changes to `Scrubbing`.

Running RAID Scrubbing on a Schedule

You can schedule periodic RAID scrubbing of all RAID 5 and RAID 6 groups.

Warning
The read/write speeds of the RAID group may decrease while RAID scrubbing is in progress.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Click the **Global Settings** icon .
   The **Global Settings** menu opens.
3. Enable **RAID Scrubbing Schedule**.
4. Specify how often data scrubbing will run.
   - Daily
   - Weekly
   - Monthly
5. Specify when data scrubbing will run.

Tip
QNAP recommends specifying a time when the NAS is not in use, such as after business hours or on weekends.

6. Click **Apply**.

Data scrubbing will run according to the specified schedule. When data scrubbing is running on a RAID group, the status of the group changes to `Scrubbing`.

Self-Encrypting Drives (SEDs)

A self-encrypting drive (SED) is a drive with encryption hardware built into the drive controller. An SED automatically encrypts all data as it is written to the drive and decrypts all data as it is read from the drive. Data stored on an SED is always fully encrypted by a data encryption key (DEK). The DEK can also be encrypted by a user-specified authentication key (AK) that allows the SED to be locked and unlocked. Both encryption keys are stored in the drive's hardware and cannot be accessed by the host operating system or unauthorized users.

Creating an SED Secure Storage Pool

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Storage Pool**.
One or more volumes or storage pools	Click **Create**, and then select **New Storage Pool**.

   The **Create Storage Pool Wizard** window opens.

3. Click **Next**.
4. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.
- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

5. Select **Create SED secure storage pool**.
   The list of disks only displays SED disks.
6. Select one or more disks.

Warning
All data on the selected disks will be deleted.

7. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
One	Single	Single
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 6, RAID 10	RAID 5
Five	JBOD, RAID 0, RAID 5, RAID 6	RAID 6
Six or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50 **Note** RAID 10 requires an even number of disks.	RAID 6

Number of disks	Supported RAID Types	Default RAID Type
Eight or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60	RAID 6

Tip
Use the default RAID type if you are unsure of which option to choose.
For details, see RAID Types.

8. Optional: Select the disk that will be used as a hot spare for this RAID group.
   The designated hot spare automatically replaces any disk in the RAID group that fails.
   For RAID 50 or RAID 60, a spare disk must be configured later. You should configure a global spare disk so that all subgroups share the same spare disk.
9. Optional: Select the number of RAID 50 or RAID 60 subgroups.
   The selected disks are divided evenly into the specified number of RAID 5 or 6 groups.
   - A higher number of subgroups results in faster RAID rebuilding, increased disk failure tolerance, and better performance if all the disks are SSDs.
   - A lower number of subgroups results in more storage capacity, and better performance if all the disks are HDDs.

Warning
If a RAID group is divided unevenly, the excess space becomes unavailable. For example, 10 disks divided into 3 subgroups of 3 disks, 3 disks, and 4 disks will provide only 9 disks of storage capacity.

10. Click **Next**.
11. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

12. Optional: Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
13. Specify the SED password.
    The SED password must consist of 8 to 32 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Any except for space ( )

Warning
Remember this password. If you forget the password, the pool will become inaccessible and all data will be unrecoverable.

14. Optional: Save the encryption key to the local NAS

Saving the encryption key enables QTS to automatically unlock and mount the SED pool when the NAS starts up. If the encryption key is not saved, you must specify the encryption password every time the NAS restarts.

Warning
Saving the encryption key can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.

15. Click **Next**.
16. Click **Create**.
    A confirmation message appears.
17. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Creating an SED Secure Static Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Volume**.
One or more volumes or storage pools	Click **Create** > **New Volume** .

The **Volume Creation Wizard** window opens.

3. Select **Static volume**.
4. Click **Next**.
5. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.
- If the expansion unit is disconnected from the NAS, the storage pool becomes inaccessible until it is reconnected.

6. Select **Create SED secure static volume**.
   The list of disks only displays SED disks.
7. Select one or more disks.
8. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
One	Single	Single
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5

Number of disks	Supported RAID Types	Default RAID Type
Four	JBOD, RAID 0, RAID 5, RAID 6, RAID 10 **Important** RAID 10 requires an even number of disks.	RAID 5
Five	JBOD, RAID 0, RAID 5, RAID 6	RAID 6
Six or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50	RAID 6
Eight or more	JBOD, RAID 0, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60	RAID 6

Tip
Use the default RAID type if you are unsure of which option to choose.
For details, see RAID Types.

9. Optional: Select the disk that will be used as a hot spare for this RAID group.
   The designated hot spare automatically replaces any disk in the RAID group that fails.
   For details, see RAID Spare Disks.

10. Optional: Select the number of RAID 50 or RAID 60 subgroups.
    The selected disks are divided evenly into the specified number of RAID 5 or 6 groups.

    - A higher number of subgroups results in faster RAID rebuilding, increased disk failure tolerance, and better performance if all the disks are SSDs.
    - A lower number of subgroups results in more storage capacity, and better performance if all the disks are HDDs.

Warning
If a RAID group is divided unevenly, the excess space becomes unavailable. For example, 10 disks divided into 3 subgroups of 3 disks, 3 disks, and 4 disks will provide only 9 disks of storage capacity.

11. Click **Next**.

12. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:

    - Letters: A to Z, a to z
    - Special characters: Hyphen (-), underscore (_)

13. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

14. Specify the number of bytes per inode.

The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.

15. Specify the SED password.

Warning
Remember this password. If you forget the password, the pool will become inaccessible and all data will be unrecoverable.

16. Optional: Save the encryption key to the local NAS
Saving the encryption key enables QTS to automatically unlock and mount the SED pool when the NAS starts up. If the encryption key is not saved, you must specify the encryption password every time the NAS restarts.

Warning
Saving the encryption key can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.

17. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	• Specify a folder name. • Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

18. Click **Next**.

19. Click **Finish**.
A confirmation message appears.

Warning
Clicking **OK** deletes all data on the selected disks.

QTS creates and initializes the volume, and then creates the optional shared folder.

SED Storage Pool and Static Volume Actions

Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** , select a SED pool or volume, click **Manage**, then select **Actions** > **SED Settings** to perform the following actions.

Action	Description
Change SED Pool Password Change SED Volume Password	Change the SED security password. You can also choose to save the encryption key to the local NAS. **Warning** Remember this password. If you forget the password, the pool will become inaccessible and all data will be unrecoverable. Saving the encryption key enables QTS to automatically unlock and mount the SED pool when the NAS starts up. If the encryption key is not saved, you must specify the encryption password every time the NAS restarts. **Warning** Saving the encryption key can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.
Lock	Lock the pool or volume. All volumes, LUNs, snapshots, and data will become inaccessible until it is unlocked.
Unlock	Unlock a locked SED pool or volume. All volumes, LUNs, snapshots, and data will become accessible.
Disable SED Security	Remove user password and disable the ability to lock and unlock the volume or pool.
Enable SED Security	Add user password and enable the ability to lock and unlock the volume or pool.

Removing a Locked SED Storage Pool or Static Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a locked SED storage pool or static volume.
3. Click **Manage**, and then select **Remove**.
   The **Removal Wizard** window opens.
4. Select a removal option.

Option	Description
Enter the password of the pool Enter the password of the volume	QTS unlocks the SED disks in the storage pool or static volume, and then deletes all data.

Option	Description
Forget password	QTS removes the storage pool or static volume without unlocking the disks. The SED disks cannot be used again until you perform one of the following actions: • Unlock the disks. Go to **Disks/VJBOD**, click **Recover**, and then select **Attach and Recover Storage Pool**. • Erase the disks using SED erase.

5. Click **Apply**.

SED Erase

SED Erase erases all of the data on a locked or unlocked SED disk and removes the SED security password.

Erasing a Disk Using SED Erase

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Select an SED disk.
3. Click **Actions**, and then select **SED Erase**.
   The **SED Erase** window opens.
4. Enter the disk's PSID.

Tip
The PSID can usually be found on the front of the disk.

5. Click **Apply**.

Expansion Units

Expansion units are designed to expand the storage capacity of a QNAP NAS by adding extra drive bays. Expansion units can be connected to the NAS using USB, Mini-SAS, Thunderbolt, or other cable type.

Tip
Expansion units used to be known as JBODs.

Expansion Unit Actions

Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** and select an expansion unit to perform one of the following actions.

Action	Description
Enclosure Info	View full hardware details of the expansion unit, including the model, serial number, firmware version, BUS type, CPU temperature, system temperature, power status, and fan speeds.
Action > **Locate**	Prompt the expansion unit chassis LEDs to blink, so that you can locate the device in a server room or rack.

Action	Description
Action > **Safely Detach**	Stop all activity and safely unmount the enclosure from the host NAS.
Action > **Update Firmware**	Update the expansion unit's firmware.
Action > **Rename Enclosure**	Rename the selected expansion unit.
RAID Group	View details about each RAID group on the expansion unit, including its RAID type, capacity, and member disks.

Expansion Unit Automatic Recovery

If an expansion unit is accidentally disconnected from the NAS, for example by an unscheduled shutdown or disconnected cable, then the following changes to storage state will occur:

- The status of all storage pools on the expansion unit will change to `Error`.
- The status of all RAID groups on the expansion unit will change to `Not Active`.

If you encounter this situation, reconnect the expansion unit to the NAS and QTS will automatically guide you through the recovery process.

Expansion Unit Recovery

Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** , select an expansion unit, and then click **Recover** to perform one of the following actions.

Action	Description
Reinitialize enclosure ID	Reset all expansion unit IDs, and then give each unit a new ID number starting from 1 based on the order than they are physically connected. **Tip** Use this action if the expansion unit IDs appear out of sequential order in the enclosure list.
Attach and Recover Storage Pool	Scan all free disks on the NAS and all connected expansion units for existing volumes, LUNs, and storage pools. **Tip** Perform this action after moving disks between NAS devices.

QNAP External RAID Devices

About QNAP External RAID Devices

QNAP External RAID devices are a series of expansion units designed to increase the storage capacity of your NAS or computer. External RAID devices are different from other QNAP expansion units in that they feature hardware RAID. A host can either access the disks in an external RAID individually, or the external RAID device can combine the disks using hardware RAID so that the host accesses them as one large disk. Some external RAID devices have hardware switches for storage configuration, while other models can only be configured through a software interface.

QNAP External RAID Device Types

Device Type	Summary	Example Models
External RAID enclosure	An expansion unit featuring hardware RAID that connects to a NAS or computer using a connector cable.	TR-004, TR-002, TR-004U
Drive Adapter	A small enclosure featuring hardware RAID that allows you to install 1-2 smaller drives into a larger drive bay in a NAS or computer (e.g. two 2.5-inch SATA drives in a 3.5-inch bay).	QDA-A2AR, QDA-A2MAR, QDA-U2MP

Note
When an external RAID enclosure is connected to a QNAP NAS, you can only create one RAID group on the enclosure. All disks not in the RAID group are automatically assigned as spare disks, and cannot be used for storage until the RAID group has been deleted.

Storage Modes

QNAP RAID enclosures support two different storage modes.

Important
QNAP drive adapters only support NAS storage mode.

Storage Mode	Description	Supported RAID Types	Supported Hosts
NAS Storage	Use the RAID enclosure's storage capacity to create a new storage pool or static volume on a QNAP NAS.	• JBOD • RAID 0 • RAID 1 • RAID 5 • RAID 10	QNAP NAS running QTS 4.3.6 or later
External Storage	Use the RAID enclosure as an external USB disk. This mode supports multiple RAID groups. Each RAID group appears as a separate disk when the enclosure is connected to a host.	• Individual • JBOD • RAID 0 • RAID 1 • RAID 5 • RAID 10	• Windows • macOS • Linux • QNAP NAS • Other NAS devices

Storage Configuration

Creating a Storage Pool on a RAID Enclosure

Important

- The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.

- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to select.

7. Click **Next**.
8. Select **Create Storage Pool**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
    - The RAID enclosure creates the RAID group.
    - The **Create Storage Pool Wizard** opens on the **Select Disks** screen.
    - The RAID group you created is automatically selected and the RAID type is set to `Single`.
11. Click **Next**.
12. Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.

13. Click **Next**.
14. Click **Create**.
    A confirmation message appears.
15. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Creating a Storage Pool on a Drive Adapter

1. Set the drive adapter to the RAID mode that you want using the device's hardware Mode switch.
2. Install the drive adapter in the NAS.
   For details, see the drive adapter's hardware user guide.
3. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
4. Perform one of the following actions.
   - Click **New Storage Pool**.
   - Click **Create**, and then select **New Storage Pool**.

   The **Create Storage Pool Wizard** window opens.
5. Click **Next**.
6. Under **Enclosure Unit**, select **NAS Host**.
7. In the list of disks, select the drive adapter.
8. Under **RAID Type**, select **Single**.
9. Click **Next**.
10. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

    Tip
    To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.
11. Optional: Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
12. Click **Next**.
13. Click **OK**.
    - The **Create Storage Pool Wizard** opens on the **Select Disks** screen.
    - The RAID group created in steps 3-5 is selected as the disk for the storage pool.
    - The RAID type is set to `Single`.
14. Click **Next**.

15. Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
16. Click **Next**.
17. Click **Create**.
    A confirmation message appears.
18. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Creating a Static Volume on a RAID Enclosure

Important

- The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.
- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to select.
For details on RAID types, see RAID Types.

7. Click **Next**.
8. Select **Create Volume**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
    - The RAID enclosure creates the RAID group.
    - The **Volume Creation Wizard** opens on the **Select Disks** screen.
    - The RAID group you created is automatically selected and the RAID type is set to `Single`.
11. Click **Next**.
12. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen (-), underscore (_)
13. Specify the number of bytes per inode.
    The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.
14. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.

Setting	Description	User Actions
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	**a.** Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. **b.** Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	**a.** Specify a folder name. **b.** Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

15. Click **Next**.
16. Click **Finish**.
    A confirmation message appears.
17. Click **OK**.

QTS creates and initializes the volume, and then creates the optional shared folder.

Creating a Static Volume on a Drive Adapter

1. Set the drive adapter to the RAID mode that you want using the device's hardware Mode switch.
2. Install the drive adapter in the NAS.
   For details, see the drive adapter's hardware user guide.
3. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
4. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Volume**.

NAS State	Action
One or more volumes or storage pools	Click **Create** > **New Volume** .

The **Volume Creation Wizard** window opens.

5. Select **Static Volume**.
6. Click **Next**.
7. Under **Enclosure Unit**, select **NAS Host**.
8. In the list of disks, select the drive adapter.
9. Under **RAID Type**, select **Single**.
10. Click **Next**.
11. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen (-), underscore (_)
12. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

13. Optional: Specify the number of bytes per inode.
    The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.
14. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.

Setting	Description	User Actions
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	**a.** Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. **b.** Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	**a.** Specify a folder name. **b.** Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

15. Click **Next**.
16. Click **Finish**.
    A confirmation message appears.
17. Click **OK**.

QTS creates and initializes the volume, and then creates the optional shared folder.

Configuring a RAID Enclosure as an External Storage Device

Important

- The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.
- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to choose.

7. Click **Next**.
8. Select **Create External Storage Space**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
11. Go to **Storage & Snapshots** > **Storage** > **External Storage** .
12. Select the uninitialized partition on the RAID enclosure.

Tip
Double-click on the RAID enclosure to see all of its partitions.

13. Click **Actions**, and then select **Format**.
    The **Format Partition** window opens.
14. Select a file system.

File System	Recommended Operating Systems and Devices
NTFS	Windows
HTS+	macOS

File System	Recommended Operating Systems and Devices
FAT32	Windows, macOS, NAS devices, most cameras, mobile phones, video game consoles, tablets **Important** The maximum file size is 4 GB.
exFAT	Windows, macOS, some cameras, mobile phones, video game consoles, tablets **Important** • Using exFAT on QTS requires an exFAT driver license. You can purchase the license in License Center. • Verify that your device is compatible with exFAT before selecting this option.
EXT3	Linux, NAS devices
EXT4	Linux, NAS devices

15. Specify a disk label.
    The label must consist of 1 to 16 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen "-"
16. Optional: Enable encryption.
    a. Select an encryption type.
    Select one of the following options:
    - AES 128 bits
    - AES 192 bits
    - AES 256 bits

    b. Specify an encryption password.
    The password must consist of 8 to 16 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - All special characters (excluding spaces)

    c. Confirm the encryption password.

    d. Optional: Select **Save encryption key**.
    Select this option to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts.

Warning

- Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.
- If you forget the encryption password, the volume will become inaccessible and all data will be lost.

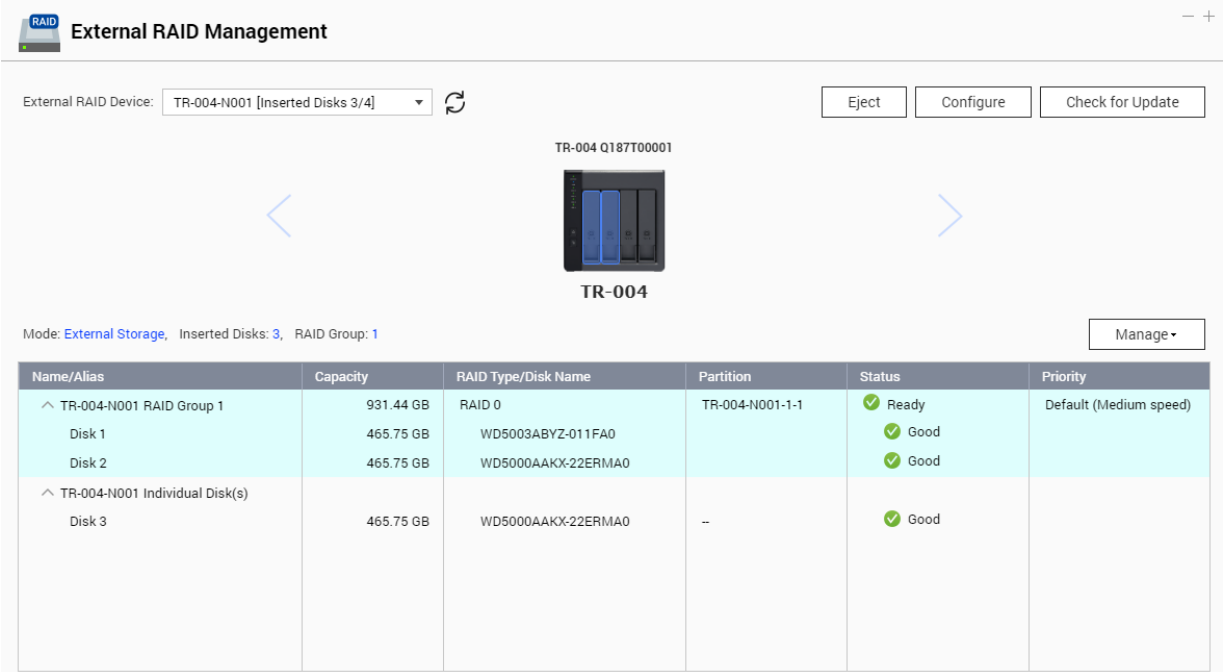
17. Click **Format**.
    A warning message appears.
18. Click **OK**.

QTS formats the RAID group on the external RAID enclosure as an external disk. You can view and manage it at **Storage & Snapshots** > **Storage** > **External Storage** .

QTS External RAID Management

Open **Storage & Snapshots**, click **External RAID device**, and then select **External RAID Management** to view, manage, and configure RAID devices connected to the NAS.

Warning
To prevent errors or data loss, do not change an RAID device's Mode switch from Software Control to any other mode while the device is connected to the NAS.



UI Element	Description
External RAID Device	Select a RAID device to manage.

UI Element	Description
Safely Detach	Disconnect a RAID device from the NAS when the device is in NAS Storage mode. QTS will stop and then safely remove all storage pools, shared folders, volumes, and LUNs stored on the device, without deleting any data. You can then connect it to another NAS or computer. **Tip** To access the storage pools, shared folders, volumes, and LUNs on another QNAP NAS, connect the RAID device to the target NAS, go to **Storage & Snapshots** > **Disks/VJBOD** then select **Recover** > **Scan all Free Disks** . **Important** This button only appears when the device is in NAS Storage mode.
Eject	Safely disconnect a RAID device from the NAS when the device is in External Storage mode. You can then connect it to another NAS or computer. **Important** This button only appears when the device is in External Storage mode.
Configure	Create a RAID group on the RAID device and configure the storage mode. **Important** The RAID device's Mode switch must be set to Software Control mode.
Check for Update	Update the RAID device's firmware, either over the internet or from a local file. For details, see Manually Updating External RAID Device Firmware in QTS.
Manage > **Configure Spare Disk**	Configure a global hot spare disk for the RAID device. If a disk in any RAID group on the device fails, the hot spare disk will automatically replace the faulty disk. For details, see Configuring a Spare Disk.
Manage > **Remove**	Delete the RAID group. The member disks will be automatically assigned as global spare disks if the device contains any other RAID groups. **Warning** All data on the selected disks will be deleted.
Manage > **View Disks**	View the information about the disks installed in the RAID device, including their status and health information. **Note** Selecting this option takes you to the **Disks/VJBOD** screen.

Migrating an External RAID Enclosure in NAS Storage Mode

Follow these steps to move a RAID enclosure containing a storage pool or static volume from a QNAP NAS to a different QNAP NAS (which we will call the target NAS).

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Select an enclosure.
3. Select **Action** > **Safely Detach** .
   The **Safely Detaching Enclosure** window opens.
4. Click **Apply**.

   Warning
   Do not disconnect or power off the RAID enclosure until the enclosure has been detached.

   A confirmation message appears.
5. Disconnect the RAID enclosure from the NAS.
6. Connect the RAID enclosure to the target QNAP NAS.
7. On the target NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
8. Click **Recover**, and then select **Attach and Recover Storage Pool**.
   A confirmation message appears.
9. Click **OK**.
   QTS scans the RAID enclosure for storage pools and static volumes, and then displays them on the **Recover Wizard** window.
10. Click **Apply**.

QTS makes all storage pools, volumes, and LUNs on the RAID enclosure available on the target NAS at **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .

Manually Updating External RAID Device Firmware in QTS

1. Open **Storage & Snapshots**.
2. Click **External RAID Device** and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Select a RAID device.
4. Click **Check for Update**.
   The **Firmware Management** window opens. QTS checks online for the latest device firmware.
5. Select a firmware update method.

Firmware Update Method	Description
Install the latest firmware version	Download and install the latest version of the device firmware. **Note** You can only select this option if QTS has checked online and found a newer firmware version than the one currently installed on the device.
Select a local firmware file	Update the firmware using a local firmware IMG file on your computer. Click **Browse** to select the file. **Tip** You can download firmware updates at https://download.qnap.com.

6. Click **Update**.

Warning
Do not power off or disconnect the RAID device unless prompted.

7. Follow the instructions to install the firmware update.
   Depending on the model you may be asked to power off then power on the device, or disconnect then reconnect the device.
   QTS re-detects the device and displays a notification message.
8. Wait for confirmation that the firmware update has finished.
9. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
10. Click **Recover**, and then select **Attach and Recover Storage Pool**.

Configuring a Spare Disk

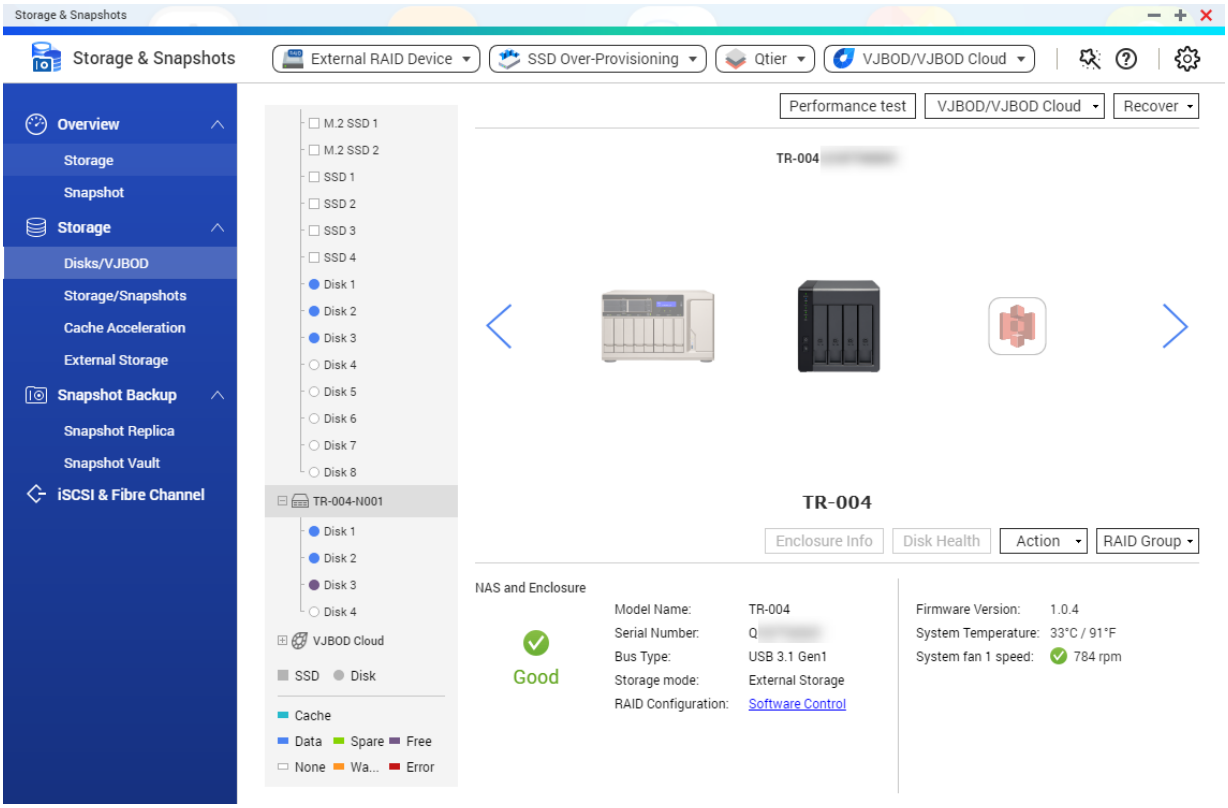
1. Open **Storage & Snapshots**.
2. Click **External RAID Device** and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Manage**, and then select **Configure Spare Disk**.
   The **Configure Spare Disk** window opens.
4. Select one or more free disks.
5. Click **Apply**.

The selected disks are assigned as spare disks for the RAID group on the external RAID device.

External RAID Device Health

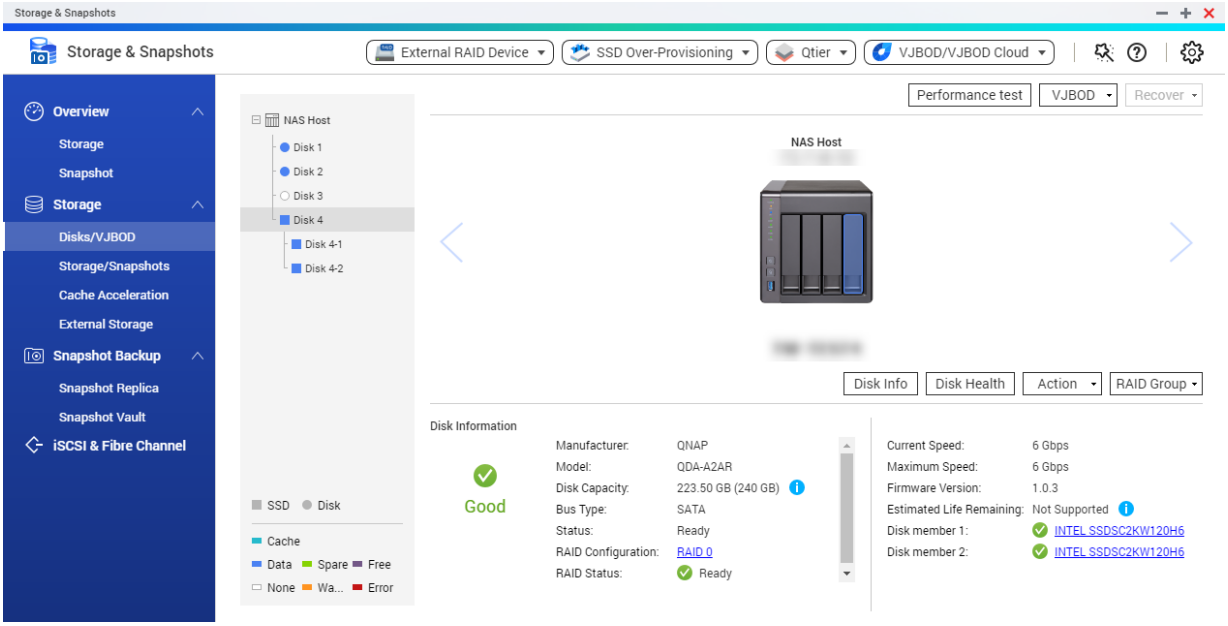
RAID Enclosure Health

To view the status and heath of RAID enclosures connected to the NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .



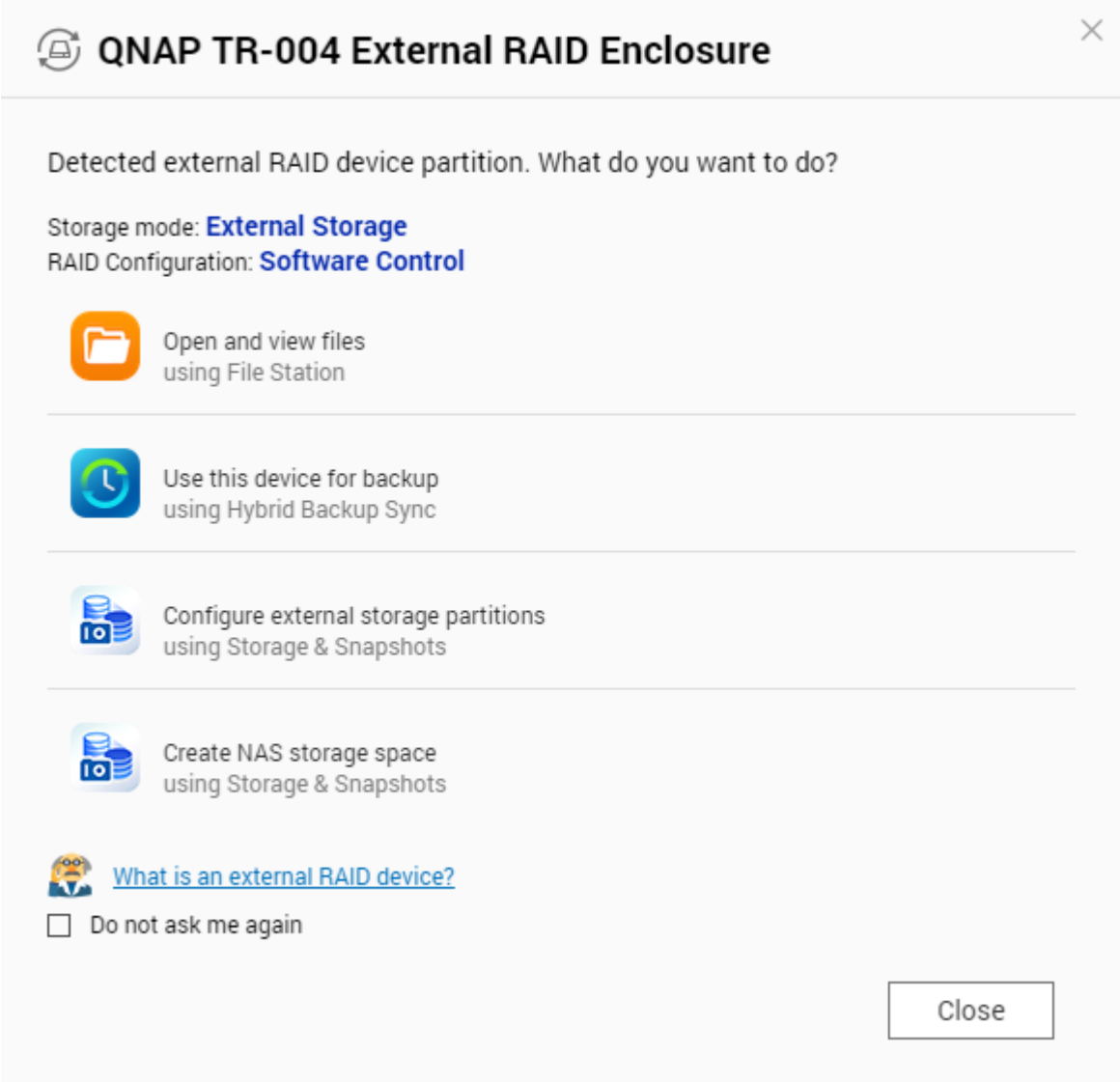
Drive Adapter Health

To view the status and heath of drive adapters and the disks installed in it, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .



The Autoplay Menu

The Autoplay menu opens when you connect a RAID enclosure to a NAS. The actions available in this menu vary depending on the enclosure's current storage mode and RAID configuration.



Action	Description
Open and view files	Opens the enclosure in **File Station**.
Use this device for backup	Opens **HBS**.
Configure external storage partitions	Opens **Storage & Snapshots** > **Storage** > **External Storage** . For more information, see Configuring a RAID Enclosure as an External Storage Device.
Create NAS storage space	Opens **Storage & Snapshots** > **Storage** > **Storage/Snapshots** . For more information, see: • Creating a Storage Pool on a RAID Enclosure
Edit access permissions	Opens the **Edit Shared Folder Permissions** window to edit access permissions for this device.

QNAP JBOD Enclosures

About QNAP JBOD Enclosures

QNAP JBOD enclosures are a series of expansion units designed to increase the storage capacity of your NAS or computer. JBOD enclosures offer a wide range of storage applications; you can manage drives independently or group them together in a software RAID configuration using a host NAS or computer. QNAP offers JBOD enclosures with USB 3.1 Gen 2 Type-C or SFF interface ports to ensure quick and efficient data transfer between the JBOD enclosure and the host device.

QNAP JBOD Enclosure Types

Enclosure Type	Description	Supported Platforms	Example Models
SATA JBOD enclosure	A JBOD enclosure that uses SFF interface ports to connect to a NAS or computer. These enclosures can only be connected to a host device that has a QNAP QXP host bus adapter installed.	Computer: • Windows • Linux NAS: • QTS • QuTS hero	• TL-D400S, TL-D800S, TL-D1600S • TL-R400S, TL-R1200S-RP
USB JBOD enclosure	A JBOD enclosure that uses USB 3.1 Gen 2 Type-C ports to connect to a NAS or computer.	Computer: • Windows • Linux • macOS NAS: • QTS • QuTS hero	• TL-D800C • TL-R1200C-RP

QTS JBOD Management

You can manage JBOD enclosures in QTS from the following locations in the Storage & Snapshots utility.

Location	Description
Disks/VJBOD	View, manage, and configure storage for attached JBOD enclosures. You can create storage pools, volumes, and RAID groups using disks installed in the JBOD enclosure.
External Storage	View and manage attached JBOD enclosures and installed disks.

Updating JBOD Enclosure Firmware in QTS

1. Open **Storage & Snapshots**.
   QTS periodically checks for the latest firmware for each connected enclosure on login. If a new firmware update is available, QTS opens the **Start Firmware Update** window.
2. Follow the instructions to install the firmware update.

Depending on the model you may be asked to power off then power on the device, or disconnect then reconnect the device.
QTS re-detects the device and displays a notification message.

3. Wait for confirmation that the firmware update has finished.
4. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
5. Click **Recover**, and then select **Attach and Recover Storage Pool**.

Expansion Units

Expansion units are designed to expand the storage capacity of a QNAP NAS by adding extra drive bays. Expansion units can be connected to the NAS using USB, Mini-SAS, Thunderbolt, or other cable type.

Tip
Expansion units used to be known as JBODs.

Expansion Unit Actions

Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** and select an expansion unit to perform one of the following actions.

Action	Description
Enclosure Info	View full hardware details of the expansion unit, including the model, serial number, firmware version, BUS type, CPU temperature, system temperature, power status, and fan speeds.
Action > **Locate**	Prompt the expansion unit chassis LEDs to blink, so that you can locate the device in a server room or rack.
Action > **Safely Detach**	Stop all activity and safely unmount the enclosure from the host NAS.
Action > **Update Firmware**	Update the expansion unit's firmware.
Action > **Rename Enclosure**	Rename the selected expansion unit.
RAID Group	View details about each RAID group on the expansion unit, including its RAID type, capacity, and member disks.

Expansion Unit Automatic Recovery

If an expansion unit is accidentally disconnected from the NAS, for example by an unscheduled shutdown or disconnected cable, then the following changes to storage state will occur:

- The status of all storage pools on the expansion unit will change to `Error`.
- The status of all RAID groups on the expansion unit will change to `Not Active`.

If you encounter this situation, reconnect the expansion unit to the NAS and QTS will automatically guide you through the recovery process.

Expansion Unit Recovery

Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** , select an expansion unit, and then click **Recover** to perform one of the following actions.

Action	Description
Reinitialize enclosure ID	Reset all expansion unit IDs, and then give each unit a new ID number starting from 1 based on the order than they are physically connected. **Tip** Use this action if the expansion unit IDs appear out of sequential order in the enclosure list.
Attach and Recover Storage Pool	Scan all free disks on the NAS and all connected expansion units for existing volumes, LUNs, and storage pools. **Tip** Perform this action after moving disks between NAS devices.

QNAP External RAID Devices

About QNAP External RAID Devices

QNAP External RAID devices are a series of expansion units designed to increase the storage capacity of your NAS or computer. External RAID devices are different from other QNAP expansion units in that they feature hardware RAID. A host can either access the disks in an external RAID individually, or the external RAID device can combine the disks using hardware RAID so that the host accesses them as one large disk. Some external RAID devices have hardware switches for storage configuration, while other models can only be configured through a software interface.

QNAP External RAID Device Types

Device Type	Summary	Example Models
External RAID enclosure	An expansion unit featuring hardware RAID that connects to a NAS or computer using a connector cable.	TR-004, TR-002, TR-004U
Drive Adapter	A small enclosure featuring hardware RAID that allows you to install 1-2 smaller drives into a larger drive bay in a NAS or computer (e.g. two 2.5-inch SATA drives in a 3.5-inch bay).	QDA-A2AR, QDA-A2MAR, QDA-U2MP

Note
When an external RAID enclosure is connected to a QNAP NAS, you can only create one RAID group on the enclosure. All disks not in the RAID group are automatically assigned as spare disks, and cannot be used for storage until the RAID group has been deleted.

Storage Modes

QNAP RAID enclosures support two different storage modes.

Important
QNAP drive adapters only support NAS storage mode.

Storage Mode	Description	Supported RAID Types	Supported Hosts
NAS Storage	Use the RAID enclosure's storage capacity to create a new storage pool or static volume on a QNAP NAS.	• JBOD • RAID 0 • RAID 1 • RAID 5 • RAID 10	QNAP NAS running QTS 4.3.6 or later
External Storage	Use the RAID enclosure as an external USB disk. This mode supports multiple RAID groups. Each RAID group appears as a separate disk when the enclosure is connected to a host.	• Individual • JBOD • RAID 0 • RAID 1 • RAID 5 • RAID 10	• Windows • macOS • Linux • QNAP NAS • Other NAS devices

Storage Configuration

Creating a Storage Pool on a RAID Enclosure

Important

- The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.
- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to select.

7. Click **Next**.
8. Select **Create Storage Pool**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
    - The RAID enclosure creates the RAID group.
    - The **Create Storage Pool Wizard** opens on the **Select Disks** screen.
    - The RAID group you created is automatically selected and the RAID type is set to `Single`.
11. Click **Next**.
12. Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
13. Click **Next**.
14. Click **Create**.
    A confirmation message appears.
15. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Creating a Storage Pool on a Drive Adapter

1. Set the drive adapter to the RAID mode that you want using the device's hardware Mode switch.
2. Install the drive adapter in the NAS.
   For details, see the drive adapter's hardware user guide.
3. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
4. Perform one of the following actions.

- Click **New Storage Pool**.
- Click **Create**, and then select **New Storage Pool**.

The **Create Storage Pool Wizard** window opens.

5. Click **Next**.
6. Under **Enclosure Unit**, select **NAS Host**.
7. In the list of disks, select the drive adapter.
8. Under **RAID Type**, select **Single**.
9. Click **Next**.
10. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

> **Tip**
> To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

11. Optional: Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
12. Click **Next**.
13. Click **OK**.
    - The **Create Storage Pool Wizard** opens on the **Select Disks** screen.
    - The RAID group created in steps 3-5 is selected as the disk for the storage pool.
    - The RAID type is set to `Single`.
14. Click **Next**.
15. Configure the alert threshold.
    QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.
16. Click **Next**.
17. Click **Create**.
    A confirmation message appears.
18. Click **OK**.

QTS creates the storage pool and then displays the information on the **Storage/Snapshots** screen.

Creating a Static Volume on a RAID Enclosure

> **Important**
> - The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.

- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to select.
For details on RAID types, see RAID Types.

7. Click **Next**.
8. Select **Create Volume**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
    - The RAID enclosure creates the RAID group.
    - The **Volume Creation Wizard** opens on the **Select Disks** screen.
    - The RAID group you created is automatically selected and the RAID type is set to `Single`.
11. Click **Next**.
12. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:
    - Letters: A to Z, a to z

- Numbers: 0 to 9
- Special characters: Hyphen (-), underscore (_)

13. Specify the number of bytes per inode.
The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.

14. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	**a.** Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. **b.** Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	**a.** Specify a folder name. **b.** Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

15. Click **Next**.

16. Click **Finish**.

A confirmation message appears.

17. Click **OK**.

QTS creates and initializes the volume, and then creates the optional shared folder.

Creating a Static Volume on a Drive Adapter

1. Set the drive adapter to the RAID mode that you want using the device's hardware Mode switch.
2. Install the drive adapter in the NAS.
   For details, see the drive adapter's hardware user guide.
3. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
4. Perform one of the following actions.

NAS State	Action
No volumes or storage pools	Click **New Volume**.
One or more volumes or storage pools	Click **Create** > **New Volume** .

   The **Volume Creation Wizard** window opens.

5. Select **Static Volume**.
6. Click **Next**.
7. Under **Enclosure Unit**, select **NAS Host**.
8. In the list of disks, select the drive adapter.
9. Under **RAID Type**, select **Single**.
10. Click **Next**.
11. Optional: Specify an alias for the volume.
    The alias must consist of 1 to 64 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen (-), underscore (_)
12. Optional: Configure SSD over-provisioning.
    Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

> **Tip**
> To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

13. Optional: Specify the number of bytes per inode.
    The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.
14. Optional: Configure advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	**a.** Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. **b.** Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Accelerate performance with SSD cache	QTS adds data from this volume to the SSD cache to improve read or write performance.	No actions
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	**a.** Specify a folder name. **b.** Select **Create this folder as a snapshot shared folder**. A snapshot shared folder enables faster snapshot creation and restoration.

15. Click **Next**.
16. Click **Finish**.
    A confirmation message appears.
17. Click **OK**.

QTS creates and initializes the volume, and then creates the optional shared folder.

Configuring a RAID Enclosure as an External Storage Device

Important

- The Mode switch on the RAID enclosure must be set to Software Control mode. For details, see the enclosure's hardware user guide.
- The RAID enclosure must not contain any existing RAID groups.

Warning
To prevent errors or data loss, do not change the enclosure Mode switch from Software Control to any other mode while the enclosure is connected to the NAS.

1. Open **Storage & Snapshots**.
2. Click **External RAID Device**, and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Configure**.
   The **External RAID Device Configuration Wizard** opens.
4. Click **Next**.
5. Select two or more disks.

Warning

- All data on the selected disks will be deleted.
- All unselected disks will be automatically assigned as spare disks, and cannot be used until the RAID group has been deleted.

6. Select a RAID type.
   QTS displays all available RAID types and automatically selects the most optimized RAID type.

Number of disks	Supported RAID Types	Default RAID Type
Two	JBOD, RAID 0, RAID 1	RAID 1
Three	JBOD, RAID 0, RAID 5	RAID 5
Four	JBOD, RAID 0, RAID 5, RAID 10	RAID 5

Tip
Use the default RAID type if you are unsure of which option to choose.

7. Click **Next**.
8. Select **Create External Storage Space**.
9. Click **Create**.
   A confirmation message appears.
10. Click **OK**.
11. Go to **Storage & Snapshots** > **Storage** > **External Storage** .
12. Select the uninitialized partition on the RAID enclosure.

Tip
Double-click on the RAID enclosure to see all of its partitions.

13. Click **Actions**, and then select **Format**.
    The **Format Partition** window opens.

14. Select a file system.

File System	Recommended Operating Systems and Devices
NTFS	Windows
HTS+	macOS
FAT32	Windows, macOS, NAS devices, most cameras, mobile phones, video game consoles, tablets **Important** The maximum file size is 4 GB.
exFAT	Windows, macOS, some cameras, mobile phones, video game consoles, tablets **Important** • Using exFAT on QTS requires an exFAT driver license. You can purchase the license in License Center. • Verify that your device is compatible with exFAT before selecting this option.
EXT3	Linux, NAS devices
EXT4	Linux, NAS devices

15. Specify a disk label.
    The label must consist of 1 to 16 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - Special characters: Hyphen "-"
16. Optional: Enable encryption.
    a. Select an encryption type.
    Select one of the following options:
    - AES 128 bits
    - AES 192 bits
    - AES 256 bits

    b. Specify an encryption password.
    The password must consist of 8 to 16 characters from any of the following groups:
    - Letters: A to Z, a to z
    - Numbers: 0 to 9
    - All special characters (excluding spaces)

    c. Confirm the encryption password.

d. Optional: Select **Save encryption key**.
Select this option to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts.

Warning

- Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.
- If you forget the encryption password, the volume will become inaccessible and all data will be lost.

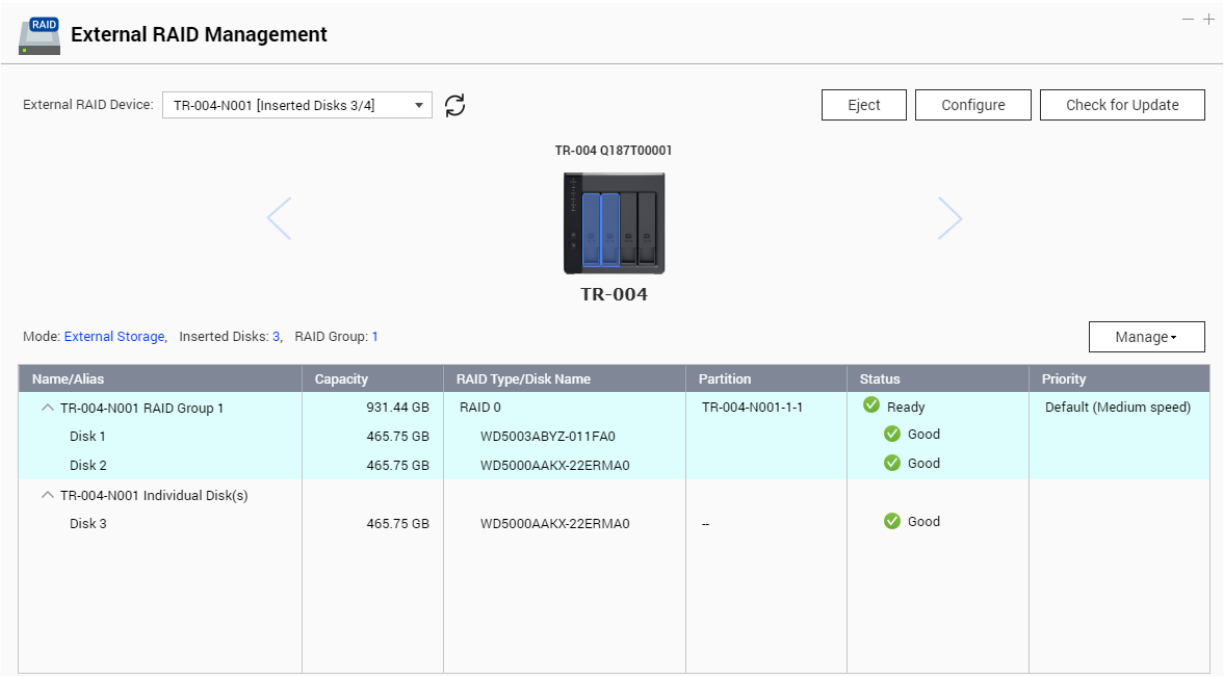
17. Click **Format**.
A warning message appears.
18. Click **OK**.

QTS formats the RAID group on the external RAID enclosure as an external disk. You can view and manage it at **Storage & Snapshots** > **Storage** > **External Storage** .

QTS External RAID Management

Open **Storage & Snapshots**, click **External RAID device**, and then select **External RAID Management** to view, manage, and configure RAID devices connected to the NAS.

Warning
To prevent errors or data loss, do not change an RAID device's Mode switch from Software Control to any other mode while the device is connected to the NAS.



UI Element	Description
External RAID Device	Select a RAID device to manage.

UI Element	Description
Safely Detach	Disconnect a RAID device from the NAS when the device is in NAS Storage mode. QTS will stop and then safely remove all storage pools, shared folders, volumes, and LUNs stored on the device, without deleting any data. You can then connect it to another NAS or computer. **Tip** To access the storage pools, shared folders, volumes, and LUNs on another QNAP NAS, connect the RAID device to the target NAS, go to **Storage & Snapshots** > **Disks/VJBOD** then select **Recover** > **Scan all Free Disks** . **Important** This button only appears when the device is in NAS Storage mode.
Eject	Safely disconnect a RAID device from the NAS when the device is in External Storage mode. You can then connect it to another NAS or computer. **Important** This button only appears when the device is in External Storage mode.
Configure	Create a RAID group on the RAID device and configure the storage mode. **Important** The RAID device's Mode switch must be set to Software Control mode.
Check for Update	Update the RAID device's firmware, either over the internet or from a local file. For details, see Manually Updating External RAID Device Firmware in QTS.
Manage > **Configure Spare Disk**	Configure a global hot spare disk for the RAID device. If a disk in any RAID group on the device fails, the hot spare disk will automatically replace the faulty disk. For details, see Configuring a Spare Disk.
Manage > **Remove**	Delete the RAID group. The member disks will be automatically assigned as global spare disks if the device contains any other RAID groups. **Warning** All data on the selected disks will be deleted.
Manage > **View Disks**	View the information about the disks installed in the RAID device, including their status and health information. **Note** Selecting this option takes you to the **Disks/VJBOD** screen.

Migrating an External RAID Enclosure in NAS Storage Mode

Follow these steps to move a RAID enclosure containing a storage pool or static volume from a QNAP NAS to a different QNAP NAS (which we will call the target NAS).

1. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
2. Select an enclosure.
3. Select **Action** > **Safely Detach** .
   The **Safely Detaching Enclosure** window opens.
4. Click **Apply**.

   Warning
   Do not disconnect or power off the RAID enclosure until the enclosure has been detached.

   A confirmation message appears.
5. Disconnect the RAID enclosure from the NAS.
6. Connect the RAID enclosure to the target QNAP NAS.
7. On the target NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
8. Click **Recover**, and then select **Attach and Recover Storage Pool**.
   A confirmation message appears.
9. Click **OK**.
   QTS scans the RAID enclosure for storage pools and static volumes, and then displays them on the **Recover Wizard** window.
10. Click **Apply**.

QTS makes all storage pools, volumes, and LUNs on the RAID enclosure available on the target NAS at **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .

Manually Updating External RAID Device Firmware in QTS

1. Open **Storage & Snapshots**.
2. Click **External RAID Device** and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Select a RAID device.
4. Click **Check for Update**.
   The **Firmware Management** window opens. QTS checks online for the latest device firmware.
5. Select a firmware update method.

Firmware Update Method	Description
Install the latest firmware version	Download and install the latest version of the device firmware. **Note** You can only select this option if QTS has checked online and found a newer firmware version than the one currently installed on the device.
Select a local firmware file	Update the firmware using a local firmware IMG file on your computer. Click **Browse** to select the file. **Tip** You can download firmware updates at https://download.qnap.com.

6. Click **Update**.

Warning
Do not power off or disconnect the RAID device unless prompted.

7. Follow the instructions to install the firmware update.
   Depending on the model you may be asked to power off then power on the device, or disconnect then reconnect the device.
   QTS re-detects the device and displays a notification message.
8. Wait for confirmation that the firmware update has finished.
9. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
10. Click **Recover**, and then select **Attach and Recover Storage Pool**.

Configuring a Spare Disk

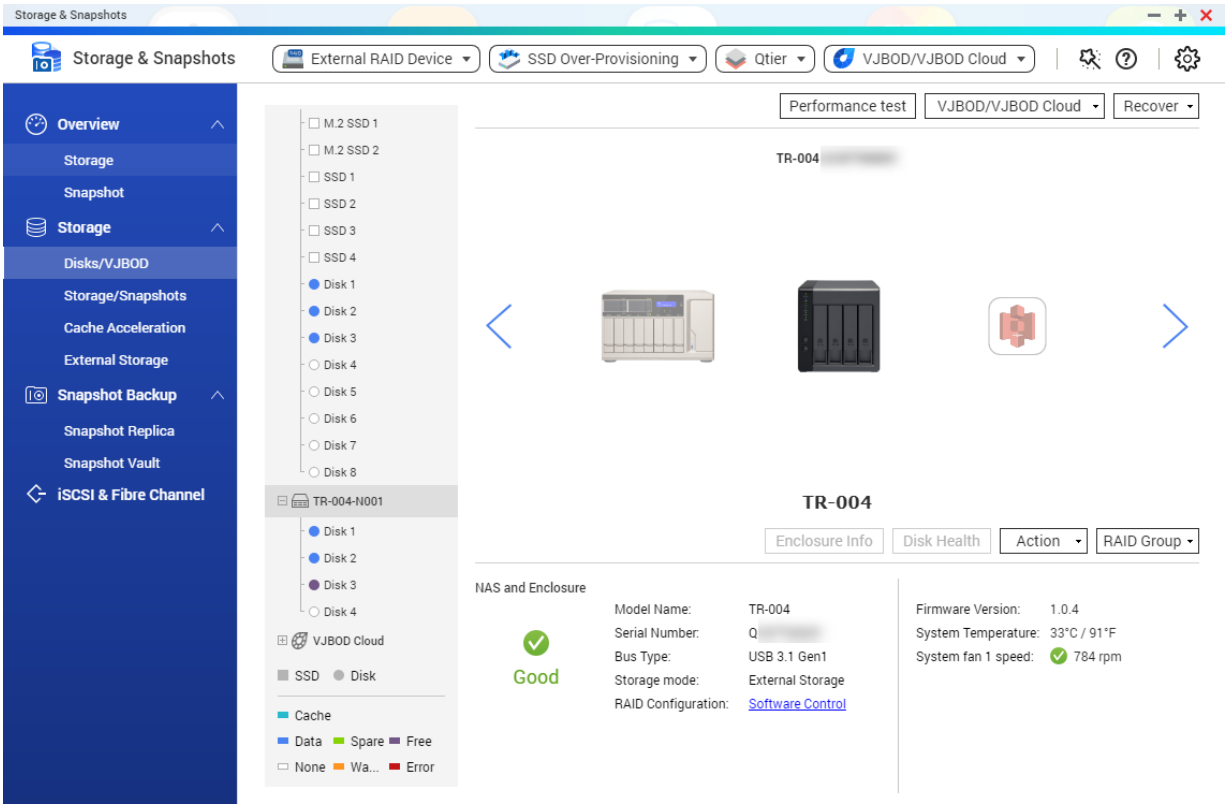
1. Open **Storage & Snapshots**.
2. Click **External RAID Device** and then select **External RAID Management**.
   The **External RAID Management** window opens.
3. Click **Manage**, and then select **Configure Spare Disk**.
   The **Configure Spare Disk** window opens.
4. Select one or more free disks.
5. Click **Apply**.

The selected disks are assigned as spare disks for the RAID group on the external RAID device.

External RAID Device Health

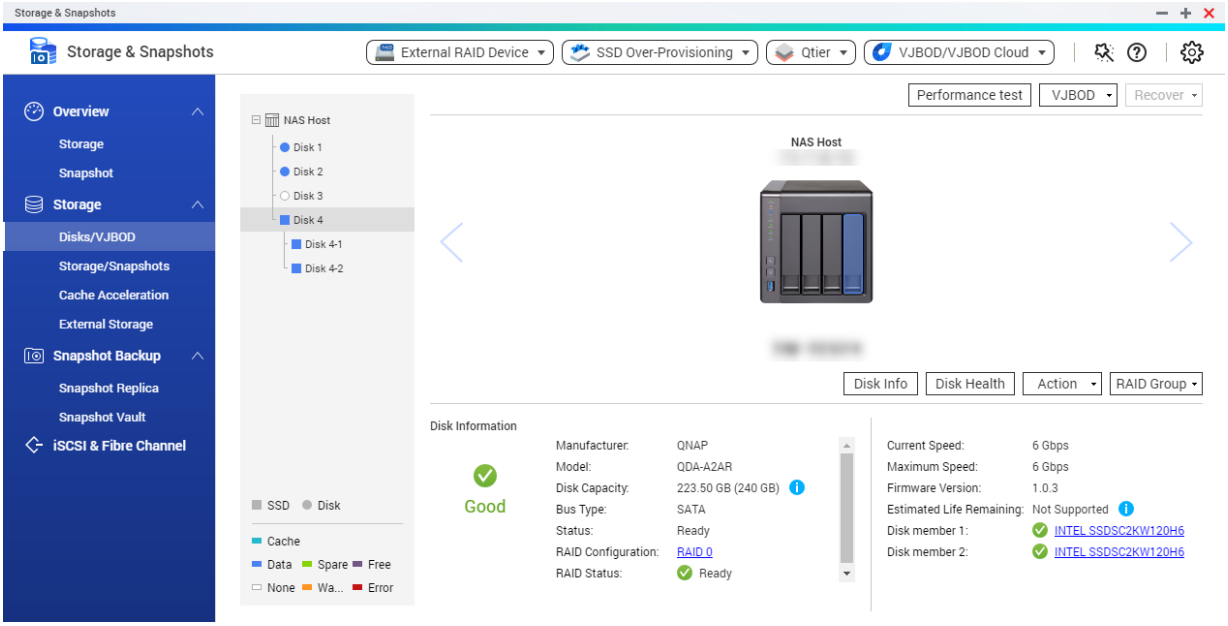
RAID Enclosure Health

To view the status and heath of RAID enclosures connected to the NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .



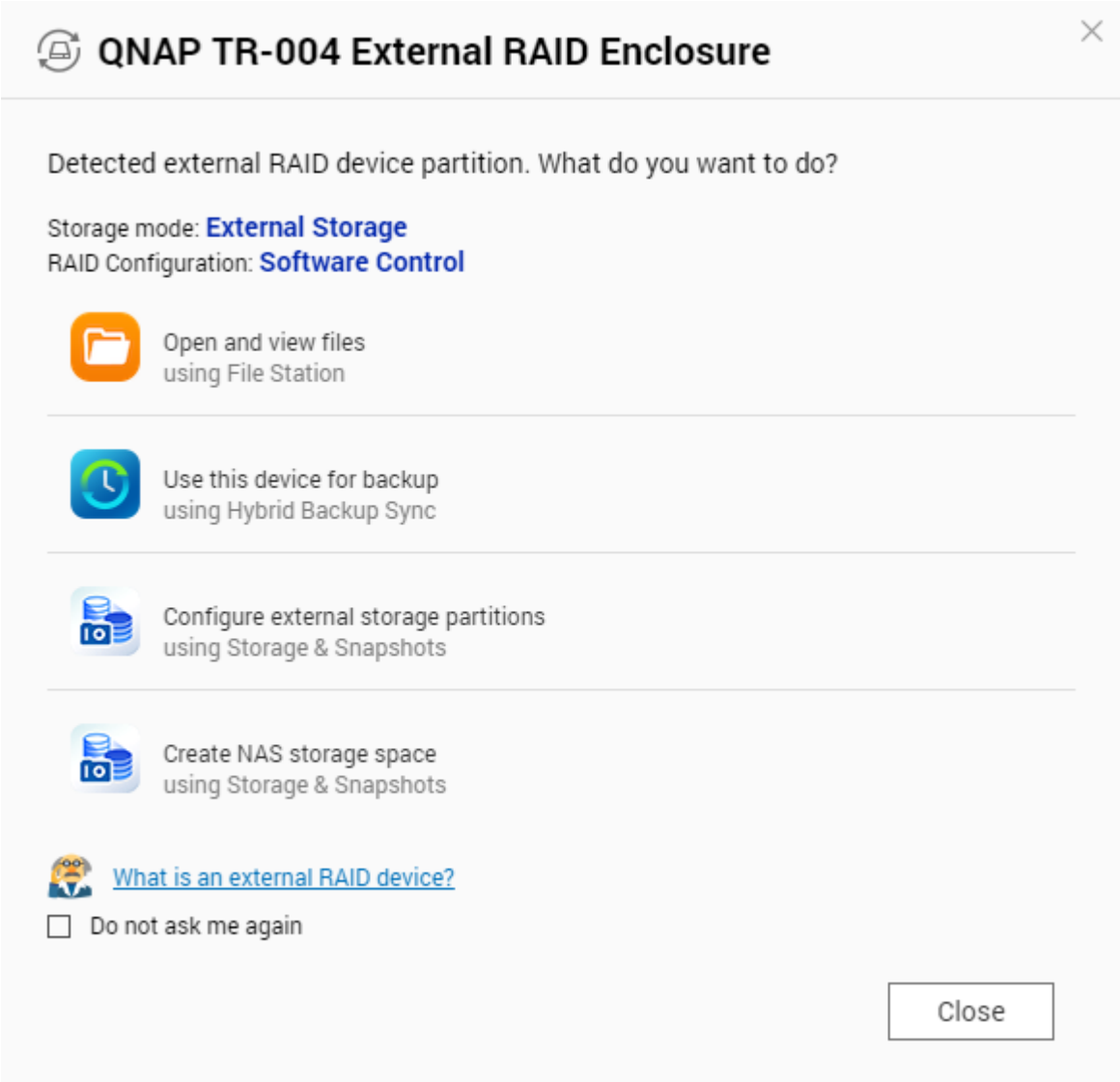
Drive Adapter Health

To view the status and heath of drive adapters and the disks installed in it, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .



The Autoplay Menu

The Autoplay menu opens when you connect a RAID enclosure to a NAS. The actions available in this menu vary depending on the enclosure's current storage mode and RAID configuration.



Action	Description
Open and view files	Opens the enclosure in **File Station**.
Use this device for backup	Opens **HBS**.
Configure external storage partitions	Opens **Storage & Snapshots** > **Storage** > **External Storage** . For more information, see Configuring a RAID Enclosure as an External Storage Device.
Create NAS storage space	Opens **Storage & Snapshots** > **Storage** > **Storage/Snapshots** . For more information, see: • Creating a Storage Pool on a RAID Enclosure
Edit access permissions	Opens the **Edit Shared Folder Permissions** window to edit access permissions for this device.

QNAP JBOD Enclosures

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USB JBOD enclosure	A JBOD enclosure that uses USB 3.1 Gen 2 Type-C ports to connect to a NAS or computer.	Computer: • Windows • Linux • macOS NAS: • QTS • QuTS hero	• TL-D800C • TL-R1200C-RP

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Location	Description
Disks/VJBOD	View, manage, and configure storage for attached JBOD enclosures. You can create storage pools, volumes, and RAID groups using disks installed in the JBOD enclosure.
External Storage	View and manage attached JBOD enclosures and installed disks.

Updating JBOD Enclosure Firmware in QTS

1. Open **Storage & Snapshots**.
   QTS periodically checks for the latest firmware for each connected enclosure on login. If a new firmware update is available, QTS opens the **Start Firmware Update** window.
2. Follow the instructions to install the firmware update.

Depending on the model you may be asked to power off then power on the device, or disconnect then reconnect the device.
QTS re-detects the device and displays a notification message.

3. Wait for confirmation that the firmware update has finished.
4. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
5. Click **Recover**, and then select **Attach and Recover Storage Pool**.

Qtier

Qtier is a proprietary automated-tiering technology, designed to increase NAS storage performance and reduce the total cost of NAS ownership.

With Qtier, a storage pool can contain a mixture of solid-state drives (SSDs), hard disk drives (HDDs), and Serial Attached SCSI (SAS) drives. QTS creates a separate storage tier for each disk type, and then moves data between the tiers based on access frequency. Frequently accessed data is moved to the fastest disks for greater read and write performance. Infrequently accessed data is moved to the slower high-capacity disks for more cost effective data storage.

Qtier Benefits

	NAS Configuration	Cost	Storage Capacity	Read/Write Performance	Management Effort
	All HDDs	Low	High	Low	Low
	All SSDs	Very high	Low	High	Low
	SSDs and HDDs manually separated into two or more storage pools	Moderate	Medium	High for SSD pool, low for HDD pool	High (admin must manually move data between pools)
	Qtier with SSDs and HDDs in one Qtier-enabled storage pool	Moderate	Medium	High for frequently accessed data	Low (QTS automatically moves data between disks)

Qtier 2.0 IO Aware

Qtier 2.0 IO Aware is a feature available in QTS version 4.3.3 or later. With IO Aware, QTS reserves 25% of the SSD tier capacity in a Qtier storage pool for faster access performance. If data in the capacity or high speed tiers experiences a high number of read or write requests, QTS immediately moves it to reserved SSD space instead of waiting to move it using auto-tiering. This improves random I/O performance, offering performance similar to having an SSD cache.

Qtier and SSD Cache Comparison

Note
Qtier can be used at the same time as SSD cache.

There are three main configuration options when configuring a NAS with a mixture of HDDs and SSDs.

Configuration	SSD Usage	HDD Usage
Qtier Storage Pool	Qtier Storage Pool (combined with HDDs)	Qtier Storage Pool (combined with SSDs)
SSD Cache	SSD cache	HDD-only storage pool
All-SSD Storage Pool	SSD-only storage pool	HDD-only storage pool

Qtier, SSD Cache, and All-SSD Storage Pool Comparison

	Qtier Storage Pool	SSD Cache	All-SSD Storage Pool
Total file storage space	High (SSDs + HDDs)	Moderate (HDDs only)	Low (SSDs only)
Maximum SSD capacity	No limit	Up to 4 TB depending on installed memory	No limit
SSD expansion	Expand as needed	Limited by available memory	Expand as needed
Applicable storage	Thick volumes, thin volumes and block-based LUNs in the pool	All volumes and LUNs on the NAS	Volumes and LUNs created on the SSDs
Data migration	Scheduled or when NAS load is low	Automatic	No migration required
Data migration method	QTS writes incoming data to the SSD tier and moves data to different tiers based on access frequency.	• Write cache: QTS writes incoming data to the SSD cache and then flushes the cache to disk periodically. • Read cache: QTS copies data to the cache as it is accessed.	No migration required
Recommended use cases	• Total SSD capacity is high • I/O is predictable • The storage pool only occasionally experiences periods of intense random I/O access	• I/O is unpredictable and frequently happens in random bursts • Home usage, where the NAS will be used for a large range of different applications	Applications require consistent intensive random read-write access
Usage examples	File server, web server, email servers, basic database services (With Qtier IO Aware)	Video editing, virtualization	Business critical database or other application

Qtier Requirements

NAS Requirements

- The NAS must support Qtier. For a full list of compatible models, see https://www.qnap.com/solution/qtier-auto-tiering.

- The NAS should have at least 4 GB of installed memory. Using Qtier with less than 4 GB of memory may cause system instability.

Tier Requirements

A Qtier storage pool can have either two or three tiers.

Important
Each tier must have a total RAW storage capacity of at least 144 GB after configuring RAID.

Qtier Pool Configuration	Tier 1	Tier 2	Tier 3
Two tiers	Ultra-high speed	High speed OR capacity	N/A
Three tiers	Ultra-high speed	High speed	Capacity

Disk Requirements

Qtier Disk Types

Tier	Disk Type
Ultra-High Speed	• SATA 2.5" SSD • SAS 2.5" SSD • SATA M.2 SSD • PCIe/NVMe M.2 SSD
High Speed	• SAS HDD
Capacity	• SATA HDD • NL-SAS HDD

Qtier Creation

Creating a Qtier Storage Pool

For details on hardware and software requirements, see Qtier Requirements.

Tip
Immediately after creating a Qtier storage pool, QTS starts moving data between tiers. This data migration may affect system storage performance. You should create the Qtier storage pool during a period of low NAS activity.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Perform one of the following actions.

Current NAS State	Action
No volumes or storage pools	Click **New Storage Pool**
One or more volumes or storage pools	Select **Create** > **New Storage Pool**

   The **Create Storage Pool Wizard** opens.

3. Select **Enable Qtier (auto-tiering storage)**.

4. Click **Next**.
5. Create the ultra-high speed tier.
   a. Click SSD.
   b. Optional: Select an expansion unit.

Important
If you create the ultra-high speed tier using disks installed in a TL-series expansion unit, then the two tiers (high speed, capacity) must consist of disks from the same expansion unit.

   c. Select one or more solid-state drives (SSDs).
   d. Select a RAID type.
   For details, see RAID Types.
   e. Optional: Select the disk that will be used as a hot spare for the ultra-high speed tier.
6. Optional: Create the high speed tier.
   At least two different tiers are required in a Qtier storage pool.
   a. Click SAS.
   b. Optional: Select an expansion unit.
   c. Select one or more SAS hard disk drives (HDDs).
   d. Select a RAID type.
   For details, see RAID Types.
   e. Optional: Select the disk that will be used as a hot spare for the high speed tier.
7. Optional: Create the capacity tier.
   At least two different tiers are required in a Qtier storage pool.
   a. Click SATA.
   b. Optional: Select an expansion unit.
   c. Select one or more SATA or NL-SAS HDDs.
   d. Select a RAID type.
   For details, see RAID Types.
   e. Optional: Select the disk that will be used as a hot spare for the capacity tier.
8. Click **Next**.
9. Optional: Configure SSD over-provisioning.
   Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

10. Optional: Configure the alert threshold.

QTS issues a warning notification when the percentage of used pool space is equal to or above the specified threshold.

11. Click **Next**.
12. Verify the storage pool information.
13. Click **Create**.
    A confirmation message appears.

Warning
All data on the selected disks will be deleted.

14. Click **OK**.

QTS creates the Qtier storage pool and starts moving data between tiers. QTS starts automatically tiering data after it has spent sufficient time analyzing data access patterns.

Enabling Qtier in an Existing Storage Pool

You can enable Qtier in an existing storage pool by adding different types of disk to the pool. For details on hardware and software requirements, see Qtier Requirements.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select **Qtier** > **Upgrade with Qtier** .
   The **Upgrade Pool to use Qtier Wizard** window opens.
3. Select a storage pool.
4. Click **Next**.
5. Create a second tier.
   a. Click SSD, SAS or SATA.
   b. Select an expansion unit.
   c. Select one or more disks.
   d. Select a RAID type.
      For details, see RAID Types.
   e. Optional: Select the disk that will be used as a hot spare for the tier.
6. Optional: Create a third tier.
   a. Click SSD, SAS or SATA.
   b. Optional: Select an expansion unit.
   c. Select one or more disks.
   d. Select a RAID type.
      For details, see RAID Types.
   e. Optional: Select the disk that will be used as a hot spare for the tier.
7. Click **Next**.

8. Optional: Configure SSD over-provisioning.
   Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.

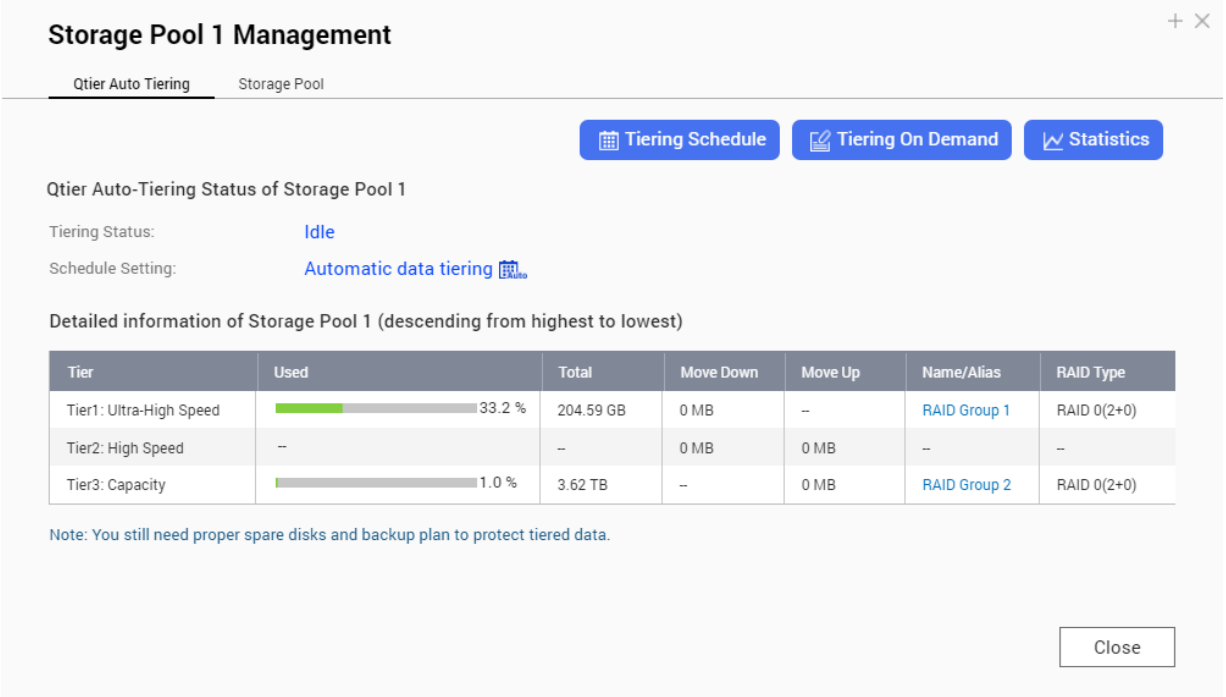
9. Click **Next**.
10. Verify the storage pool information.
11. Click **Finish**.
    A confirmation message appears.

Warning
All data on the selected disks will be deleted.

12. Click **OK**.

The pool status changes to `Upgrading`. After Qtier is enabled, the pool status changes back to `Ready`.

Qtier Management



The Qtier Storage Pool Management Screen

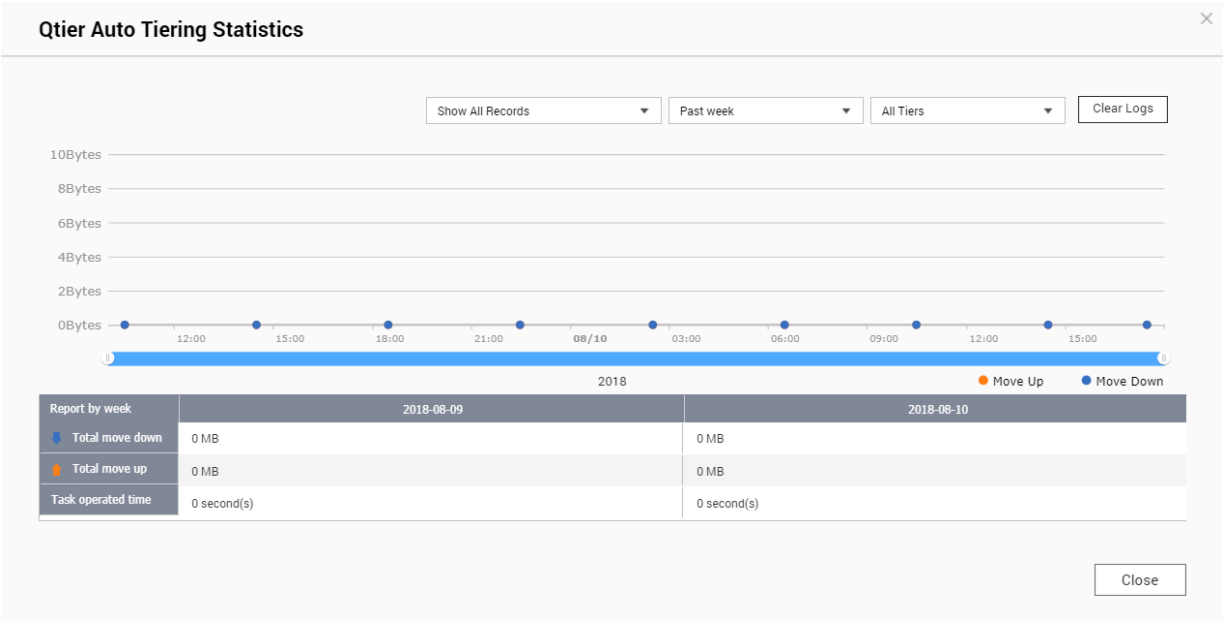
Item	Description
Tiering Schedule	Select when QTS moves data between tiers. For details, see Configuring the Qtier Tiering Schedule.

Item	Description
Tiering on Demand	Select which LUNs and shared folders Qtier should perform auto tiering on. For details, see Configuring Tiering On Demand.
Statistics	View detailed on statistics on data movement between tiers. For details, see Qtier Statistics.
Tiering Status	The current status of Qtier. For details, see Qtier Status.
Schedule Setting	The current tiering schedule for this pool.
Tier	The tier name.
Used	Percentage of used space in the tier.
Total	Total storage capacity of the tier.
Move Down	The total amount of data moved to a slower tier.
Move Up	The total amount of data moved to a faster tier.
Name/Alias	The tier's RAID group.
RAID Type	The configuration of the tier's RAID group, including RAID type, number of disks and number of space disks.

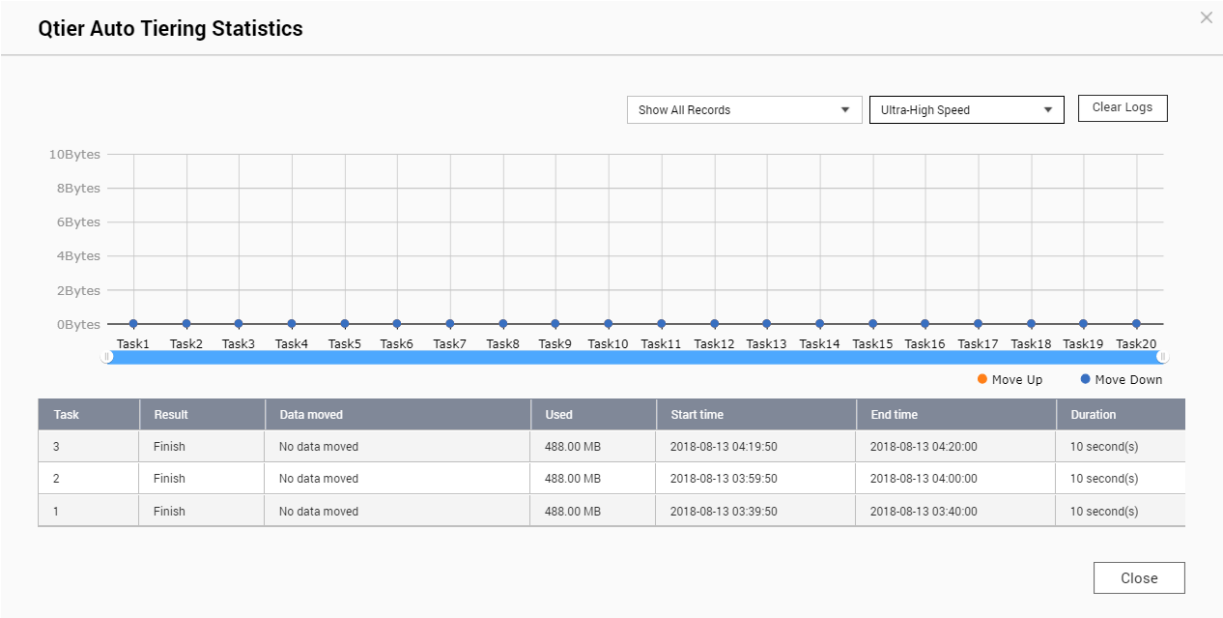
Qtier Statistics

The appearance and functionality of Qtier depends on the current tiering schedule.

Qtier Schedule	Qtier Statistics Screen Description
Automatic data tiering	Displays the total amount of data moved between tiers for the previous day, week, or month.
Manually set tiering schedule	Displays the total amount of data moved between tiers for the previous 20 scheduled tiering runs.



Qtier Statistics (Automatic data tiering)



Qtier Statistics (Manually set tiering schedule)

Qtier Status

Qtier Status Message	Description
Idle	Qtier is analyzing data access patterns but is not currently moving data
Processing	Qtier is moving data between tiers.
Canceling	A user stopped the tiering process.
Suspending	A user paused the tiering process.
Suspended	A user paused the tiering process. Qtier is inactive.
Resuming	A user resumed the tiering process from a paused state.
Resumed	Qtier is moving data between tiers. This is the same as `Processing`.

Qtier Tiering Schedule

Qtier can move data between tiers on a set schedule. NAS access speeds and system performance may decrease while Qtier is moving data.

Tip
Schedule Qtier to move data during periods of low usage, such as during the night or on weekends.

Configuring the Qtier Tiering Schedule

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a Qtier storage pool.
3. Click **Manage**.
   The **Storage Pool Management** window opens.

4. Go to the **Qtier Auto Tiering** tab.
5. Click **Tiering Schedule**.
   The **Qtier Auto Tiering Schedule Settings** window opens.
6. Select a schedule type.

Option	Description	Recommended usage	User Actions
Automatic data tiering	Qtier moves data whenever it detects that the Qtier storage pool is idle.	The NAS has no regular usage pattern. Data may be accessed at any time.	Select **Enable exclusion schedule** to specify times that Qtier should not perform data tiering.
Manually set tiering schedule	Qtier only move data at the times you specify.	The NAS has a regular known usage pattern. For example, if the NAS is primarily used in an office environment, Qtier can be scheduled to move data at night and on weekends.	Specify the hours on the calendar that Qtier should perform data tiering. You can configure the following settings: • **Start minutes**: Auto tiering will start at this number of minutes past the hour. • **Run now**: Start tiering data immediately.

7. Click **Apply**.

Removing the Ultra-High Speed Tier

Removing the ultra-high speed tier converts a Qtier storage pool into a regular storage pool.

Important
You can only remove the ultra-high speed tier if the allocated storage pool space is less than the remaining storage pool capacity (Total storage pool capacity - Ultra-high speed tier capacity = Remaining capacity).

Tip
This feature is useful in the following situations:

- You want to use the SSD drives for another purpose.
- You want to increase the amount of SSD over-provisioning in the ultra-high speed tier.
- You want to change the RAID configuration of the ultra-high speed tier.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a Qtier storage pool.
3. Click **Manage**.
   The **Storage Pool Management** window opens.
4. Click **Remove** and then select **Remove Ultra-High Speed Tier**.
   The **Ultra-High Speed Tier Removal Wizard** window opens.
5. Click **Next**.

6. Confirm that you want to remove the remove ultra-high speed tier.
7. Click **Next**.

Warning
The storage pool will be inaccessible while QTS removes the ultra-high speed tier. This process might take a long time.

8. Click **Finish**.

QTS creates a background task. The status of the storage pool changes to `Removing SSD Tier...`.

Tiering On Demand

Using Tiering On Demand, you can disable auto tiering for specific LUNs and shared folders in a Qtier storage pool. If auto tiering is disabled, QTS permanently moves all data in the LUN or folder to the slowest storage tier.

Important
You can only disable auto tiering for user data. Qtier always tiers system and application data stored in the pool.

Configuring Tiering On Demand

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a Qtier storage pool.
3. Click **Manage**.
   The **Storage Pool Management** window opens.
4. Go to the **Qtier Auto Tiering** tab.
5. Click **Tiering On Demand**.
6. Configure auto tiering for each LUN and shared folder.
7. Click **Apply**.

Snapshots

A snapshot protects data by recording the state of a thick volume, thin volume, or LUN at a specific point in time. With snapshots, you can perform the following:

- Restore a volume or LUN to a previous state.
- Access and restore previous versions of files and folders.
- Create an identical copy of a volume or LUN.

Note
To use snapshots, your NAS model must support snapshots and have at least 1 GB of memory. For a list of compatible NAS models, see www.qnap.com/solution/snapshots.

Snapshot Storage Limitations

The maximum number of snapshots a NAS can store is determined by the NAS CPU manufacturer or NAS series, and installed memory.

Tip
For more information on NAS hardware specifications, go to https://www.qnap.com.

NAS CPU or Model	Installed Memory	Maximum Snapshots per NAS	Maximum Snapshots per Volume or LUN
• Intel CPU • AMD CPU	≥ 1 GB	32	16
	≥ 2 GB	64	32
	≥ 4 GB	1024	256
• Annapurna Labs CPU • TS-1635AX • TS-328 • TS-128A, TS-228A • TS-x51, TS-x51+	≥ 1 GB	32	16
	≥ 2 GB	64	32
	≥ 4 GB	256	64

Snapshot Creation

Taking a Snapshot

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick volume, thin volume, or block-based LUN.

Tip
To take a snapshot of a file-based LUN, take a snapshot of its parent volume.

3. Click **Snapshot** and then select **Take a Snapshot**.
   The **Take a Snapshot** window opens.
4. Optional: Specify a name.
5. Optional: Choose to keep the snapshot permanently.
   If selected, QTS retains the snapshot indefinitely. If not selected, QTS may delete the snapshot according to the snapshot retention policy set for the volume or LUN.
   For more information, see Snapshot Retention Policy.
6. Select the LUN snapshot type.
   This setting is only available when taking a snapshot of a block-based LUN.

Type	Description
Crash consistent	The snapshot records the state of the data on the LUN.

Type	Description
Application consistent	The snapshot records the state of data and applications on the LUN. The iSCSI host flushes data in memory to the LUN before QTS takes a snapshot. If VMware vCenter is using the LUN, vCenter takes a virtual machine snapshot. **Important** This option is only available for VMware vCenter, or for Volume Shadow Copy Service (VSS) aware applications running on a Windows server. You must install QNAP Snapshot Agent on the iSCSI initiator.

7. Optional: Specify a description.
   The description helps you to identify the snapshot.
8. Click **OK**.
   A confirmation message appears.
9. Click **OK**.

QTS takes the snapshot. The snapshot appears in **Snapshot Manager**.

Configuring a Snapshot Schedule

Tip
You can configure a separate snapshot schedule for each volume and LUN.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick volume, thin volume, or block-based LUN.
3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Click **Schedule Snapshot**.
   The **Snapshot Settings** window opens.
5. Select **Enable schedule**.
6. Specify how often QTS will take a snapshot.
7. Select the LUN snapshot type.
   This setting is only available when taking a snapshot of a block-based LUN.

Type	Description
Crash consistent	The snapshot records the state of the data on the LUN.

Type	Description
Application consistent	The snapshot records the state of data and applications on the LUN. The iSCSI host flushes data in memory to the LUN before QTS takes a snapshot. If VMware vCenter is using the LUN, vCenter takes a virtual machine snapshot. **Important** This option is only available for VMware vCenter, or for Volume Shadow Copy Service (VSS) aware applications running on a Windows server. You must install QNAP Snapshot Agent on the iSCSI initiator.

8. Optional: Enable smart snapshots.
   When enabled, QTS only takes a snapshot if data on the volume or LUN was modified since the last snapshot was taken.
9. Optional: Specify a description.
   The description helps you to identify the snapshot.
10. Click **OK**.
    A confirmation message appears.
11. Click **OK**.

QTS starts taking snapshots according to the schedule.

Snapshot Management

Snapshot Retention Policy

The snapshot retention policy determines how long QTS keeps each snapshot of a volume or LUN before deleting it. Each volume and LUN has its own individual snapshot retention policy.

Configuring a Snapshot Retention Policy

Important
After you create or modify a snapshot retention policy, QTS applies the new policy to existing snapshots. If the new policy is more restrictive than the previous policy, for example changing from `Keep for: 5 days` to `Keep for: 2 days`, then QTS deletes existing snapshots to conform with the new policy.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick volume, thin volume, or LUN.
3. Click **Snapshot** and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Click **Schedule Snapshot**.
   The **Snapshot Settings** window opens.
5. Click **Snapshot Retention**.
6. Select a snapshot retention policy.

Snapshot Retention Policy	UI Label	Description
Time-based	Keep for	Keep each snapshot for the specified length of time.
Fixed number	Keep the specified number of snapshots	Keep a fixed maximum number of snapshots on the NAS. After the maximum number is reached, QTS deletes the oldest snapshot when taking a new snapshot.
Smart versioning	Smart versioning	Keep a snapshot created during a time period for a specified length of time. Examples: • **Hourly**: 24 - At the end of every hour, the earliest snapshot created that hour becomes the hourly backup. The snapshot is retained for 24 hours and then deleted. • **Daily**: 14 - At the end of every day, the earliest snapshot created that day becomes the daily snapshot. The snapshot is retained for 14 days and then deleted. • **Weekly**: 5 - At the end of every week, the earliest snapshot created that week becomes the weekly snapshot. The snapshot is retained for 5 weeks and then deleted. • **Monthly**: 11 - At the end of every month, the earliest snapshot created that month becomes the monthly snapshot. The snapshot is retained for 11 months and then deleted. **Important** The maximum number of snapshots for all time periods combined is 256.

7. Click **OK**.

Configuring Pool Guaranteed Snapshot Space

Pool guaranteed snapshot space is storage pool space that is reserved for storing snapshots. Enabling this feature ensures that QTS always has sufficient space to store new snapshots.

Pool Guaranteed Snapshot Space Status	Snapshot Storage Location
Disabled	Free space in the storage pool
Enabled	Pool guaranteed snapshot space until full, then free space in the storage pool

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .

2. Select a thick volume, thin volume, or LUN.
3. Click **Snapshot**, and then select **Snapshot Manager**.
4. Click **Pool Guaranteed Snapshot Space**, and then select **Configure**.
5. Enable **Enable Pool Guaranteed Snapshot Space**.
6. Select the amount of reserved space.

Option	Description
Recommended	Reserve a percentage of the total storage pool space. **Tip** The default value is 20%.
Custom	Reserve a fixed amount of storage pool space.

7. Click **OK**.

Deleting Snapshots

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick volume, thin volume, or block-based LUN.
3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Optional: Change the view to list view.
   a. Click
   b. Select **List View**.
5. Select one or more snapshots.
6. Click .

Snapshot Data Recovery

Restoring Files and Folders from a Snapshot

Tip

- Use snapshot revert to quickly restore all data on a volume or LUN.
  For details, see Reverting a Volume
- You can restore files and folders from a snapshots in File Station by enabling **Enable File Station Snapshot Directory for administrators**.
  For details, see Snapshot Global Settings

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

The volume must contain at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Select a snapshot.
5. Select the files and folders to be restored.
6. Perform one of the following actions.

Action	Description
Select **Restore** > **Restore Files**	Restore the files or folders to their original storage location. If the files or folders still exists on the NAS, then they will be overwritten with the older versions. **Warning** All changes made after the snapshot was taken will be deleted.
Select **Restore** > **Restore Files to**	Choose one of the following restoration options. • Restore the files or folders to a different location on the NAS. • Restore the files or folders to remote mounted storage space. • Restore a single shared folder as a new shared folder.
In the menu bar, click	Download the files and folders to your computer in a ZIP file.

QTS restores the files and folders then displays a confirmation message.

Reverting a Volume

Reverting restores a volume or LUN to the state at which the snapshot was taken. Restoring data using snapshot revert is significantly faster than restoring individual files and folders.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

Important
The volume must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Select a snapshot.
5. Click **Revert Volume Snapshot**.

Warning
All changes made after the snapshot was taken will be deleted.

6. Optional: Select **Take a new snapshot before reverting**.

QTS takes a snapshot before starting the revert. This ensures that changes made on the volume or LUN are not permanently lost.

7. Click **Local Revert**.

The status of the volume changes to `Reverting`. QTS disables access to the volume until the revert process is finished.

Reverting a LUN

Reverting restores a volume or LUN to the state at which the snapshot was taken. Restoring data using snapshot revert is significantly faster than restoring individual files and folders.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a block-based LUN.

Important
The LUN must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Select a snapshot.
5. Click **Revert LUN Snapshot**.

Warning
All changes made after the snapshot was taken will be deleted.

6. Optional: Configure the following settings.

Setting	Description
Take a new snapshot before reverting	QTS takes a snapshot before starting the revert. This ensures that changes made to data since the snapshot was taken are not permanently lost.
Re-map LUN to the same iSCSI target after revert	If enabled, QTS automatically remaps the LUN to its current target after reverting. If disabled, you must manually remap the LUN after reverting.

7. Click **Local Revert**.

QTS unmaps the LUN from its iSCSI target. The status of the LUN changes to `Reverting`.

Restoring Files and Folders using Windows Previous Versions

QTS snapshots integrate with the Previous Versions feature, which enables Windows users to restore files and folders from a snapshot in Windows File Explorer.

Important

- You must be using Windows 7, Windows 8 or Windows 10.
- The files must be stored on a thick volume or thin volume that has at least one snapshot.
- **Enable Windows Previous Versions** must be enabled in the shared folder settings.

- **Allow symbolic links between different shared folders** must be enabled at **Control Panel** > **Network & File Services** > **Win/Mac/NFS** > **Microsoft Networking** > **Advanced Options** .

1. In Windows, open a NAS shared folder using File Explorer.
   For details on mapping a shared folder, see Mapping a Shared Folder on a Windows Computer.
2. Right-click a file or folder, and then select **Properties** > **Previous Versions**
   A list of available previous versions appears. Each version corresponds to a snapshot containing the file or folder.
3. Select a previous version.
4. Select one of the following options.

Button	Description
Open	Open the previous version of the file or folder.
Restore	Overwrite the current version of the file or folder with the previous version. **Warning** All changes made to the file or folder after the snapshot was taken will be deleted.

Snapshot Clone

Cloning creates a copy of a volume or LUN from a snapshot. The copy is stored in the same storage pool as the original volume or LUN.

Cloning a Volume

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

Important
The volume must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Select a snapshot.
5. Click **Clone**.
   The **Clone Snapshot** window opens.
6. Specify a volume alias.
7. Click **OK**.

QTS clones the volume and shared folders, and then displays a confirmation message.

Cloning a Block-Based LUN

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a block-based LUN.

Important
The LUN must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Select a snapshot.
5. Click **Clone**.
   The **Clone Snapshot** window opens.
6. Specify a LUN name.
7. Optional: Select an iSCSI target.
   QTS will map the LUN copy to the target.
8. Click **OK**.

QTS clones the LUN and then displays a confirmation message.

Snapshot Replica

- Snapshot Replica is a snapshot-based full backup solution for QTS.
- With Snapshot Replica you can back up a volume or block-based LUN to another storage pool, either on the same NAS or on a different QNAP NAS, using snapshots.
- Backing up data with Snapshot Replica reduces storage space and bandwidth requirements, and simplifies data recovery.

Protection Levels

Snapshot Replica can back up your snapshots to another storage pool on the local NAS, or to a remote NAS. These different backup configurations provide different levels of data protection.

Protects Against	Snapshots only	Snapshots + Local Snapshot Replica	Snapshots + Remote Snapshot Replica
Accidental modification or deletion of files	✓	✓	✓
Ransomware	✓	✓	✓
RAID Group Failure • Member disks fail • Member disks are removed from the NAS		✓	✓
Storage Pool Failure • One or more RAID groups in the pool fail • Pool is deleted		✓	✓

Protects Against	Snapshots only	Snapshots + Local Snapshot Replica	Snapshots + Remote Snapshot Replica
NAS Hardware Failure • NAS cannot power on • QTS encounters an error and cannot start • NAS is stolen			✓

Snapshot Replica Requirements

NAS	Requirement
Source and Destination NAS	Must be a QNAP NAS that supports snapshots.
Source and Destination NAS	Both source and destination NAS devices must be running QTS. Replicating snapshots from QTS to QuTS hero or vice versa is not supported.
Source and Destination NAS	Must have at least 1GB of installed memory.
Source and Destination NAS	SSH port 22 and TCP data ports 50100-50199 must be open.
Destination NAS	The NAS must have at least one storage pool with free space greater than or equal to the size of the volume or LUN being backed up.
Destination NAS	**Allow SSH connections** must be enabled at **Control Panel** > **Network & File Servers** > **Telnet / SSH** .

Creating a Snapshot Replica Job

Important
When running a Snapshot Replica job for the first time, all data on the volume or LUN is transferred to the destination NAS. This may take a long time, depending on the network connection speed and the read/write speeds of both NAS devices.

1. Go to **Storage & Snapshots** > **Snapshot Backup** > **Snapshot Replica** .
2. Click **Create a Replication Job**.
   The **Create a Snapshot Replication Job** wizard opens.
3. Select the source volume or LUN.
4. Optional: Specify a job name.

Tip
The default job name is the first 6 characters of the source volume or LUN name followed by "_rep".

5. Click **Next**.
6. Specify the address of the destination NAS.
   Perform one of the following actions.

Action	Destination NAS Location	Description
Manually specify the NAS address	LAN, WAN, Internet	Allows you to enter an IP address, hostname, or FQDN
Click **Detect** and then select a NAS from the list	LAN	Displays a list of all QNAP NAS devices on the local network
Click **Local Host**	Local NAS	Replicates snapshots between different storage pools on the same NAS

7. Enter the password for the default admin account on the destination NAS.
8. Optional: Specify a port.

Tip
The default port is 22.

9. Click **Test**.
   QTS connects to the destination NAS using the specified admin password, and checks that there is sufficient storage space.
10. Click **Next**.
11. Specify how many replicated snapshots will be kept on the destination NAS.
    After the specified number is reached, QTS will delete the oldest snapshot each time it replicates a new snapshot.
12. Select the destination storage pool.
13. Click **Next**.
14. Select a backup plan.

Backup Plan	Description
Start replication job after taking a local snapshot	The replica job will run each time QTS creates the specified number of snapshots. These snapshots may be created manually or on a schedule.

Backup Plan	Description

Start replication job on a schedule	The replica job runs according to the specified schedule, and replicates all snapshots created since it was last run. If no new snapshots were created, it will not replicate any data.
	Choose one of the following scheduling options, and then click **Add**.
	• Run on a schedule: The job automatically runs daily, weekly, or monthly. Settings:
	  • Schedule: How often the job runs
	  • Day: The day that the job runs on
	  • Expiration date: The replica job stops running after this date
	  • Frequency: How often the job runs on the days specified by "Schedule" and "Day"
	  • Start at: The time that the job starts running.
	• Run once: The job runs once on a specific time and day.
	• Manually start: The job does not run unless a user starts it.

Take a new snapshot on a schedule, then run replication job	The replica job runs according to the specified schedule. QTS takes a new snapshot immediately before starting each run of the job. This ensures that there is always at least one snapshot to replicate.
	Choose one of the following scheduling options, and then click **Add**.
	• Run on a schedule: The job automatically runs daily, weekly, or monthly. Settings:
	  • Schedule: How often the job runs
	  • Day: The day that the job runs on
	  • Expiration date: The replica job stops running after this date
	  • Frequency: How often the job runs on the days specified by "Schedule" and "Day"
	  • Start at: The time that the job starts running.
	• Run once: The job runs once on a specific time and day.
	• Manually start: The job does not run unless a user starts it.

15. Click **Next**.

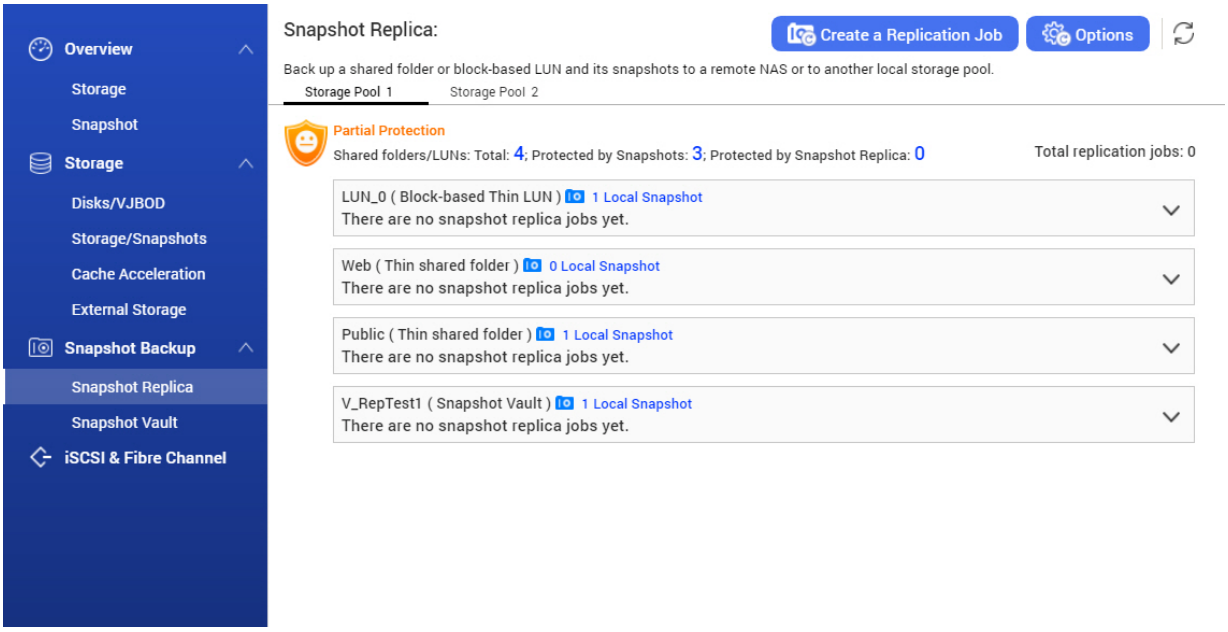
16. Optional: Configure transfer settings.

Setting	Description
Encrypt transfer	QTS encrypts the snapshot before replicating it. • The job must be run by the NAS admin user • The port used by this job must be the same as the SSH port on the destination NAS
Compress transfer	QTS compresses snapshots when replicating them. This consumes more CPU and system memory, but reduces the amount of bandwidth required. **Tip** Enable this setting in low bandwidth networks, or if the NAS devices are connected through a WAN.
Maximum transfer speed	Limits how much network bandwidth this job uses

17. Optional: Export the source data to an external storage device.
    To save time and bandwidth, you can export the source data to a connected external storage device such as a USB disk. After connecting the external storage device to the destination NAS, QTS will import the source data when the job is next run.
    a. Connect an external storage device to the NAS.
    b. Select **Export source data to external storage device on first run**.
    c. Select the external storage device.
    d. Optional: Select **Skip the export** if you have already exported the source data to the external storage device.
18. Click **Next**.
19. Optional: Select **Execute backup immediately**.
    When enabled, the job will run immediately after being created.
20. Review the job information.
21. Click **Finish**.
    QTS creates the job.
22. Optional: If you chose to export source data to an external storage device, disconnect the storage device from the source NAS and connect it to the destination NAS.

Snapshot Replica Management

To manage snapshot replica setting and jobs, go to **Storage & Snapshots** > **Snapshot Backup** > **Snapshot Replica** .



Snapshot Replica Job Actions

Icon	Description
	Enable or disable the schedule
	Start
	Stop
	Edit settings
	View logs
	Delete

Snapshot Replica Options

Setting	Description	Default Value
Timeout (seconds)	When a job is interrupted, QTS waits the specified number of seconds before canceling the job and marking it as failed.	600
Number of retries	When a job fails, QTS runs the job again the specified number of times.	3

Data Recovery on a Source NAS

Restoring Files and Folders from a Remote Snapshot

Important

Restoration time depends on the amount of data being restored and the connection speed between the two NAS devices.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

Important
The volume must be the source volume for a Snapshot Replica job.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Under **Select snapshot location**, select a remote NAS.
5. Select a snapshot.
6. Select the files and folders to be restored.
7. Perform one of the following actions.

Action	Description
Select **Restore** > **Restore Files**	Restore the files or folders to their original storage location. If the files or folders still exists on the NAS, then they will be overwritten with the older versions. **Warning** All changes made after the snapshot was taken will be deleted.
Select **Restore** > **Restore Files to**	Choose one of the following restoration options. • Restore the files or folders to a different location on the NAS. • Restore the files or folders to remote mounted storage space. • Restore a single shared folder as a new shared folder.
In the menu bar, click	Download the files and folders to your computer in a ZIP file.

QTS restores the files and folders then displays a confirmation message.

Reverting a Volume Using a Remote Snapshot

Reverting restores a volume or LUN to the state at which the snapshot was taken. Restoring data using snapshot revert is significantly faster than restoring individual files and folders.

Important
Restoration time depends on the amount of data being restored and the connection speed between the two NAS devices.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

Important
The volume must be the source volume for a Snapshot Replica job.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Under **Select snapshot location**, select a remote NAS.
5. Select a snapshot.
6. Click **Revert Volume Snapshot**.

Warning
All changes made after the snapshot was taken will be deleted.

7. Optional: Configure the following settings.

Setting	Description
Take a new snapshot before reverting	QTS takes a snapshot before starting the revert. This ensures that changes made to data since the snapshot was taken are not permanently lost.
Enable encryption during transfer	QTS encrypts the snapshot before sending it for additional security.

Warning
If the network connection is interrupted or if the storage configuration of the source or destination NAS changes while reverting, the volume might become inaccessible. If this happens, revert the volume again using a local or remote snapshot.

8. Click **Remote Revert**.
   The **Remote Revert Warning** window opens.
9. Enter the QTS administrator password.
10. Click **OK**.

The status of the volume changes to `Remote Reverting`. QTS disables access to the volume until the revert process is finished.

Reverting a LUN Using a Remote Snapshot

Reverting restores a shared folder or LUN to the state at which the snapshot was taken. Restoring data using snapshot revert is faster than restoring individual files and folders.

Warning

- While reverting, ensure that data in not being accessed on the LUN. The safest way to do this is to disconnect all iSCSI initiators. Accessing the LUN during a snapshot revert might result in data loss.
- Restoration time depends on the amount of data being restored and the connection speed between the two NAS devices.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a block-based LUN.

Important
The LUN must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Under **Select snapshot location**, select a remote NAS.
5. Select a snapshot.
6. Click **Revert LUN Snapshot**.

Warning
All changes made after the snapshot was taken will be deleted.

7. Optional: Configure the following settings.

Setting	Description
Take a new snapshot before reverting	QTS takes a snapshot before starting the revert. This ensures that changes made to data since the snapshot was taken are not permanently lost.
Enable encryption during transfer	QTS encrypts the snapshot before sending it for additional security.
Re-map LUN to the same iSCSI target after revert	If enabled, QTS automatically remaps the LUN to its current target after reverting. If disabled, you must manually remap the LUN after reverting.

Warning
If the network connection is interrupted or if the storage configuration of the source or destination NAS changes while reverting, the LUN might become inaccessible. If this happens, revert the LUN again using a local or remote snapshot.

8. Click **Remote Revert**.
   The **Remote Revert Warning** window opens.
9. Enter the QTS administrator password.
10. Click **OK**.

QTS unmaps the LUN from its iSCSI target. The status of the LUN changes to `Reverting`.

Cloning a Volume from a Remote Snapshot

Important
The time required to clone the volume depends on the amount of data stored on the volume and the connection speed between the two NAS devices.

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a thick or thin volume.

Important
The volume must have at least one snapshot.

3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.

4. Under **Select snapshot location**, select a remote NAS.
5. Select a snapshot.
6. Click **Clone**.
   The **Clone Snapshot** window opens.
7. Specify a volume alias.
8. Select a storage pool.
9. Select **Enable encryption during transfer**.
   QTS encrypts the snapshot before sending it for additional security.
10. Click **OK**.

QTS clones the volume and shared folders, and then displays a confirmation message.

Cloning a Block-Based LUN from a Remote Snapshot

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Select a block-based LUN.

Important
The LUN must have at least one snapshot.

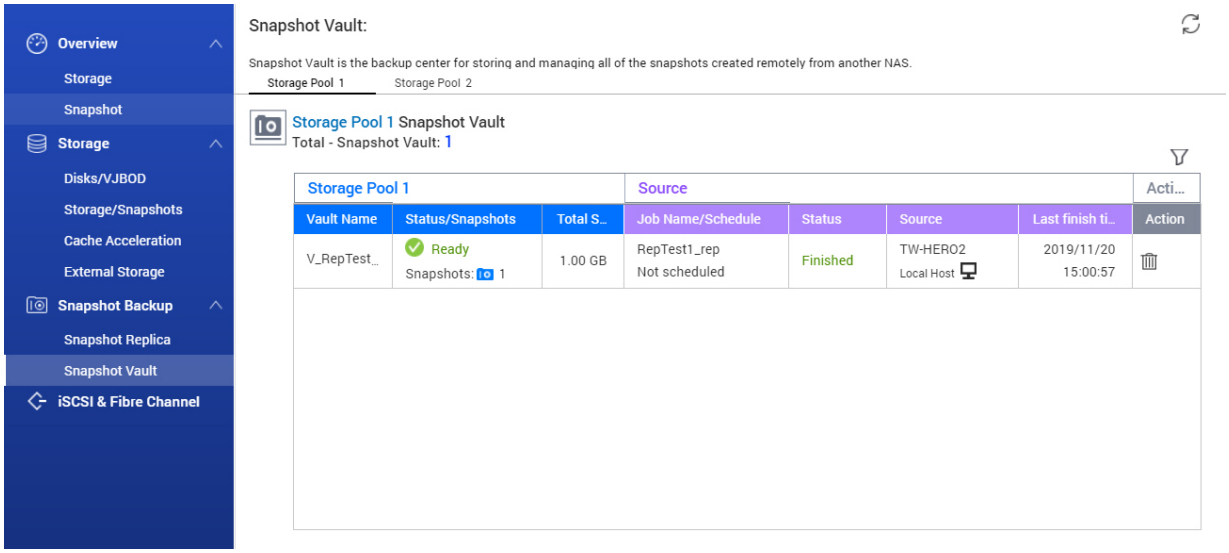
3. Click **Snapshot**, and then select **Snapshot Manager**.
   The **Snapshot Manager** window opens.
4. Under **Select snapshot location**, select a remote NAS.
5. Select a snapshot.
6. Click **Clone**.
   The **Clone Snapshot** window opens.
7. Specify a LUN name.
8. Select a storage pool.
9. Optional: Select an iSCSI target.
   QTS will map the LUN copy to the target.
10. Select **Enable encryption during transfer**.
    QTS encrypts the snapshot before sending it for additional security.
11. Click **OK**.

QTS clones the LUN and then displays a confirmation message.

Data Recovery on a Destination NAS

Snapshot Vault

After setting a NAS as the destination for a Snapshot Replica job, the replicated snapshots are stored in Snapshot Vault. Each replica job has its own separate vault.



Restoring Files and Folders from a Snapshot Vault

1. Go to **Storage & Snapshots** > **Snapshot Backup** > **Snapshot Vault** .
2. Select a storage pool.
3. On a vault, click .
   The **Snapshot Vault** window opens.
4. Optional: Unlock the vault.
   If the original source volume is encrypted, you must unlock the vault with the volume's encryption password.
   a. Click **Unlock**.
   b. Enter the encryption password or upload the encryption key.
   c. Click **OK**.
5. Select a snapshot.
6. Select the files and folders to be restored.
7. Click **Restore Files To**.
8. Specify a restore location.
9. Click **OK**.

Cloning a Volume from a Snapshot Vault

1. Go to **Storage & Snapshots** > **Snapshot Backup** > **Snapshot Vault** .
2. Select a storage pool.
3. On a vault, click .
   The **Snapshot Vault** window opens.

4. Optional: Unlock the vault.
   If the original source volume is encrypted, you must unlock the vault with the volume's encryption password.
   a. Click **Unlock**.
   b. Enter the encryption password or upload the encryption key.
   c. Click **OK**.
5. Select a snapshot.
6. Click **Clone**.
   The **Clone Snapshot** window opens.
7. Specify a volume alias.
8. Click **OK**.

QTS clones the volume and shared folders, and then displays a confirmation message.

Cloning a Block-Based LUN from a Snapshot Vault

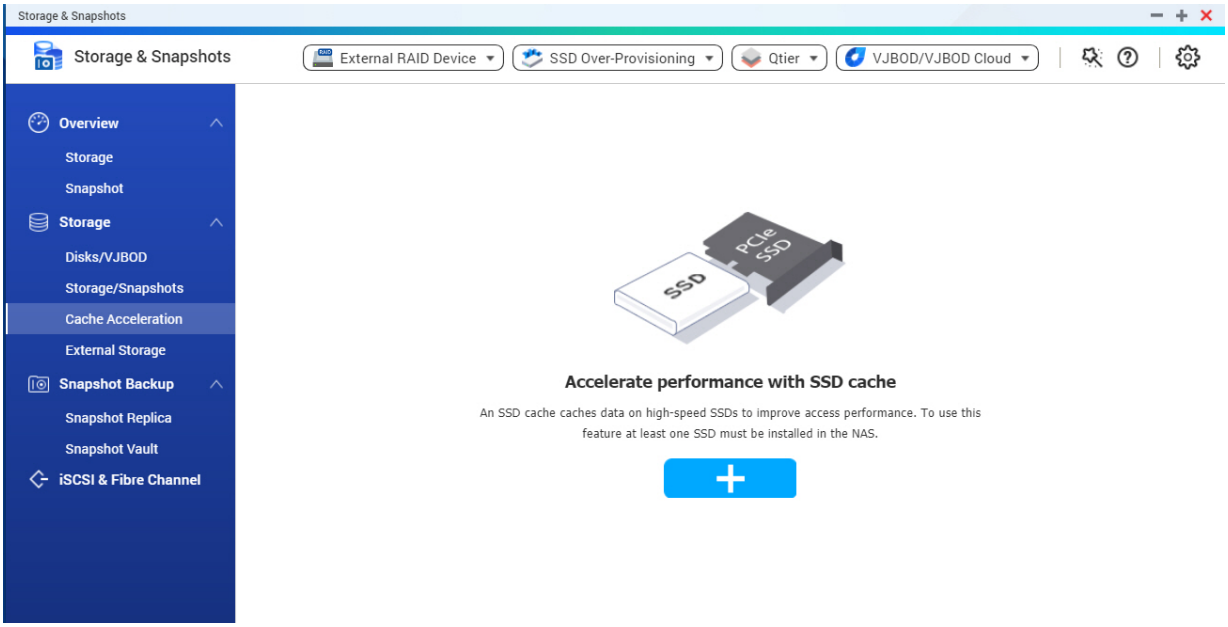
Important
The time required to create the LUN depends on the amount of data stored on the LUN and the connection speed between the two NAS devices.

1. Go to **Storage & Snapshots** > **Snapshot Backup** > **Snapshot Vault** .
2. Select a storage pool.
3. On a vault, click .
   The **Snapshot Vault** window opens.
4. Select a snapshot.
5. Click **Clone**.
   The **Clone Snapshot** window opens.
6. Specify a LUN name.
7. Optional: Select an iSCSI target.
   QTS will map the LUN copy to the target.
8. Click **OK**.

QTS clones the LUN and then displays a confirmation message.

Cache Acceleration

Cache Acceleration enables you to create an SSD cache to improve the read and write performance of the NAS.



Cache Acceleration Requirements

- The NAS model must support Cache Acceleration.
  For information about NAS and drive bay compatibility, see https://www.qnap.com/solution/ssd-cache
- The NAS must have one or more free SSDs installed in a compatible drive bay.
- The NAS must have a suitable amount of installed memory.
  The amount of memory required depends on the size of the SSD cache.

SSD Cache Size	Required Memory
512GB	≧ 1GB
1TB	≧ 4GB
2TB	≧ 8GB
4TB	≧ 16GB

Creating the SSD Cache

1. Go to **Storage & Snapshots** > **Storage** > **Cache Acceleration** .
2. Click +.
   The **Create SSD Cache** window opens.
3. Click **Next**.
4. Select one or more SSDs.

Warning
All data on the selected disks will be deleted.

5. Select a cache type.

Cache Type	Description
Read-only	When data is read from a LUN or volume, QTS copies the data to the SSD cache to speed up future read requests.
Write-only	QTS writes incoming data to the SSD cache first, then flushes the data to regular storage later. Read access to the new data is also accelerated while it is in the cache.
Read-write	QTS uses the SSD cache for both read and write caching, accelerating both read and write speeds.

6. Select a RAID type.

Warning
Selecting a RAID type with no disk failure protection (Single, JBOD, RAID 0) when the cache type is `Write-only` or `Read-write` may result in data loss.

Tip
RAID 10 provides the best write cache performance.

7. Click **Next**.

8. Optional: Configure SSD over-provisioning.
Over-provisioning reserves a percentage of SSD storage space on each disk in the RAID group to improve write performance and extend the disk's lifespan. You can decrease the amount of space reserved for over-provisioning after QTS has created the RAID group.

Tip
To determine the optimal amount of over-provisioning for your SSDs, download and run SSD Profiling Tool from App Center.
For details, see SSD Profiling Tool.

9. Select a cache mode.

Cache Mode	Description	Recommended Use Cases
Random I/O	Only small data blocks are added to the SSD cache. Larger blocks are accessed directly from regular storage.	Virtualization, databases
All I/O	Small and large data blocks are added to the SSD cache. Both sequential and random I/O requests are accelerated.	Video streaming, large file access operations

Tip
An HDD RAID group may outperform a SSD RAID group for sequential I/O if the ratio of HDDs to SSDs is 3:1 or greater, and the HDD group has a RAID type of RAID 0, 5, 6, or 10. However, SSDs will always be faster for random I/O. If the NAS contains a RAID group of type RAID 0, 5, 6, or 10 that contains three times more disks than the SSD cache, you should select **Random I/O**.

10. Optional: Configure the following advanced settings.

Setting	Description
Bypass block size	This value determines the maximum size of the data blocks that are stored in the SSD cache. Selecting a larger size may improve the cache's hit rate but uses more cache space. The default value is 1 MB.

Setting	Description
Cache replacement policy	Specify how data is removed from the SSD cache. Choose one of the following options: • Least recently used (LRU): Better cache performance but uses more CPU resources. This is the default option. • First in first out (FIFO): Lower CPU usage than LRU but might cause worse cache performance.

11. Click **Next**.
12. Select which volumes and LUNs can use the SSD cache.

Important
For data safety, volumes and LUNs created on an external storage device cannot use the SSD cache if the cache type is `Read-write`.

13. Click **Next**.
14. Click **Create**.
    A confirmation message appears.
15. Select **I understand** and then click **OK**.

Expanding the SSD Cache

The SSD cache can be expanded by adding a new SSD RAID group.

Important
Expanding the SSD cache clears all cached data.

1. Go to **Storage & Snapshots** > **Storage** > **Cache Acceleration** .
2. Click **Manage** and then select **Expand**.
   A confirmation message appears.
3. Click **OK**.
4. Select one or more SSDs.

Warning
All data on the selected disks will be deleted.

5. Select a RAID type.

Warning
Selecting a RAID type with no disk failure protection (Single, JBOD, RAID 0) when the cache type is `Write-only` or `Read-write` may result in data loss.

Tip
RAID 10 provides the best write cache performance.

6. Click **Expand**.
   A confirmation message appears.

7. Click **OK**.

Configuring SSD Cache Settings

1. Go to **Storage & Snapshots** > **Storage** > **Cache Acceleration** .
2. Click **Manage** and then select **Settings**.
   The **Switch SSD Cache** window opens.
3. Select which volumes and LUNs can use the SSD cache.

Important
For data safety, volumes and LUNs created on an external storage device cannot use the SSD cache if the cache type is `Read-write`.

4. Click **Next**.
5. Select a cache mode.

Cache Mode	Description	Recommended Use Cases
Random I/O	Only small data blocks are added to the SSD cache. Larger blocks are accessed directly from regular storage.	Virtualization, databases
All I/O	Small and large data blocks are added to the SSD cache. Both sequential and random I/O requests are accelerated.	Video streaming, large file access operations

Tip
An HDD RAID group may outperform a SSD RAID group for sequential I/O if the ratio of HDDs to SSDs is 3:1 or greater, and the HDD group has a RAID type of RAID 0, 5, 6, or 10. However, SSDs will always be faster for random I/O. If the NAS contains a RAID group of type RAID 0, 5, 6, or 10 that contains three times more disks than the SSD cache, you should select **Random I/O**.

6. Optional: Configure bypass block size.
   This value determines the maximum size of the data blocks that are stored in the SSD cache. Selecting a larger size may improve the cache's hit rate but uses more cache space. The default value is 1 MB.
7. Click **Finish**.

Cache Missing

If the write-only or read-write cache disks become unavailable because of hardware failure or physical removal from the NAS, all volumes using the write-cache will also become unavailable and will have `Cache Missing` as their status. QTS restricts access to these volumes to protect data integrity, as some volume data may be stored in the write cache without being flushed to disk.

When the SSD cache is missing, restore it using one of the following methods:

- If the SSD cache disks were removed from the NAS, re-insert the disks into the same drive bays.
- Resolve any RAID errors.
- Restart the NAS.

Removing a Missing SSD Cache

Important
You should only delete a missing SSD cache if it is not possible to restore the cache, for example, because of disk failure.

Warning
Removing a missing SSD write-only or read-write cache will delete all unflushed write data.

1. Go to **Storage & Snapshots** > **Storage** > **Cache Acceleration** .
2. Select **Manage** > **Remove** .
   A confirmation message appears.
3. Enter the admin password.
4. Click **OK**.
5. Restart the NAS.
6. Run a file system check on all volumes that used the SSD cache.
   For the details, see Volume File System Check.

Removing the SSD Cache

Warning
Removing an SSD from the SSD cache while write caching is enabled may cause data loss.

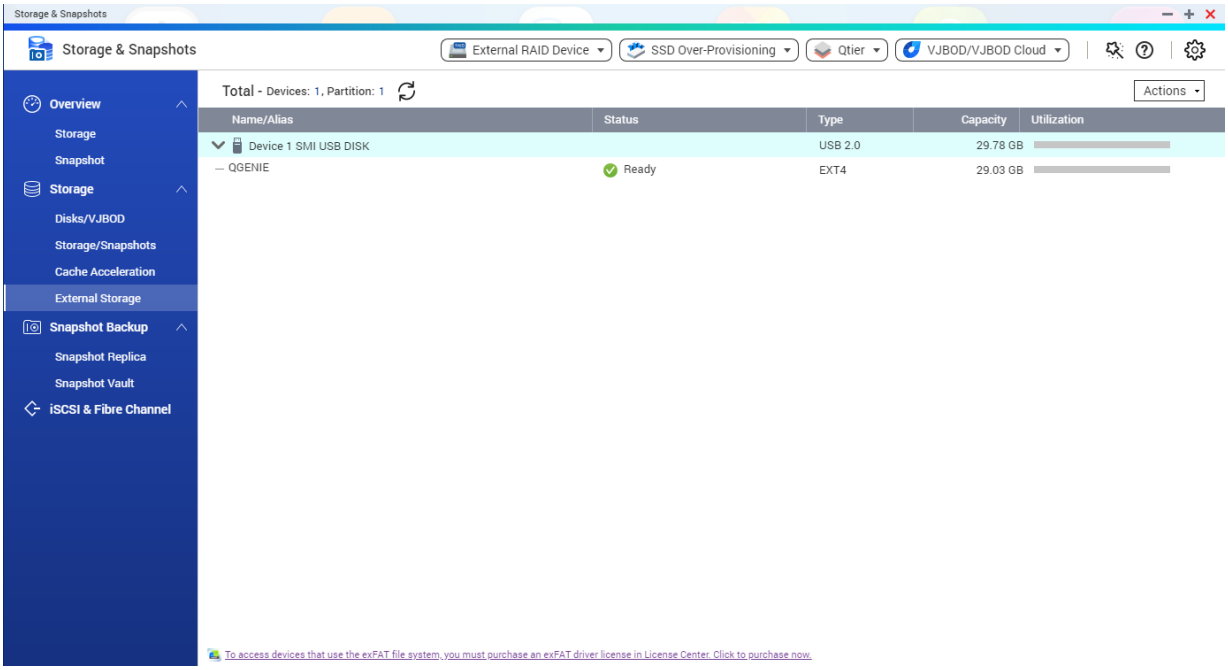
1. Go to **Storage & Snapshots** > **Storage** > **Cache Acceleration** .
2. Click **Manage** and then select **Remove**.
   A confirmation message appears.
3. Click **OK**.

QTS flushes all data in the cache to disk, then deleted the RAID groups. This process make take a long time.

External Storage

QTS supports external USB and eSATA storage devices, such as flash drives, portable hard drives, and storage enclosures. After connecting a USB or eSATA external storage device to the NAS, the device and all of its readable partitions will be displayed on this page. QTS will also create a shared folder for each readable partition on the device.

Note
To access partitions formatted using the exFAT file system, you must purchase an exFAT driver license in License Center.



External Storage Device Actions

Action	Description
Erase	Delete all data and partitions on the device.
Eject	Safely unmount the external storage device from the NAS, so that you can disconnect it.

External Storage Disk Actions

Action	Description
Full Disk Format	Format the disk. For details, see Formatting an External Storage Partition.
Secure Erase	Permanently erase all data on a disk. For details, see Secure Erase.

External Storage Partition Actions

Action	Description
Storage Information	Displays details about the selected partition, including partition name, capacity, used space, and file system type.
Format	Formats the partition. For details, see Formatting an External Storage Partition.
Encryption Management	Manages encryption on a previously encrypted device. You can lock or unlock the device, change the encryption password, or download the encryption key.

Action	Description
Eject	Unmounts the partition. The external storage device and any stored partitions will continue working.

Formatting an External Storage Partition

1. Go to **Storage & Snapshots** > **Storage** > **External Storage** .
2. Select a storage partition.
3. Click **Action**, and then select **Format**.
   The **Format Partition** window opens.
4. Select a file system.

File System	Recommended Operating Systems and Devices
NTFS	Windows
HTS+	macOS
FAT32	Windows, macOS, NAS devices, most cameras, mobile phones, video game consoles, tablets **Important** The maximum file size is 4 GB.
exFAT	Windows, macOS, some cameras, mobile phones, video game consoles, tablets **Important** • Using exFAT on QTS requires an exFAT driver license. You can purchase the license in License Center. • Verify that your device is compatible with exFAT before selecting this option.
EXT3	Linux, NAS devices
EXT4	Linux, NAS devices

5. Specify a disk label.
   The label must consist of 1 to 16 characters from any of the following groups:
   - Letters: A to Z, a to z
   - Numbers: 0 to 9
   - Special characters: Hyphen "-"
6. Optional: Enable encryption.
   a. Select an encryption type.
      Select one of the following options:
      - AES 128 bits

- AES 192 bits
- AES 256 bits

b. Specify an encryption password.
The password must consist of 8 to 16 characters from any of the following groups:

- Letters: A to Z, a to z
- Numbers: 0 to 9
- All special characters (excluding spaces)

c. Confirm the encryption password.

d. Optional: Select **Save encryption key**.
Select this option to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts.

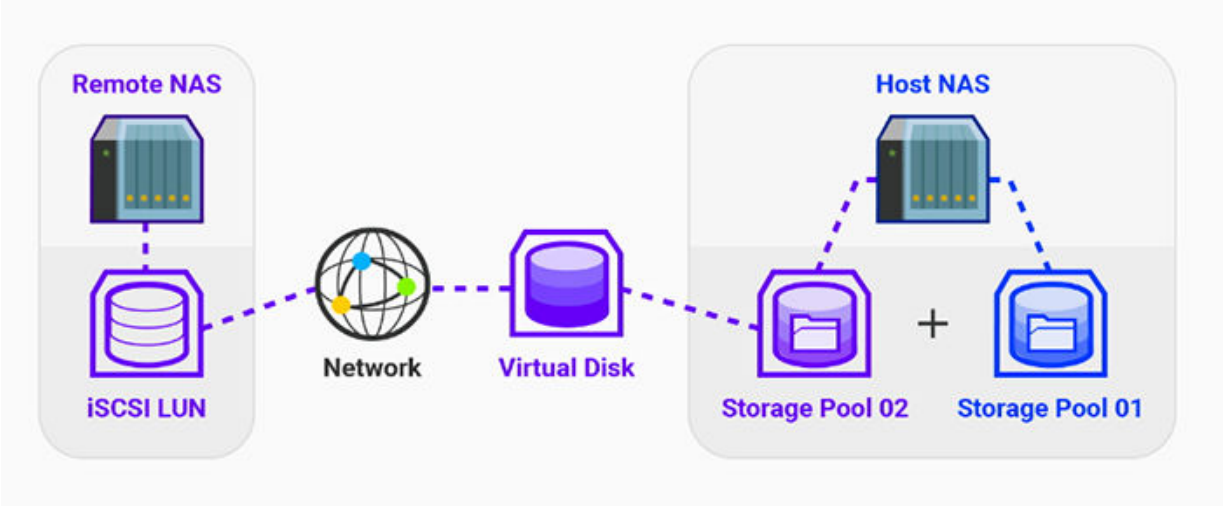
Warning

- Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS.
- If you forget the encryption password, the volume will become inaccessible and all data will be lost.

7. Click **Format**.
A warning message appears.
8. Click **OK**.

VJBOD (Virtual JBOD)

VJBOD (Virtual JBOD) enables you to add storage space from other QNAP NAS devices to your NAS as local VJBOD disks, to create a virtual expansion enclosure. VJBOD disks can be used to create new local storage space, expanding local NAS storage capacity. VJBOD is based on iSCSI technology.



VJBOD Requirements

Local NAS requirements:

- The NAS is running QTS 4.2.2 or later, or QuTS hero 4.5.0 or later.
- The NAS model supports VJBOD.
  For a list of supported series and models, see https://www.qnap.com/solution/vjbod.

Remote NAS requirements:

- The NAS is running QTS 4.2.1 or later, or QuTS hero.
- The NAS model supports iSCSI and storage pools.
- The NAS has a storage pool with at least 154 GB of free space, or an unused thick LUN with a capacity of 154 GB or more.

Tip
For a stable VJBOD connection, ensure the following conditions:

- All NAS devices are on the same local network.
- All NAS devices are configured with static IP addresses.
- On a remote NAS, additional LUNs are not mapped to an iSCSI target that is being used by a VJBOD disk.

VJBOD Limitations

- You can create a maximum of 8 VJBOD disks.
- You can only expand an existing storage pool using VJBOD disks if the pool consists of VJBOD disks from the same storage pool on the same remote NAS.
- It is not possible to create a system volume using VJBOD disks.
- VJBOD disks only support the RAID type Single.

VJBOD Automatic Reconnection

If a remote NAS gets disconnected, QTS automatically tries to reconnect to the NAS and recover the VJBOD disk every 30 seconds.

Important

- To allow automatic reconnection, all NAS devices should be configured with static IP addresses.
- The following things may prevent VJBOD connection or reconnection:
  - Use of dynamic IP addresses
  - Host IQN binding
  - Firewalls of IP blocks
  - Incorrect CHAP credentials

VJBOD Creation

Creating a VJBOD Disk from a New LUN

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Click **Create**, and then select **Create Virtual JBOD**.
   The **Create Virtual JBOD Disk Wizard** opens.
3. Click **Next**.
4. Specify the IP address or hostname of the remote NAS.

Important
The remote NAS must have at least one storage pool containing at least 153 GB of free space.

Tip
Click **Detect** to view the IP addresses of all QNAP NAS devices on the local network. Click **Local Host** to use the IP of the local NAS.

5. Specify an administrator account and password of the remote NAS.

Important
For security reasons, QNAP does not recommend using the "admin" account.

6. Optional: Specify the system administration port of the remote NAS.

Tip
The default port is 8080. If HTTPS is enabled, the default port is 443.

7. Click **Next**.
8. Optional: Select the local interface that will be used by VJBOD.
9. Optional: Select the remote interface that will be used by VJBOD.
10. Optional: Enable iSER.
    Enabling iSER increases data transfer speeds and reduces CPU and memory load.
    a. Ensure that selected local and remote network adapters are iSER-compatible and have `iSER` listed under **Supported Protocols**.
    b. Select **Use iSER when available**.
11. Click **Next**.
12. Select **Create a new iSCSI LUN on the remote NAS**.
13. Optional: Select **Host Binding**.
    When selected, only the local NAS will be able to access the VJBOD disk.

Tip
Enable this option if the VJBOD disk will be used to store sensitive information.

14. Click **Next**.
15. Select a storage pool.

16. Click **Next**.
17. Specify the capacity of the VJBOD disk.

Important
The size of the VJBOD disk cannot be changed after creation.

18. Optional: Configure advanced settings.

Setting	Description
4K bytes sector size	Changing the sector size to 4 KB increases LUN performance for specific applications and disk types.
SSD cache	The SSD cache will be used to improve VJBOD disk access performance.

19. Click **Next**.
QTS starts creating a dedicated iSCSI target on the remote NAS for the VJBOD disk.
20. Optional: Enable CHAP authentication.
An initiator must authenticate with the target using the specified username and password. This provides security, as iSCSI initiators do not require a NAS username or password.
    - Username
        - Length: 1 to 127 characters
        - Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
    - Password
        - Length: 12 to 16 characters
        - Valid characters: 0 to 9, a to z, A to Z, all special characters
21. Optional: Enable CRC checksums.
Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately.

Checksum Type	Description
Data Digest	The checksum can be used to verify the data portion of the PDU.
Header Digest	The checksum can be used to verify the header portion of the PDU.

22. Click **Next**.
23. Review the summary, and then click **Next**.
QTS creates the iSCSI target and LUN on the remote NAS, and then creates a VJBOD disk using the LUN. The disk appears at **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
24. Select a follow-up action.

Action	Description
Create New Storage Pool	Creates a storage pool using the VJBOD disk
Create New Static Volume	Creates a static volume using the VJBOD disk

Action	Description
Do nothing	Ends the creation process. You can configure the VJBOD disk later. **Tip** To create a storage pool or static volume on a VJBOD disk later, go through the normal steps of creating a storage pool or static volume. Then on the disk selection screen, under **Enclosure Unit** select `Virtual JBOD`.

25. Click **Finish**.

Creating a VJBOD Disk from an Existing LUN

1. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
2. Click **Create**, and then select **Create Virtual JBOD**.
   The **Create Virtual JBOD Disk Wizard** opens.
3. Click **Next**.
4. Specify the IP address or hostname of the remote NAS.

Important
The remote NAS must have at least one storage pool containing at least 153 GB of free space.

Tip
Click **Detect** to view the IP addresses of all QNAP NAS devices on the local network. Click **Local Host** to use the IP of the local NAS.

5. Specify an administrator account and password of the remote NAS.

Important
For security reasons, QNAP does not recommend using the "admin" account.

6. Optional: Specify the system administration port of the remote NAS.

Tip
The default port is 8080. If HTTPS is enabled, the default port is 443.

7. Click **Next**.
8. Optional: Select the local interface that will be used by VJBOD.
9. Optional: Select the remote interface that will be used by VJBOD.
10. Optional: Enable iSER.
    Enabling iSER increases data transfer speeds and reduces CPU and memory load.
    a. Ensure that selected local and remote network adapters are iSER-compatible and have `iSER` listed under **Supported Protocols**.
    b. Select **Use iSER when available**.
11. Click **Next**.
12. Select **Choose an existing iSCSI LUN on the selected NAS**.

13. Click **Next**.
14. Select a LUN.

> **Important**
> The LUN must be thick and block-based, and must have a capacity of at least 154 GB. Mutual CHAP must be disabled.

15. Click **Next**.
16. Optional: Enable CHAP authentication.
    An initiator must authenticate with the target using the specified username and password. This provides security, as iSCSI initiators do not require a NAS username or password.
    - Username
      - Length: 1 to 127 characters
      - Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
    - Password
      - Length: 12 to 16 characters
      - Valid characters: 0 to 9, a to z, A to Z, all special characters
17. Optional: Enable CRC checksums.
    Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately.

Checksum Type	Description
Data Digest	The checksum can be used to verify the data portion of the PDU.
Header Digest	The checksum can be used to verify the header portion of the PDU.

18. Click **Next**.
19. Review the summary, and then click **Next**.
    QTS creates a VJBOD disk using the LUN. The disk appears at **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
20. Select a follow-up action.

Action	Description
Create New Storage Pool	Creates a storage pool using the VJBOD disk
Create New Static Volume	Creates a static volume using the VJBOD disk
Recover Existing Data	Restores a static volume or storage pool that was previously created on the VJBOD disk

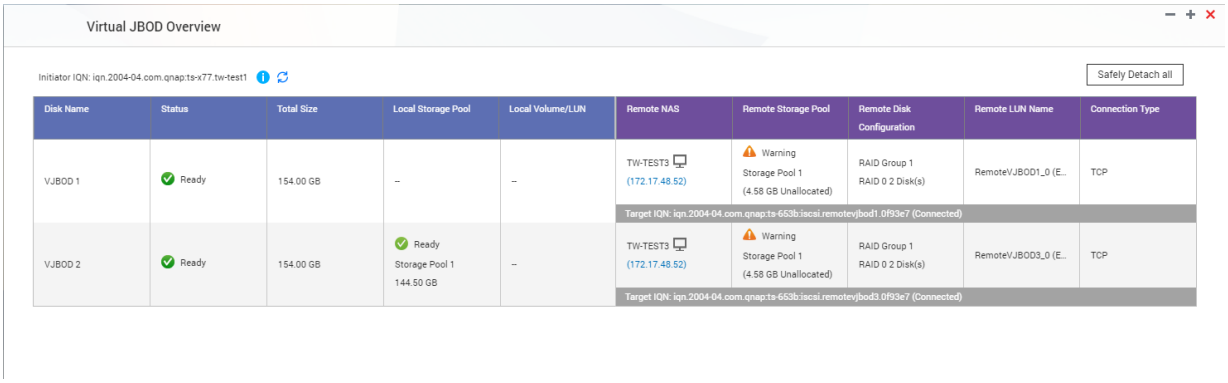
Action	Description
Do nothing	Ends the creation process. You can configure the VJBOD disk later. **Tip** To create a storage pool or static volume on a VJBOD disk later, go through the normal steps of creating a storage pool or static volume. Then on the disk selection screen, under **Enclosure Unit** select `Virtual JBOD`.

21. Click **Finish**.

VJBOD Management

Virtual JBOD Overview

To view an overview of all VJBOD disks including information on their source remote NAS devices, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** , click **VJBOD/VJBOD Cloud**, and then select **VJBOD Overview**.



VJBOD Disk Actions

Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** , select a VJBOD disk, and then click **Action**.

Action	Disk Status	Description
New Volume	Free	Creates a new static volume on the VJBOD disk
NAS Detail	Any	Displays information about VJBOD disk's remote NAS
Remote Log	Any	Displays the event log on the VJBOD disk's remote NAS
Data Recovery	Free	Restores a static volume or storage pool that was previously created on the VJBOD disk
Edit Disk	Any	Edits the disk name, and configure whether this disk uses the SSD cache
Disconnect	Free	Disconnects the VJBOD from its remote NAS

Action	Disk Status	Description
Connect	Disconnected	Reconnects a disconnected VJBOD disk
Edit Target	Disconnected	Edits the following iSCSI target settings: port number, CHAP authentication, and CRC checksum settings
Detach	Data	Safely disconnects the VJBOD disk containing a storage pool or static volume. You can then connect the LUN to another NAS, create a new VJBOD disk, and recover the pool or volume using **Action** > **Data Recovery** .
Delete	Disconnected	Deletes a VJBOD from the local disk. The LUN and all data will remain on the remote NAS You can also choose to delete the iSCSI target and LUN on the remote NAS.

Moving a VJBOD Disk to Another QNAP NAS

1. Note the details of the VJBOD disk's remote LUN.
   a. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
   b. Click **VJBOD/VJBOD Cloud**, and then select **VJBOD Overview**.
   The **VJBOD Overview** window opens.
   c. Locate the VJBOD disk that you want to move, and then note the **Remote LUN Name** and the IP address under **Remote NAS**.
2. Detach the VJBOD disk's static volume or storage pool.
   a. Go to **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .
   b. Select the static volume or storage pool on the VJBOD disk.
   c. Click **Manage**.
   The **Volume Management** or **Storage Pool Management** window opens.
   d. Click **Action**, and then select **Safely Detach**.
3. Remove the VJBOD disk from the NAS.
   a. Go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .
   b. Select the VJBOD disk.
   c. Click **Action**, and then select **Disconnect**.
   The status of the VJBOD disk changes to `Disconnected`.
   d. Click **Action**, and then select **Delete**.
   QTS removes the VJBOD disk from the local NAS.
4. Add the VJBOD disk on another QNAP NAS.

a. On the other NAS, go to **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .

b. Click **Create**, and then select **Create Virtual JBOD**.
The **Create Virtual JBOD Disk Wizard** opens.

a. Click **Next**.

b. Specify the IP address or hostname of the remote NAS.

c. Specify the admin password of the remote NAS.

d. Optional: Specify the system administration port of the remote NAS.

Tip
The default port is 8080. If HTTPS is enabled, the default port is 443.

e. Click **Next**.

f. Optional: Select the local interface that will be used by VJBOD.

g. Optional: Select the remote interface that will be used by VJBOD.

h. Optional: Select **Use iSER when available**.
Enabling iSER increases data transfer speeds and reduces CPU and memory load.

i. Click **Next**.

j. Select **Choose an existing iSCSI LUN on the selected NAS**.

k. Click **Next**.

l. Select the LUN containing the VJBOD disk.

m. Click **Next**.

n. Optional: Enable CRC checksums.
Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately.

Checksum Type	Description
Data Digest	The checksum can be used to verify the data portion of the PDU.
Header Digest	The checksum can be used to verify the header portion of the PDU.

o. Click **Next**.

p. Review the summary, and then click **Next**.
QTS creates a VJBOD disk using the LUN. The disk appears at **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .

q. In the actions list, select **Recover Existing Data**.

r. Click **Finish**.

QTS scans for and restores any storage pools, volumes, and LUNs on the VJBOD disk.

VJBOD Cloud

VJBOD Cloud is a block-based storage gateway solution that enables you to create volumes and LUNs on your NAS using cloud space from cloud services such as Google Cloud and Amazon S3. VJBOD Cloud volumes and LUNs utilize local storage space for accelerated read and write speeds, allowing both NAS users and applications to seamlessly and transparently access cloud storage space.

Installation

VJBOD Cloud Requirements

Requirements:

- A QNAP NAS running QTS 4.4.1 or later
- A cloud space (bucket or container) with at least 1 GB of free space from a supported cloud service provider

Installing VJBOD Cloud

1. Log on to QTS as administrator.
2. Ensure that a system volume is configured on the NAS.
   For details, see The System Volume.
3. Open **App Center**, and then click .
   A search box appears.
4. Type `VJBOD Cloud`, and then press `ENTER`.
   The VJBOD Cloud application appears in the search results.
5. Click **Install**.
   The installation window appears.
6. Select the volume on which you want to install VJBOD Cloud.
7. Click **OK**.
   QTS installs VJBOD Cloud.

VJBOD Cloud Volume and LUN Creation

Creating a VJBOD Cloud Volume

1. Open **VJBOD Cloud**.
2. Click **Create VJBOD Cloud Volume/LUN**.
   The **Create VJBOD Cloud Volume/LUN** window opens.
3. Click **Cloud Volume**.
   The **Create VJBOD Cloud Volume** screen appears.
4. Select a cloud service.
5. Configure the selected cloud service.
   Depending on the selected cloud storage provider, you may need to log in, authenticate, or configure settings through a third-party interface. For details, see Connecting to a VJBOD Cloud Service.
6. Click **Search**.

7. Select a cloud space.
   This may be a bucket, container, account name, or something else depending on the cloud service provider.
8. Optional: Click **Performance test**.
   QTS tests the read and write speeds of the cloud space, and then displays the results with a warning if speeds are too low.
9. Click **Next**.
10. Select **Create a new volume**.
11. Optional: Specify an alias for the volume.
    Alias requirements:
    - Length: 1–64 characters
    - Valid characters: A–Z, a–z, 0–9
    - Valid special characters: Hyphen (-), Underscore (_)
12. Specify the capacity of the volume.
    The amount of free space in the cloud storage space determines the maximum capacity.

Important

- The minimum volume capacity is 3 GB.
- Increasing the capacity may increase cloud storage costs. Check with the cloud service provider for details.

13. Optional: Configure any of the following advanced settings.

Setting	Description	User Actions
Alert threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	Specify a value.

Setting	Description	User Actions
Encryption	QTS encrypts all data on the volume with 256-bit AES encryption.	• Specify an encryption password containing 8 to 32 characters, with any combination of letters, numbers and special characters. Spaces are not allowed. • Select **Save encryption key** to save a local copy of the encryption key on the NAS. This enables QTS to automatically unlock and mount the encrypted volume when the NAS starts up. If the encryption key is not saved, you must specify the encryption password each time the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Create a shared folder on the volume	QTS automatically creates the shared folder when the volume is ready. Only the NAS admin account can access the new folder.	Specify a folder name.

14. Optional: Specify the number of bytes per inode.
    The number of bytes per inode determines the maximum volume size and the number of files and folders that the volume can store. Increasing the number of bytes per inode results in a larger maximum volume size, but a lower maximum number of files and folders.
15. Allocate stored space.
    Stored space is space used to store a copy of the volume's data locally on the NAS.
    a. Select a storage pool.
    b. Specify the capacity of the stored space.

Limit	Amount	Notes
Minimum stored space capacity	1.25x the volume's capacity	Additional space is needed to store metadata.
Maximum stored space capacity	2x the volume's capacity	-

16. Click **Next**.
17. Review the summary information, and then click **Finish**.

The VJBOD Cloud volume appears in the **Cloud Storage** table at **VJBOD Cloud** > **Overview** .

Creating a VJBOD Cloud LUN

1. Open **VJBOD Cloud**.

2. Click **Create VJBOD Cloud Volume/LUN**.
   The **Create VJBOD Cloud Volume/LUN** window opens.
3. Click **Cloud LUN**.
   The **Create VJBOD Cloud LUN** screen appears.
4. Select a cloud service.
5. Configure the selected cloud service.
   Depending on the selected cloud storage provider, you may need to log in, authenticate, or configure settings through a third-party interface. For details, see Connecting to a VJBOD Cloud Service.
6. Click **Search**.
7. Select a cloud space.
   This may be a bucket, container, account name, or something else depending on the cloud service provider.
8. Optional: Click **Performance test**.
   QTS tests the read and write speeds of the cloud space, and then displays the results with a warning if speeds are too low.
9. Click **Next**.
10. Select **Create a new cloud LUN**.
11. Specify a LUN name.
    Name requirements:
    - Length: 1–31 characters
    - Valid characters: A–Z, a–z, 0–9
    - Valid special characters: Underscore (_)
12. Specify the capacity of the LUN.
    The amount of free space in the cloud storage space determines the maximum capacity.

Important

- The minimum LUN capacity is 3 GB.
- Increasing the capacity may increase cloud storage costs. Check with the cloud service provider for details.

13. Optional: Configure the sector size.

Setting	Description
Sector size	Changing the sector size to 4 KB increases LUN performance for specific applications and disk types. **Important** VMware does not currently support a 4 KB sector size.

14. Allocate stored space.
    Stored space is space used to store a copy of the LUN's data locally on the NAS.
    a. Select a storage pool.

b. Specify the capacity of the stored space.

Limit	Amount	Notes
Minimum stored space capacity	1.25x the LUN's capacity	Additional space is needed to store metadata.
Maximum stored space capacity	2x the LUN's capacity	-

15. Click **Next**.
16. Optional: Deselect **Do not map it to a target for now**.
    If deselected, the **Edit LUN Mapping** wizard appears after QTS has finished creating the LUN.
17. Review the summary information, and then click **Finish**.

The VJBOD Cloud LUN appears in the **Cloud Storage** table at **VJBOD Cloud** > **Overview** .

Reattaching an Existing VJBOD Cloud Volume

1. Open **VJBOD Cloud**.
2. Click **Create VJBOD Cloud Volume/LUN**.
   The **Create VJBOD Cloud Volume/LUN** window opens.
3. Click **Cloud Volume**.
   The **Create VJBOD Cloud Volume** screen appears.
4. Select a cloud service.
5. Configure the selected cloud service.
   Depending on the selected cloud storage provider, you may need to log in, authenticate, or configure settings through a third-party interface. For details, see Connecting to a VJBOD Cloud Service.
6. Click **Search**.
7. Select a cloud space.
   This may be a bucket, container, account name, or something else depending on the cloud service provider.
8. Optional: Click **Performance test**.
   QTS tests the read and write speeds of the cloud space, and then displays the results with a warning if speeds are too low.
9. Click **Next**.
10. Select **Attach an existing cloud volume**.
11. Select an existing volume.
12. Allocate stored space.
    Stored space is space used to store a copy of the volume's data locally on the NAS.
    a. Select a storage pool.
    b. Specify the capacity of the stored space.

Limit	Amount	Notes
Minimum stored space capacity	1.25x the volume's capacity	Additional space is needed to store metadata.

Limit	Amount	Notes
Maximum stored space capacity	2x the volume's capacity	-

13. Click **Next**.
14. Optional: Forcibly disconnect the volume from its current NAS.
    If a volume is connected to another NAS, then the volume's status will be `Occupied` and **Current NAS** will display an IP address other than `Localhost`.

    Warning
    Forcibly disconnecting a volume deletes the volume's data from the other NAS, and then recreates the volume locally from its last restore point. Any changes to data made since the last restore point will be lost.

    a. Specify the admin password of the other NAS.
    b. Click **OK**.
15. Review the summary information, and then click **Finish**.

The VJBOD Cloud volume appears in the **Cloud Storage** table at **VJBOD Cloud** > **Overview** .

Reattaching an Existing VJBOD Cloud LUN

1. Open **VJBOD Cloud**.
2. Click **Create VJBOD Cloud Volume/LUN**.
   The **Create VJBOD Cloud Volume/LUN** window opens.
3. Click **Cloud LUN**.
   The **Create VJBOD Cloud LUN** screen appears.
4. Select a cloud service.
5. Configure the selected cloud service.
   Depending on the selected cloud storage provider, you may need to log in, authenticate, or configure settings through a third-party interface. For details, see Connecting to a VJBOD Cloud Service.
6. Click **Search**.
7. Select a cloud space.
   This may be a bucket, container, account name, or something else depending on the cloud service provider.
8. Optional: Click **Performance test**.
   QTS tests the read and write speeds of the cloud space, and then displays the results with a warning if speeds are too low.
9. Click **Next**.
10. Select **Attach an existing cloud LUN**.
11. Select an existing LUN.
12. Allocate stored space.
    Stored space is space used to store a copy of the LUN's data locally on the NAS.

    a. Select a storage pool.

b. Specify the capacity of the stored space.

Limit	Amount	Notes
Minimum stored space capacity	1.25x the LUN's capacity	Additional space is needed to store metadata.
Maximum stored space capacity	2x the LUN's capacity	-

13. Click **Next**.
14. Optional: Forcibly disconnect the LUN from its current NAS.
    If a volume is connected to another NAS, then the LUN's status will be `Occupied` and **Current NAS** will display an IP address other than `Localhost`.

Warning
Forcibly disconnecting a LUN deletes the LUN's data from the other NAS, and then recreates the LUN locally from its last restore point. Any changes to data made since the last restore point will be lost.

a. Specify the admin password of the other NAS.

b. Click **OK**.

15. Optional: Deselect **Do not map it to a target for now**.
    If deselected, the **Edit LUN Mapping** wizard appears after QTS has finished creating the LUN.
16. Review the summary information, and then click **Finish**.

The VJBOD Cloud LUN appears in the **Cloud Storage** table at **VJBOD Cloud** > **Overview** .

Connecting to a VJBOD Cloud Service

Refer to this table when configuring a cloud service for a VJBOD Cloud volume or LUN.

Cloud Service	Steps
Alibaba Cloud OSS	1. Select **AlibabaCloudOSS**. 2. Specify the access key. 3. Specify the secret key. 4. Optional: Select **Enable secure connection (SSL)**. 5. Optional: Select **Validate SSL certificate**.

Cloud Service	Steps
Amazon S3	**1.** Select **AmazonS3**. **2.** Select a cloud service: • **AWS Global** • **AWS China** • **AWS GovCloud (US)**: Select either **Standard** or **FIPS** protocol. • **S3 Compatible**: Specify the server address. **3.** Specify the access key. **4.** Specify the secret key. **5.** Optional: Select **Enable secure connection (SSL)**. **6.** Optional: Select **Validate SSL certificate**.
Microsoft Azure	**1.** Select **Azure**. **2.** Specify the storage account. **3.** Specify the access key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
Backblaze	**1.** Select **Backblaze**. **2.** Specify the key ID. **3.** Specify the application key. **4.** Optional: Select **Validate SSL certificate**.
Catalyst	**1.** Select **Catalyst**. **2.** Specify the user ID. **3.** Specify the password. **4.** Specify the project name. **5.** Optional: Select **Validate SSL certificate**.

Cloud Service	Steps
Cynny Space	**1.** Select **Cynny Space**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
DigitalOcean	**1.** Select **Digital Ocean**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Select a region.
DreamObjects	**1.** Select **DreamObjects**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
Google Cloud Storage (P12 Key)	**1.** Select **GoogleCloudStorage**. **2.** Select **P12 key**. **3.** Specify the project ID. **4.** Specify the email address. **5.** Click **Browse**, and then select the P12 key file. **6.** Optional: Select **Validate SSL certificate**.
Google Cloud Storage (JSON Key)	**1.** Select **GoogleCloudStorage**. **2.** Select **JSON key**. **3.** Specify the project ID. **4.** Specify the email address. **5.** Click **Browse**, and then select the JSON key file. **6.** Optional: Select **Validate SSL certificate**.

Cloud Service	Steps
Google Cloud Storage (OAuth)	**1.** Select **GoogleCloudStorage**. **2.** Select **OAuth**. **3.** Specify the project ID. **4.** Optional: Select **Validate SSL certificate**.
HiCloud	**1.** Select **HiCloud**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
HKT Cloud Storage	**1.** Select **HKT**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
Huawei Cloud OBS	**1.** Select **HuaweiCloudOBS**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
IBM Cloud	**1.** Select **IBM Cloud**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.

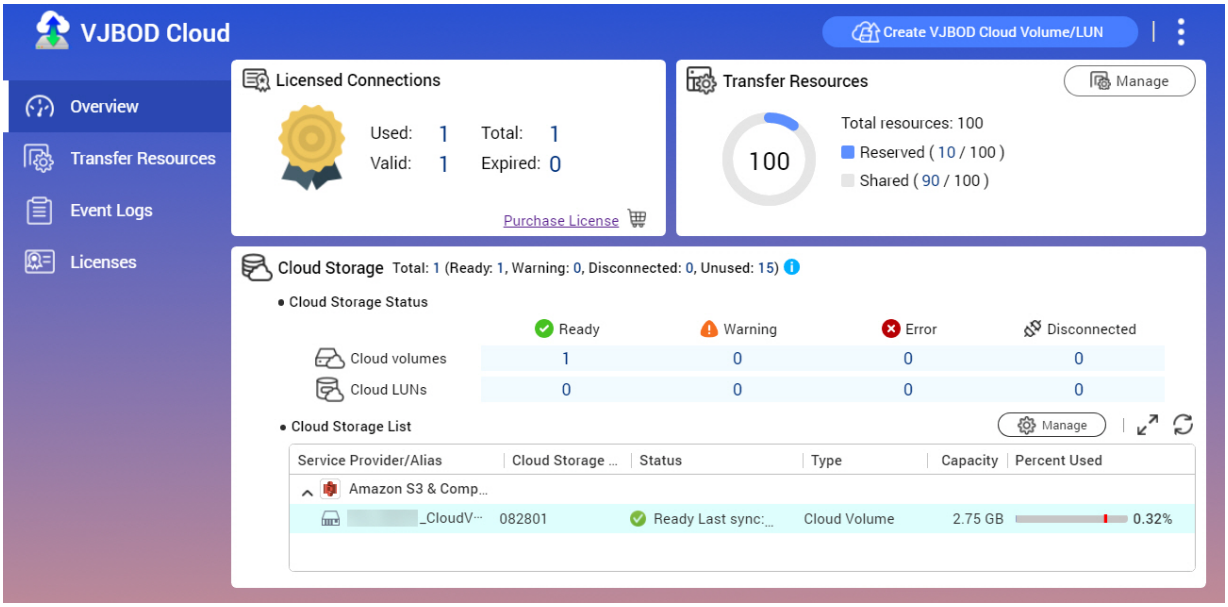
Cloud Service	Steps
luckycloud S3	**1.** Select **luckycloud S3**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Validate SSL certificate**.
Oracle Cloud	**1.** Select **Oracle Cloud**. **2.** Specify the name space. **3.** Specify the access key. **4.** Specify the secret key. **5.** Optional: Select **Enable secure connection (SSL)**. **6.** Optional: Select **Validate SSL certificate**. **7.** Select a region.
Qcloud Italy	**1.** Select **Qcloud IT**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
Rackspace	**1.** Select **Rackspace**. **2.** Specify the user ID. **3.** Specify the password. **4.** Optional: Select **Validate SSL certificate**. **5.** Select a region.

Cloud Service	Steps
S3 Compatible	**1.** Select **S3 Compatible**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Specify the authentication service. **5.** Select a signature version. **6.** Optional: Select **Enable secure connection (SSL)**. **7.** Optional: Select **Validate SSL certificate**. **8.** Optional: Specify a region.
SFR	**1.** Select **SFR**. **2.** Specify the access key. **3.** Specify the secret key. **4.** Optional: Select **Enable secure connection (SSL)**. **5.** Optional: Select **Validate SSL certificate**.
Swift	**1.** Select **Swift**. **2.** Optional: Enable keystone authentication. **a.** Select **Enable Keystone Auth**. **b.** Specify a tenant ID or tenant name. **3.** Select the large object type. **4.** Specify the user ID. **5.** Specify the auth service. **6.** Specify the API key or password. **7.** Optional: Select **Validate SSL certificate**.

Cloud Service	Steps
Swift (Keystone v3)	1. Select **Swift**. 2. Select **Enable Keystone Auth**. 3. Select **V3**. 4. Specify a project name or project ID. 5. Specify the domain name. 6. Select the large object type. 7. Specify the user name. 8. Specify the auth service. 9. Specify the password. 10. Optional: Select **Validate SSL certificate**. 11. Select a region.
Wasabi	1. Select **Wasabi**. 2. Specify the access key. 3. Specify the secret key. 4. Optional: Select **Enable secure connection (SSL)**. 5. Optional: Select **Validate SSL certificate**.

Overview

The **Overview** screen displays the number of used and total licensed connections, transfer resource information, and information on connected VJBOD Cloud volumes and LUNs. On this screen you can manage VJBOD Cloud volumes and LUNs by selecting one and then clicking **Manage**.



Volume Actions

Action	Description	Steps
Resize volume	Increase or decrease the size of the volume.	1. Click **Resize Volume**. 2. Specify the new capacity of the volume. 3. Select the unit of storage space. 4. Optional: Click **Set to Max** to set the capacity of the volume equal to all free space in the cloud space. 5. Click **Apply**.
Utilization	View statistics showing data uploaded, data downloaded, and cache space utilization for the volume.	Click **Actions**, and then select **Utilization**.
Set Threshold	When enabled, QTS will issue a warning notification when the amount of used space in the volume reaches the specified threshold.	1. Click **Actions**, and then select **Set Threshold**. 2. Enable **Please input the alert threshold [1-100]**. 3. Specify the alert threshold. 4. Click **Apply**.
Set Threshold	QTS issues a warning notification when the percentage of used volume space is equal to or above the specified threshold.	1. Click **Actions**, and then select **Set Threshold**. 2. Specify a percentage of volume space.
Check file system	A file system check scans for and automatically repairs errors in the file system of the volume.	1. Click **Actions**, and then select **Check File System**. 2. Click **OK**.

Action	Description	Steps
Recovery	QTS periodically takes snapshots of a VJBOD Cloud volume. You can use these recovery point snapshots to restore the volume to a previous state.	For details, see VJBOD Cloud Volume and LUN Recovery.

LUN Actions

Action	Description	Steps
Expand LUN	Increase the capacity of the LUN or its stored space.	1. Click **Expand LUN**. 2. Specify the new capacity of the LUN or its stored space, in GB. 3. Optional: Click **Set to Max** to set the capacity of the LUN equal to all free space in the cloud space. 4. Click **Apply**.
Utilization Info	View statistics showing data uploaded, data downloaded, and cache space utilization for the LUN.	Click **Actions**, and then select **Utilization**.
Recovery	QTS periodically takes snapshots of a VJBOD Cloud LUN. You can use these recovery point snapshots to restore the LUN to a previous state.	For details, see VJBOD Cloud Volume and LUN Recovery.

Volume/LUN Connection Status

Status	Description
Ready	The cloud storage space is working normally.
Syncing	A volume or LUN is currently syncing with the cloud space.
License Expiring	The VJBOD Cloud license attached to this storage space will expire within one month. You must renew it if you want to continue using volumes and LUNs in this storage space.
License Expired	The license attached to this storage space has expired. All volumes and LUNs created in this storage space are set to read-only.
Not Ready	There is a problem with the connection to this storage space.

Volume/LUN Connection Actions

To perform one of the following actions go to **VJBOD Cloud** > **Overview** , select a VJBOD Cloud volume or LUN, click **Manage**, and then click **Connection**.

Action	Description
Connect	Reconnects the volume or LUN to the cloud space.
Disconnect	Disconnects the volume or LUN from the cloud space. The volume or LUN becomes read-only.
Edit	Edits the volume or LUN's cloud space connection details.

Action	Description
Remove	Remove the volume or LUN from the NAS and delete all of its data from the cloud space. **Important** If QTS is unable to connect to the cloud service provider, then the volume or LUN will be removed from the local NAS but its data might be left in the cloud space.
Safely Detach	Removes the volume or LUN from the NAS but do not delete its data from the cloud space. The volume or LUN can be reattached to this NAS or another NAS later. For details, see the following sections: • Reattaching an Existing VJBOD Cloud Volume • Reattaching an Existing VJBOD Cloud LUN **Important** • QTS moves all non-uploaded data in the write cache to the cloud space before removing the volume or LUN. This process may take a long time to complete. • If it's not possible to connect to the cloud space, the detach operation will fail. **Force Detach**: QTS removes the volume or LUN from the local NAS and leaves its data in the cloud space. If it's not possible to connect to the cloud space, QTS will still delete the volume or LUN from the local NAS. **Warning** If **Force Detach** is selected, non-uploaded data stored in the volume or LUN might be deleted.

VJBOD Cloud Volume and LUN Recovery

QTS periodically takes recovery point snapshots of each VJBOD Cloud volume and LUN to ensure that the volume or LUN can be recovered if it encounters an error. You can use these recovery points to restore the volume or LUN to a previous state.

Recovering a VJBOD Cloud Volume or LUN

1. Go to **VJBOD Cloud** > **Overview** .
2. Under **Cloud Storage**, select a VJBOD Cloud volume or LUN.
3. Click **Manage**.
   The volume or LUN management window opens.
4. Click **Actions**, and then select **Recovery**.
   The **VJBOD Cloud Volume/LUN Recovery** window opens.
5. Select a recovery point.

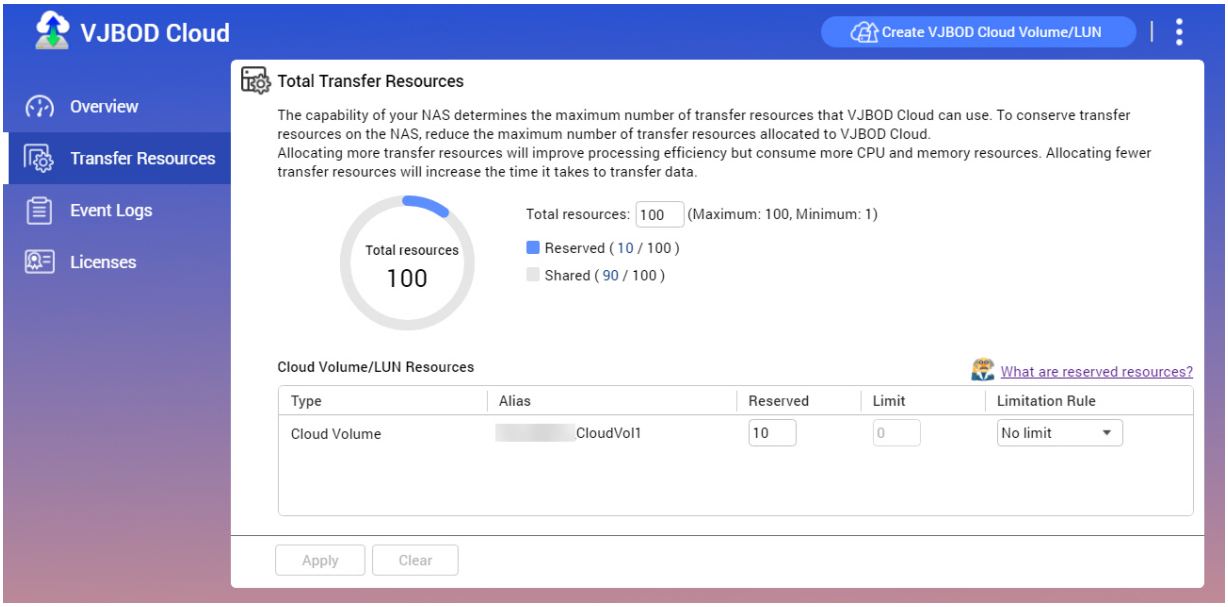
Warning
All changes to data made after the recovery point will be deleted.

6. Click **Recover**.

The status of the volume or LUN changes to `Recovering`, and then changes back to `ready` when the recovery process has finished.

Transfer Resources

The **Transfer Resources** screen displays the total number of transfer resources allocated to VJBOD Cloud, and the number of transfer allocated to each VJBOD Cloud volume and LUN. On this screen you can manage transfer resources allocation.



Transfer Resource Overview

In VJBOD Cloud, transfer resources correspond to data uploads and downloads. If VJBOD Cloud has 100 total transfer resources, that means the application can create 100 threads for uploading data to and downloading data from the cloud. The total transfer resources allocated to VJBOD Cloud is determined by your NAS hardware.

Transfer Resource Allocation

By default, transfer resources are shared between all VJBOD Cloud volumes and LUNs. When a volume or LUN needs to upload to or download data from the cloud, VJBOD Cloud removes transfer resources from the shared transfer resource pool and temporarily allocates them to the volume or LUN, then returns them to the pool after the data transfer has finished.

A single volume or LUN may use a large number of shared transfer resources, stopping other volumes and LUNs from syncing data with the cloud. To prevent this you can reserve transfer resources for a volume or LUN, guaranteeing that those resources will always be available. You can also set a limit on the maximum number of transfer resources a volume or LUN can use.

Transfer Resource Usage Guidelines

Problem	Solution
VJBOD Cloud is taking a long time to sync data to the cloud.	Increase the total number of transfer resources allocated to VJBOD Cloud.
VJBOD Cloud is using too much NAS memory, CPU, or network bandwidth.	Decrease the total number of transfer resources allocated to VJBOD Cloud.
• A VJBOD Cloud volume or LUN is taking a long time to sync data to the cloud. • A VJBOD Cloud volume or LUN contains important data, which should always be backed up before other volumes and LUN data.	Increase the transfer resources reserved for the volume or LUN.
A VJBOD Cloud volume or LUN is using too many transfer resources or too much network bandwidth.	Limit the maximum number of transfer resources the volume or LUN can use.

Configuring Total Transfer Resources

1. Go to **VJBOD Cloud** > **Transfer Resources** .
2. Under **Total resources**, specify the total number of transfer resources available to VJBOD Cloud. The minimum number is one. The maximum number is determined by your NAS hardware.

Important
Total transfer resources must be greater than current reserved transfer resources.

3. Click **Apply**.

Configuring Transfer Resources for a Volume or LUN

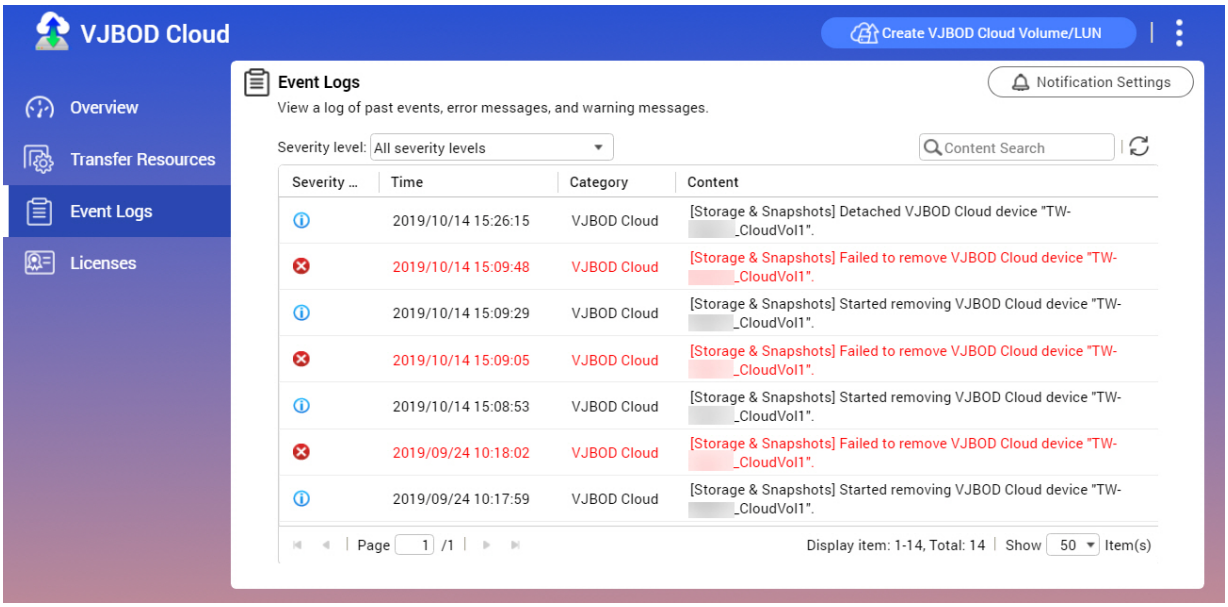
1. Go to **VJBOD Cloud** > **Transfer Resources** .
2. Under **Cloud Volume/LUN Resources**, locate a VJBOD Cloud volume or LUN.
3. Configure any of the following settings.

Setting	Description
Reserved	The number of transfer resources reserved for this volume or LUN.
Limit	The maximum number of transfer resources this volume or LUN can use. **Note** To set this value, **Limitation Rule** must be set to `Limit`.
Limitation Rule	Select one of the following rules: • Limit: The maximum number of transfer resources this volume or LUN can use is restricted. It can only use the number specified under **Limit**. • Limit: The maximum number of transfer resources this volume or LUN can use is unrestricted. It can use all of its reserved resources and all shared transfer resources.

4. Click **Apply**.

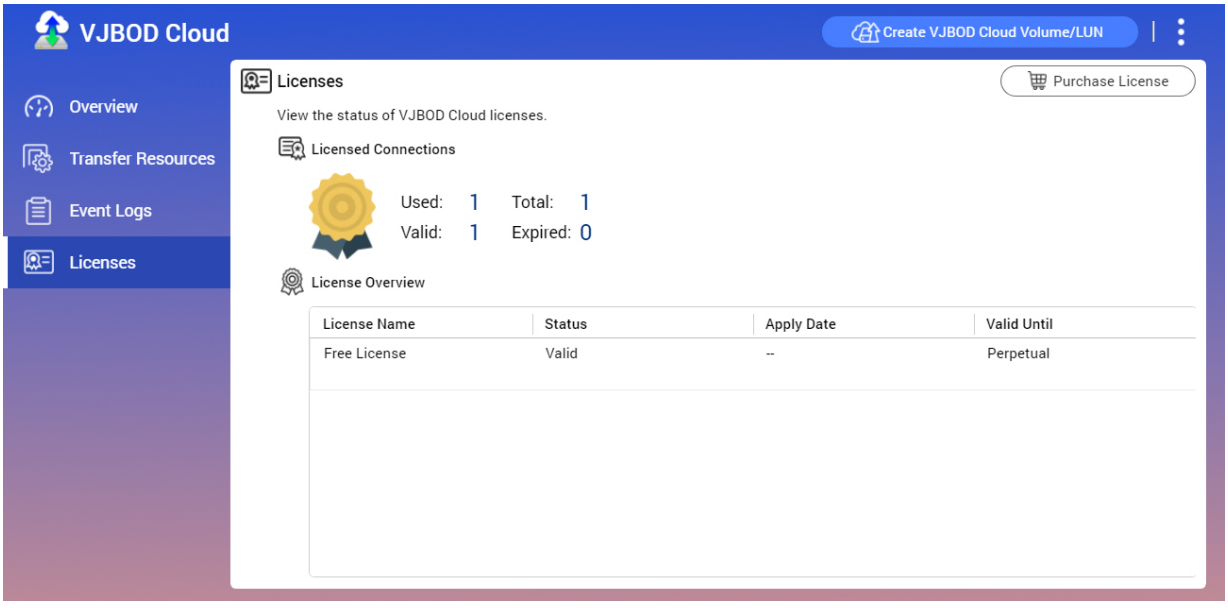
Event Logs

The **Event Logs** screen displays a log of events, error messages, and warnings related to VJBOD Cloud. On this screen you can view logs by severity level, search logs using keywords, and configure notification settings.



Licenses

The **Licenses** screen displays information about VJBOD Cloud licenses on the NAS. On this screen you can view how many licenses are registered to the local NAS, and how many of those licenses are currently being used. You can also purchase additional VJBOD Cloud licenses.



VJBOD Cloud Licensing Overview

- VJBOD Cloud requires a license for each connection to a unique cloud space. A cloud space may be called a bucket, container, account name, or something else depending on the cloud service provider. For example, the following VJBOD Cloud volumes and LUNs require three licenses:
  - *Amazon S3 → Bucket1 → Volume1*
  - *Amazon S3 → Bucket2 → Volume2*
  - *Azure → Space1 → LUN1*
- Each unique cloud space can contain an unlimited number of VJBOD Cloud volumes and LUNs. For example, the following VJBOD Cloud volumes and LUNs require only one license:
  - *Amazon S3 → Bucket1 → Volume1*
  - *Amazon S3 → Bucket1 → Volume2*
  - *Amazon S3 → Bucket1 → LUN1*
- If a license expires, all VJBOD Cloud volumes and LUNs created from the cloud space attached to the license become read-only until the license is renewed.
- VJBOD Cloud includes one free license.

Purchasing VJBOD Cloud Licenses

1. Go to **VJBOD Cloud** > **Licenses** .
2. Click **Purchase License**.
   The **License Center** window opens.
3. Click **Software Store**.
4. Locate **VJBOD Cloud**, and then click **Buy**.
5. Follow the onscreen instructions to purchase and activate the VJBOD Cloud licenses.

3. System Settings

General Settings

Settings	Description
System Administration	This screen allows you to specify the server name and ports and configure secure connection settings.
Time	Time settings affect event logs and scheduled tasks. This screen allows you to specify the time zone and format and configure the system date and time.
Daylight Saving Time (DST)	Daylight saving time (DST) settings apply only to regions that use DST. This screen allows you to either automatically adjust the system clock or manually configure the settings.
Codepage	This screen allows you to select the language that the NAS uses to display file and directory information.
Region	This screen allows you to select a region for your NAS. System and application content and services are localized according to the selected region.
Login Screen	This screen allows you to customize the NAS login screen.

Configuring System Administration Settings

1. Go to **Control Panel** > **System** > **General Settings** > **System Administration** .
2. Specify the following information.

Field	User Action
Server name	Specify a name containing up to 14 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Dashes (-) **Important** • The server name must contain one or more letters. • The server name cannot consist of numbers only. • The server name cannot start with a dash.
System port	Specify the port used to access the web interface. The default port is 8080.
Enable HTTP compression	Select this option to improve transfer speeds and bandwidth utilization. This setting is disabled by default. **Warning** Enabling this option may lead to security risks.

Field	User Action
Enable secure connection (HTTPS)	Select this option to allow HTTPS connections. **a.** Select **Enable secure connection (HTTPS)**. **b.** Select a TLS version. **Warning** Selecting the latest TLS version may decrease compatibility for other clients in your system. **c.** Specify a port number. **d.** Optional: Select **Force secure connection (HTTPS) only** to require all users to connect to the NAS using only HTTPS.
Do not allow QTS embedding in IFrames	**a.** Select this option to prevent websites from embedding QTS using IFrames. **b.** Click **Allowed Websites** to allow a specific website to embed QTS in IFrames. **c.** The **Allowed Websites** window appears. **d.** Optional: Click **Add** to add a website to the list. The **Add Host Name** window appears. **e.** Specify a host name. **f.** Click **Add**. The host name is added to the allowed websites list. **g.** Optional: Select a website, and then click **Delete** to delete a website from the list. **h.** Click **Apply**.

3. Click **Apply**.

Configuring Time Settings

Important
You must configure the system time correctly to avoid the following issues.

- When using a web browser to connect to the NAS or save a file, the displayed time of the action is incorrect.
- Event logs do not reflect the exact time that events occurred.
- Scheduled tasks run at the wrong time.

1. Go to **Control Panel** > **System** > **General Settings** > **Time** .
2. Select a time zone.
3. Specify the date and time format.
4. Select the time setting.

Option	User Action
Manual setting	Specify the date and time.
Synchronize with an Internet time server automatically	Ensure that your NAS is connected to the Internet, and then specify the following information: • **Server**: Name of the Network Time Protocol (NTP) server Examples: time.nist.gov, time.windows.com • **Time interval**: Number of hours or days between each time synchronization task
Set the server time the same as your computer time	Click **Update**.

5. Click **Apply**.

Configuring Daylight Saving Time

These settings are available for NAS users in regions that use Daylight Saving Time (DST). Users outside these regions can disregard these settings.

1. Go to **Control Panel** > **System** > **General Settings** > **Daylight Saving Time** .
2. Select **Adjust system clock automatically for daylight saving time**.
3. Optional: Select **Enable customized daylight saving time table**.
4. Optional: Perform any of the following actions.

Action	Steps
Add DST data	**a.** Click **Add Daylight Saving Time Data**. The **Add Daylight Saving Time Data** window appears. **b.** Specify a time period and the number of minutes to offset. **c.** Click **Apply**.
Edit DST data	**a.** Select a DST schedule from the table. **b.** Click . **c.** Specify a time period and the number of minutes to offset. **d.** Click **Apply**.
Delete DST data	**a.** Select a DST schedule from the table. **b.** Click **Delete**. **c.** Click **OK**.

5. Optional: Select a DST schedule from the table.
6. Click **Apply**.

Configuring Codepage Settings

All files and directories on the NAS use Unicode encoding. If your operating system or FTP client does not support Unicode, you must configure the following settings to properly view files and directories on the NAS.

1. Go to **Control Panel** > **System** > **General Settings** > **Codepage** .
2. Select the language of your operating system.
3. Click **Apply**.

Configuring Region Settings

Important
The NAS region settings affect device connectivity and the functionality, content, and validity of some applications, utilities, licenses, and certificates. Ensure that you select the correct region to avoid errors.

1. Go to **Control Panel** > **System** > **General Settings** > **Region** .
2. Select a region.

Region	Description
Global	Select this region if the NAS is located outside of China.
China	Select this region if the NAS is located in China.

3. Click **Apply**.

Configuring the Login Screen

1. Go to **Control Panel** > **System** > **General Settings** > **Login Screen** .
2. Configure the following settings.

Field	User Action
Login screen template	Select a template for the login screen.
Show firmware version	Select this option to display the QTS firmware version.
Show the link bar	Select this option to display links to myQNAPCloud, QNAP Utilities, and Feedback.
Background	Select a background image or fill color.
Logo	Select a logo.
Message	Specify a message that will appear on the login screen. You can enter a maximum of 120 ASCII characters. You can also select the font color and size.

3. Click **Preview** to view the changes.
4. Click **Apply**.

Security

Configuring the Allow/Deny List

1. Go to **Control Panel** > **System** > **Security** > **Allow/Deny List** .
2. Select an option.

Option	Description	User Action
Allow all connections	The NAS can connect to all IP addresses and network domains.	Select **Allow all connections**.
Use IP deny list	The NAS cannot connect to any IP address or network domains included in the IP deny list.	**a.** Select **Deny connections from the list**. **b.** Click **Add**. The IP configuration window appears. **c.** Specify an IP address, netmask, or IP range. **d.** Click **Create**. **Tip** To remove an IP address, netmask, or IP range, select an entry from the table, and then click **Remove**.
Use IP allow list	The NAS can only connect to the IP addresses or network domains included in the IP allow list.	**a.** Select **Allow connections from the list only**. **b.** Click **Add**. The IP configuration window appears. **c.** Specify an IP address, netmask, or IP range. **d.** Click **Create**. **Tip** To remove an IP address, netmask, or IP range, select an entry from the table, and then click **Remove**.

3. Click **Apply**.

Configuring IP Access Protection

1. Go to **Control Panel** > **System** > **Security** > **IP Access Protection** .
2. Select the connection methods you want to protect.

Note
SSH, **Telnet**, and **HTTP(S)** are enabled by default.

3. Optional: Specify the following information.

- Time period
- Maximum number of unsuccessful login attempts within the time period
- Amount of time the IP will be blocked

4. Click **Apply**.

Configuring Account Access Protection

1. Go to **Control Panel** > **System** > **Security** > **Account Access Protection** .
2. Specify the user type.
3. Select the connection methods you want to protect.
4. Optional: Specify the following information.
   - Time period
   - Maximum number of unsuccessful login attempts within the time period
5. Click **Apply**.

Certificate & Private Key

Secure Sockets Layer (SSL) is a protocol used for secure data transfers and encrypted communication between web servers and browsers. To avoid receiving alerts or error messages when accessing the web interface, upload an SSL certificate from a trusted provider.

Replacing the SSL Certificate and Private Key

Warning
The NAS supports only X.509 PEM certificates and private keys. Uploading an invalid security certificate may prevent you from logging in to the NAS through SSL. To resolve the issue, you must restore the default security certificate and private key.

1. Go to **Control Panel** > **System** > **Security** > **Certificate & Private Key** .
2. Click **Replace Certificate**.
   The **Replace Certificate** window appears.
3. Select an option.

Option	Description
Import certificate	This option allows you to import an SSL certificate and private key from your computer.
Get from Let's Encrypt	This option uses the Let's Encrypt service to validate and issue a certificate for your specified domain.
Create self-signed certificate	This option allows you to create a self-signed certificate.

4. Click **Next**.
   A configuration window appears.
5. Perform any of the following actions.

Option	User Action
Import certificate	**a.** Click **Browse** to upload a valid certificate and private key. **b.** Optional: Click **Browse** to upload an intermediate certificate.
Get from Let's Encrypt	**a.** Specify a domain name containing a maximum of 63 ASCII characters, without spaces. **b.** Specify a valid email address. **c.** Optional: Specify an alternative name. **Tip** Use "," to separate multiple aliases. Example: `123.web.com,789.web.com`
Create self-signed certificate	Configure the following information. • **Private key length** • **Common name** • **Email** • **Country** • **State/Province/Region** • **City** • **Organization** • **Department**

6. Click **Apply**.

Downloading the SSL Certificate and Private Key

1. Go to **Control Panel** > **System** > **Security** > **Certificate & Private Key** .
2. Click **Download Certificate**.
   A dialog box appears.
3. Select **Certificate**, **Private Key**, or both.
4. Click **OK**.
   QTS downloads the selected files to your computer.

Restoring the Default SSL Certificate and Private Key

1. Go to **Control Panel** > **System** > **Security** > **Certificate & Private Key** .
2. Click **Restore to Default**.
   A confirmation message appears.
3. Click **OK**.

Configuring the Password Policy

Important
The following password policy is configured by default:

- English letters: No restrictions
- Digits: Enabled
- Minimum length: 8

1. Go to **Control Panel** > **System** > **Security** > **Password Policy** .
2. Optional: Under **Password Strength**, configure any of the following password criteria.

Criteria	Description
English letters	Passwords must contain at least one letter. Select **At least 1 uppercase and 1 lowercase** to require at least one uppercase and one lowercase letter.
Digits	Passwords must contain at least one number.
Special characters	Passwords must contain at least one special character.
Must not include characters repeated three or more times consecutively	Repeating characters are not allowed. For example, `AAA`.
Must not be the same as the associated username, or the username reversed.	The password must not be the same as the username or the reversed username. For example, username: `user1` and password: `1resu`.
Minimum length	The password length must be greater than or equal to the specified number. The maximum length of a password is 64 characters.

3. Optional: Require NAS users to periodically change their passwords.

Important
Enabling this option disables **Disallow the user to change password** under user account settings.

   a. Select **Require users to change passwords periodically**.
   b. Specify the maximum number of days that each user password is valid.
   c. Optional: Select **Send a notification email to users a week in advance of their password expiring**.

4. Click **Apply**.

Hardware

Configuring General Hardware Settings

1. Go to **Control Panel** > **System** > **Hardware** > **General** .
2. Configure the following settings.

Settings	User Action
Enable configuration reset switch	Select this option to enable the reset button. For details, see System Reset and Restore to Factory Default.
Enable disk standby mode	Select this option to allow the NAS drives to enter standby mode if there is no disk access within the specified period. Disk status LED remains on during standby mode.
Enable light signal alert	Select this option to allow the status LED to flash when free space on the NAS is less than the set value.
Enable write cache (EXT4 delay allocation)	If the NAS disk volume uses EXT4, select this option for higher write performance. If the NAS is set as a shared storage in a virtualized or clustered envrionment, disable this option. **Note** When this option is enabled, an unexpected system shutdown may lead to data loss.
Run user-defined processes during startup	Select this option to run user-defined processes during startup.
Turn on LED	Select this option to turn on the LED, set its brightness level, and set a schedule for brightness setting. **Note** This function is only applicable for some models.

3. Click **Apply**.

Configuring Audio Alert Settings

1. Go to **Control Panel** > **System** > **Hardware** > **Audio Alert** .
2. Configure any of the following settings.

Setting	Description
System operations	Select this option to trigger an audio alert every time the NAS starts, shuts down, or upgrades firmware.
System events	Select this option to trigger an audio alert when errors or warnings occur.
Enable speech notification	Select this option to replace some audio alerts with speech. You can select a language and modify the volume. **Tip** Click **Test** to check the modified speech settings. If there is no sound, another app may be using the speaker.

3. Click **Apply**.

Configuring Smart Fan Settings

1. Go to **Control Panel** > **System** > **Hardware** > **Smart Fan** .
2. Select fan rotation speed settings.

Setting	User Action
Automatically adjust fan speed (recommended)	Select from the two automatic fan speed adjustment options. **a.** QTS monitors the temperatures of the system, disks, and CPU and automatically adjusts the fan speed. **b.** QTS adjusts the fan speed according to user-specified temperatures. **Note** Modes are only available for system fans. • **Quiet mode**: Fans run on low speed to decrease noise. • **Normal mode**: Fans run on normal speed. This is the default setting. • **Performance mode**: Fans run on high speed to lower the system temperature. This mode is suitable for high loading systems.
Manually set fan speed	Move the slider to set the fan speed.

3. Click **Apply**.

Backup Battery Unit (BBU)

You can schedule a learning cycle for the backup battery units (BBUs). A learning cycle is when a controller performs a battery calibration operation to determine the battery's condition. During this cycle, the system switches to write-through mode to protect data integrity.

In write-through mode, the NAS writes data directly to HDDs/SSDs instead of writing to the RAM first. This prevents data loss if a power outage occurs before the NAS finishes writing data.

This function is only available for models with redundant power supply units.

Configuring the Backup Battery Unit (BBU) Settings

Important
QNAP strongly recommends scheduling the learning cycle during off-peak hours.

1. Go to **Control Panel** > **System** > **Hardware** > **BBU** .
2. Select **Enable BBU learning schedule**.
3. Specify a learning cycle schedule.
4. Click **Apply All**.

Configuring Expansion Cards Settings

1. Go to **Control Panel** > **System** > **Hardware** > **Expansion Cards** .
   QTS lists the available expansion cards.
2. Identify the expansion cards you want to configure.
3. Under **Resource Use**, select an OS or an application.

Note
Some functions are only applicable for certain models and expansion cards.

OS or Application	Description
QTS	QTS applications share expansion card resources for transcoding. • Select **Hardware Transcoding** to allow QTS software to use expansion card resources to speed up transcoding tasks. Only one card can be assigned to hardware transcoding. • Select **Output** to use expansion card resources for video output of HD Station or Linux Station. Only one card can be assigned to output.
Virtualization Station	Virtualization Station has exclusive use of all expansion card resources.
Container Station	Container Station has exclusive use of all expansion card resources.

4. Click **Apply**.

Power

You can configure Wake-on-LAN (WOL), select a NAS behavior after power outage, and specify power schedules.

EuP Mode

Energy-using Products (EuP) is a directive designed to improve energy efficiency of electrical devices, reduce use of hazardous substances, and improve environment-friendliness of the product.

Configuring EuP Mode

1. Go to **Control Panel** > **System** > **Power** > **EuP Mode Configuration** .
2. Select a mode.

Mode	Description
Enable	When enabled, Wake-on-LAN, power recovery, and power schedule settings are disabled. The NAS keeps power consumption below 1W when powered off.
Disable	When disabled, power consumption of the NAS is slightly higher than 1W when powered off. EuP mode is disabled by default.

3. Click **Apply**.

Wake-on-LAN (WOL)

You can power on the NAS remotely using the Wake-on-LAN (WOL) protocol in Qfinder. This feature is enabled by default.

Important

> If the power cable is disconnected when the NAS is powered off, WOL will not work until the NAS has been manually powered on.

Enabling or Disabling Wake-on-LAN (WOL)

1. Go to **Control Panel** > **System** > **Power** > **Wake-on-LAN (WOL)** .
2. Select **Enable** or **Disable**.
3. Click **Apply**.

Power Recovery

This feature allows you to configure the power on and off status of the NAS after a power outage.

Configuring the Power Recovery Settings

1. Go to **Control Panel** > **System** > **Power** > **Power Recovery** .
2. Select a power recovery setting.
   - Restore the previous NAS power state.
   - Turn on the NAS automatically.
   - Keep the NAS turned off.
3. Click **Apply**.

Power Schedule

This feature allows you to schedule automatic system power on, power off, and restarts at specified times.

Configuring the Power Schedule

1. Go to **Control Panel** > **System** > **Power** > **Power Schedule** .
2. Select **Enable schedule**.
3. Perform any of the following tasks.

Task	User Action
Add a scheduled action.	**Note** One schedule is shown by default. **a.** Click **Add**. **b.** Select the following. • **Action**: Select whether you want to shut down, restart, or turn on the NAS. • **Schedule Type**: Select the frequency of the action. • **Hour** and **Minute**: Select the time of day to perform the action.

Task	User Action
Remove a scheduled action.	Click **Remove**. **Note** Schedules are removed starting from the bottom.

4. Optional: Select **Postpone scheduled restart/shutdown when a replication job is in progress.**
5. Click **Apply**.

Firmware Update

QNAP recommends keeping your QTS version up to date. This ensures that your NAS can benefit from new features, enhancements, and bug fixes.

Checking for Live Updates

1. Go to **Control Panel** > **System** > **Firmware Update** > **Live Update** .
2. Click **Check for Update**.
   QTS checks for available firmware updates. You can choose to update QTS if there is an available update.
3. Enable **Auto Update**.
4. Specify the auto update frequency.
5. Click **Apply**.
6. Optional: Select one or more of the following options.
   - Automatically check if a newer version is available when logging into the NAS web administration interface.
   - Join the QTS Beta program to receive beta update notifications.

Note
Joining the QTS Beta program allows you to use the latest QTS features and applications before they are officially released.

7. Click **Apply**.

Updating the Firmware Manually

Important

- QNAP recommends backing up all data on the NAS before updating QTS.
- The update may require several minutes or longer, depending on your hardware configuration and network connection. Do not power off the NAS during the update.

1. Download the NAS firmware.
   a. Go to http://www.qnap.com/download.

b. Select the number of drive bays on your NAS model.

c. Select your NAS model.

d. Read the release notes and confirm the following:

- The NAS model matches the firmware version.
- Updating the firmware is necessary.

e. Ensure that the product model and firmware version are correct.

f. Download the firmware package.

g. Extract the firmware image file.

2. Go to **Control Panel** > **System** > **Firmware Update** > **Firmware Update** .
3. Go to **Control Panel** > **System** > **Firmware Update** > **Software Update** .
4. Click **Browse** and then select the extracted firmware image file.
5. Click **Update System**.

Updating the Firmware Using Qfinder Pro

Important

- QNAP recommends backing up all data on the NAS before updating QTS.
- The update may require several minutes or longer, depending on your hardware configuration and network connection. Do not power off the NAS during the update.

1. Download the NAS firmware.

a. Go to http://www.qnap.com/download.

b. Select the number of drive bays on your NAS model.

c. Select your NAS model.

d. Read the release notes and confirm the following:

- The NAS model matches the firmware version.
- Updating the firmware is necessary.

e. Ensure that the product model and firmware version are correct.

f. Download the firmware package.

g. Extract the firmware image file.

2. Open Qfinder Pro.
Qfinder Pro displays a list of NAS devices on your network.
3. Select a NAS model from the device list.
4. Go to **Tools** > **Update Firmware** .

Tip
You can also right-click the NAS model on the list and then select **Update Firmware**.

The **Firmware Update** window appears.

5. Specify your QTS username and password.
   To update the firmware, you must be the administrator of the selected NAS.
   Qfinder Pro displays the **Update Firmware** screen.
6. Click **Browse** and then select a firmware image file.
7. Perform one of the following actions:

Action	Steps
Update a single NAS device	Select the NAS that you want to update.
Update multiple NAS devices of the same model	**a.** Select a NAS model from the list. **b.** Select **Update all the devices with the same model number within the network**. **c.** Select the NAS devices that you want to update.

8. Click **Start**.

Backup/Restore

QTS provides system backup and restore features to help protect your data in the event of data loss or system failure.

Backing Up System Settings

1. Go to **Control Panel** > **System** > **Backup/Restore** > **Backup/Restore Settings** .
2. Click **Backup**.

QTS exports the system settings as a BIN file and downloads the file to your computer.

Restoring System Settings

Warning
If the selected backup file contains user or user group information that already exists on the NAS, QTS will overwrite the duplicate information.

1. Go to **Control Panel** > **System** > **Backup/Restore** > **Backup/Restore Settings** .
2. Click **Browse**.
3. Select a valid BIN file that contains the QTS system settings.
4. Click **Restore**.

System Reset and Restore to Factory Default

QTS provides several options for resetting or restoring the NAS to its default state.

Important
QNAP recommends backing up your data before performing this task.

Option	Description	Steps

Basic system reset	This resets the following settings to the default values without deleting the user data stored on the disks.
	• System administrator password: MAC address of adapter 1 without special characters (all letters must be uppercase). For example, if the MAC address of adapter 1 is 11:22:33:AA:BB:CC, then the default admin password will be 112233AABBCC.
	Tip
	You can find the MAC address of adapter 1 using Qfinder Pro. It is also printed on a sticker on the device as "MAC1".
	• TCP/IP configuration:
	  • Obtain IP address settings automatically via DHCP
	  • Disable jumbo frames
	• System port: 8080 (system service port)
	• Security level: Low (Allow all connections)
	• LCD panel password: (blank)
	• VLAN: Disabled
	• Service binding: All NAS services can run on all available network interfaces.
		1. Power on the NAS.
		2. Press and hold the reset button for 3 seconds.

Option	Description	Steps
Advanced system reset	This performs a basic system reset and then restores the QTS default settings, deleting all users, user groups, and shared folders previously created. The user data stored on the disks is retained. **Note** To retrieve old data after an advanced system reset, re-create the previous folder structure on the NAS.	Perform an advanced system reset using one of the following methods. • Using QTS: a. Go to **Control Panel** > **System** > **Backup/Restore** > **Restore to Factory Default** . b. Click **Reset Settings**. c. Choose to restart or shut down the NAS after the system is reset. d. Click **OK**. • Using the reset button: a. Power on the NAS. b. Press and hold the reset button for 10 seconds.
Restore factory default settings and format all volumes	This restores the default system settings and formats all disk volumes.	1. Go to **Control Panel** > **System** > **Backup/Restore** > **Restore to Factory Default** . 2. Click **Restore Factory Defaults & Format All Volumes**. 3. Choose to restart or shut down the NAS after the system is reset. 4. Click **OK**.
Reinitialize the NAS	This deletes all data on the disks and reinstalls QTS.	1. Go to **Control Panel** > **System** > **Backup/Restore** > **Restore to Factory Default** . 2. Click **Reinitialize NAS**. 3. Choose to restart or shut down the NAS after the NAS is reinitialized. 4. Click **OK**.

External Device

USB Printer

The NAS supports using and sharing up to three network printers on your network in Windows, macOS, and Linux (Ubuntu) environments.

Configuring USB Printer Settings

Ensure that the printers are connected to the NAS via USB before performing this task.

Warning
Restarting the NAS or updating QTS while print jobs are still in progress cancels all the queued print jobs.

1. Go to **Control Panel** > **System** > **External Device** > **USB Printer** .
   QTS displays the detected USB printers on your network.
2. Select a USB printer and then perform one or more of the following tasks.

Task	Action
View printer information	Click **Printer Info**. This displays the details of the selected printer.
View printer log	Click **Printer Log**. This displays the current and completed print jobs on the selected printer. **Tip** You can stop, resume, or cancel ongoing or pending print jobs. You can also delete completed or pending print jobs. Click **Clear** to clear the history.
Clean up spool space	Click **Clean Up Spool Space**. This deletes the data stored in the printer spool.
Configure printer settings	Click **Settings**. This enables you to configure the following settings: • **Stop printer sharing and clear print spool**: Select this option to disable printing and delete all stored data on the selected printer. • **Bonjour printer support**: Select this option to introduce the printing service to the macOS users on your network.

3. Optional: Specify the maximum number of print jobs allowed on each printer.
   One printer can support processing up to 1000 print jobs. The oldest print jobs are automatically overwritten if the printer reaches the maximum number of print jobs.
4. Click **Apply**.

Creating a USB Printer Access List

You can create an access list to allow or deny user access to USB printers.

1. Go to **Control Panel** > **System** > **External Device** > **USB Printer** .
   QTS displays the detected USB printers on your network.
2. Specify access rights.
   a. Beside **Access right**, select **Allow printing** or **Deny printing**.
   b. Specify the IP addresses or domain names that you want to allow or deny.

Tip

> You can specify multiple IP addresses or domain names and separate them using commas. You can also use wildcard characters (such as an asterisk or a question mark) in an IP address or a domain name.

3. Click **Apply**.

Uninterruptible Power Supply (UPS)

The NAS supports connecting to uninterruptible power supply (UPS) devices to protect the NAS from abnormal system shutdowns caused by power disruptions.

NAS Behavior During a Power Outage

The following table describes the possible scenarios during a power outage and the corresponding NAS behavior.

Phase	Scenario	NAS Behavior
Phase 1: From the start of the power outage until the end of the specified waiting time	The power outage occurs.	The NAS detects the remaining UPS power.
	The UPS power is greater than 15%.	Depending on your UPS settings, the NAS powers off or switches to auto-protection mode after the specified waiting time elapses.
	The UPS power is less than 15%.	After 30 seconds, the NAS automatically powers off or switches to auto-protection mode regardless of the specified waiting time.
	The power is restored.	The NAS remains functional.
Phase 2: From the end of the specified waiting time until the UPS runs out of power	The power is not restored, and the NAS is in auto-protection mode.	The NAS stops all running services. All shared folders and iSCSI LUNs become inaccessible.
	The power is not restored, and the NAS is powered off.	The NAS remains powered off.
	The power is restored, and the NAS is in auto-protection mode.	The NAS restarts and resumes its previous state.
	The power is restored, and the NAS is powered off.	The NAS remains powered off.
Phase 3: From the moment the UPS runs out power until the power is restored	The power is not restored, and the NAS is in auto-protection mode.	The NAS powers off.
	The power is not restored, and the NAS is powered off.	The NAS remains powered off.
	The power is restored.	The NAS applies the specified power recovery settings.

Configuring the UPS Settings

1. Go to **Control Panel** > **System** > **External Device** > **UPS** .
2. Select one of the following options and configure the settings.

Mode	Steps

USB connection	**a.** Connect the UPS to the NAS using a USB cable. **b.** Select **USB connection**. **c.** Choose one of the following options. • Power off the server after the power fails for a specified time period • Allow the NAS to enter auto-protection mode after the power fails for a specified time period **Note** In auto-protection mode, the NAS stops all services and unmounts all volumes to protect your data. After the power is restored, the NAS restarts and resumes normal operation. **d.** (Optional) Select **Enable network UPS master** and then specify the IP addresses to which QTS sends notifications in the event of power failure. **Note** This option can only be selected when the UPS is connected to the NAS via USB.
SNMP connection	**a.** Connect the UPS to the same network as the NAS. **b.** Select **SNMP connection**. **c.** Specify the IP address of the UPS. **d.** Choose one of the following options. • Power off the server after the power fails for a specified time period • Allow the NAS to enter auto-protection mode after the power fails for a specified time period
Network UPS slave	**a.** Connect the UPS to the same network as the NAS. **b.** Select **Network UPS slave**. **c.** Specify the IP address of the UPS server. **d.** Choose one of the following options. • Power off the server after the power fails for a specified time period

	• Allow the NAS to enter auto-protection mode after the power fails for a specified time period

3. Click **Apply**.

System Status

You can check the status of your NAS in **Control Panel** > **System** > **System Status** .

Section	Description
System Information	This screen displays basic system information, such as model name, CPU, memory, firmware version, and system up time.
Network Status	This screen displays the current network settings of each network interface.
System Service	This screen displays the current status of system services, such as antivirus, domain controllers, multimedia management, and VPN servers.
Hardware Information	This screen displays NAS hardware information, such as CPU usage, memory, disk temperature, and system fan speed.

System Logs

You can view and manage system logs in **Control Panel** > **System** > **System Logs** .

System Event Logs

QTS keeps a maximum of 10,000 event log entries, including warnings, errors, and information messages. You can perform the following actions for System Event Logs.

Action	Steps
Display a certain event type	Select an event type from the drop-down list.
Perform a basic search	Specify keywords in the search box.
Perform an advanced search	1. Click beside the search box. 2. Specify the detailed information. 3. Click **Search**.
Delete a log entry	Right-click a log entry and then select **Delete this record**.
Copy one or more log entries	1. Select one or multiple log entries. 2. Right-click the selected log entries. 3. Click **Copy**. **Tip** You can press Ctrl or Shift to select multiple log entries.

Action	Steps
Delete all event log entries	1. Click **Clear All**. A confirmation message appears. 2. Click **OK**.
Export system event logs	Click **Save**. QTS exports system event logs as a CSV file and downloads the file to your computer.

System Connection Logs

QTS can log the following events for connection sessions.

Protocol	Events
HTTP/HTTPS, FTP, Telnet, SMB, iSCSI, RADIUS	• Logging on and off • Accessing, creating, deleting, moving, and renaming files and folders
AFP and SSH	Logging on and off

You can perform the following actions for System Connection Logs.

Action	Steps
Start logging connection sessions	Click **Start Logging**.
Configure log settings	1. Click **Options**. 2. Select which connection types to log. 3. (Optional) Choose to archive the connection logs to a specified location when the number of log entries reaches 10,000. 4. Click **Apply**.
Display a certain event type	Select an event type from the drop-down list.
Perform a basic search	Specify keywords in the search box.
Perform an advanced search	1. Click beside the search box. 2. Specify the detailed information. 3. Click **Search**.
Delete a log entry	Right-click a connection log entry and then select **Delete this record**.
Block a connection	1. Right-click a connection log entry. 2. Hover the mouse pointer over **Add to the block list**. 3. Select a time period for which the connection will be blocked.
Delete all connection log entries	1. Click **Clear All**. A confirmation message appears. 2. Click **OK**.

Action	Steps
Export system event logs	Click **Save**. QTS exports and downloads the system connection logs as a CSV file.

Online Users

This section shows the users that are currently connected to the NAS via various network services. You can perform the following actions.

Action	Step
Disconnect a connection	Right-click a user connection and select **Disconnect this connection**.
Block a connection	1. Right-click a user connection and select **Add to the block list**. 2. Specify how long the connection should be blocked.
Disconnect and block a connection	1. Right-click a user connection and select **Disconnect this connection and block the IP**. 2. Specify how long the connection should be blocked.
Perform a basic search	Specify keywords in the search box.
Perform an advanced search	1. Click beside the search box. 2. Specify the detailed information. 3. Click **Search**.

Syslog Client Management

Syslog is a standard for forwarding log messages on a network. You must enable this service to store event and connection logs on a remote syslog server. You can select the types of logs to record.

Resource Monitor

You can monitor the status of your NAS in **Control Panel** > **System** > **Resource Monitor** .

Resource Monitor displays information and statistics about hardware usage and system resources.

Section	Description
Overview	This screen provides a general summary of CPU usage, memory usage, network usage, and ongoing processes on the NAS.

Section	Description
System Resource	This screen uses line charts to display CPU usage, memory usage, network usage, and graphics card usage (if supported and installed) over time. You can hover the mouse pointer over a line chart to view the hardware usage at a specific point in time. **Tip** You can click **More** (⋮) and then select **Settings** to specify the time interval on the line charts.
Storage Resource	This screen uses line charts to display the activities of volumes, LUNs, storage pools, RAID groups, and disks on the NAS over time. This screen also summarizes the storage usage of each volume. You can hover the mouse pointer over a line chart to view the storage activity at a specific point in time.
Processes	This screen displays all ongoing background processes and provides information about each process, such as its current status, CPU usage, and memory usage. **Tip** You can enable **Group by Applications** to group related processes together (for example, all the processes related to an application or a system feature).

4. Privilege Settings

Go to **Control Panel** > **Privilege** to configure privilege settings, disk quotas, and domain security on the NAS.

Users

Default User Accounts

User Account	Description
admin	This account can configure settings, create users, and install applications. You cannot delete this account.

Creating a Local User

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Click **Create** > **Create a User** .
   The **Create a User** window appears.
3. Specify the following information.

Field	Description
Profile photo	Optional: Upload a profile photo for the user.
User Description (optional)	Specify a user description that contains a maximum of 50 characters.
Username	Specify a username that contains 1 to 32 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Multi-byte characters: Chinese, Japanese, Korean, and Russian • Special characters: . - _ ~ ! @ # $ % ^ & ( ) { }
Password	Specify a password that contains a maximum of 64 ASCII characters.
Phone number (optional)	Specify a phone number that will receive SMS notifications from QTS. **Note** Other NAS users might be able to see this information. If you do not want to share this information, leave the field blank.
Email (optional)	Specify an email address that will receive notifications from QTS. For details, see Email Notifications. **Note** Other NAS users might be able to see this information. If you do not want to share this information, leave the field blank.

Field	Description
Send a notification mail to the newly created user (optional)	When selected, QTS sends a message that contains the following information to the specified email address: URLs for connecting to the NAS **Tip** • Users have the option to edit the notification message. To edit the notification message, follow these steps: 1. Click **Edit Message**. The **Edit Message** window appears. 2. Specify a subject and message. 3. Click **Save**. 4. Optional: To use the default message, click **Restore to Defaults**.

4. Optional: Add the user to one or more user groups.
   a. Under **User Group**, click **Edit**.
   b. Select one or more user groups.
5. Optional: Specify shared folder permissions for the user.
   a. Under **Shared Folder Permission**, click **Edit**.
   b. Select the shared folder permissions for the user.
   c. Optional: Select **Apply changes to subfolders**.
6. Optional: Specify application privileges for the user.
   a. Under **Edit Application Privilege**, click **Edit**.
   b. Select application permissions for the user.

Tip
QNAP recommends denying access to applications and network services that the user does not require.
By default, administrator accounts have access to all applications.

7. Optional: Set a quota for the user.

Note
This option is only available when quotas are enabled.

   a. Under **Quota**, click **Edit**.
   b. Set the quota.
      • **No Limit**: Quota settings do not apply to the user.
      • **Limit disk space to**: Specify a quota for the user.

- **Use group quotas**: Group quota settings apply to the user.

Note
Individual quotas may override group quotas.

8. Click **Create**.

Creating Multiple Users

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Click **Create** > **Create Multiple Users** .
   The **Multiple Users Creation Wizard** appears.
3. Click **Next**.
4. Specify the following information.

Field	Description
User Name Prefix	Specify a username that contains a maximum of 23 ASCII characters and that does not: • Contain a space • Begin with the following characters: - # @ • Contain the following characters: @ " + = / \ : | * ? < > ; [ ] % `' This prefix will be included before all usernames. Example: `test`
User Name Start No	Specify a start number with a maximum of 8 digits. Example: `1` **Note** QTS removes leading zeros in starting numbers. For example, `001` becomes `1`.
Number of Users	Specify the number of users (1–4095). Example: `5`
Password	Specify a password that contains a maximum of 64 ASCII characters.

Note
The username format is `[username prefix][user number]`. The specified start number and number of users determine the user number.
Using the examples, the users created will have the following usernames: `test1`, `test2`, `test3`, `test4`, and `test5`.

5. Click **Next**.
   The **Create Private Network Share** screen appears.
6. Optional: Create a private network share for each user.
   a. Select **Yes**.
   b. Click **Next**.

c. Specify the following information.

Field	Description
Hide network drive	Selecting this option hides the folder in Windows networks. Users who know the specific path can still access the folder.
Lock File (Oplocks)	Opportunistic lock (Oplocks) is a Windows file locking mechanism that facilitates caching and access control to improve performance. This feature is enabled by default and should only be disabled in networks where multiple users simultaneously access the same files.
Disk Volume	Select the data volume where the private network share will be created.

To continue without creating a private network share, select **No**.

7. Click **Next**.
   QTS creates the user accounts and adds them to the displayed user list.
8. Click **Finish**.

User Account Lists

The NAS supports importing user accounts from TXT, CSV, and BIN files. The files contain user account information including usernames, passwords, user groups, and quota settings.

File Format	Description
TXT	Create user account lists using a text editor. For details, see Creating a TXT User File.
CSV	Create user account lists using a spreadsheet editor. For details, see Creating a CSV User File.
BIN	QNAP NAS devices can export user account information, including quota settings, to BIN files. For details, see Exporting Users.

Creating a TXT User File

1. Create a new file in a text editor.
2. Specify user information in the following format.
   `Username,Password,Quota (MB),Group Name`

Important

- Separate values using commas.
- Specify a quota between 100 MB and 2048 GB (2048000 MB).

  Note
  The system only accepts quotas in MB. GB values must be expressed in MB.

- Specify information for only one user on each line.
  Example:
  ```
  John,s8fk4b,100,Sales
  Jane,9fjwbx,150,Marketing
  Mary,f9xn3ns,390,RD
  ```

3. Save the list as a TXT file.

Important
If the list contains multi-byte characters, save the file with UTF-8 encoding.

Creating a CSV User File

1. Create a new workbook in a spreadsheet editor.
2. Specify user information in the following format.
   - column A: `Username`
   - column B: `Password`
   - column C: `Quota (MB)`
   - column D: `Group name`

Important

- Specify a quota between 100 MB and 2048 GB (2048000 MB).

  Note
  The system only accepts quotas in MB. GB values must be expressed in MB.

- Specify information for only one user in each row.
  Example:

	A	B	C	D
1	John	s8fk4b	100	Sales
2	Jane	9fjwbx	150	Marketing
3	Mary	f9xn3ns	390	R&D

3. Save the workbook as a CSV file.

Important
If the list contains multi-byte characters, open the file using a text editor and then save with UTF-8 encoding.

Importing Users

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Click **Create** > **Import/Export Users** .
   The **Import/Export Users** window appears.
3. Select **Import user and user group settings**.
4. Optional: Select any of the following options.

Field	Description
Send a notification mail to the newly created user	When selected, QTS sends a message that contains the following information to the specified email address of the user. • Username and password • URLs for connecting to the NAS **Important** To send email notifications, ensure that you have configured an SMTP server. For details, see Configuring an Email Notification Server - Conref.
Overwrite duplicate users	When selected, QTS overwrites existing user accounts that have duplicates on the imported user account list.

5. Click **Browse**, and then select the file that contains the user account list.

Important
Ensure that you are importing a valid QTS user account list file to avoid parsing errors.

For details, see User Account Lists.

6. Click **Next**.

File Type	User Action
TXT or CSV	The **Import User Preview** screen appears. Check the status of the user account list. **Important** The **Status** indicates whether any information is invalid. If any information is invalid, the user account list will not be imported successfully.
BIN	The following screen describes the **Overwrite duplicate users** feature.

7. Click **Next**.
QTS imports the user account list.

8. Click **Finish**.

Exporting Users

1. Go to **Control Panel** > **Privilege** > **Users** .

2. Click **Create** > **Import/Export Users** .
The **Import/Export Users** window appears.

3. Select **Export user and user group settings**.

4. Click **Next**.
QTS exports the user account list to your computer as a BIN file.

Tip
You can use this file to import users to another NAS running QTS.

Modifying User Account Information

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Locate a user.
3. Perform any of the following tasks.

Task	User Action
Change password	**a.** Under **Action**, click . The **Change Password** window appears. **b.** Specify a password that contains a maximum of 64 ASCII characters. **c.** Verify the password. **d.** Click **Apply**.
Edit account profile	**a.** Under **Action**, click . The **Edit Account Profile** window appears. **b.** Edit the settings. The **Edit Account Profile** window provides the following settings not included in the **Create a User** window: • **Description (optional)**: Specify a user description that contains a maximum of 50 characters. • **Disallow the user to change password**: When selected, QTS prevents the user from changing the password. • **Disable this account**: Select this option to disable the user account. You can either select to disable the account **Now** or specify an **Expiry Date**. **c.** Modify the quota for the user. **Note** This option is only available when quotas are enabled. • **No Limit**: Quota settings do not apply to the user. • **Limit disk space to**: Specify a quota for the user. • **Use group quotas**: Group quota settings apply to the user. **Important** Individual quotas may override group quotas. **d.** Click **OK**.
Edit user group membership	**a.** Under **Action**, click . The **Edit User's Groups** window appears. **b.** Select or deselect user groups. **c.** Click **Apply**.

Task	User Action
Edit shared folder permissions	**a.** Under **Action**, click . The **Edit Shared Folder Permission** window appears. **b.** Edit the user's permissions for each shared folder. **c.** Optional: Select **Apply changes to subfolders**. **d.** Click **Apply**.
Edit application privileges	**a.** Under **Action**, click . The **Edit Application Privileges** window appears. **b.** Select the applications that the user is allowed to access. **c.** Click **Apply**. **Tip** QNAP recommends denying access to applications and network services that the user does not require. By default, administrator accounts have access to all applications.

Deleting Users

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Select the users to delete.

Note
Default user accounts cannot be deleted.

3. Click **Delete**.
   A warning message appears.
4. Optional: Select **Also delete the selected user(s)' home folders and data**.
5. Click **Yes**.

Home Folders

Enabling home folders creates a personal folder for each local and domain user on the NAS. When a home folder is created, the user's home folder appears as a shared folder called `home`. Users can access their home folder through Microsoft networking, FTP, and File Station.

All user home folders are located in the `homes` shared folder. By default, only the administrator can access this folder. If home folders are disabled, home folders become inaccessible to users. However, the folders and files they contain are not deleted from the NAS. The administrator can still access the `homes` folder and each user's home folder.

Enabling Home Folders

1. Go to **Control Panel** > **Privilege** > **Users** .
2. Click **Home Folder**.
   The **Home Folder** window appears.

3. Select **Enable home folder for all users**.
4. Select a volume.
   Home folders are stored on the selected volume.
5. Click **Apply**.

User Groups

A user group is a collection of users with the same access rights to files or folders. Administrators can create user groups to manage folder permissions for multiple users.

Default User Groups

User Group	Description
administrators	Users in this group can configure settings, create users, and install applications. You cannot delete this group.
everyone	Users in this group can only view and modify files. This group contains all local user accounts and can be used to grant shared folder permissions to all local user accounts. You cannot delete this group.

Creating a User Group

1. Go to **Control Panel** > **Privilege** > **User Groups** .
2. Click **Create**.
   The **Create a User Group** window appears.
3. Specify the **User group name**.
   The user group name can contain 1 to 128 characters from any of the following groups:
   - Letters: A to Z, a to z
   - Numbers: 0 to 9
   - Multi-byte characters: Chinese, Japanese, Korean, and Russian
   - Dashes (-)
4. Optional: Specify a description that contains a maxiumum of 128 characters.
5. Optional: Add users to the user group.
   a. Under **Assign users to this group**, click **Edit**.
   b. Select one or more users.
6. Optional: Specify shared folder permissions for the user group.
   a. Under **Edit shared folder permissions**, click **Edit**.
   b. Select the permissions for each shared folder.
      For details, see Conflicts in Shared Folder Permissions.
7. Optional: Set a quota for the user group.

Note
This option is only available when quotas are enabled.
For details, see Enabling Quotas.

a. Under **Quota**, click **Edit**.

b. Set the quota.

- **No Limit**: Quota settings do not apply to the user group.
- **Limit disk space to**: Specify a quota for the user group.

Important
Individual quotas may override group quotas.
For details, see Quota Conflicts.

8. Click **Create**.
A dialog box appears.

9. Choose whether group quotas will be applied to users in the group.

Option	Description
Yes	Applies group quota settings to each user in the group.
No	Retains individual quota settings for users in the group.

For details on group quota settings, see Quota Conflicts.

Modifying User Group Information

1. Go to **Control Panel** > **Privilege** > **User Groups** .
2. Locate a user group.
3. Perform any of the following tasks.

Task	User Action
Edit user group details	**a.** Under **Action**, click . The **View Group Details** window appears. **b.** Modify the description. **c.** Modify the quota. **Note** • You cannot modify the quota in the default user group. • This option is only available when quotas are enabled. For details, see Enabling Quotas. • **No Limit**: Quota settings do not apply to the user group. • **Limit disk space to**: Specify a quota for the user group. **Important** Individual quotas may override group quotas. For details, see Quota Conflicts. **d.** Click **OK**.
Edit user group members	**a.** Under **Action**, click . The **Edit User Group** window appears. **b.** Select or deselect users. **c.** Click **Apply**.
Edit shared folder permissions	**a.** Under **Action**, click . The **Edit Shared Folder Permissions** window appears. **b.** Edit the user group's permissions for each shared folder. For details, see Shared Folder Permissions. **c.** Click **Apply**. **Important** Group-level permissions may override user-level permissions. For details, see Conflicts in Shared Folder Permissions.

Deleting User Groups

1. Go to **Control Panel** > **Privilege** > **User Groups** .
2. Select the user groups to delete.

Note
Default user groups cannot be deleted.

3. Click **Delete**.
   A warning message appears.

4. Click **OK**.

Shared Folders

Go to **Control Panel** > **Privilege** > **Shared Folders** to configure settings and permissions for shared folders.

Default Shared Folders

QTS automatically creates the following shared folders to help you organize data on your NAS.

Important
Default shared folders cannot be deleted and certain properties cannot be changed.

Folder	Description
Download	This is the default folder for Download Station and is the default path when downloading content in QTS. You can assign a different path for downloads in Download Station.
Multimedia	This is the default folder for multimedia apps and stores multimedia content such as photos, videos, and music. You can manage this folder in the Multimedia Console utility in **Control Panel** > **Applications** .
Public	This folder can be used by any user account. By default, the shared folder permission for this folder is set to Read Only. For details, see Shared Folder Permissions.
Web	This folder stores content from the Web Server utility, which you can manage in **Control Panel** > **Applications** .

Restoring Default Shared Folders

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Click **Restore Default Shared Folders**.
   A warning message appears.
3. Click **OK**.

QTS restores the default shared folders.

Creating a Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Click **Create**, and then select **Shared Folder**.
   The **Create A Shared Folder** window opens.
3. Specify the following information:

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '.
Comment (optional)	Specify a comment that contains 1 to 128 ASCII characters. The information is for your reference and is not used by QTS.
Disk Volume	Specify the volume on which the shared folder will be created.
Qtier Auto Tiering	When enabled, Qtier performs auto-tiering on data in the folder. For details, see Qtier. This setting is only available if you select a Qtier-enabled storage pool. **Tip** You can also enable auto-tiering from the **Shared Folders** screen.
Path	• **Specify path automatically**: Creates a new root folder on the selected volume using the specified shared folder name. • **Enter path manually**: Select an existing folder as the root folder.

4. Optional: Configure user access permissions.
   a. Under **Configure access privileges for users**, click **Edit**.
   b. Specify the access permissions for users.
      For details, see Shared Folder Permissions.
5. Optional: Enable folder encryption.
   a. Under **Folder Encryption**, click **Edit**.
   b. Select **Encryption**.
      Folder encryption protects folder content against unauthorized data access when the drives are physically stolen.
   c. Specify the following information.

Field/Option	Description
Input Password	Specify a password that contains 8 to 32 characters except the following: " $: = \ This field does not support multibyte characters.
Verify Password	The password must match the previously specified password.

Field/Option	Description
Save encryption key	When enabled, QTS automatically unlocks the shared folder after the NAS restarts. When disabled, the administrator must unlock the folder after the NAS restarts. For details, see Unlocking a Shared Folder. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.

6. Optional: Configure advanced settings.

Option	Description
Guest Access Right	Select the permission level assigned to users without a NAS account.
Hide network drive	Selecting this option hides the folder in Windows networks. Users who know the specific path can still access the folder.
Lock File (Oplocks)	Opportunistic lock (Oplocks) is a Windows file locking mechanism that facilitates caching and access control to improve performance. This feature is enabled by default and should only be disabled in networks where multiple users simultaneously access the same files.
SMB Encryption	This option is available only when SMB3 is enabled. Selecting this option encrypts all Microsoft network communication using the SMB3 protocol.
Enable Windows Previous Versions	When enabled, the Previous Versions feature in Windows can be used with the shared folder.
Enable Network Recycle Bin	Selecting this option creates a Recycle Bin for this shared folder.
Restrict the access of Recycle Bin to administrators only for now	Selecting this option prevents non-administrator users from recovering or deleting files in the Recycle Bin. **Note** This option is available only when **Enable Network Recycle Bin** is selected.
Enable sync on this shared folder	Selecting this option allows this shared folder to be used with Qsync. This option is only available if Qsync Central is installed on the NAS.
Enable access-based share enumeration (ABSE)	When enabled, users can only see the shared folders that they have permission to mount and access. Guest account users must enter a username and password to view shared folders.
Enable access-based enumeration (ABE)	When enabled, users can only see the files and folders that they have permission to access.

Option	Description
Set this folder as the Time Machine backup folder (macOS)	When enabled, the shared folder becomes the destination folder for Time Machine in macOS. **Important** • If space in the folder is insufficient when starting a new Time Machine backup, QTS automatically deletes the oldest Time Machine backup in the folder to free up space. • You should disable **Enable Network Recycle Bin** when **Set this folder as the Time Machine backup folder (macOS)** is selected, to prevent automatically deleted Time Machine backups from filling the recycle bin.

7. Click **Create**.

Editing Shared Folder Properties

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate a shared folder.
3. Under **Action**, click .
   The **Edit Properties** window appears.
4. Modify any of the following settings.

Setting	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '.
Comment (optional)	Specify a comment that contains 1 to 128 ASCII characters. The information is for your reference and is not used by QTS.
Disk Volume	Specify the volume on which the shared folder will be created.
Qtier Auto Tiering	When enabled, Qtier performs auto-tiering on data in the folder. For details, see Qtier. This setting is only available if you select a Qtier-enabled storage pool. **Tip** You can also enable auto-tiering from the **Shared Folders** screen.
Path	Modify the folder path.

Setting	Description
Hide network drive	Selecting this option hides the folder in Windows networks. Users who know the specific path can still access the folder.
Lock File (Oplocks)	Opportunistic lock (Oplocks) is a Windows file locking mechanism that facilitates caching and access control to improve performance. This feature is enabled by default and should only be disabled in networks where multiple users simultaneously access the same files.
SMB Encryption	This option is available only when SMB3 is enabled. Selecting this option encrypts all Microsoft network communication using the SMB3 protocol.
Enable Windows Previous Versions	When enabled, the Previous Versions feature in Windows can be used with the shared folder.
Enable Network Recycle Bin	Selecting this option creates a Recycle Bin for this shared folder.
Restrict the access of Recycle Bin to administrators only for now	Selecting this option prevents non-administrator users from recovering or deleting files in the Recycle Bin. **Note** This option is available only when **Enable Network Recycle Bin** is selected.
Enable write-only access on FTP connection	When enabled, only the admin has read and write access to the shared folder. Other users will only be able to write to the folder.
Only allows applications to access files using the long file name format	When selected, applications can only use the long file name (LFN) format to access files in the shared folder.
Encrypt this folder	Folder encryption protects folder content against unauthorized data access when the drives are physically stolen. Specify the following information. **a. Input Password** Specify a password that contains 8 to 32 characters except the following: " $: = \ This field does not support multibyte characters. **b. Verify Password** The password must match the previously specified password. **c. Save encryption key** When enabled, QTS automatically unlocks the shared folder after the NAS restarts. When disabled, the administrator must unlock the folder after the NAS restarts. For details, see Unlocking a Shared Folder. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.
Enable sync on this shared folder	Selecting this option allows this shared folder to be used with Qsync. This option is only available if Qsync Central is installed on the NAS.

Setting	Description
Enable access-based share enumeration (ABSE)	When enabled, users can only see the shared folders that they have permission to mount and access. Guest account users must enter a username and password to view shared folders.
Enable access-based enumeration (ABE)	When enabled, users can only see the files and folders that they have permission to access.
Set this folder as the Time Machine backup folder (macOS)	When enabled, the shared folder becomes the destination folder for Time Machine in macOS. **Important** • If space in the folder is insufficient when starting a new Time Machine backup, QTS automatically deletes the oldest Time Machine backup in the folder to free up space. • You should disable **Enable Network Recycle Bin** when **Set this folder as the Time Machine backup folder (macOS)** is selected, to prevent automatically deleted Time Machine backups from filling the recycle bin.
Migrate to Snapshot Shared Folder	Migrate the shared folder to a snapshot shared folder. For details, see Migrating to a Snapshot Shared Folder.

5. Click **OK**.

Refreshing a Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate a shared folder.
3. Under **Action**, click .

Removing Shared Folders

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Select the shared folders to remove.

Note
Default shared folders cannot be removed.

3. Click **Remove**.
   A confirmation message appears.
4. Optional: Select **Also delete the data (mounted ISO image files will not be deleted)**.
5. Click **Yes**.

Snapshot Shared Folders

A snapshot shared folder is a shared folder created on a dedicated volume and allows users to quickly recover data by restoring a folder or reverting a volume from a snapshot. Users can also set folder quotas for snapshot shared folders.

For details on snapshots, see Storage & Snapshots.

The snapshot shared folder feature requires a NAS that supports snapshots and contains at least 1 GB of memory. For details on compatible models, see www.qnap.com/solution/snapshots.

Creating a Snapshot Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Click **Create**, and then select **Snapshot shared folder**.
   The **Create a Snapshot Shared Folder** window opens.
3. Specify the following information:

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '.
Comment (optional)	Specify a comment that contains 1 to 128 ASCII characters.
Storage Pool	Specify the storage pool where the shared folder will be created.
Space Allocation	Select one of the following space allocation options: • **Thick provisioning** • **Thin provisioning**
Qtier Auto Tiering	When enabled, Qtier performs auto-tiering on data in the folder. This setting is only available if you select a Qtier-enabled storage pool. **Tip** You can also enable auto-tiering from the **Shared Folders** screen.
Allocate folder quota	You can allocate a folder quota for the snapshot shared folder.

4. Optional: Configure user access permissions.
   a. Under **Configure access privileges for users**, click **Edit**.
   b. Specify the access permissions for users.
      For details, see Shared Folder Permissions.
5. Optional: Configure advanced settings.
   For details, see Creating a Shared Folder.
6. Click **Create**.

Migrating to a Snapshot Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Select the folder you want to migrate to a snapshot shared folder.
3. Click **Migrate to Snapshot Shared Folder**.
   The **Migrating shared folder to a snapshot shared folder** wizard appears.
4. Select the location for the snapshot shared folder.
5. Click **Next**.
6. Optional: Free up storage pool space on the volume.

Note
If there is not enough storage space in the storage pool for the snapshot shared folder, the **Free Storage Pool Space** screen appears.

Option	User Action
Release unused guaranteed snapshot space	**Note** This option is only available if guaranteed snapshot space has been allocated to the storage pool. **a.** Click **Set up now**. The **Snapshot Settings** window appears. **b.** Configure the snapshot settings to release space. For details, see Storage & Snapshots. **c.** Click **OK**.
Run a space reclaim to release used space on thin volumes	**Note** This option is only available if the storage pool contains a thin volume with reclaimable space. **a.** Click **Run now**. A dialog box appears. **b.** Click **OK** to reclaim the available storage space. QTS reclaims the used space. A dialog box appears. **c.** Click **OK**.

Option	User Action
Convert a thick volume to a thin volume to release unallocated space	**Note** This option is only available if the storage pool contains a thick volume. **a.** Select a volume to convert. **b.** Click **Run now**. The **Convert to Thin Volume** window appears. **Warning** Converting a volume deletes all existing snapshots on the volume. **c.** Click **Apply.** QTS converts the volume.

7. Configure the snapshot shared folder.

Field	Description
Qtier Auto Tiering	When enabled, Qtier performs auto-tiering on data in the folder. This setting is only available if you select a Qtier-enabled storage pool. **Tip** You can also enable auto-tiering from the **Shared Folders** screen.
Space Allocation	Select one of the following space allocation options: • **Thick provisioning** • **Thin provisioning**
Allocated space quota	Specify a quota for the snapshot shared folder. **Tip** Click **Set to Max** to allocate all remaining storage pool space to the volume.

8. Click **Next**.
9. Review the settings.
10. Click **OK**.

ISO Shared Folders

Users can mount ISO image files on the NAS as ISO shared folders and access them without having to burn discs. By default, most NAS models support up to 256 ISO shared folders.

ISO Shared Folder Requirements

By default, most NAS models can support up to 256 ISO shared folders. However, some NAS models support fewer than 256 ISO image files, depending on the number of Network Recycle Bin folders: Number of supported ISO image files = 256 − 6 (default shared folders) − (number of Network Recycle Bin folders). The following NAS models support fewer than 256 ISO image files.

NAS Model		
TS-1x: • TS-110 • TS-112 • TS-119 • TS-119P+ • TS-120 • TS-121	TS-2x: • TS-210 • TS-212 • TS-219 • TS-219P • TS-219P+ • TS-220 • TS-221	Other models: • TS-410

Mounting an ISO File as a Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Click **Create**, and then select **Create an ISO Share**.
   The **Create an ISO Share** window opens.
3. Select the source ISO image file to be mounted.
4. Click **Next**.
5. Specify the following information.

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • End with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % `' **Note** For ARM-based NAS models, ISO shared subfolder names do not support Cyrillic characters. If a subfolder name includes Cyrillic characters, it will not be displayed correctly on the NAS. Shared folders on macOS that include the character "#" in their names cannot be mounted.
Hidden Folder	Selecting **Yes** hides the folder in Windows networks. Users who know the specific path can still access the folder.
Description	Specify a description that contains a maximum of 128 ASCII characters.

6. Click **Next**.

7. Configure user access permissions and guest access rights to the ISO shared folder.

Type	Option	Description	User Action
User access permissions	**Grant read-only access right for administrators only**	Selecting this option grants administrator accounts read-only access to the ISO shared folder.	**a.** Click **Next**. **b.** Review the settings.
	By User	Selecting this option allows you to configure access permissions to the ISO shared folder at the user level.	**a.** Click **Next**. **b.** Configure the user account access rights for the ISO shared folder. **c.** Click **Next**. **d.** Review the settings.
	By User Group	Selecting this option allows you to configure access permissions to the ISO shared folder at the user group level.	**a.** Click **Next**. **b.** Configure the user group access rights for the ISO shared folder. **c.** Click **Next**. **d.** Review the settings.
Guest access rights	**Deny Access**	Selecting this option denies access to guest accounts.	N/A
	Read only	Selecting this option grants read-only access to guest accounts.	

For details, see Shared Folder Permissions.

8. Click **Next**.
QTS mounts the ISO file as a shared folder and then adds it to the **Shared Folder** screen.

9. Click **Finish**.

Shared Folder Permissions

Permission	Description
Read Only (RO)	The user or user group can read files in the shared folder, but not write them.
Read/Write (RW)	The user or user group can read and write files in the shared folder.
Deny	The user or user group cannot read or write files in the shared folder.

Note
You can configure shared folder permissions for users and user groups. For details, see the following topics:

- Modifying User Account Information
- Modifying User Group Information

Editing Shared Folder Permissions

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate a shared folder.
3. Under **Action**, click .
   The **Edit Shared Folder Permission** window appears.
4. Under **Select permission type**, select a permission type to edit.
5. Perform any of the following tasks.

Permission Type	Description	User Action
Users and groups permission	Edit user and user group permissions for shared folders that can be accessed through Windows, macOS, FTP, and File Station.	**a.** Specify permissions for each user and user group. **b.** Optional: Add a user to the list of users with permissions for the shared folder. 1. Click **Add**. The **Select users and groups** window appears. 2. Select the type of user or user group from the drop-down menu in the upper left. 3. Specify the permissions for the users you want to add. 4. Click **Add**. QTS adds the users and their corresponding permissions to the list. **c.** Optional: Remove a user from the list of users with permissions for the shared folder. 1. Click the user you want to remove. 2. Click **Remove**. QTS removes the user from the list. **d.** Optional: Modify guest access rights. Under **Guest Access Right**, select the permission type for guest accounts.

Permission Type	Description	User Action
NFS host access	Edit NFS host access rights for shared folders.	**a.** Select **Access right** to enable NFS access rights. **Note** You will not be able to select this for SMB mounted shared folders because they do not support NFS host access. **b.** Under **Host / IP / Network**, enter an IP address or domain name. **c.** Optional: Add an NFS host. Under **Allowed IP Address or Domain Name**, click **Add**. QTS adds an entry to the list. **d.** Optional: Delete an NFS host. **1.** Select an NFS host from the list. **2.** Click **Delete**.
Microsoft Networking host access	Specify which computers can access shared folders through Microsoft Networking.	**a.** Add a Microsoft Networking host. **1.** Click **Add**. QTS adds an entry to the list. **2.** Under **Host / IP / Network**, enter an IP address or domain name. **b.** Optional: Delete a Microsoft Networking host. **1.** Select a Microsoft Networking host from the list. **2.** Click **Delete**.

6. Click **Apply**.

Configuring Advanced Folder Permissions

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Advanced Permissions** .
2. Select any of the following options.

Option	Description
Enable Advanced Folder Permissions	When enabled, users can assign folder and subfolder permissions to individual users and user groups. **Note** SMB/NFS mounted shared folders do not support advanced folder permissions.
Enable Windows ACL support	When enabled, users can only configure folder and subfolder permissions from Windows File Explorer.

3. Click **Apply**.

Conflicts in Shared Folder Permissions

When a user is assigned different permissions for a shared folder, QTS uses the following hierarchy to resolve conflicts.

1. No Access/Deny
2. Read/Write (RW)
3. Read Only (RO)

User Permission	User Group Permission	Actual Permission
No Access	No Access	No Access
Read Only		No Access
Read/Write		No Access
Not Specified		No Access
No Access	Read Only	No Access
Read Only		Read Only
Read/Write		Read/Write
Not Specified		Read Only
No Access	Read/Write	No Access
Read Only		Read/Write
Read/Write		Read/Write • Shared folders through Samba/AFP: Read/Write • Shared folders through NFS: Read Only
Not Specified		Read/Write
No Access	Not Specified	No Access
Read Only		Read Only
Read/Write		Read/Write
Not Specified		No Access

Folder Aggregation

Users can aggregate shared folders on a Windows network and link them to a portal folder accessible on the NAS. You can link up to 10 folders to a single portal folder.

Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** to enable folder aggregation.

Note

- Folder aggregation is supported in Samba networks only. QNAP recommends folder aggregation for a Windows Active Directory (AD) environment.
- If access permissions are assigned to portal folders, the NAS and remote servers must be joined to the same AD domain.

Creating a Portal Folder

Note
Ensure that folder aggregation is enabled before performing the following steps. For details, see Folder Aggregation.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** .
2. Under **Folder Aggregation List**, click **Create a Portal Folder**.
   The **Create a Portal Folder** window appears.
3. Specify the following information.

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '
Hidden Folder	Selecting **Yes** hides the folder in Windows networks. Users who know the specific path can still access the folder.
Comment	Specify a comment between 1 and 128 ASCII characters.
Users must login before accessing the portal folder.	When selected, users must log in to the NAS with their username and password before accessing the portal folder. This prevents guest accounts from accessing the portal folder and other user permission issues.

4. Click **Apply**.

Modifying Portal Folder Information

Note
Ensure that folder aggregation is enabled before performing the following steps. For details, see Folder Aggregation.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** .
2. Locate a portal folder.
3. Perform any of the following tasks.

Task	User Action
Edit portal folder properties	**a.** Under **Action**, click . The **Edit Portal Folder** window appears. **b.** Edit the folder properties. For details, see Creating a Portal Folder.

Task	User Action
Configure the remote folder link	**a.** Under **Action**, click . The **Remote Folder Link** window appears. **b.** Specify the **Name**, **Host Name**, and **Remote Shared Folder** for any remote folder link.

4. Click **Apply**.

Deleting Portal Folders

Note
Ensure that folder aggregation is enabled before performing the following steps. For details, see Folder Aggregation.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** .
2. Select the portal folders that you want to delete.
3. Click **Delete**.
   A warning message appears.
4. Click **Yes**.

Importing Folder Trees

Note
Ensure that folder aggregation is enabled before performing the following steps. For details, see Folder Aggregation.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** .
2. Click **Import/Export Folder Tree**.
   The **Import/Export Folder Tree** window appears.
3. Under **Import Folder Tree**, click **Browse**.
4. Select the file that contains the folder tree.

Important
Ensure that you are importing a valid QTS folder tree file to avoid parsing errors.

5. Click **Import**.
   A warning message appears.
6. Click **OK**.
   QTS imports the folder tree.
7. Click **OK**.
8. Click **Finish**.

Exporting Folder Trees

Note

Ensure that folder aggregation is enabled before performing the following steps. For details, see Folder Aggregation.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Folder Aggregation** .
2. Click **Import/Export Folder Tree**.
   The **Import/Export Folder Tree** window appears.
3. Under **Export Folder Tree**, click **Export**.
   QTS exports the folder tree to your computer as a BIN file.

Tip
You can use this file to import folder trees to another NAS running QTS.

4. Click **Finish**.

Shared Folder Encryption

Shared folders on the NAS can be encrypted with 256-bit AES encryption to protect data. Encrypted shared folders can be mounted with normal read/write permissions but can only be accessed using the authorized password. Encrypting shared folders protects sensitive data from unauthorized access if the drives are physically stolen.

Encrypting a Shared Folder

Note

- Default shared folders cannot be encrypted.
- The volume or path of an encrypted folder cannot be changed.
- Encrypted folders cannot be accessed through NFS.

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate a shared folder.
3. Under **Action**, click .
   The **Edit Properties** window appears.
4. Select **Encrypt this folder**.
5. Specify the following information.

Field/Option	Description
Input Password	Specify a password that contains 8 to 32 characters except the following: " $: = \ This field does not support multibyte characters.
Verify Password	The password must match the previously specified password.

Field/Option	Description
Save encryption key	When enabled, QTS automatically unlocks the shared folder after the NAS restarts. When disabled, users must unlock the folder after restarting the NAS. For details, see Unlocking a Shared Folder. **Note** QNAP strongly recommends exporting and saving the encryption key. For details, see Configuring Encryption Settings.

The **Folder Encryption** window appears.

6. Review the information.
7. Click **Yes**.

Configuring Encryption Settings

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate an encrypted shared folder.
3. Under **Action**, click .
The **Encryption Management** window appears.

Note
If the encrypted folder is locked, you must unlock it before configuring encryption settings. For details, see Unlocking a Shared Folder.

4. Perform any of the following tasks.

Task	User Action
Download the encryption key file	**a.** Go to **Download**. **b.** Enter the encryption password. **c.** Click **OK**. QTS exports the encryption key file to your computer as a TXT.
Save the encryption key	**a.** Go to **Save**. **b.** Select **Mount automatically on start up**. When enabled, QTS automatically unlocks the shared folder after the NAS restarts. **c.** Enter the encryption password. **d.** Click **OK**. QTS saves the encryption key.

Task	User Action
Lock the shared folder	**a.** Go to **Lock**. **b.** Optional: Select **Forget the saved key**. **Note** When selected, users must unlock the folder after restarting the NAS. This setting is only available if **Save encryption key** was enabled when the folder was encrypted or **Mount automatically on start up** was enabled after the folder was encrypted. **c.** Click **OK**. QTS locks the folder. **Note** • Locked folders do not appear in File Station. A folder will only reappear after it is unlocked. • Users cannot edit the properties or permissions of a locked shared folder.

Unlocking a Shared Folder

1. Go to **Control Panel** > **Privilege** > **Shared Folders** > **Shared Folder** .
2. Locate a locked shared folder.
3. Under **Action**, click .
   The **Unlock Folder** window appears.
4. Select one of the following options.

Option	User Action
Input Encryption Password	**a.** Enter the encryption password. **b.** Optional: Select **Save encryption key**. When enabled, QTS automatically unlocks the shared folder after the NAS restarts. **Note** This option is selected by default.
Upload Encryption Key File	**a.** Click **Browse**. **b.** Select the encryption key file.

5. Click **OK**.

Shared Folder Access

You can map or mount a NAS shared folder as a network drive, allowing you to easily access and manage files from your Windows, Mac, or Linux computer.

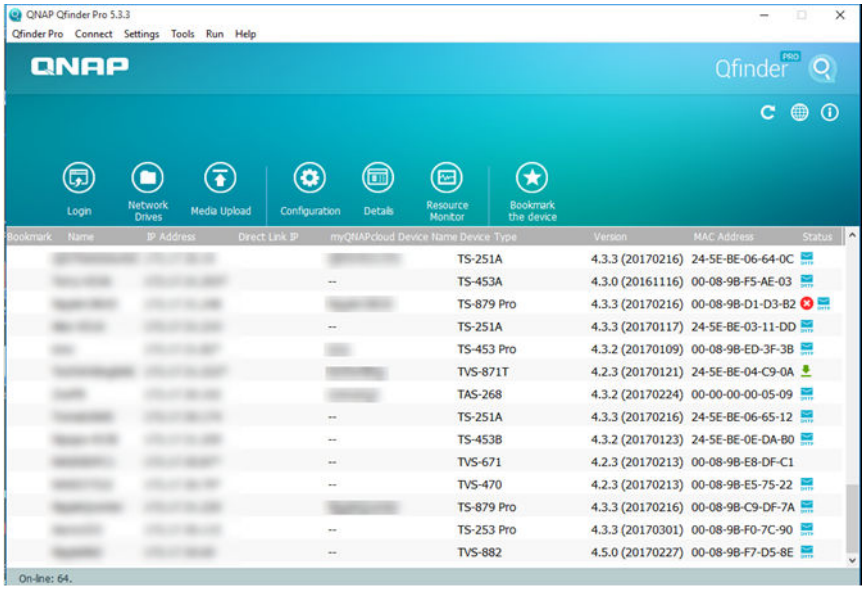
For Windows and Mac, you can use Qfinder Pro to map or mount your NAS shared folders. Qfinder Pro is a desktop utility that enables you to locate and access the QNAP NAS devices in your local area network.

To download Qfinder Pro, go to https://www.qnap.com/utilities.

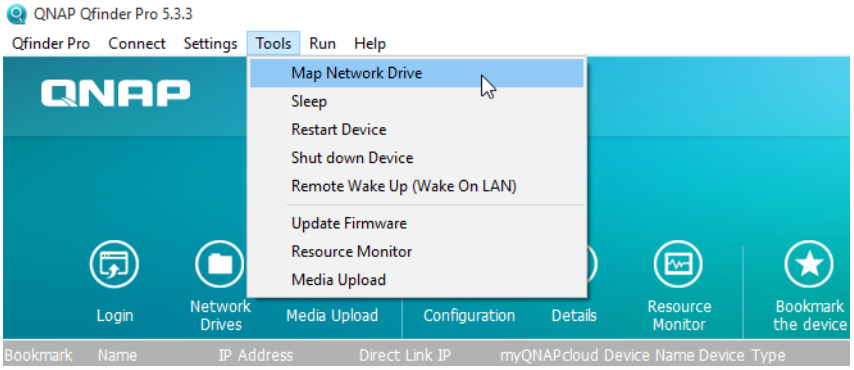
Mapping a Shared Folder on a Windows Computer

Before mapping a shared folder, ensure that you have Qfinder Pro installed on your Windows computer.

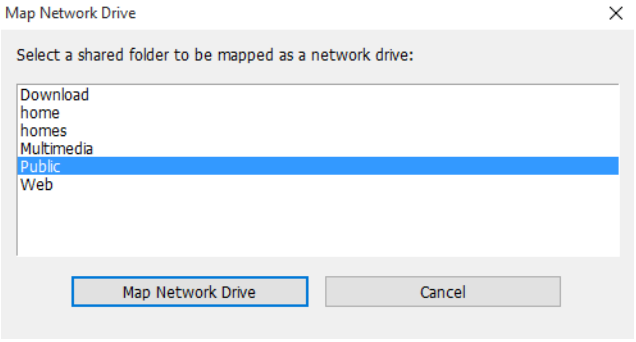
1. Power on the NAS.
2. Connect the NAS to your local area network.
3. Open **Qfinder Pro**.
   Qfinder Pro displays all QNAP NAS devices in your local area network.



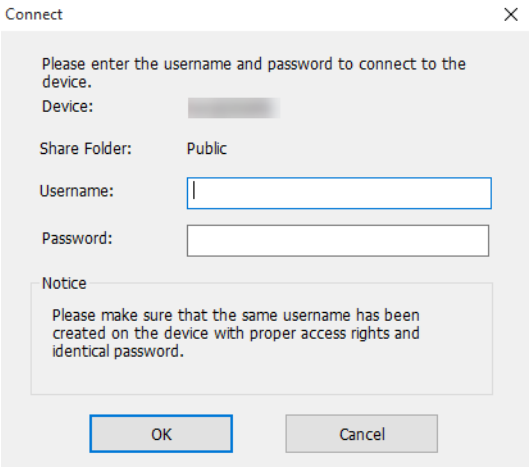
4. Select the NAS where the shared folder is located.
5. Click **Tools** > **Map Network Drive** .



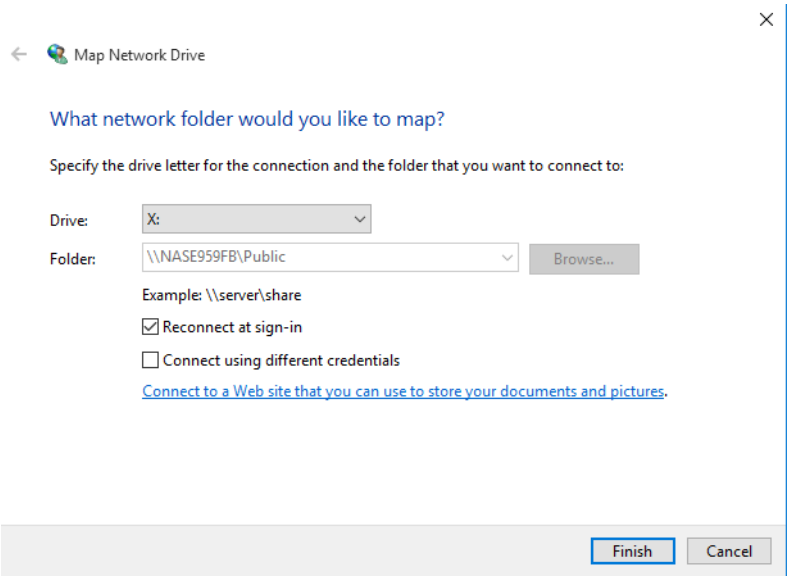
6. Select a shared folder.
7. Click **Map Network Drive**.



8. Specify your QTS username and password.
9. Click **OK**.



10. Specify the following information.



Field	Description
Drive	Specify the drive letter for the shared folder.
Folder	This field is uneditable because you have already selected the shared folder. This is for your reference.
Reconnect at sign-in	When selected, the shared folder will automatically be connected the next time the user signs in.
Connect using different credentials	When selected, the user will have the option to sign into the NAS with a different account after mapping the shared folder.
Connect to a Web site that you can use to store your documents and pictures.	When clicked, the **Add Network Location Wizard** appears. You can use this wizard to create a shortcut to your mapped shared folder.

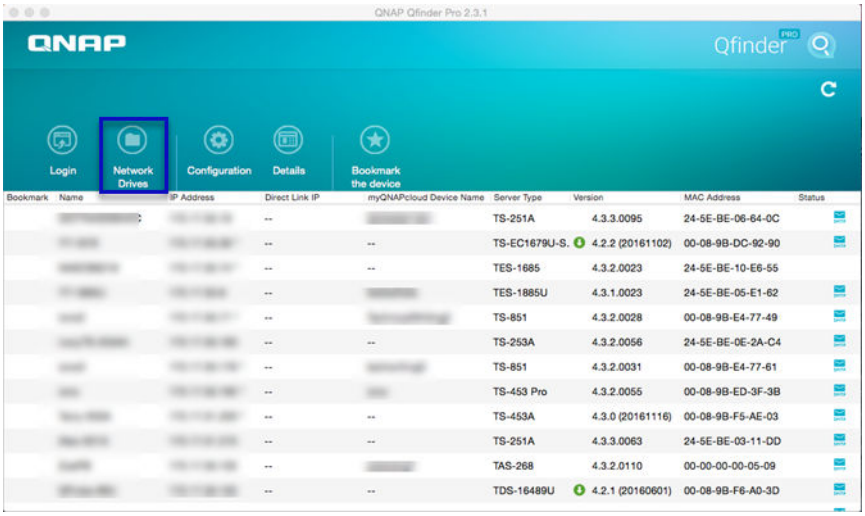
11. Click **Finish**.

The shared folder is mapped as a network drive and can be accessed using Windows Explorer.

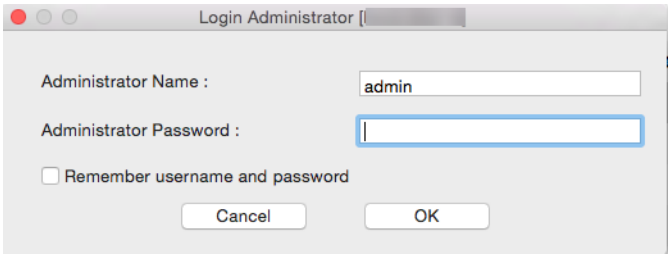
Mounting a Shared Folder on a Mac Computer

Before mounting a shared folder, ensure that you have Qfinder Pro installed on your Mac computer.

1. Power on the NAS.
2. Connect the NAS to your local area network.
3. Open **Qfinder Pro**.
   Qfinder Pro displays all QNAP NAS devices in your local area network.
4. Select the NAS where the shared folder is located.
5. Click **Network Drives**.

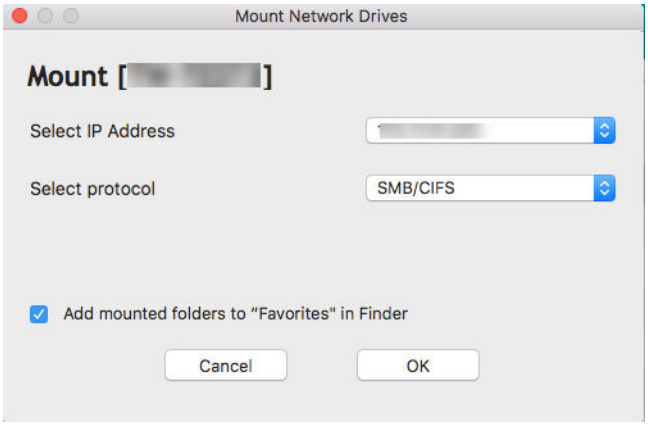


6. Specify your QTS username and password.
7. Click **OK**.



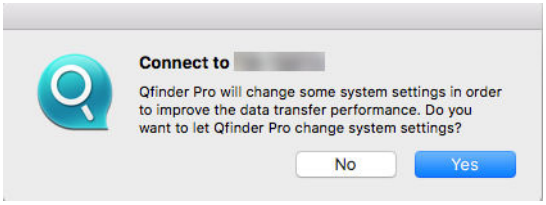
The **Mount Network Drives** window opens.

8. Select **Add mounted folders to "Favorites" in Finder**.
9. Click **OK**.

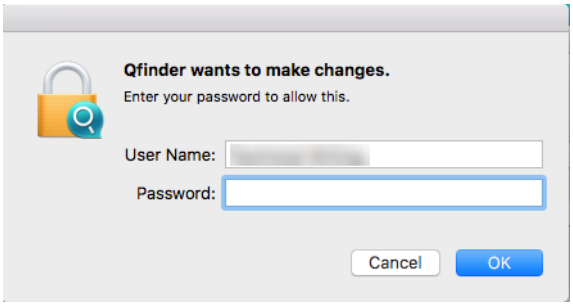


A confirmation message appears.

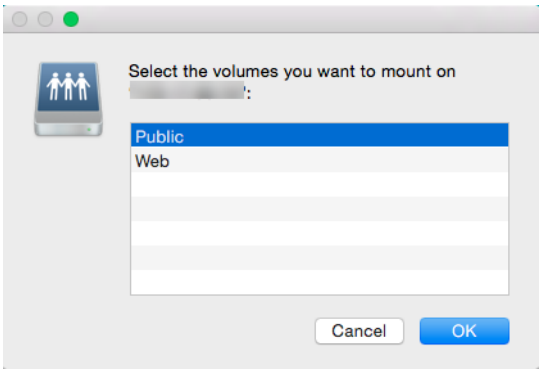
10. Click **Yes**.



11. Specify your Mac username and password.
12. Click **OK**.



13. Select the shared folder.
14. Click **OK**.



The shared folder is mounted as a network drive and can be accessed using Qfinder Pro.

Mounting a Shared Folder on a Linux Computer

1. Open a terminal with root privileges.
2. Run the following command:

```
mount <NAS Ethernet Interface IP>:/share/<Shared Folder Name> <Directory to Mount>
```

Tip
If the NAS ethernet interface IP address is 192.168.0.42 and you want to connect to a shared folder "public" under the /mnt/pub directory, run the following command:

```
mount -t nfs 192.168.0.42:/share/public/mnt/pub
```

3. Specify your NAS username and password.

You can connect to the shared folder using the mounted directory.

Quota

You can enable quotas (in MB or GB) for users and user groups to help manage storage space. When quotas are enabled, QTS prevents users from saving data to the NAS after the quota is reached. By default, quotas are not enabled for users.

QTS provides three types of quota settings.

Type	Description
Individual	Set quotas for individual users. Go to **Control Panel** > **Privilege** > **Users** to edit user quotas. For details, see Modifying User Account Information.
Group	Set quotas at the group level. Setting a group quota applies the quota to each user in the group. Go to **Control Panel** > **Privilege** > **User Groups** to edit group quotas. For details, see Modifying User Group Information.

Type	Description
All users	When enabled, the quota is applied to both new and existing users. Go to **Control Panel** > **Privilege** > **Quota** to enable quotas. For details, see Enabling Quotas.

Note
Quotas are applied per volume and are not shared across volumes.

Important
Individual quotas may override group quotas.
For details, see Quota Conflicts.

Tip
You can export quota settings to a CSV file to use as a reference.
For details, see Exporting Quota Settings.

Enabling Quotas

1. Go to **Control Panel** > **Privilege** > **Quota** .
2. Select **Enable quota for all users**.
3. Specify the all users quota.

Note
The all users quota must be between 100 MB and 2048 GB (2048000 MB).

4. Click **Apply**.
   QTS displays the quota settings for Local Users.

Editing Quota Settings

1. Go to **Control Panel** > **Privilege** > **Quota** .
2. Select the type of user or group.
   - **Local Users**
   - **Domain Users**
   - **Local Groups**
   - **Domain Groups**

Tip
By default, the **Quota** screen displays Local Users.

3. Select a user or group.
4. Click **Edit**.
   The **Quota** window appears.
5. Set a quota for the user or group.
   - **No Limit**: Quota settings do not apply to the user or group.

- **Limit disk space to**: Specify a quota for the user or group.
- **Use group quotas**: Group quota settings apply to the user.

Important
Individual quotas may override group quotas.
For details, see Quota Conflicts.

6. Click **OK**.

Exporting Quota Settings

1. Go to **Control Panel** > **Privilege** > **Quota** .
2. Click **Generate**.
3. Click **Download**.

QTS exports the quota settings as a CSV file.

Quota Conflicts

QTS uses the following hierarchy to resolve quota conflicts.

1. Individual quota
2. Group quota
3. All users quota

The following table describes the possible scenarios for different combinations of user quotas and group quotas.

- The **User Quota** column shows the quota setting that is applied to the user individually.
- The **Group Quota** column shows whether the user belongs to any groups.
- The **Actual Quota** column shows the actual quota setting that is applied to the user.

User Quota	Group Quota	Actual Quota
No limit	Yes	No limit
	No	No limit
Individual	Yes	Individual quota
	No	Individual quota
Use group quotas	Yes	Group quota
	No	All users quota

Note
If a user belongs to multiple groups with group quotas, the highest group quota applies to the user.

Domain Security

The NAS supports user authentication through local access rights management, the Microsoft Active Directory (AD), and the Lightweight Directory Access Protocol (LDAP) directory.

Joining the NAS to an AD domain or an LDAP directory allows AD or LDAP users to access the NAS using their own accounts without having to configure user accounts on the NAS.

Note
QTS supports AD running on Windows Server 2003, 2008, 2008 R2, 2012, 2012 R2, and 2016.

Go to **Control Panel** > **Privilege** > **Domain Security** to configure domain security settings.

Option	Description
No domain security (Local users only)	Only local users can access the NAS.
Active Directory authentication (Domain member)	Users can join the NAS to an AD, allowing domain users to be authenticated by the NAS. Local and AD users can access the NAS using Samba, AFP, FTP, and File Station. For details, see Active Directory (AD) Authentication.
LDAP authentication	Users can connect the NAS to an LDAP directory, allowing LDAP users to be authenticated by the NAS. Local and LDAP users can access the NAS using Samba, AFP, FTP, and File Station. For details, see LDAP Authentication.
Set this NAS as a domain controller	Clicking this directs the user to the **Domain Controller** screen. For details, see Domain Controller.

Active Directory (AD) Authentication

Active Directory (AD) is a Microsoft directory service that stores information for users, user groups, and computers for authenticating and managing domain access. Windows environments use AD to store, share, and manage a network's information and resources.

When a NAS is joined to an AD domain, the NAS automatically imports all of the user accounts on the AD server. AD users can then use the same login details to access the NAS.

Configuring AD Authentication Using the Quick Configuration Wizard

1. Go to **Control Panel** > **Privilege** > **Domain Security** .
2. Select **Active Directory authentication (Domain member)**.
3. Click **Quick Configuration Wizard**.
   The **Active Directory Wizard** appears.
4. Click **Next**.
5. Specify the fully qualified domain name (FQDN) of the AD DNS server.
   QTS automatically generates the **NetBIOS domain name**.
6. Specify the IP address of the AD DNS server.
7. Optional: Select **Obtain DNS server address automatically by DHCP server**.
8. Click **Next**.
9. Select a domain controller.
10. Select the server signature rule for the domain.

Option	Description
Auto	SMB signing is offered but not enforced. Clients can choose whether to use SMB signing or not.
Mandatory	SMB signing is required.
Disabled	SMB signing is disabled for SMB 1. For SMB 2 and above, this option behaves the same as **Auto**.

11. Specify the domain administrator username and password.
12. Click **Join**.
    The NAS joins the domain.
13. Click **Finish**.

Configuring AD Authentication Manually

Verify the following before starting this task:

- The time settings of the NAS and the AD server are identical. The maximum time disparity tolerated is 5 minutes.
- The AD server is configured as the primary DNS server. If you use an external DNS server, you will not be able to join the domain.
- You have specified the IP address of the WINS server that you use for name resolution.

1. Go to **Control Panel** > **Privilege** > **Domain Security** .
2. Select **Active Directory authentication (Domain member)**.
3. Click **Manual Configuration**.
   The **Active Directory** window appears.
4. Specify the following information.
   - **Domain NetBIOS Name**
   - **AD Server Name**
   - **Domain**
   - **Domain Administrator Username**

Note
The specified user must have administrator access rights to the AD domain.

   - **Domain Administrator Password**
   - **Organizational Unit (Optional)**
   - **Server description (Optional)**

Note
The NAS Samba service replicates this in the server's **Comment** field. This description appears when connecting to a NAS Samba shared folder using the command line interface.

5. Select the server signature rule for the domain.

Option	Description
Auto	SMB signing is offered but not enforced. Clients can choose whether to use SMB signing or not.
Mandatory	SMB signing is required.
Disabled	SMB signing is disabled for SMB 1. For SMB 2 and above, this option behaves the same as **Auto**.

6. Click **Join**.

AD Server and Domain Names

After joining the NAS to the AD domain, you can use the following username formats to log in to the NAS and access shared folders:

- Local users: `NASname\NASusername`
- AD users: `Domain\DomainUsername`

The location of AD server and domain names depends on the version of Windows Server.

Windows Server Version	Location
2003	Go to **System Properties** in Windows. Example: If the computer name is "node1.qnap-test.com", the AD server name is "node1" and the domain name is "qnap-test.com".
2008	Go to **Control Panel** > **System** in Windows. The AD server name will appear as the computer name, and the domain name can be found in the domain field.
2012, 2016	Right-click , and then click **System**. The AD server name will appear as the computer name, and the domain name can be found in the domain field.

Enabling Trusted Domain Authentication

A trusted domain is a domain that AD trusts to authenticate users. If you join the NAS to an AD domain, all users from trusted domains can log in and access shared folders.

Trusted domains are configured in AD. You can only enable trusted domains on the NAS. By default, this feature is disabled in QTS.

1. Go to **Control Panel** > **Network & File Services** > **Win/Mac/NFS** > **Microsoft Networking** .
2. Click **Advanced Options**.
   The **Advanced Options** window appears.
3. Select **Enable trusted domains**.

Note
This setting is only available if the NAS is joined to a domain.

4. Click **Apply**.
   The **Advanced Options** window closes.
5. Click **Apply**.

LDAP Authentication

A Lightweight Directory Access Protocol (LDAP) directory contains user and user group information stored on an LDAP server. Administrators can use LDAP to manage users in the LDAP directory and connect to multiple NAS devices with the same login details. This feature requires a running LDAP server and knowledge of Linux servers, LDAP servers, and Samba.

Configuring LDAP Authentication

1. Go to **Control Panel** > **Privilege** > **Domain Security** .
2. Select **LDAP authentication**.
3. Select the type of LDAP server.
4. Specify the following information.

LDAP Server Type	Fields	User Action
Remote LDAP server	**LDAP Server Host**	Specify the host name or IP address of the LDAP server.
	LDAP Security	Select the method that the NAS uses to communicate with the LDAP server. • **ldap://**: Use a standard LDAP connection. The default port is 389. • **ldap:// (ldap + TLS)**: Use an encrypted connection with TLS. The default port is 389. Newer versions of LDAP servers normally use this port. • **ldap:// (ldap + SSL)**: Use an encrypted connection with SSL. The default port is 686. Older versions of LDAP servers normally use this port.
	Base DN	Specify the LDAP domain. Example: `dc=mydomain,dc=local`
	Root DN	Specify the LDAP root user. Example: `cn=admin, dc=mydomain,dc=local`
	Password	Specify the root user password.
	Users Base DN	Specify the Organizational unit (OU) where users are stored. Example: `ou=people,dc=mydomain,dc=local`
	Group Base DN	Specify the OU where groups are stored. Example: `ou=group,dc=mydomain,dc=local`
	Current Samba ID	N/A
LDAP server of the remote NAS	**IP address or NAS name**	Specify the server IP address or the name of the NAS.
	LDAP domain	Specify the LDAP domain name.
	Password	Specify the NAS administrator password.
LDAP server of the local NAS	N/A	N/A

LDAP Server Type	Fields	User Action
IBM Lotus Domino	This server type includes the same fields as **Remote LDAP server**, in addition to the following:	
	uidNumber	Specify the uid number. Select **HASH**.
	gidNumber	Specify the gid number. Select **HASH**.

5. Click **Apply**.
   The **LDAP authentication options** window appears.
6. Select which users are allowed to access the NAS.

Note
LDAP authentication options vary depending on when Microsoft Networking is enabled. For details, see LDAP Authentication Options.

7. Click **Finish**.

LDAP Authentication Options

The **LDAP authentication options** vary depending on when Microsoft Networking is enabled.

For details, see Microsoft Networking.

Scenario	Options
Microsoft Networking is enabled before LDAP settings are applied.	• **Local users only**: Only local users can access the NAS using Microsoft Networking. • **LDAP users only**: Only LDAP users can access the NAS using Microsoft Networking.
Microsoft Networking is enabled after the NAS is connected to the LDAP server.	• **Standalone Server**: Only local users can access the NAS using Microsoft Networking. • **LDAP Domain Authentication**: Only LDAP users can access the NAS using Microsoft Networking.

AD and LDAP Management

The administrator can modify domain user accounts and user groups when the NAS joins an AD domain or connects to an LDAP server.

Managing AD and LDAP Users

1. Go to **Privilege** > **Users** .
2. Select **Domain Users**.
   QTS displays the list of domain users.
3. Locate a user.
4. Perform any of the following tasks.

Task	User Action
Edit an account profile	**a.** Under **Action**, click . The **Edit Account Profile** window appears. **b.** Edit the user quota. **Note** User quotas must be enabled for this option to appear. For details, see Enabling Quotas.
Edit shared folder permissions	**a.** Under **Action**, click . The **Edit Shared Folder Permission** window appears. **b.** Edit the user's permissions for each shared folder. For details, see Shared Folder Permissions.
Edit application privileges	**a.** Under **Action**, click . The **Edit Application Privileges** window appears. **b.** Select the applications that the user is allowed to access. **Tip** QNAP recommends denying access to applications and network services that the user does not require. By default, administrator accounts have access to all applications.

Tip

Click to display newly created users on the AD or LDAP server. Permission settings are automatically synchronized with the domain controller.

5. Click **Apply**.

Managing AD and LDAP User Groups

1. Go to **Control Panel** > **Privilege** > **User Groups** .
2. Select **Domain Groups**.
   QTS displays the list of domain user groups.
3. Locate a user group.
4. Perform any of the following tasks.

Task	User Action
View group details	Under **Action**, click . The **View Group Details** window appears. QTS displays the group name and group users.
Edit shared folder permissions	**a.** Under **Action**, click . The **Edit Shared Folder Permission** window appears. **b.** Edit the user group's permissions for each shared folder. For details, see Shared Folder Permissions.

Tip

Click to display newly created groups on the AD or LDAP server. Permission settings are automatically synchronized with the domain controller.

5. Click **Apply**.

Domain Controller

You can configure your QNAP NAS as a domain controller for Microsoft Windows environments. By configuring the NAS as a domain controller, you can store user account information, manage user authentication, and enforce security for a Windows domain.

Enabling a Domain Controller

Important

When the NAS is configured as a domain controller, only domain users can access shared folders through CIFS/SMB (Microsoft Networking). All local NAS users are denied access.

1. Go to **Control Panel** > **Privilege** > **Domain Controller** .
2. Select **Enable Domain Controller**.

Important

The domain controller cannot be enabled if an LDAP server is already running on the NAS.

3. Select the domain controller mode.

Mode	Description
Domain Controller	Only a domain controller can create a domain. The first NAS that creates the domain must be a domain controller. In this mode, the NAS can create and authenticate users.
Additional Domain Controller	If more than one domain controller is needed, you can add additional domain controllers. When the NAS is set as an additional domain controller, it can create and authenticate users.
Read-Only Domain Controller	This configures the NAS as a read-only domain controller to accelerate the user authentication process for specified websites. Read-only domain controllers can authenticate users, but not create domain user accounts.

4. Specify the following information.

Domain Controller Mode	Field	Description
Domain Controller	**Domain**	Specify the domain.
	Administrator Password	Specify an administrator password between 8 and 127 characters that contains at least one of each of the following: • Uppercase characters (A through Z) • Lowercase characters (a through z) • Base 10 digits (0 through 9) • Nonalphanumeric characters: ~!@#$ %^&*_-+=`|\(){}[]:;"'<>,.?/
	Verify Password	Verify the administrator password.
• **Additional Domain Controller** • **Read-Only Domain Controller**	**Domain**	Specify the domain.
	Domain DNS IP	Specify the domain DNS IP.
	Administrator Account	Specify the administrator account name.
	Administrator Password	Specify the administrator password.

5. Select the server signature rule for the domain.

Option	Description
Auto	SMB signing is offered but not enforced. Clients can choose whether to use SMB signing or not.
Mandatory	SMB signing is required.
Disabled	SMB signing is disabled for SMB 1. For SMB 2 and above, this option behaves the same as **Auto**.

6. Click **Apply**.

Resetting a Domain Controller

1. Go to **Control Panel** > **Privilege** > **Domain Controller** .
2. Click **Reset**.
   A dialog box appears.
3. Enter the administrator password.
4. Click **OK**.

Default Domain User Accounts

Domain User Account	Description
Administrator	This account is used to configure settings, create users, and manage the domain. This account cannot be deleted.
Guest	Users without dedicated accounts can use this account to view and modify files.
krbtgt	This is the Key Distribution Center (KDC) service account. The KDC is a domain service that uses the Active Directory (AD) as the account database and the Global Catalog for directing referrals to KDCs in other domains.

Creating a Domain User

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Users** .
2. Click **Create** > **Create a User** .
   The **Create a User** wizard appears.
3. Click **Next**.
4. Specify the following information.

Field	Description
Username	Specify a username between 1 and 20 characters that does not: • Begin with a space • Begin with the following characters: - # @ • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '
Password	Specify a password between 8 and 127 characters that contains at least three of the following: • Uppercase characters (A through Z) • Lowercase characters (a through z) • Base 10 digits (0 through 9) • Nonalphanumeric characters: ~!@#$%^&*_-+=`|\(){}[]:;"'<>,.?/
Description (optional)	Specify a user description that contains a maximum of 1024 ASCII characters.
Email (optional)	Specify an email address that will receive notifications from QTS. For details, see Email Notifications.

5. Click **Next**.
6. Specify the following information.

Setting	Description
User must change the password at first logon	The user must change the password after logging in for the first time.
Account expiration	Set an expiration date for the account. • **Now**: The account expires upon creation. • **Expiry date**: Specify an expiration date for the account.

7. Click **Next**.
8. Assign the account to existing Windows user groups.
9. Click **Next**.
10. Review the summary, and then click **Finish**.

Creating Multiple Domain Users

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Users** .
2. Click **Create** > **Create Multiple Users** .
   The **Create Multiple Users** wizard appears.
3. Click **Next**.
4. Specify the following information.

Field	Description
User Name Prefix	Specify a username prefix between 1 and 16 ASCII characters that does not: • Begin with a space • Begin with the following characters: - # @ • Contain the following characters: " + = / \ : | * ? < > ; [ ] % `' This prefix will be included before all usernames.
User Name Start No	Specify a starting number up to 8 digits in length. **Note** QTS removes leading zeros in starting numbers. For example, `001` becomes `1`.
Number of Users	Specify a number between 1 and 4095. This number signifies the number of accounts that will be created.
Password	Specify a password between 8 and 127 characters that contains at least three of the following: • Uppercase characters (A through Z) • Lowercase characters (a through z) • Base 10 digits (0 through 9) • Nonalphanumeric characters: ~!@#$%^&*_-+=`|\(){}[]:;"'<>,.?/
User must change the password at first logon	The user must change the password after logging in for the first time.
Account expiration	Set an expiration date for the account. • **Now**: The account expires upon creation. • **Expiry date**: Specify an expiration date for the account.

5. Click **Create**.
   QTS creates the accounts and adds them to the list of domain users.
6. Click **Finish**.

Domain User Account Lists

User accounts can also be imported directly from TXT or CSV files. The files contain user account information including usernames, passwords, descriptions, and email addresses.

File Format	Description
TXT	Create domain user account lists using a text editor. For details, see Creating a TXT Domain User File.
CSV	Create domain user account lists using a spreadsheet editor. For details, see Creating a CSV Domain User File.

Creating a TXT Domain User File

1. Create a new file in a text editor.
2. Specify domain user information in the following format.
   `Username,Password,Description,Email`

Important

- Separate values using commas.
- Ensure that the password meets the requirements for domain user accounts. For details, see Creating a Domain User.
- Specify information for only one user on each line.
  Example:
  ```
  John,s8fK4br*,John's account,john@qnap.com
  Jane,9fjwbXy#,Jane's account,jane@qnap.com
  Mary,f9xn3nS%,Mary's account,mary@qnap.com
  ```

3. Save the list as a TXT file.

Important
If the list contains multi-byte characters, save the file with UTF-8 encoding.

Creating a CSV Domain User File

1. Create a new workbook in a spreadsheet editor.
2. Specify domain user information in the following format.
   - column A: `Username`
   - column B: `Password`
   - column C: `Description`
   - column D: `Email`

Important

- Ensure that the password meets the requirements for domain user accounts. For details, see Creating a Domain User.
- Specify information for only one user in each row.
  Example:

	A	B	C	D
1	John	s8fK4b*	John's account	john@qnap.com
2	Jane	9fjwbX#	Jane's account	jane@qnap.com
3	Mary	f9xn3nS%	Mary's account	mary@qnap.com

3. Save the workbook as a CSV file.

Important
If the list contains multi-byte characters, open the file using a text editor and then save with UTF-8 encoding.

Batch Importing Domain Users

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Users** .
2. Click **Create** > **Batch Import Users** .
   The **Batch Import Users** wizard appears.
3. Optional: Select **Overwrite existing users**.

Important
When selected, QTS overwrites existing domain user accounts that have duplicates on the imported domain user account list.

4. Click **Browse**, and then select the file that contains the domain user account list.

Important
Ensure that you are importing a valid QTS domain user account list file to avoid parsing errors.

   For details, see Domain User Account Lists.

5. Click **Next**.
   The **File content preview** screen appears.

Important
Ensure that the file contents are valid. If any information is invalid, the domain user account list cannot be imported.

6. Click **Import**.
   QTS imports the domain user account list.
7. Click **Finish**.

Modifying Domain User Account Information

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Users** .
2. Locate a user.
3. Perform any of the following tasks.

Task	User Action
Change password	**a.** Under **Action**, click . The **Change Password** window appears. **b.** Specify a password that meets the requirements. **c.** Verify the password. **d.** Click **Change**.
Edit user properties	**a.** Under **Action**, click . The **Edit User Properties** window appears. **b.** Edit the user properties. For details, see Creating a Domain User. **c.** Click **Finish**.
Edit user group membership	**a.** Under **Action**, click . The **Edit User Groups** wizard appears. **b.** Select or deselect user groups. For details, see Domain User Groups. **c.** Click **Next**. **d.** Review the summary, and then click **Finish**.
Edit user profile	**a.** Under **Action**, click . The **Edit User Profile** window appears. **b.** Specify the following: • **Profile path** Specify the shared folder where the roaming profiles are stored. • **Login script** Specify the login script that executes when a domain user logs in from a computer member of the domain. To directly specify the script filename, connect to **\NAS\netlogon** using the domain administrator account and copy the script to the **/sysvol** shared folder in the **\scripts** folder of your domain. • **Home Folder** Specify the drive and shared folder that is mapped to the drive when the domain user logs in to the domain. • Click **Finish**.

Tip
You can also edit quota settings for domain users. For details, see Editing Quota Settings.

Deleting Domain Users

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Users** .
2. Select the domain users to delete.

Note
The administrator account cannot be deleted.

3. Click **Delete**.
   A warning message appears.
4. Click **Yes**.

Domain User Groups

A domain user group is a collection of domain users with the same access rights to files and folders. Domain administrators can create domain user groups to improve security for domain users.

Default Domain User Groups

- Allowed RODC Password Replication Group
- Certificate Service DCOM Access
- Denied RODC Password Replication Group
- Enterprise Read-Only Domain Controllers
- Incoming Forest Trust Builders
- Network Configuration Operators
- Pre-Windows 2000 Compatible Access
- Read-Only Domain Controllers
- Terminal Server License Servers
- Windows Authorization Access Group

Creating a Domain User Group

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Groups** .
2. Click **Create a User Group**.
   The **Create a User Group** wizard appears.
3. Specify a user group name between 1 and 128 ASCII characters that does not begin with:
   - Spaces
   - The following characters: - # @
4. Click **Next**.
5. Optional: Add users to the group.
   a. Select **Yes**.
   b. Click **Next**.
   c. Select the users you want to add to the group.
   d. Click **Next**.

6. Review the summary, and then click **Finish**.

Editing Domain User Groups

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Groups** .
2. Locate a domain user group.
3. Under **Action**, click .
   The **Edit Group Users** wizard appears.
4. Select or deselect user groups.
5. Click **Next**.
6. Review the summary, and then click **Finish**.

Deleting Domain User Groups

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Groups** .
2. Select the user groups to delete.

Note
Some default user groups cannot be deleted.

Important
Do not delete the default group of the domain.

3. Click **Delete**.
   A warning message appears.
4. Click **Yes**.

Computers

The **Computers** screen displays the computer accounts for computers or NAS devices that have joined the domain. Computer accounts are created automatically when a computer or NAS joins the domain.

Creating a Computer Account

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Computers** .
2. Click **Create a Computer**.
   The **Create a Computer** wizard appears.
3. Specify the following information.

Field	Description
Computer name	Specify a computer name between 1 and 15 ASCII characters that include any of the following: • Uppercase characters (A through Z) • Lowercase characters (a through z) • Base 10 digits (0 through 9) • Dashes (-)
Description	Specify a user description that contains a maximum of 1024 ASCII characters.
Location	Specify the location of the computer using a maximum of 1024 ASCII characters.

4. Click **Next**.
5. Assign the account to existing Windows user groups.
6. Click **Next**.
7. Review the summary, and then click **Create**.

Modifying Computer Account Information

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Computers** .
2. Locate a computer account.
3. Perform any of the following tasks.

Task	User Action
Edit computer properties	**a.** Under **Action**, click . The **Edit computer properties** window appears. **b.** Edit the **Description** or **Location**. For details, see Creating a Computer Account.
Edit user group membership	**a.** Under **Action**, click . The **Edit User Groups** window appears. **b.** Select or deselect user groups. For details, see Domain User Groups. **c.** Click **Next**.

4. Click **Finish**.

Editing Computer Account Shared Folder Permissions

1. Go to **Control Panel** > **Privilege** > **Computers** .
2. Locate a computer account.
3. Under **Action**, click .

The **Edit Shared Folder Permission** window appears.

4. Edit the computer account's permissions for each shared folder.
   For details, see Shared Folder Permissions.
5. Click **Apply**.

Deleting Computer Accounts

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Computers** .
2. Select the accounts to delete.

> **Note**
> The host computer account cannot be deleted.

3. Click **Delete**.
   A warning message appears.
4. Click **Yes**.

DNS

The Domain Name System (DNS) helps the domain controller locate services and devices within the domain using service and resource records. Two DNS zones are created by default: the domain created when setting up the NAS as a domain controller, and a zone called "_msdcs". System administrators can modify DNS settings and add or delete domains and records.

Modifying DNS Settings

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **DNS** .
2. Log in under the domain administrator account.

> **Note**
> This is the account created when enabling the domain controller.

   a. Specify the following information.

Field	Description
Account	Enter `administrator`.
Password	Enter the password specified when the account was created.

   b. Click **Login**.

3. Under **DNS Settings**, select a domain.
   A list of records appears.
4. Select a record.
   The properties panel appears.
5. Modify any of the following.

Field	Description
Name	Edit the name of the record.

Field	Description
Type	Select the type of record.

6. Modify the values.

Task	User Action
Add a value	**a.** Specify a value. **b.** Click . The value is added to the list.
Move a value up	**a.** Select a value from the list. **b.** Click . The value moves up in the list.
Move a value down	**a.** Select a value from the list. **b.** Click . The value moves down in the list.
Remove a value	**a.** Select a value from the list. **b.** Click . The value is removed from the list.

7. Click **Apply**.

Adding Domains

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **DNS** .
2. Log in under the domain administrator account.

Note
This is the account created when enabling the domain controller.

   a. Specify the following information.

Field	Description
Account	Enter `administrator`.
Password	Enter the password specified when the account was created.

   b. Click **Login**.

3. Click **Action** > **Add Domain** .
   The **Add New Domain** window appears.
4. Enter the domain name.
5. Click **Create**.

Adding Records

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **DNS** .
2. Log in under the domain administrator account.

Note
This is the account created when enabling the domain controller.

   a. Specify the following information.

Field	Description
Account	Enter `administrator`.
Password	Enter the password specified when the account was created.

   b. Click **Login**.

3. Select a domain or record.
4. Click **Action** > **Add Record** .
   The **Add New Record** window appears.
5. Specify the following information.

Field	Description
Record Name	Specify the name of the record.
Type	Select the type of record.
Value	Specify the value.

6. Click **Create**.

Deleting Domains or Records

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **DNS** .
2. Log in under the domain administrator account.

Note
This is the account created when enabling the domain controller.

   a. Specify the following information.

Field	Description
Account	Enter `administrator`.
Password	Enter the password specified when the account was created.

   b. Click **Login**.

3. Select a domain or record to delete.
4. Click **Action** > **Delete** .
   A warning message appears.

5. Click **Yes**.

Back Up/Restore

Users can back up or restore domain controller settings. Only the primary domain controller needs to be backed up; backing up the primary domain controller also backs up any additional or read-only domain controllers. When restoring a domain controller, there are some restrictions and limitations if the domain controller is in an AD environment with more than one domain controller. For details, see Restoring Domain Controllers.

Backing Up Domain Controllers

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Backup/Restore** .
2. Under **Back up ADDC Database**, select **Back up Database**.
3. Specify the following information.

Option	Description
Backup frequency	Select how often the Active Directory Domain Controller (ADDC) database is backed up.
Start Time	Select when the backup will begin.
Destination folder	Select the NAS folder where the backup will be stored.
Backup Options	Select one of the following: • **Overwrite existing backup file (dc_backup.exp)** • **Create a new file for each backup and append the date to the filename (dc_backupyyyy_mm_dd_exp)**

4. Click **Apply**.

Restoring Domain Controllers

Important
Restoring a domain controller overwrites all user, user group, and domain controller settings. Any changes made after the backup file was created will be lost.

Warning
Restoring a domain controller in a multiple-controller environment from a backup file will corrupt the domain controller database. Instead, re-add the NAS as a domain controller, and it will synchronize with the existing controller.

1. Go to **Control Panel** > **Privilege** > **Domain Controller** > **Backup/Restore** .
2. Under **Restore ADDC Database**, click **Browse**.
3. Locate a domain controller backup file.
4. Click **Import**.

5. Network & File Services

Network Access

Service Binding

NAS services run on all available network interfaces by default. Service binding enables you to bind services to specific network interfaces to increase security. You can bind services to one or more specific wired or wireless network interfaces.

Important
Configuring service binding does not affect users currently connected to the NAS. When users reconnect they will only be able to access the configured services using the specified network interfaces.

Configuring Service Binding

1. Go to **Control Panel** > **Network & File Services** > **Network Access** > **Service Binding** .
2. Select **Enable Service Binding**.
   A list of available services and interfaces is displayed.
3. Bind services to interfaces.

Important

- By default, QTS services are available on all network interfaces.
- Services must be bound to at least one interface.

Tip
Click **Use Default Value** to bind all services.

   a. Identify a service.

   b. Deselect interfaces not bound to the service.

4. Click **Apply**.

Proxy

A proxy server acts as an intermediary between the NAS and the internet. When enabled, QTS will route internet requests through the specified proxy server.

Configuring the Proxy Server Settings

1. Go to **Control Panel** > **Network & File Services** > **Network Access** > **Proxy** .
2. Select **Use a proxy server**.
3. Specify the proxy server URL or IP address.
4. Specify a port number.
5. Optional: Configure proxy authentication.

a. Select **Authentication**.

b. Specify a username.

c. Specify a password.

6. Click **Apply**.

Service Ports

QNAP uses designated ports for communication. These ports are assigned to a specific service and users must manually open the required ports by adding the port number.

Note
The port for the enabled service should remain open while configuring the firewall, or while setting up the router for port forwarding or UPnP.

Service Name	Default Port Number
Apple Filing Protocol (AFP)	548
BitTorrent	6681 - 6999
FTP/FTPES	20, 21
Passive FTP	55536 - 56559
LDAP server	389
MySQL database system	3306
NAS web	8080
NAS web (HTTPS)	443
NetBIOS/ Samba	137, 138, 139, 445
Network File System (NFS)	2049, 111, dynamic ports
QVPN (OpenVPN)	1194
QVPN (PPTP server)	1723
QVPN (L2TP/IPSec server)	500, 4500, 1701
QVPN (QBelt server)	443
RADIUS authentication	1645, 1812
RADIUS accounting	1646, 1813
rsync	873
Real-time Remote Replication (RTRR)	8899
Secure Shell (SSH)/SSH File Transfer Protocol (SFTP) server	22
Simple Mail Transfer Protocol (SMTP)	25
Simple Network Management Protocol (SNMP)	161
Syslog	514
Telnet	13131
Trivial File Transfer Protocol (TFTP)	69
TwonkyMedia server (TMS)	9000
Virtualization Station	8088
Virtualization Station (HTTPS)	8089
Web server (HTTP, HTTPS)	80, 8081

Win/Mac/NFS

Microsoft Networking

Microsoft Networking referes to Samba, a network protocol that allows data to be accessed over a computer network and provides file and print services to Windows clients.

Configuring Microsoft Networking

1. Go to **Control Panel** > **Network & File Services** > **Win/Mac/NFS** > **Microsoft Networking** .
2. Select **Enable file service for Microsoft networking**.
3. Configure Microsoft networking settings.

Setting	User Action
Server description (Optional)	Specify a description that contains a maximum of 256 characters. The description must enable users to easily identify the NAS on a Microsoft network.
Workgroup	Specify a workgroup name that contains 1 to 15 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Multi-byte characters: Chinese, Japanese, Korean, and Russian • Special characters: ~ ! @ # $ ^ & ( ) - _ { } . '

4. Select an authentication method.

Option	Description
Standalone server	QTS uses the local user account information for authentication.
AD domain member	QTS uses Microsoft Active Directory (AD) for authentication.
LDAP domain authentication	QTS uses an LDAP directory for authentication.

5. Configure the advanced settings.
   a. Click **Advanced Options**.
      The **Advanced Options** window opens.
   b. Configure the advanced settings.
   c. Configure any of the following settings.

Option	User Action
Enable WINS server	Select this option to run a WINS server on the NAS.
Use the specified WINS server	Select this option to specify a WINS server IP address that QTS will use for name resolution.

Option	User Action
Local master browser	Select this option to use the NAS as a local master browser. A local master browser is responsible for maintaining the list of devices in a specific workgroup on a Microsoft network. **Important** To use the NAS as local master browser, specify the workgroup name when configuring Microsoft networking. The default workgroup in Windows is "workgroup".
Allow only NTLMSSP authentication	Select this option to authenticate clients using only NT LAN Manager Security Support Provider. When this option is deselected, QTS uses NT LAN Manager (NTLM).
Name resolve priority	Select a name service to use for name resolution. The default service is **DNS only**. If a WINS server is specified, **Try WINS then DNS** is selected by default.
Atlernative login Style	Select this option to change how usernames are structured when accessing FTP, AFP, or File Station services. After selecting this option, users can access NAS services using Domain\Username, instead of Domain+Username.
Automatically register in DNS	Select this option to register the NAS on the DNS server. If the NAS IP address changes, the NAS automatically updates the IP address on the DNS server. This option is only available if AD authentication is enabled.
Enable trusted domains	Select this option to join users from trusted AD domains. This option is only available if AD authentication is enabled.
Enable Asynchronous I/O	Select this option to improve the Samba performance using asynchronous I/O. Asynchronous I/O refers to the I/O behavior on the CIFS protocol layer. This is different from the synchronous I/O feature found in the shared folder settings, which only applies to specific shared folders on the file system level. **Tip** To prevent power interruption, use a UPS when asynchronous I/O is enabled.
Enable WS-Discovery to help SMB clients discover the NAS.	Select this option to enable Web Services Dynamic Discovery (WS-Discovery). WS-Discovery makes the NAS visible in File Explorer on Windows 10 computers.
Highest SMB version	Select the highest SMB protocol version used in your networking operation. Use the default SMB version if you are unsure about this setting. **Note** Selecting SMB3 will also include SMB3.1 and SMB3.1.1.

Option	User Action
Lowest SMB version	Select the lowest SMB protocol version used in your networking operation. Use the default SMB version if you are unsure about this setting. **Note** Selecting SMB3 will also include SMB3.1 and SMB3.1.1.
Allow Symbolic links within a shared folder	Select this option to allow symbolic links within shared folders. **Important** You must enable this setting in order to restore files from snapshots on Windows using Windows Previous Versions. For details, see Snapshot Data Recovery.
Allow Symbolic links between different shared folders	Select this option to allow symbolic links between shared folders. **Note** This setting requires **Allow Symbolic links within a shared folder** to be selected first.
Restrict anonymous users from accessing SMB shared folders	Select this option to require users to log in before accessing SMB shared folders. **Note** This setting will be locked to **Enabled (strict)** if ABSE is enabled on any shared folder.
Veto files	This option enables you to hide files from users accessing the NAS via SMB. Files are hidden if their filename matches a pattern in the veto criteria file.
Veto criteria	Specify filename criteria for hiding files from SMB NAS users. **Note** This option is only available when **Veto files** is selected.

   d. Click **Apply**.
   The **Advanced Options** window closes.

6. Click **Apply**.

Apple Networking

The Apple Filing Protocol (AFP) is a file service protocol that allows data to be accessed from a macOS device.

Configuring Apple Networking

1. Go to **Control Panel** > **Network & File Services** > **Win/Mac/NFS** > **Apple Networking** .
2. Select **Enable AFP (Apple Filing Protocol)**.
3. Optional: Select **DHX2 authentication support**.
4. Click **Apply**.

NFS Service

Network File System (NFS) is a file system protocol that allows data to be accessed over a computer network. Enabling the NFS service allows Linux and FreeBSD users to connect to the NAS.

Enabling the NFS Service

1. Go to **Control Panel** > **Network & File Services** > **Win/Mac/NFS** > **NFS Service** .
2. Enable NFS Service.
   a. Optional: Click **Enable NFS v2/v3 Service**.
   b. Optional: Click **Enable NFS v4 Service**.
3. Click **Apply**.

Telnet/SSH

Telnet is a network protocol used to provide a command line interface for communicating with the NAS.

Secure Shell (SSH) is a network protocol used for securely accessing network services over an unsecured network. Enabling SSH allows users to connect to the NAS using an SSH-encrypted connection or a SSH client such as PuTTY.

SSH File Transfer Protocol (SFTP) is a secure network protocol that works with SSH connections to transfer files and navigate through the QTS filesystem. SFTP can be enabled after allowing SSH connections on the NAS.

Configuring Telnet Connections

Important
Only administrator accounts can access the NAS through Telnet.

1. Go to **Control Panel** > **Network & File Services** > **Telnet/SSH** .
2. Select **Allow Telnet connection**.
3. Specify a port number.
   Port numbers range from 1 to 65535.

Tip
The default Telnet port is 13131.

4. Click **Apply**.

Configuring SSH Connections

Important
Only administrator accounts can access the NAS through SSH.

1. Go to **Control Panel** > **Network & File Services** > **Telnet/SSH** .
2. Select **Allow SSH connection**.
3. Specify a port number.
   Port numbers range from 1 to 65535.

Tip
The default SSH port is 22.

4. Optional: Select **Enable SFTP**.
5. Click **Apply**.

Editing SSH Access Permissions

1. Go to **Control Panel** > **Network & File Services** > **Telnet/SSH** .
2. Click **Edit Access Permission**.
   The **Edit Access Permission** window opens.
3. Select user accounts to give access permissions.

Important
Only administrator accounts can log in using an SSH connection.

4. Click **Apply**.

SNMP

The Simple Network Management Protocol (SNMP) is used to collect and organize information about managed devices on a network. Enabling the QTS SNMP service allows for the immediate reporting of NAS events, such as warnings or errors, to a Network Management Station (NMS).

Configuring SNMP Settings

1. Go to **Control Panel** > **Network & File Services** > **SNMP** .
2. Select **Enable SNMP Service**.
3. Configure the SNMP settings.

Setting	User Action
Port number	Specify the port that the Network Management Station (NMS) will use to connect to QTS.
SNMP Trap Level	Select the type of alert messages that the NAS will send to the NMS. • **Information**: QTS sends information regarding ongoing or scheduled NAS operations. • **Warning**: QTS sends alerts when NAS resources are critically low or the hardware behaves abnormally. • **Error**: QTS sends alerts failing to enable or update NAS features or applications.
Trap Address	Specify the IP addresses of the NMS. You can specify a maximum of 3 trap addresses.

4. Select the SNMP version that the NMS uses.

Option	User Action
SNMP V1/V2	Specify an SNMP community name that contains 1 to 64 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 The SNMP community string functions as a password that is used to authenticate messages sent between the NMS and the NAS. Every packet that is transmitted between the NMS and the SNMP agent includes the community string.
SNMP V3	Specify the username, authentication protocol and password, and privacy protocol and password. **a.** Specify a username. **Note** The username should contain 1 to 32 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Multi-byte characters: Chinese, Japanese, Korean, and Russian • Special characters: All except " ' / \ **b.** Optional: Select **Use Authentication**. **1.** Specify the authentication protocol. **Tip** You can select either **HMAC-MD5** or **HMAC-SHA**. If you are unsure about this setting, QNAP recommends selecting **HMAC-SHA**. **2.** Specify an authentication password that contains 8 to 64 ASCII characters. **c.** Optional: Select **Use Privacy**. **1.** Specify a privacy password that contains 8 to 64 ASCII characters.

5. Click **Apply**.

SNMP Management Information Base (MIB)

The Management Information Base (MIB) is a type of database in ASCII text format that is used to manage the NAS in the SNMP network. The SNMP manager uses the MIB to determine the NAS status or understand the messages that the NAS sends within the network. You can download the MIB and then view the contents using any word processor or text editor.

Important
MIBs describe the structure of the management data of a device subsystem. They use a hierarchical namespace containing object identifiers (OID). Each OID identifies a variable that you can read or set using SNMP. You must assign the correct OID to retrieve the NAS information. The default OID for QNAP NAS devices is 1.3.6.1.4.1.24681.2.

Downloading the SNMP MIB

1. Go to **Control Panel** > **Network & File Services** > **SNMP** .
2. Under **SNMP MIB**, click **Download**.
   QTS downloads the NAS.mib file on your computer.

Service Discovery

UPnP Discovery Service

Universal Plug and Play (UPnP) is a networking technology that enables the discovery of networked devices connected to the same network. After enabling this service, devices supporting UPnP can discover the NAS.

Enabling the UPnP Discovery Service

1. Go to **Control Panel** > **Network & File Services** > **Service Discovery** > **UPnP Discovery Service** .
2. Select **Enable UPnP Discovery Service**.
3. Click **Apply**.

Bonjour

Bonjour is a networking technology developed by Apple that enable devices on the same local area network to discover and communicate with each other.

Enabling Bonjour

1. Go to **Control Panel** > **Network & File Services** > **Service Discovery** > **Bonjour** .
2. Select **Enable Bonjour Service**.
3. Select the services to be advertised by Bonjour.

Important
You must enable the services in QTS before advertising them with Bonjour.

4. Click **Apply**.

Network Recycle Bin

The Network Recycle Bin contains files deleted from the NAS through File Station, QuFTP, or by clients connected using Microsoft networking.

Configuring the Network Recycle Bin

1. Go to **Control Panel** > **Network & File Services** > **Network Recycle Bin** .
2. Select **Enable Network Recycle Bin**.

3. Optional: Configure the Network Recycle Bin settings.

Setting	Description
File retention time	Specify the number of days files are retained. The **Daily check time** controls when recycled files are checked against the retention time. **Tip** This field supports a maximum of 9999 days. The default is 180 days.
Exclude these file extensions	Specify which file extensions are excluded from the Network Recycle Bin. **Important** File types are case insensitive and must be separated by a comma.

4. Click **Apply**.

Deleting All Files in the Network Recycle Bin

1. Go to **Control Panel** > **Network & File Services** > **Network Recycle Bin** .
2. Click **Empty All Network Recycle Bin**.
   A warning message appears.
3. Click **OK**.
   QTS deletes all files from the Network Recycle Bin.

Restricting Access to the Network Recycle Bin

1. Go to **Control Panel** > **Privilege** > **Shared Folders** .
2. Identify a shared folder.
3. Under **Actions**, click .
   The **Edit Properties** window appears.
4. Select **Enable Network Recycle Bin**.
5. Select **Restrict the access to Recycle Bin to administrators only for now**.
6. Click **OK**.

6. File Station

Overview

About File Station

File Station is a QTS file management application that allows you to access files on the NAS. You can quickly locate files and folders, manage access permissions, play media files, and share data with other users.

System Requirements

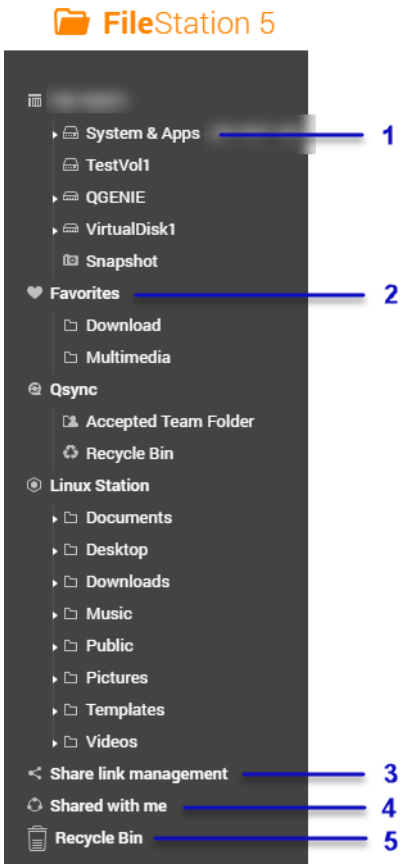
Category	Detail
Web browser	• Microsoft Internet Explorer 9 or later • Microsoft Edge • Mozilla Firefox 3.6 or later • Apple Safari 5 or later • Google Chrome
Java program	Java Runtime Environment (JRE) 7 or later
Flash player	Adobe Flash Player 9 or later is required for viewing media files.

Supported File Formats

Category	File Extension
Image	• BMP • JPG • JPE • PNG • TGA • GIF • HEIC **Note** To view this image format, you must install CAYIN MediaSign Player, and its Plus license must be activated. The NAS must also update to QTS version 4.4.3 or later or QuTS hero version 4.5.1. • HEIF **Note** To view this image format, you must install CAYIN MediaSign Player, and its Plus license must be activated. The NAS must also update to QTS version 4.4.3 or later or QuTS hero version 4.5.1 or later.
Music	• MP3 • FLAC • OGG • WAV • AIF • AIFF
Video	• AVI • MP4

Parts of the User Interface

Left Panel



Label	UI Element	Description
1	Volume	Displays all the folders on the volume, including shared folders. Default shared folders vary depending on the NAS model.
2	Favorites	Displays bookmarked folders.
3	Share link management	Displays links to NAS files shared by the current user account. **Note** Administrators see links shared by all NAS users.
4	Shared with me	Displays files and folders shared with the current user account.
5	Recycle Bin	Displays deleted files and folders.

Depending on your setup, the following folders may also appear on the list.

Folder	Description
Snapshot	Displays the saved snapshots.

Folder	Description
Local folders	Displays the local folders on a Windows computer. **Important** To view local folders from File Station, you must first install Java Runtime Environment.
Qsync	Displays files, folders, and team folders from Qsync.
SMB shared folder	Displays files and folders from a shared folder mounted through SMB protocol. **Note** To view the folder name, connection name, and the file protocol, hover your cursor over an SMB shared folder.
NFS shared folder	Displays files and folders from a shared folder mounted through NFS protocol. **Note** To view the folder name, connection name, and the file protocol, hover your cursor over an NFS shared folder.
File Cloud Gateway shared folder	Displays files and folders from a shared folder mounted through a File Cloud Gateway connection via HybridMount.

Depending on your setup, the following mounts created in HybridMount may also appear on the list.

Mount	Description
CIFS/SMB	Displays a list of connections mounted through CIFS/SMB protocol.
NFS	Displays a list of connections mounted through NFS protocol.
FTP	Displays a list of connections mounted through FTP protocol.
WevDAV	Displays a list of connections mounted through a local network or over the internet.
Cloud services	Displays connections mounted through a cloud service. **Note** To view the folder name, connection name, and the cloud provider, hover your cursor over the cloud mount.

Left Panel Tasks

You can perform the following tasks for a volume on the left panel.

Tip
To see the task options, hover the mouse point over a volume and then click ⋮.

Task	Description
Create a shared folder	Click to create a shared folder. For details, see Creating a Shared Folder.
Open Snapshot Manager	Click to open Snapshot Manager. For details, see the Snapshots section of the QTS User Guide.

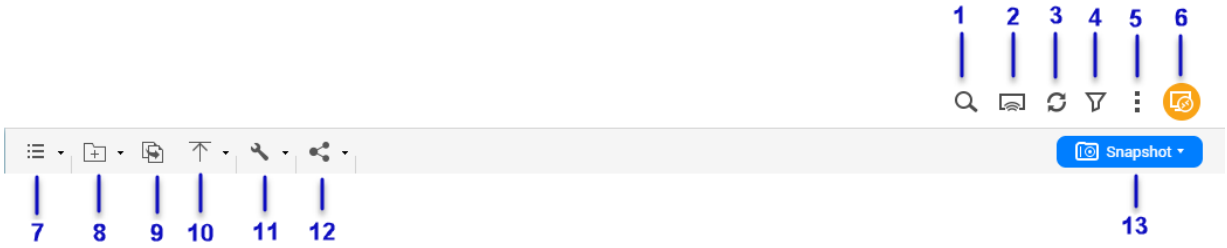
Task	Description
Lock/Unlock the volume	Click to lock or unlock an encrypted volume in Storage & Snapshots.

Volume Icons

Depending on your NAS model and environment, the following icons may appear beside each available volume.

Icon	Name	Description
	On Demand Tiering	This icon appears when auto tiering is enabled on the volume.
	Snapshots	This icon appears when snapshots are available for the volume. For details, go to the Snapshot section of the QTS User Guide.
	Cache Acceleration	This icon appears when acceleration is enabled on the volume.
	Volume Encryption	This icon appears when the volume is encrypted.
	Volume Synchronization	This icon appears when the cloud volume is synchronizing data.

Toolbar



Label	Item	Description
1	Search	Search files and folders by their name or type. **Tip** You can select **Advanced Search** to specify more criteria.
2	Network Media Player	Stream videos, photos, and music to compatible devices on your network.
3	Refresh	Refresh the current page.
4	Smart Filter	Filter files and folders based on the specified criteria.
5	More Settings	Configure File Station settings, open the Help guide, or view application information.
6	Remote Mount	Manage files across local, external, remote, and cloud storage resources on a single interface. To use this feature, install HybridMount from App Center. For more information on HybridMount, go to the QNAP website.

Label	Item	Description
7	Browsing Mode	Select a browsing mode.
8	Create folder	Create a folder, shared folder, snapshot shared folder, or share a space with another NAS user.
9	Copy	Copy the selected files and folders. **Note** This button only appears when a file or folder is selected.
10	Upload	Upload files or folders to the selected shared folder.
11	More Actions	Perform different tasks. **Note** Some task options only appear when you select certain types of files.
12	Share	Share the selected files and folders. **Note** This button only appears when a file or folder is selected.
13	Snapshot	Open Snapshot Manager or view the Snapshot Manager quick tutorial.

Settings

Modifying General Settings

1. Click ⋮ on the top-right corner.
2. Select **Settings**.
   The **Options** window appears.
3. Select **General**.
4. Modify the following settings.

Option	Description
Show hidden files on NAS	File Station displays files and folders.
Allow all users to create shared links	All users can share data from the NAS using shared links.
Show Network Recycle Bin(s)	File Station displays the `@Recycle` folder in all user folders.
Only allow the admin and administrators group to use "Share to NAS user"	File Station prevents non-administrators from sharing files with other NAS users.
Only allow the admin and administrators group to permanently delete files	File Station prevents non-administrators from permanently deleting files.
Only allow the admin and administrators group to use on-the-fly transcode	File Station prevents non-administrators from using on-the-fly transcoding.
Track file and folder access	File Station allows users to track file or folder access and view and information in System Connection Logs.

5. Click **Close**.

Modifying File Transfer Settings

1. Click ⋮ on the top-right corner.
2. Select **Settings**.
   The **Options** window appears.
3. Select **File Transfer**.
4. Under **Duplicate File Name Policy**, specify policies for handling duplicate files.

Scenario	Policy
When uploading files	• **Always ask me** • **Rename duplicate files** • **Skip duplicate files** • **Overwrite duplicate files**
When copying or moving files	• **Always ask me** • **Rename duplicate files** • **Skip duplicate files** • **Overwrite duplicate files**

5. Optional: Select **Always merge all file transfer processes into one task**.
6. Under **Google Drive File Transfer Policy**, specify policies for handling Google Drive files.

Scenario	Policy
When downloading or moving Google Drive files	• Always ask me • Download as Microsoft Office file formats (.docx, .pptx, .xlsx) • Keep Google Drive file formats
When downloading a single Google Drive file to my PC	• Always ask me • Download as Microsoft Office file formats (.docx, .pptx, .xlsx) • Keep Google Drive file formats

7. Click **Apply**.
8. Click **Close**.

Modifying Multimedia Settings

1. Open File Station.
2. Click ⋮ on the toolbar.

3. Select **Settings**.
   The **Options** window appears.
4. Select **Multimedia**.
5. Modify the following settings.

Option	Description
Support multimedia playback and thumbnail display	File Station allows multimedia playback and displays thumbnails for media files.
Always display the 360° panoramic view button on the viewer	File Station permanently displays the 360° panoramic view button without checking the file metadata.

6. Click **Close**.

Modifying Document Settings

1. Click ⋮ on the top-right corner.
2. Select **Settings**.
   The **Options** window appears.
3. Select **Documents**.
4. Under **Microsoft Office File Policy**, specify policies for handling Microsoft Office files.

File Format	Policy
For .doc, .ppt, .xls files	• Always ask me • View in Google docs • Open with Chrome Extension • Open with web browser
For .docx, .pptx, .xlsx files	• Always ask me • Edit with Office Online • View in Google docs • Open with Chrome Extension • Open with web browser

5. Click **Apply**.
6. Click **Close**.

Modifying Third-party Service Settings

You can convert Apple iWork file formats to Microsoft Office file formats using CloudConvert. The converted files will be stored in the same folder with source files.

1. Click ⋮ on the top-right corner.

2. Select **Settings**.
   The **Options** window appears.
3. Select **Third-party Service**.
4. Acquire your CloudConvert API key.

Tip
For details, see the tutorial: https://www.qnap.com/en/how-to/faq/article/how-to-get-an-api-key-from-cloudconvert

5. Paste your CloudConvert API key.
6. Click **Apply**.

File Operations

File Station enables you to perform the following tasks.

Operation	Task
Store	• Uploading a File
Access	• Downloading a File • Opening a File • Opening Microsoft Word, Excel, and PowerPoint Files Using the Chrome Extension • Opening a Text File Using Text Editor • Viewing a File in Google Docs • Viewing a File in Microsoft Office Online • Opening Image Files Using Image2PDF • Viewing File Properties • Modifying File Permissions
Organize	• Sorting Files • Copying a File • Moving a File • Renaming a File • Deleting a File • Restoring a Deleted File • Mounting an ISO File • Unmounting an ISO File • Compressing a File • Extracting Compressed Files or Folders

Operation	Task
Share	• Sharing a File or Folder by Email • Sharing a File or Folder on a Social Network • Sharing a File or Folder Using Share Links • Sharing a File or Folder with a NAS User
Play	• Playing an Audio File • Playing a Video File • Playing a Video File Using CAYIN MediaSign Player • Opening a 360-degree Image or Video File • Streaming to a Network Media Player
Transcode	• Adding a File to the Transcoding Folder • Canceling or Deleting Transcoding • Viewing Transcode Information

Uploading a File

1. Open File Station.
2. Perform one of the following actions.

Action	Steps
Use the toolbar	a. Click and then select **File**. The **File Upload** window opens. b. Select the file and then click **Open**.
Use drag and drop	a. Locate the file on your computer. b. Drag and drop the file to the File Station window.

A confirmation message appears.

3. Select one of the following policies for handling duplicate files.

Option	Description
Rename duplicate files	Upload and rename a file if another file with the same name and extension already exists in the destination folder.
Skip duplicate files	Do not upload a file if another file with the same file name and extension already exists in the destination folder.
Overwrite duplicate files	Upload the file and then overwrite an existing file with the same name and extension in the destination folder.

Tip

> You can set the selected option as the default policy. File Station will not ask again after remembering the setting. You can still change the policy in **File Station** > **More Settings** > **Settings** > **File Transfer** .

4. Click **OK**.
   File Station uploads the file.

Downloading a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Download**. **d.** Click **OK**.
Use the context menu	Right-click the file and then click **Download**.

Depending on your browser, a confirmation message appears before the file is downloaded to your computer.

Opening a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Open**.
Use the context menu	Right-click and then select **Open**.

Action	Steps

Open the file directly	Double-click the file.
	
	Note
	• File Station performs various actions depending on the type of the selected file.
	• For document files, you can choose an action from the following options.
	  • **Edit with Office Online**
	  • **View in Google Docs**
	  • **Open with Chrome Extension**
	  • **Open with web browser**

File Station opens the selected file.

Opening Microsoft Word, Excel, and PowerPoint Files Using the Chrome Extension

This task requires that you use the Google Chrome browser and install the Office Editing for Docs, Sheets & Slides extension.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	a. Select the file. b. Click . c. Select **Open with Chrome Extension**.
Use the context menu	Right-click the file and then select **Open with Chrome Extension**.

File Station opens an editable file on Google Docs, Sheets, or Slides.

Opening a Text File Using Text Editor

This task requires that you install Text Editor from the App Center.

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps

Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Open with Text Editor**.
Use the context menu	**a.** Right-click the file. **b.** Select **Open with Text Editor**.

File Station opens the selected text file using Text Editor.

Viewing a File in Google Docs

This task requires that you use the Google Chrome browser and enable myQNAPcloud Link.

You can open and view files in Google Docs. To use this feature, your web browser must allow pop-up windows.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **View in Google docs**.
Use the context menu	Right-click and then select **View in Google docs**.

File Station opens a preview of the file in Google Docs.

Viewing a File in Microsoft Office Online

This task requires that you enable myQNAPcloud Link.

You can open and edit Microsoft Word, Excel, and Powerpoint files using Office Online. To use this feature, your web browser must allow pop-up windows.

Note
Editing a file in Microsoft Office Online overwrites the file saved on the NAS.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Edit with Office Online**.
Use the context menu	Right-click the file and then select **Edit with Office Online**.

File Station opens the file in Microsoft Office Online.

Opening Image Files Using Image2PDF

You must to install Image2PDF from the App Center before starting this task.

1. Opening File Station
2. Locate the file.
3. Perform one of the following methods.

Method	Steps
Use the menu bar	**a.** Select the file. **b.** Click . **c.** Select **Open with Image2PDF**.
Use the context menu	Right-click and then select **Open with Image2PDF**.

File Station opens the selected image file with the Image2PDF wizard.

Follow the wizard's on-screen instructions to convert the image file into a PDF file.

Viewing File Properties

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Properties**.
Use the context menu	**a.** Right-click the file. **b.** Select **Properties**.

The **Properties** window opens and displays the following information.

Field	Description
Type	Displays the file type.
Size	Displays the file size.
File Path	Displays the folder location.
Modified Date	Displays the date that the file was last modified.
Owner	Displays name of the NAS user who uploaded the file.
Group	Displays the name of the NAS group that can access the file.
Storage Pool	Displays the name of the storage pool on which the file is located.
Volume	Displays the name of the volume on which the file is stored.
View Access Logs	Keeps track of access to the file. **Tip** To enable this feature, click **Start Logging** in **Control Panel** > **System** > **System Logs** > **System Connection Logs** .

4. Click **Close**.

Modifying File Permissions

This task requires that you enable advanced folder permissions in **Control Panel** > **Privilege** > **Shared Folders** > **Advanced Permissions** .

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Properties**.
Use the context menu	**a.** Right-click the file. **b.** Select **Properties**.

   The **Properties** window opens.

4. Click .
5. Enable or disable the following permissions for the owner, group, or other users on the list.

Permission	Description
Read Only	Allows a user to view the file.
Read/Write	Allows a user to view and make changes to the file.
Deny	Denies any access to the file.

Tip
You can click **+** to add users to the list and click **-** to remove users from the list.

6. Optional: Select the access rights for guest users.
7. Optional: Specify the ownership of the file.
   a. Click .
   b. Select a user.
   c. Click **Set**.
8. Click **Apply**.

Sorting Files

1. Open File Station.
2. Locate the folder.
3. Click .
4. Select **List**.
   File Station displays files in a list view.
5. Click a column title.
   File Station sorts files in an ascending or descending order based on the selected column.

Copying a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	a. Select the file. b. Click . c. Select **Copy to/Move to** and then select **Copy to**. d. Select the destination folder. e. Click **OK**.
	a. Select the file. b. Click **Copy**. c. Go to the destination folder. d. Click **Paste**.
Use the context menu	a. Right-click the file. b. Select **Copy**.

	c. Go to the destination folder. **d.** Right-click inside the folder and then select **Paste**.
Use keyboard shortcuts	**a.** Select the file. **b.** Press **CTRL + C** or **Command-C**. **c.** Go to the destination folder. **d.** Press **CTRL + V** or **Command-V**.
Use drag and drop	**a.** Select the file. **b.** Drag and drop to the destination folder. Step result: A context menu appears. **c.** Select one of the following actions. • Copy and skip • Copy and overwrite • Copy and rename automatically

File Station creates a copy of the selected file.

Moving a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Copy to/Move to** and then select **Move to**. **d.** Select the destination folder. **e.** Click **OK**.
	a. Select the file. **b.** Click . **c.** Select **Cut**. **d.** Select the destination folder. **e.** Click . **f.** Select **Paste**.

Use the context menu	**a.** Right-click the file and then select **Copy to/Move to** and **Move to**. **b.** Select the destination folder. **c.** Click **OK**.
	a. Right-click the file and then select **Cut**. **b.** Select the destination folder. **c.** Right-click inside the folder and then select **Paste**.
Use keyboard shortcuts	**a.** Select the file. **b.** Press **CTRL + X** or **Command-X**. **c.** Go to the destination folder. **d.** Press **CTRL + V** or **Command-V**.
Use drag and drop	**a.** Select the file. **b.** Drag and drop to the destination folder. **c.** Step result: A context menu appears. **d.** Select one of the following actions. • Move and skip • Move and overwrite • Move (and rename if a file exists with the same name)

File Station moves the selected file to the specified folder.

Renaming a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Rename**.
Use the context menu	**a.** Right-click the file. **b.** Select **Rename**.
Use a keyboard shortcut.	Press **F2**.

4. Specify the file name and then click **OK**.
File Station renames the file.

Deleting a File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Delete**.
Use the context menu	**a.** Right-click the file. **b.** Select **Delete**.
Use the keyboard	Press **Delete**.

   A confirmation message appears.

4. Specify how to delete the file.
   - Move to Network Recycle Bin
   - Delete permanently
5. Click **OK**.
   File Station either moves the selected file to the Recycle Bin or deletes it permanently.

Restoring a Deleted File

1. Open File Station.
2. Go to **Recycle Bin**.
3. Locate the file.
4. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Recover**.
Use the context menu	**a.** Right-click the file. **b.** Select **Recover**.

   A confirmation message appears.

5. Click **Yes**.

File Station restores the selected file.

Mounting an ISO File

1. Open File Station.
2. Upload an ISO file.
   For details, see Uploading a File.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Mount ISO**.
Use the context menu	**a.** Right-click the file. **b.** Select **Mount ISO**.

   The **Mount ISO** window appears.
4. Specify the shared folder name.
5. Click **OK**.
   File Station mounts the ISO file as a shared folder.

Unmounting an ISO File

1. Open File Station.
2. On the left panel, locate the mounted ISO file.
3. Right-click the file and then select **Unmount**.
   A confirmation message appears.
4. Click **Yes**.
   File Station unmounts the ISO file and displays a confirmation message.
5. Click **OK**.

Compressing a File

1. Open File Station.
2. Locate the file or folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file or folder. **b.** Click .

	c. Select **Compress(Zip)**.
Use the context menu	**a.** Right-click the file or folder. **b.** Select **Compress(Zip)**.

4. Configure the file compression settings.

Option	Task
Archive name	Specify a name for the compressed file.
Compression level	Select the type of compression method. • Normal - Standard compression • Maximum compression - Prioritizes compression quality • Fast compression - Prioritizes compression speed
Archive format	Select the format of file compression. • zip • 7z
Update mode	Specify how the files should be updated. • Add and replace files - Add and replace the specified files. • Update and add files - Update old files and add new files. • Update existing files - Update older versions of existing files. • Synchronize files - Update old files, add new files, and remove files that are no longer in the folder.

5. Optional: Specify a password to encrypt the file.
6. Click **OK**.
   File Station compresses the selected file and creates a archive file.

Extracting Compressed Files or Folders

1. Open File Station.
2. Locate the compressed archive file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Extract**.
Use the context menu	**a.** Right-click the file. **b.** Select **Extract**.

4. Select one of the following extraction options.

Option	Description
Extract files	Select specific files to extract.
Extract here	Extract all files in the current folder.
Extract to /<new folder>/	Extract all files in a new folder. The new folder uses the file name of the compressed file.

File Station extracts the compressed files to the specified folder.

Sharing a File or Folder by Email

Before starting this task, you must configure the QTS email settings in **Desktop** > > **E-mail Account** .

1. Open File Station.
2. Locate the file or folder.
3. Perform one of the following actions.

Action	User Action
Use the toolbar	**a.** Select the file or folder. **b.** Click **Share**. **c.** Select **Via Email**.
Use the context menu	**a.** Right-click the file or folder. **b.** Select **Share**. **c.** Select **Via Email**.

The **Share** window appears.

4. Configure the following settings.

Field	User Action
Send from	Select the email delivery method. • Use NAS to mail the links. • Use local computer to mail the links.
Sender	Select an email account.
To	Specify the email address of the recipient. **Tip** You can select a recipient from your contact list if Qcontactz is installed on the NAS.
Subject	Specify the email subject line.
Message	Enter a new message or use the default message.

5. Optional: Click **More settings** and configure additional settings.

Field	User Action
Link Name	Enter a name for the link or use the current name of the file or folder. **Note** A link name cannot contain the following characters: / | \ : ? < > * "
Domain name/IP	Select the domain name or IP address. **Tip** The following domains and IP are supported: • **myQNAPcloud**: Provides a link to the shared file or folder using the DDNS address set in myQNAPcloud. • **WAN**: Provides a link to the shared file or folder to other computers using a different network. • **LAN**: Provides a link to the shared file or folder to other computers using the same local network. • **SmartShare**: Provides a SmartURL via myQNAPcloud Link to the shared file or folder. • **All available links**: Provides links to the shared file or folder using all of the available domains and IPs. **Note** The recipients get direct read access.
Show SSL in URL	Use an HTTPS URL.
On-the-fly transcoding	Allow users to transcode videos on the fly. **Note** • This setting only appears when sharing files. • To use on-the-fly transcoding, you must install and enable Video Station 5.2.0 (or later).
File upload	Allow users to upload files to this folder. **Note** This setting only appears when sharing folders.

Field	User Action
Expire in	Specify the expiration date. **Note** You cannot access the shared file or folder after the expiration date.
Password	Require a password to access the link. **Tip** You can choose to include the password in the email.

6. Click **Share Now**.
   File Station sends an email to the recipient.

Sharing a File or Folder on a Social Network

1. Open File Station.
2. Locate the file or folder.
3. Perform one of the following actions.

Action	User Action
Use the toolbar	**a.** Select the file or folder. **b.** Click **Share**. **c.** Select **To Social Network**.
Use the context menu	**a.** Right-click the file or folder. **b.** Select **Share** and then select **To Social Network**.

   The **Share** window appears.

4. Configure the following settings.

Field	User Action
Social Network	Select the social network website.
Message	Enter a new message or use the default message.

5. Optional: Click **More settings** and configure additional settings.

Field	User Action
Link Name	Type a name for the link or use the current file or folder name. **Note** A link name cannot contain the following characters: / | \ : ? < > * "

Field	User Action
Domain name/IP	Select the domain name or IP address. **Tip** The following domains and IP are supported: • **myQNAPcloud**: Provides a link to the shared file or folder using the DDNS address set in myQNAPcloud. • **WAN**: Provides a link to the shared file or folder to other computers using a different network. • **LAN**: Provides a link to the shared file or folder to other computers using the same local network. • **SmartShare**: Provides a SmartURL via myQNAPcloud Link to the shared file or folder. • **All available links**: Provides links to the shared file or folder using all of the available domains and IPs. **Note** The recipients get direct read access.
Show SSL in URL	Use an HTTPS URL.
On-the-fly transcoding	Allow users to transcode videos on the fly. **Note** • This setting only appears when sharing video files. • To use on-the-fly transcoding, you must install and enable Video Station 5.2.0 (or later).
File upload	Allow users to upload files to this folder **Note** This setting only appears when sharing folders.
Expire in	Specify the expiration date. **Note** You cannot access the shared file or folder after the expiration date.
Password	Require a password to access the link.

6. Click **Share Now**.
   File Station connects to the specified social network website.

Sharing a File or Folder Using Share Links

1. Open File Station.
2. Locate the file or folder.
3. Perform one of the following actions.

Action	User Action
Use the toolbar	**a.** Select the file or folder. **b.** Click **Share**. **c.** Select **Create share link only**.
Use the context menu	**a.** Right-click the file or folder. **b.** Select **Share** and then select **Create share link only**.

The **Share** window appears.

4. Configure the following settings.

Field	User Action
Link Name	Type a name for the link or use the current file or folder name. **Note** A link name cannot contain the following characters: / | \ : ? < > * "

Field	User Action
Domain name/IP	Select the domain name or IP address. **Tip** The following domains and IP are supported: • **myQNAPcloud**: Provides a link to the shared file or folder using the DDNS address set in myQNAPcloud. • **WAN**: Provides a link to the shared file or folder to other computers using a different network. • **LAN**: Provides a link to the shared file or folder to other computers using the same local network. • **SmartShare**: Provides a SmartURL via myQNAPcloud Link to the shared file or folder. • **All available links**: Provides links to the shared file or folder using all of the available domains and IPs. **Note** The recipients get direct read access.
Show SSL in URL	Use an HTTPS URL.
On-the-fly transcoding	Allow users to transcode videos on the fly. **Note** • This setting only appears when sharing video files. • To use on-the-fly transcoding, you must install and enable Video Station 5.2.0 (or later).
File upload	Allow users to upload files to this folder **Note** This setting only appears when sharing folders.
Expire in	Specify the expiration date. **Note** This setting only appears when you share a folder.
Password	Require a password to access the link.

5. Click **Create Now**.

File Station generates a link.

Sharing a File or Folder with a NAS User

1. Open File Station.
2. Locate the file or folder.
3. Perform one of the following actions.

Action	User Action
Use the toolbar	**a.** Select the file or folder. **b.** Click **Share**. **c.** Select **To NAS user**.
Use the context menu	**a.** Right-click the file or folder. **b.** Select **Share** and then select **To NAS user**.

The **Share** window appears.

4. Select the user to share the file or folder with.

Option	User Action
Existing user	Select a user from the list. Optional: Select **Send a notification email to the user** and then specify the email subject and message. Only users who have provided email information will receive notifications. **Note** You can specify the email information of each user in **Control Panel** > **Privilege** > **Users** .
New user	Create a new user account.

5. Optional: Click **More settings** and configure additional settings.

Field	User Action
Link Name	Type a name for the link or use the current file or folder name. **Note** A link name cannot contain the following characters: / | \ : ? < > * "

Field	User Action
Domain name/IP	Select the domain name or IP address. **Tip** The following domains and IP are supported: • **myQNAPcloud**: Provides a link to the shared file or folder using the DDNS address set in myQNAPcloud. • **WAN**: Provides a link to the shared file or folder to other computers using a different network. • **LAN**: Provides a link to the shared file or folder to other computers using the same local network. • **SmartShare**: Provides a SmartURL via myQNAPcloud Link to the shared file or folder. • **All available links**: Provides links to the shared file or folder using all of the available domains and IPs. **Note** The recipients get direct read access.
Show SSL in URL	Use an HTTPS URL.
On-the-fly transcoding	Allow users to transcode videos on the fly. **Note** • This setting only appears when sharing video files. • To use on-the-fly transcoding, you must install and enable Video Station 5.2.0 (or later).
File upload	Allow users to upload files to this folder **Note** This setting only appears when sharing folders.
Expire in	Specify the expiration date. **Note** You cannot access the shared file or folder after the expiration date.
Password	Require a password to access the link.

6. Click **Share Now**.
   File Station shares the file with the specified user.

Playing an Audio File

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Play**.
Use the context menu	**a.** Right-click the file. **b.** Select **Play**.

File Station plays the selected audio file using Media Viewer.

Playing a Video File

You must install Video Station from App Center to play certain video formats.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Play**. **d.** Select a resolution.
Use the context menu	**a.** Right-click the file. **b.** Select **Play**. **c.** Select a resolution.

File Station plays the selected file using Media Viewer.

Playing a Video File Using CAYIN MediaSign Player

CAYIN MediaSign Player is a third-party web media player. You must install CAYIN MediaSign Player from App Center and have an activated license to play video files.

Note
CAYIN MediaSign Player can be enabled and disabled using Multimedia Services.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	a. Select the file. b. Click . c. Click **Play with CAYIN MediaSign Player**.
Use the context menu	a. Right-click the file. b. Click **Play with CAYIN MediaSign Player**

File Station plays the selected file using CAYIN MediaSign Player.

Opening a 360-degree Image or Video File

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	a. Select the file. b. Click . c. Select **Play**.
Use the context menu	a. Right-click the file. b. Select **Play**.

4. Optional: Select the resolution.

File Station opens the selected file using the Media Viewer. You can click **360 Panorama Mode** ( ) on Media Viewer to view the photo or video in Panorama Mode.

Streaming to a Network Media Player

This task requires that you install Media Streaming Add-on from App Center.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click on the toolbar. **c.** Select a media player. The **Media Viewer** window appears. **d.** Select **Play the selected item on this player**. **e.** Click **OK**.
	a. Select the file. **b.** Click . **c.** Hover the mouse pointer over **Streaming to**. **d.** Under **Network Media Player**, select a media player.
Use the context menu	**a.** Right-click the file. **b.** Hover the mouse pointer over **Streaming to**. **c.** Under **Network Media Player**, select a media player.

File Station plays the selected file using the specified network media player.

Adding a File to the Transcoding Folder

Important
Video files cannot be converted to a resolution higher than the original. If a higher resolution is selected, File Station automatically transcodes the file in its original resolution.

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Add to Transcode**.
Use the context menu	**a.** Right-click the file. **b.** Select **Add to Transcode**.

The **Add to Transcode** window opens.

4. Select the transcoding video resolution.

- 240p
- 360p
- 480p SD
- 720p HD
- 1080p FULL HD
- Original resolution
- Only audio

5. Optional: Rotate the video.
   - Click to rotate the video clockwise.
   - Click to rotate the video counterclockwise.
6. Click **OK**.

File Station adds the transcoded file to the @Transcode folder.

Canceling or Deleting Transcoding

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Cancel/Delete Transcoding**.
Use the context menu	**a.** Right-click the file. **b.** Select **Cancel/Delete Transcoding**.

   A confirmation message appears.

4. Click **OK**.
   File Station removes the selected file from the Transcode folder and cancels the transcoding process.

Viewing Transcode Information

1. Open File Station.
2. Locate the file.
3. Perform one of the following actions.

Action	Steps

Use the toolbar	**a.** Select the file. **b.** Click . **c.** Select **Transcode Information**.
Use the context menu	**a.** Right-click the file. **b.** Select **Transcode Information**.

Multimedia Console opens. You can view transcoding tasks and configure related settings.

Folder Operations

File Station enables you to perform the following tasks.

Operation	Task
Store	• Uploading a Folder • Uploading a Folder Using Drag and Drop
Access	• Viewing Folder Properties • Viewing Storage Information • Modifying Folder Permissions • Viewing Qsync Folders • Managing Share Links • Viewing Files and Folders Shared with Me
Organize	• Creating a Folder • Copying a Folder • Creating a Desktop Shortcut • Adding a Folder to Favorites • Removing a Folder from Favorites • Compressing a Folder
Share	• Creating a Shared Folder • Creating a Snapshot Shared Folder • Sharing Space with a New User
Transcoding	• Adding a Folder to the Transcoding Folder • Canceling or Deleting Transcoding

Uploading a Folder

Note
This feature is only available on Google Chrome browsers.

1. Open File Station.
2. Open the destination folder.
3. Click and then select **Folder**.
   The **Browse for Folder** window opens.
4. Select the folder to upload.
   A confirmation message appears.
5. Select one of the following policies for handling duplicate files.

Option	Description
Rename duplicate files	Upload and rename a file if another file with the same name and extension already exists in the destination folder.
Skip duplicate files	Do not upload a file if another file with the same file name and extension already exists in the destination folder.
Overwrite duplicate files	Upload the file and then overwrite an existing file with the same name and extension in the destination folder.

Tip
You can set the selected option as the default policy. File Station will not ask again after remembering the setting. You can change the policy later in **File Station** > **More Settings** > **Settings** > **File Transfer** .

6. Click **OK**.
   File Station uploads the selected folder.

Uploading a Folder Using Drag and Drop

Note
This feature is only available on Google Chrome browsers.

1. Open File Station.
2. Drag and drop the local folder to File Station.
3. Select one of the following policies for handling duplicate files.

Option	Description
Rename duplicate files	Upload and rename a file if another file with the same name and extension already exists in the destination folder.
Skip duplicate files	Do not upload a file if another file with the same file name and extension already exists in the destination folder.
Overwrite duplicate files	Upload the file and then overwrite an existing file with the same name and extension in the destination folder.

4. Click **OK**.
   File Station uploads the selected folder.

Viewing Folder Properties

1. Open File Station.

2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Properties**.
Use the context menu	**a.** Position the mouse pointer inside the folder. **b.** Right-click the folder. **c.** Select **Properties**.
Use the left panel	**a.** Right-click the folder. **b.** Select **Properties**.

The **Properties** window opens and displays the following information.

Field	Description
Type	Displays the folder type.
Size	Click to display the folder size and total file count.
File Path	Displays the folder location.
Modified Date	Displays the date that the folder was last modified.
Owner	Displays name of the NAS user who uploaded the folder.
Owner	Displays the name of the NAS group that can access the folder.
Storage Pool	Displays the name of the storage pool on which the folder is stored.
Volume	Displays the name of the volume on which the folder is stored.
Transfer to Dedicated Volume	Migrates this shared folder to a snapshot shared folder.
View Access Logs	Keeps track of access to the folder. **Tip** To enable this feature, click **Start Logging** in **Control Panel** > **System** > **System Logs** > **System Connection Logs** .
Multimedia Console	Opens Multimedia Console. This allows you to manage multimedia content sources.
Shared Folder	Edits folder properties.

4. Click **Close**.

Viewing Storage Information

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Storage Info**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Storage Info**.

The **Storage Info** window opens and displays the following information.

Information	Description
Shared folder	Displays the names of shared folders.
Used size	Displays the total storage size currently in use.
Volume	Displays the volume name.
Capacity	Displays the total storage capacity of the shared folder.
Free size	Displays the total available storage space in the shared folder.
Volume status	Displays the volume status.

4. Click **Close**.

Modifying Folder Permissions

This task requires that you enable advanced folder permissions in **Control Panel** > **Privilege** > **Shared Folders** > **Advanced Permissions** .

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Properties**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Properties**.

The **Properties** window opens.

4. Click .
5. Enable or disable the following permissions for the owner, group, and other users on the list.

Permission	Description

Read Only	Allows a user to view the folder.
Read/Write	Allows a user to view and make changes to the folder.
Deny	Denies a user any access to the folder

Tip
You can click **+** to add users to the list and **-** to remove users from the list.

6. Optional: Select the access right for guest users.
7. Optional: Specify the ownership of the folder.
   a. Click .
   b. Select a user.
   c. Click **Set**.
8. Optional: Enable one or more of the following settings.
   - Only the owner can delete the contents
   - Only admin can create files and folders
   - Apply changes to files and subfolders
   - Apply and replace all existing permissions
9. Click **Apply**.

Viewing Qsync Folders

1. Open File Station.
2. On the left panel, click **Qsync**.
   File Station displays the list of team folders shared by other NAS users.

Managing Share Links

1. Open File Station.
2. On the left panel, click **Share link management**.
   File Station displays the list of shared files and folders.

Note
File Station automatically checks and deletes expired links.

3. Select an item from the list and then perform one of the following tasks.

Task	User Action
Re-share	Click and then select one of the following share methods. • Sharing a File or Folder by Email • Sharing a File or Folder on a Social Network • Sharing a File or Folder Using Share Links • Sharing a File or Folder with a NAS User
Stop sharing	Click .
Copy the link to the clipboard	Click .

File Station performs the specified task.

Viewing Files and Folders Shared with Me

1. Open File Station.
2. On the left panel, click **Shared with me**.

File Station lists the files and folders shared with the current account. You can copy, open, or download a selected file or folder.

Creating a Folder

1. Open File Station.
2. Locate the destination folder.
3. Perform one of the following tasks.

Task	Steps
Use the toolbar	a. Click b. Select **Folder**. The **Create folder** window opens. c. Specify the folder name. d. Click **OK**.
Use the context menu	a. Right-click inside the folder and then select **Create folder**. b. Specify the folder name. c. Click **OK**.

File Station creates a new folder.

Copying a Folder

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Copy to/Move to** and then select **Copy to**. **d.** Select the destination folder. **e.** Click **OK**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Copy**. **c.** Go to the destination folder. **d.** Right-click inside the folder and then select **Paste**.

File Station creates a copy of the selected folder.

Creating a Desktop Shortcut

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Create Shortcut to Desktop**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Create Shortcut to Desktop**.
Drag and Drop	**a.** Select the folder. **b.** Drag and drop the folder to the desktop.

File Station creates a desktop shortcut for the selected folder.

Tip
Hovering the mouse pointer over a desktop shortcut displays the path of the original folder.

Adding a Folder to Favorites

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Add to Favorites**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Add to Favorites**.
Use the Favorites button	**a.** Select the folder. **b.** Click .

File Station adds the selected folder to the Favorites folder.

Removing a Folder from Favorites

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Remove from Favorites**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Remove from Favorites**.
Use the Favorites button	**a.** Select the folder. **b.** Click .

File Station removes the selected folder from the Favorites folder.

Compressing a Folder

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Compress(Zip)**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Compress(Zip)**.

4. Configure the folder compression settings.

Option	Task
Archive name	Specify a name for the compressed file.
Compression level	Select the type of compression method. • Normal - Standard compression • Maximum compression - Prioritizes compression quality • Fast compression - Prioritizes compression speed
Archive format	Select the format of file compression. • zip • 7z
Update mode	Specify how the files should be updated. • Add and replace files - Add and replace the specified files. • Update and add files - Update old files and add new files. • Update existing files - Update older versions of existing files. • Synchronize files - Update old files, add new files, and remove files that are no longer in the folder.

5. Optional: Specify a password to encrypt the file.
6. Click **OK**.
   File Station compresses the selected folder and creates an archive file.

Deleting a Folder

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Delete**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Delete**.
Use the keyboard	Press **Delete**.

A confirmation message appears.

4. Specify how to delete the folder.
   - Move to Network Recycle Bin
   - Delete permanently
5. Click **OK**.
   File Station either moves the selected folder to the Recycle Bin or deletes it permanently.

Creating a Shared Folder

1. Open File Station.
2. On the menu bar, click .
3. Select **Shared Folder**.
   The **Create A Shared Folder** window opens.
4. Configure the folder settings.

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • End with "." • Begin with "_sn_" or "_sn_bk" • Contain the following characters: " + = / \ : | * ? < > ; [ ] % ` '.
Comment (optional)	Specify a comment that contains 1 to 128 ASCII characters.
Disk Volume	Specify the volume on which the shared folder will be created.
Qtier auto Tiering	Select this option to enable auto-tiering for this folder. **Note** To use this feature, you must enable Qtier on the storage pool.

Field	Description
Path	• **Specify path automatically**: Creates a new root folder on the selected volume using the specified shared folder name. • **Enter path manually**: Select an existing folder as the root folder.

5. Optional: Configure user access permissions.
   a. Under **Configure access privileges for users**, click **Edit**.
   b. Specify access permissions for each user.
6. Optional: Enable folder encryption.
   a. Under **Folder Encryption**, click **Edit**.
   b. Select **Encryption**.
   c. Specify the following information.

Field/Option	Description
Input Password	Specify a password that contains 8 to 32 characters except the following: " $: = \
Verify Password	The password must match the previously specified password.
Save encryption key	When enabled, QTS automatically unlocks the shared folder after the NAS restarts. When disabled, the administrator must unlock the folder after the NAS restarts. **Warning** • Saving the encryption key on the NAS can result in unauthorized data access if unauthorized personnel are able to physically access the NAS. • If you forget the encryption password, all data will become inaccessible.

7. Optional: Configure advanced settings.
   a. Under **Advanced Settings**, click **Edit**.
   b. Configure the following settings.

Option	Description
Guest Access Right	Select the permission level assigned to users without a NAS account.
Hide network drive	Selecting this option hides the folder in Windows networks. Users who know the specific path can still access the folder.

Option	Description
Lock File (Oplocks)	Opportunistic lock (Oplocks) is a Windows file locking mechanism that facilitates caching and access control to improve performance. This feature is enabled by default and should only be disabled in networks where multiple users simultaneously access the same files.
SMB Encryption	This option is available only when SMB3 is enabled. Selecting this option encrypts all Microsoft network communication using the SMB3 protocol.
Enable Windows Previous Versions	When enabled, the Previous Versions feature in Windows can be used with the shared folder.
Enable Network Recycle Bin	Selecting this option creates a Recycle Bin for this shared folder.
Restrict the access of Recycle Bin to administrators only for now	Selecting this option prevents non-administrator users from recovering or deleting files in the Recycle Bin. **Note** This option is available only when **Enable Network Recycle Bin** is selected.
Enable sync on this shared folder	Selecting this option allows this shared folder to be used with Qsync. This option is only available if Qsync Central is installed on the NAS.
Enable access-based share enumeration (ABSE)	When enabled, users can only see the shared folders that they have permission to mount and access. Guest account users must enter a username and password to view shared folders.
Enable access-based enumeration (ABE)	When enabled, users can only see the files and folders that they have permission to access.
Set this folder as the Time Machine backup folder (macOS)	When enabled, the shared folder becomes the destination folder for Time Machine in macOS.

8. Click **OK**.
   File Station creates a shared folder.

Creating a Snapshot Shared Folder

1. Open File Station.
2. On the menu bar, click .
3. Select **Snapshot shared folder**.
   The **Create a Snapshot Shared Folder** window opens.
4. Configure the folder settings.

Field	Description
Folder Name	Specify a folder name that contains 1 to 64 characters and that does not: • Begin or end with a space • Contain consecutive spaces • Contain the following characters: " + = / \ : | * ? < > ; [ ] % `.
Comment (optional)	Specify a comment that contains 1 to 128 ASCII characters.
Storage Pool	Specify the storage pool where this shared folder will be created.

Field	Description
Space Allocation	Select one of the following space allocation options: • Thick provisioning • Thin provisioning
Qtier Auto Tiering	Select this option to enable auto-tiering for this folder. **Note** To use this feature, you must enable Qtier on the storage pool.
Allocate Folder Quota	Specify a data quota for the folder.

5. Optional: Configure user access permissions.
   a. Under **Configure access privileges for users**, click **Edit**.
   b. Specify access permissions for each user.
6. Optional: Configure advanced settings.
   a. Under **Advanced Settings**, click **Edit**.
   b. Configure the following settings.

Option	Description
Guest Access Right	Select the permission level assigned to users without a NAS account.
Hide network drive	Selecting this option hides the folder in Windows networks. Users who know the specific path can still access the folder.
Lock File (Oplocks)	Opportunistic lock (Oplocks) is a Windows file locking mechanism that facilitates caching and access control to improve performance. This feature is enabled by default and should only be disabled in networks where multiple users simultaneously access the same files.
SMB Encryption	This option is available only when SMB3 is enabled. Selecting this option encrypts all Microsoft network communication using the SMB3 protocol.
Enable Windows Previous Versions	Selecting this option allows users to use the Previous Versions feature on Windows to restore the previous versions of this shared folder.
Enable Network Recycle Bin	Selecting this option creates a Recycle Bin for this shared folder.
Restrict the access of Recycle Bin to administrators only for now	Selecting this option prevents non-administrator users from recovering or deleting files in the Recycle Bin.
Enable access-based share enumeration (ABSE)	When this option is enabled, users can only see the shared folders that they have permissions to mount and access. Guests must specify a username and password to view shared folders.
Enable access-based enumeration (ABE)	When this option is enabled, users can only see the shared folders that they have permissions to mount and access.
Set this folder as the Time Machine backup folder (macOS)	Selecting this option allows users to back up the data on the Mac to this shared folder via Time Machine.

7. Click **Create**.
   File Station creates a snapshot shared folder.

Sharing Space with a New User

1. Open File Station.
2. On the menu bar, click .
3. Select **Share space with a user**.
   The **Create a User** window opens.
4. Specify the following information:

Field	Description
Username	Specify a username that contains 1 to 32 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Special characters: ~ ! @ # $ ^ & ( ) - _ . { }
Password	Specify a password that contains 1 to 64 ASCII characters.
Quota	Specify the storage capacity available to the user.
Phone number (optional)	The information is for your reference and is not used by QTS.
Email (optional)	QTS sends a notification to this email address when the account password is about to expire. **Note** • You must configure the related settings in **SMTP Server** and **Change Password**. Otherwise, QTS would not send notifications to the specified email address. • **SMTP Server**: Go to **Control Panel** > **System** > **Notification** > **E-mail** . • **Change Password**: Go to **Control Panel** > **System** > **Security** > **Password Policy** .
(Optional) Send a notification mail to the newly created user	When selected, QTS sends a message that contains the following information to the specified email address. • Username and password • URLs for connecting to the NAS

5. Click **Create**.
   File Station creates a new user account and allocates the specified storage space.

Adding a Folder to the Transcoding Folder

Important
Video files cannot be converted to a resolution higher than the original resolution. If a higher resolution is selected, File Station automatically transcodes the file in its original resolution.

1. Open File Station.

2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Add to Transcode**.
Use the context menu	**a.** Right-click the file. **b.** Select **Add to Transcode**.

The **Add to Transcode** window opens.

4. Select the transcoding video resolution.
   - 240p
   - 360p
   - 480p SD
   - 720p HD
   - 1080p FULL HD
   - Original resolution
   - Only audio
5. Click **OK**.

File Station adds the transcoded files to the @Transcode folder.

Canceling or Deleting Transcoding

1. Open File Station.
2. Locate the folder.
3. Perform one of the following actions.

Action	Steps
Use the toolbar	**a.** Select the folder. **b.** Click . **c.** Select **Cancel/Delete Transcoding**.
Use the context menu	**a.** Right-click the folder. **b.** Select **Cancel/Delete Transcoding**.

A confirmation message appears.

4. Click **OK**.
   File Station removes the selected folder from the Transcode folder and cancels the transcoding process.

Locking or Unlocking an Encrypted Shared Folder

After creating an encrypted shared folder, you can lock or unlock this folder to control user access. For details on how to create an encrypted shared folder, see Creating a Shared Folder.

1. Open File Station.
2. Locate an encrypted folder on the left panel.

Tip
File Station displays the following icons beside an encrypted shared folder.

Icon	Status
	The encrypted folder is locked.
	The encrypted folder is unlocked.

3. Perform one of the following tasks.

Tasks	Steps
Lock the shared folder	**a.** Right-click the shared folder. **b.** Select **Lock**.
Unlock the shared folder	**a.** Click the shared folder. A confirmation message appears. **b.** Click **Unlock**. **c.** Specify the password. **d.** Click **OK**.

Keeping a Folder or a File in Reserved Cache

You can keep the most important or the most frequently used data in the reserved cache to enhance access performance. HybridMount is required for this task.

Important
You can only perform this operation for folders in the shared folders mounted via HybridMount. For details on how to use HybridMount and how to mount cloud services, see HybridMount Help.

1. Open File Station.
2. Select a mounted shared folder.
3. Select a folder or file.
4. Choose one of the following methods.

Method	Steps
Use the toolbar	**a.** Click . **b.** Select **Always Keep in Reserved Cache**. A confirmation message appears. **c.** Click **OK**.
Use the context menu	**a.** Right-click the selected item. **b.** Select **Always Keep in Reserved Cache**. A confirmation message appears. **c.** Click **OK**.

File Station keeps the selected folder or file in the reserved cache.

Folders or files in the reserved cache can have one of the following statuses.

Status Icon	Description
	This file or folder is only stored in the cloud
	File Station is downloading this file or folder.
	File Station has encountered an error when downloading this file or folder.
	File Station has cached and is uploading this file or folder.
	File Station has cached and placed this file or folder in the upload queue.
	File Station has encountered an error when uploading this file or folder.
	This file or folder has been cached and synced and will always be kept in the reserved cache.
	This file or folder has been cached and synced.
	This file or folder has been cached and synced but marked as low priority. When the cache space is insufficient, File Station will remove files or folders that are the least recently accessed.
	This file or folder is ignored and not uploaded to the cloud. File Station ignores and skips temporary system files during the sync process.

Removing a Folder from Reserved Cache

You can remove folders from the reserved cache.

Important
You can only perform this operation for folders in the shared folders mounted via HybridMount. For details on how to use HybridMount and how to mount cloud services, see HybridMount Help.

1. Open File Station.

2. Select a mounted shared folder.
3. Locate one or more folders.
4. Choose one of the following methods.

Method	Steps
Use the toolbar	**a.** Select one or more folders. **b.** Click . **c.** Select **Do Not Keep in Reserved Cache**. A confirmation message appears. **d.** Click **OK**.
Use the context menu	**a.** Select one or more folders. **b.** Right-click the folder. **c.** Select **Do Not Keep in Reserved Cache**. A confirmation message appears. **d.** Click **OK**.

7. myQNAPcloud

myQNAPcloud is a service that allows you to access, manage, and share files stored on your QNAP devices remotely through the internet.

Getting Started

1. Create a QNAP ID.
   For details, see Creating a QNAP ID With Email or Phone Number.
2. Register the device to myQNAPcloud.
   For details, see Registering a Device to myQNAPcloud.
3. Optional: Configure any of the following settings.

Settings	Description
Port forwarding	Port forwarding allows you to access your device on the internet through a UPnP router. For details, see Configuring Port Forwarding.
My DDNS	My DDNS allows you to specify a dedicated myQNAPcloud subdomain name that you can use to access your device on the internet. For details, see Configuring DDNS Settings
Published services	You can publish QNAP services on your device, such as the QNAP desktop and File Station, so they can be accessible on myQNAPcloud. For details, Configuring Published Services.
myQNAPcloud Link	myQNAPcloud Link allows you to access your device on the myQNAPcloud website or through mobile apps and client utilities without changing your router settings. Using shared links, you can also simultaneously download and sync files to a remote NAS without needing to first save them to client device. For details, see Enabling myQNAPcloud Link.
Access controls	Access controls allow you to configure device access permissions for myQNAPcloud users. For details, see Configuring Device Access Controls.
SSL certificates	myQNAPcloud allows you to add SSL certificates to help secure your network communication. You can either download and install a myQNAPcloud or Let's Encrypt certificate. For details, see Installing an SSL Certificate.

Account Setup

Creating a QNAP ID With Email or Phone Number

1. Go to https://account.qnap.com/.
   The **QNAP Account** login page displays.
2. Click **Create Account**.
   The **Create Account** screen appears.
3. Specify a nickname, a valid email address or phone number, and a password.
4. Read and acknowledge the Terms of Service and Privacy Policy.
5. Click **Sign Up**.
   The **Data Privacy Notice** box appears.

6. Read the notice, and then click **I Agree**.
   myQNAPcloud sends a verification email or message.
7. Confirm the registration.
   Your QNAP ID is activated.

Tip
The registration link automatically expires in 15 days. You can go to the QNAP Account Center to send a new activation email.

Registering a Device to myQNAPcloud

1. Log on to QTS as administrator.
2. Go to **myQNAPcloud** > **Overview** .
3. Click **Get Started**.
   The **myQNAPcloud wizard** appears.
4. Click **Start**.
5. Specify your QNAP ID and password.
6. Click **Next**.
7. Specify a device name containing up to 30 alphanumeric characters.
   You may reuse an existing device name. The device currently using this name will be deregistered from myQNAPcloud.
8. Click **Next**.
9. Select the services you want to enable.

Service	Description
Auto Router Configuration	This allows you to configure port forwarding.
DDNS	This allows you to access your device on the internet using a dedicated address.
Published Services	This allows you to select which services you want to publish on the myQNAPcloud website.
myQNAPcloud Link	myQNAPcloud Link allows you to access your device on the myQNAPcloud website or through mobile apps and client utilities without changing your router settings. Using shared links, you can also simultaneously download and sync files to a remote NAS without needing to first save them to client device. If you enable this option and your device does not have myQNAPcloud Link, myQNAPcloud Link will automatically be downloaded and installed after you click **Next**.

10. Select an access control option.

Option	Description
Public	All users can search for your device and view the published services on the myQNAPcloud website. They can also access your device with a SmartURL.
Private	Your device will not appear in the search results. Only you can access your device on the myQNAPcloud website.

Option	Description
Customized	Your device will only be visible to you and invited users. Other users will not be able to access your device even with a SmartURL.

11. Click **Next**.
    myQNAPcloud applies your settings.
    The **Summary** screen appears.
12. Review the details, and then click **Finish**.

Installing myQNAPcloud Link

Only perform this task if you did not enable myQNAPcloud Link when registering your device to your myQNAPcloud account.

1. Log on to QNAP as administrator.
2. Open **App Center**.
3. Click .
   A search box appears.
4. Type `myQNAPcloud Link` and then press `ENTER`.
   The myQNAPcloud Link application appears in the search results list.
5. Click **Install**.
   App Center installs myQNAPcloud Link on your device.

Overview

The **Overview** screen displays your basic myQNAPcloud settings, as well as the device network connectivity and DDNS status.

Status Icon	Description
	The item is enabled and functioning properly.
	The item is disabled.
	One or more settings need to be configured for the item to function properly.
	There is no network connectivity.

Button	Description
	Click this to view your QNAP ID details.
	Click this to sign out of myQNAPcloud.
	Click this to modify your device name.
	Click this to copy the SmartURL to your clipboard.
	Click this to open the myQNAPcloud FAQ page on your browser.
	Click this to diagnose connection problems.
Test	Click this to test the internet connectivity.

Configuring Port Forwarding

Port forwarding is only available if your router supports UPnP.

1. Go to **Auto Router Configuration**.
2. Select **Enable UPnP port forwarding**.
   Your device scans for UPnP routers on the network.

> **Tip**
> If your device cannot locate the router, click **Rescan**. If the issue persists, click **Diagnostics**, and then verify your network configuration or contact QNAP support through **Helpdesk**.

3. Optional: Add a new service to the **Forwarded Services** table.
   a. Click **Add NAS Service**.
      The **Add NAS Service** window appears.
   b. Specify a NAS service name that contains 1 to 64 ASCII characters.
   c. Specify a port number.
   d. Select an external port setting.
      - **Auto**: myQNAPcloud automatically selects an available external port.
      - **Manual**: You can specify a new port if the current service port is being used by other services.
   e. Select a protocol.
      If you are unsure about this setting, select **TCP**.
   f. Click **OK**.
4. In the **Forwarded Services** table, select the services you want to forward.
5. Click **Apply to Router**.

> **Tip**
> You can go to **Overview** to verify that there are no connectivity errors.

Configuring DDNS Settings

1. Open myQNAPcloud.
2. Go to **My DDNS**.
3. Enable **My DDNS**.
4. Perform any of the following tasks.

Task	User Action
Change the myQNAPcloud DDNS domain name	a. Click **here**. The **Change Device Name Wizard** appears. b. Specify a device name containing up to 30 alphanumeric characters. c. Click **Apply**.

Task	User Action
Update myQNAPcloud	Click **Update**.
Manually configure the DDNS IP address	**a.** Click **Manually configure your DDNS IP address**. The **Public IP Address** window appears. **b.** Select an option. • **Assign static IP addresses**: myQNAPcloud binds the DDNS to the specified static IP address regardless of changes to the network environment. • **Automatically obtain IP address**: myQNAPcloud automatically detects the WAN IP. **c.** Click **Apply**.

Configuring Published Services

1. Open myQNAPcloud.
2. Go to **Published Services**.
3. In the **Publish** column, select all the services you want published.
   Published services are accessible through the myQNAPcloud website.
4. Optional: In the **Private** column, select all the services you want publish privately.
   Private services are only available to specified users with the access code.
   a. Specify an access code containing 6 to 16 alphanumeric characters.
   b. In the **User Management** table, select the users you want to grant access to.
      You can select a maximum of 9 users.

Tip
Click **Add Users** to add users to the list.
Click **Delete** to remove users from the list.

   c. Optional: Modify user access privileges.

Option	Description
myQNAPcloud Connect (VPN)	Select this option to grant users access to private NAS services when they use the myQNAPcloud Connect utility. Users can download myQNAPcloud Connect from the QNAP Utilities page (https://www.qnap.com/en/utilities/essentials).
myQNAPcloud Website	Select this option to grant users access to private NAS services published in the myQNAPcloud website (https://www.myqnapcloud.com/).

5. Click **Apply**.

Enabling myQNAPcloud Link

1. Open myQNAPcloud.
2. Go to **myQNAPcloud Link**.

3. Enable **myQNAPcloud Link**.

Tip
If there are issues with the connection, click **Reconnect**.

Configuring Device Access Controls

1. Open myQNAPcloud.
2. Go to **Access Control**.
3. Select an access control option.

Option	Description	User Action
Public	All users can search for your device and view the published services on the myQNAPcloud website.	Select **Public**.
Private	Your device will not appear in the search results. Only you can access your device on the myQNAPcloud website.	Select **Private**.
Customized	Your device will only be visible to you and invited users. Other users will not be able to access your device even with a SmartURL	**a.** Select **Customized**. **b.** Optional: Add a user. 1. Click **Add**. 2. Specify the user's email address or phone number. 3. Click . **c.** Optional: Remove a user. • From the list of users, identify a user you want to remove. • Click ×.

4. Click **Apply**.

Installing an SSL Certificate

Important
myQNAPcloud SSL web service and Let's Encrypt certificates can only be used with the myqnapcloud domain.

1. Open myQNAPcloud.
2. Go to **SSL Certificate**.
3. Download and install a certificate.

Type	Description	User Action
myQNAPcloud SSL web service certificate	This certificate provides a secure environment for exchanging confidential information online and confirms the identity of your site to employees, business partners, and other users. You can purchase certificates on the myQNAPcloud website.	**a.** Under **myQNAPcloud SSL Certificate**, click **Download and install**. The **Download & Install SSL Certificate** window appears. **b.** Select a license from the list. A notification appears if you have not yet purchased a myQNAPcloud certificate.
Let's Encrypt certificate	Let's Encrypt is a free, automated, and open certificate authority that issues domain-validated security certificates. You can install Let's Encrypt certificates with the myQNAPcloud DDNS service. You can choose to automatically renew this certificate before it expires.	**a.** Under **Let's Encrypt**, click **Download and install**. The **Download & Install SSL Certificate** window appears. **b.** Specify a valid email address. This address is required for the Let's Encrypt account registration. **c.** Optional: Select **Automatically renew domain before expiration.**

4. Click **Confirm**.
   myQNAPcloud applies the certificate and displays the details.

Tip
To delete the certificate from the device, click **Release** and then **Confirm**.

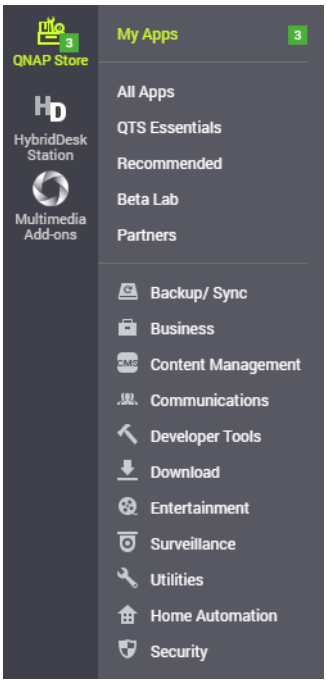
8. App Center

App Center is a digital distribution and management platform in QTS where you can browse, download, and manage applications and utilities developed for the QNAP NAS.

Overview

Left Panel

The left panel allows you to browse available apps in various categories. You can go to the **My Apps** section to view all your installed apps. App Center displays a badge count to indicate the number of available updates.



Toolbar

Left side

No.	Element	Possible User Actions
1	View mode	• Click the icon to switch between two view modes. • Click and select a view mode.
2	App sorting	Click and select an app sorting method.

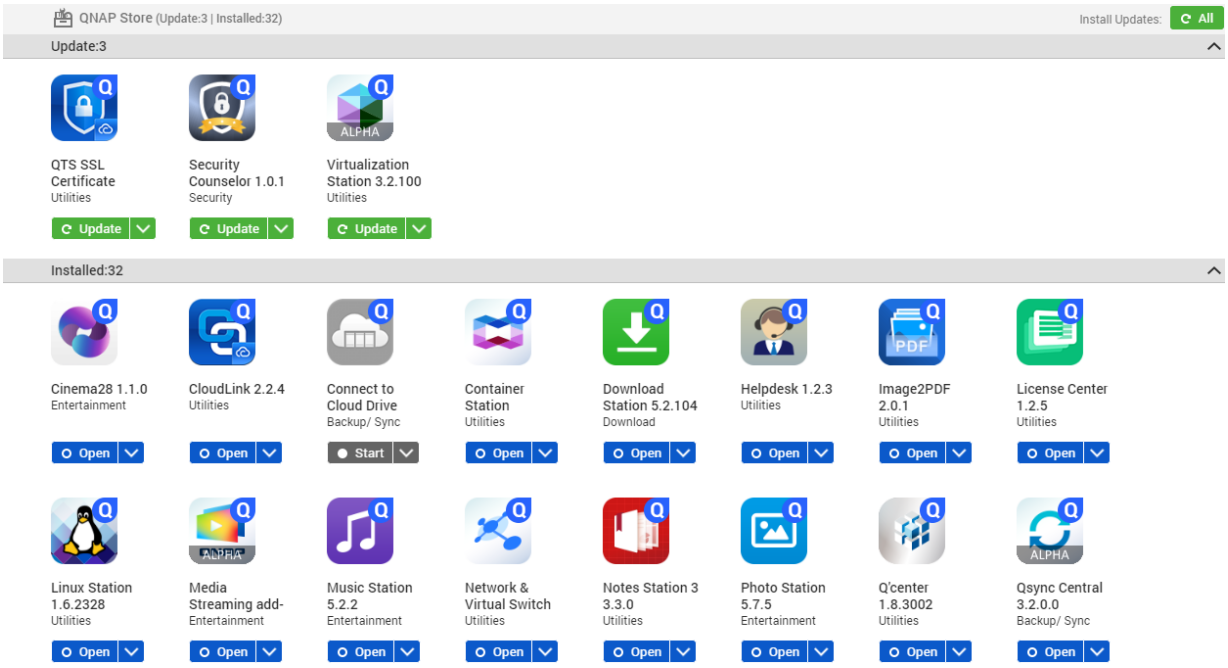
No.	Element	Possible User Actions
3	Volume information	View the basic volume information and the installation locations of your apps. For more volume information, click **Details**.

Right side

No.	Element	Possible User Actions
1	Search	Specify keywords to search for apps. App Center instantly displays search results based on specified keywords.
2	Refresh	Reload the data in App Center to view the current status of your apps.
3	Manual installation	Manually install an app by uploading an installation package. For details, see Installing an App Manually.
4	Settings	Configure various App Center settings. For details, see App Center Settings.
5	More	View the Quick Start or the Help document for more information about App Center.

Main Area

The main area allows you to browse available apps and manage your installed apps. For details, see App Operations.



App Operations

Viewing App Information

You can browse apps and view their descriptions in App Center. This helps you decide whether to install or update an app.

1. Open App Center.
2. Locate an app.
3. Click the app icon.
   App Center displays the app information in a new window.
4. Perform one of the following actions.
   - View the app description
   - View the app changelog
   - Go to the QNAP forum
   - Download the app installation package

Installing an App from App Center

Important
Based on the app you choose to install, App Center may display a confirmation message that provides more information and asks for your approval for installation. Certain apps also require you to specify the installation location. Read the message carefully before installing the app.

1. Open App Center.
2. Locate an app.

3. Optional: Click the app icon to view the app information.
4. Click **Install**.
   The app is installed.

Installing an App Manually

Warning
QNAP recommends only installing apps from QTS App Center or from the QNAP website. QNAP shall not be held liable for any damages, data loss, or security vulnerabilities resulting from the installation and use of unauthorized apps from untrusted sources.

1. Open App Center.
2. Click on the toolbar.
   The **Install Manually** window appears.
3. Click **Browse**.
4. Locate and select the installation package.
5. Click **Install**.
   A message appears.
6. Depending on the scenario, perform one of the following actions.

Scenario	Actions
The app has a valid digital signature.	**a.** Read the confirmation message. **b.** Click **OK**.
The app does not have a valid digital signature, and you enabled the installation of apps without valid digital signatures.	**a.** Read the confirmation message. **b.** Click **OK**.
The app does not have a valid digital signature, and you did not enable the installation of apps without valid digital signatures.	**a.** Read the warning message. **b.** Select **I understand the risks and want to install this application.** **c.** Click **Install**.

Tip
For more information on this setting, see Enabling Installation of Apps without Valid Digital Signatures.

App Center installs the application.

Updating an App

When updates are available for an installed app, App Center moves the app to the **Update** or **Required Update** section based on the importance of updates. You must perform required updates to ensure the functionality, compatibility, and data security of your apps.

1. Open App Center.
2. Locate an app in the **Update** or **Required Update** section.

3. Click **Update** or **Required Update**.
   A confirmation message appears.
4. Click **OK**.

Batch Updating Multiple Apps

1. Open App Center.
2. Perform one the following updates.

Updates	Action
Only required updates	Below the toolbar, click **Required Update**.
All available updates	Below the toolbar, click **All**.

   A confirmation message appears.
3. Click **OK**.

Enabling or Disabling an App

You can enable or disable non-built-in apps in App Center.

Note
Disabling an app may affect the functionality of other apps.

1. Open App Center.
2. Locate an app.
3. Perform one of the following actions.

Action	Steps
Enable the app	Click **Start**.
Disable the app	a. Click . b. Select **Stop**.

- After an app is enabled, its action button displays **Open**.
- After an app is disabled, its action button displays **Start**.

Migrating an App

You can migrate an installed app to another volume to better allocate system resources.

1. Open App Center.
2. Locate an app.
3. Click .
4. Select **Migrate to**.
   The **App Migration** window appears.

5. Select the destination volume.
6. Click **Migrate**.
   A confirmation message appears.
7. Click **OK**.

Granting or Denying User Access to an App

QTS administrators can grant or deny user access to apps. The main menu of non-administrator users only display the apps that they have access to.

1. Open App Center.
2. Locate an app.
3. Click .
4. Hover the mouse pointer over **Display on**.
5. Select one of the following options:
   - Administrator's main menu

Note
This is the only available option for many built-in system utilities, which non-administrators cannot be granted access to.

   - Every user's main menu
   - Every user's main menu and as an app shortcut on the login screen

Uninstalling an App

Warning
Uninstalling an app also deletes the related user data.

1. Open App Center.
2. Locate an app.
3. Click .
4. Select **Remove**.
   A confirmation message appears.
5. Click **OK**.

App Center Settings

Adding an App Repository

You can add an app repository to enrich the content in App Center. This allows you to download and install apps from third-party sources.

1. Open App Center.

2. Click on the toolbar.
3. Go to **App Repository**.
4. Click **Add**.
   The **Add** window appears.
5. Specify the following connection information.
   - Name
   - URL
6. Optional: Specify the login credentials.
   - Username
   - Password
7. Click **Add**.

App Center adds the repository to the list. You can select the repository and then click **Edit** to modify its settings or click **Delete** to remove this repository from App Center.

Configuring App Update Settings

1. Open App Center.
2. Click .
3. Go to **Update**.
4. Select **When updates are available** and then select one of the following options.

Option	Description
Send a notification	QTS sends notification messages when updates are available for your apps. You can click **Configure Notification Rule** to create rules in Notification Center. For details, see Notification Center.
Install all updates automatically	App Center automatically installs all available updates for your apps. You can select how often App Center should check for available updates.
Install all required updates automatically	App Center automatically installs all required updates for your apps to ensure their functionality, compatibility, and data security. You can select how often App Center should check for required updates.

5. Click **Apply**.

Digital Signatures

QNAP uses digital signatures to validate apps created by QNAP or QNAP-trusted publishers. The use of digital signatures prevent the unauthorized tampering of apps that may lead to security risks.

A digital signature is considered valid if it meets the following criteria.

- The digital signature has not been tampered with.
- The digital signature has not expired.
- The digital signature is certified by QNAP.

Enabling Installation of Apps without Valid Digital Signatures

Warning
A valid digital signature ensures that an application was created by QNAP or a QNAP-trusted publisher. It also ensures that the app has not been maliciously tampered with. Installing apps without valid digital signatures may expose your NAS to security risks. QNAP shall not be held liable for any damages, data loss, or security vulnerabilities resulting from the installation and use of such apps.

1. Open App Center.
2. Click ⚙ on the toolbar.
   The **Settings** window appears.
3. Go to **General**.
4. Select **Allow installation of applications without a valid digital signature**.

Important
App Center does not allow the installation of apps with tampered digital signatures even when this setting is enabled.

5. Click **Apply**.

9. Network & Virtual Switch

About Network & Virtual Switch

Network & Virtual Switch is a QTS utility that centralizes the creation, configuration, and control of network connections. Network & Virtual Switch also manages physical network interfaces, virtual adapters, Wi-Fi, and Thunderbolt connections in addition to controlling DHCP, DDNS,and gateway services.

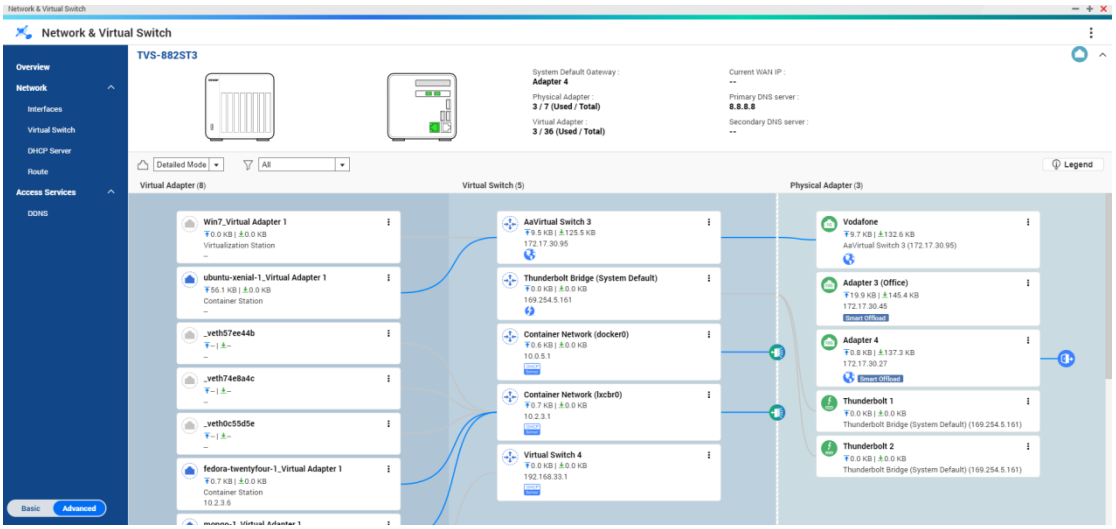
Basic and Advanced Mode

Network & Virtual Switch features two separate usage modes. Switch between these modes by clicking **Basic** or **Advanced** in the Network & Virtual Switch menu pane.

Mode	Description
Basic	This mode is well-suited for most users, and requires minimal configuration of network settings. • Virtual Switch functions are disabled. • Static Route functions are disabled.
Advanced	This mode is best-suited for power-users who need more control over the configuration of network settings. • Virtual Switch functions are enabled. • Static Route functions are enabled.

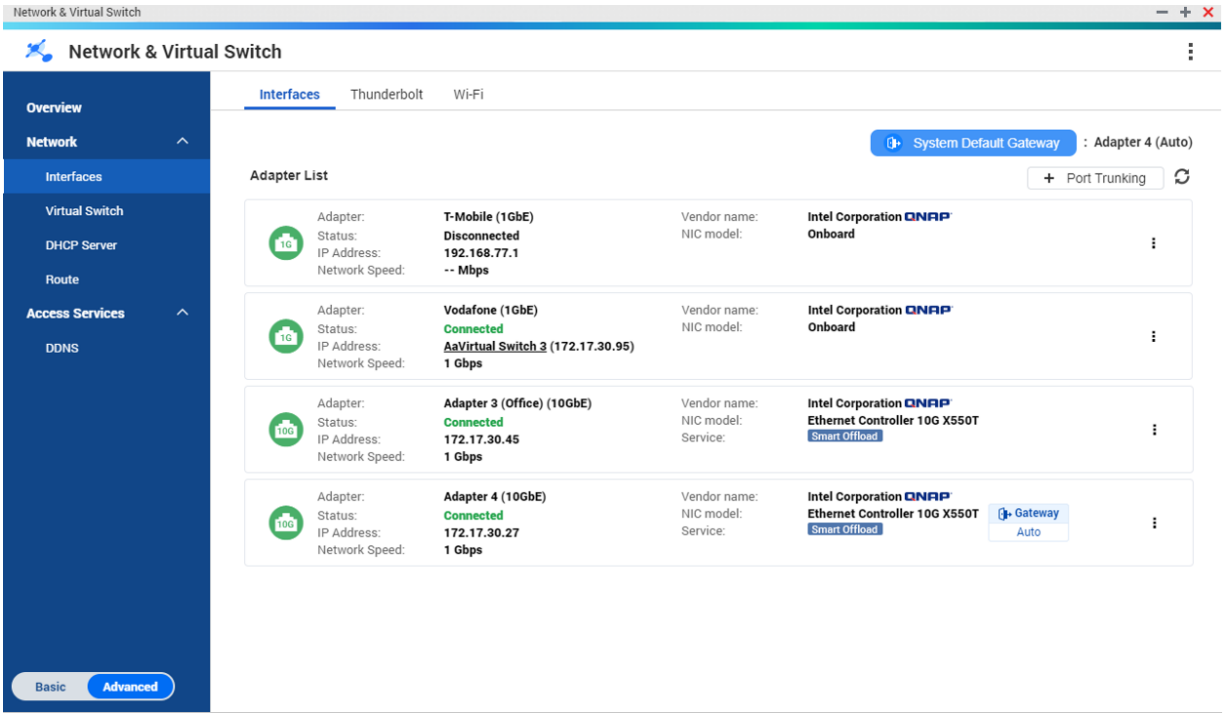
Overview

This screen provides a general overview of the network topology, IP address, status, and usage information for each device on the network.



Interfaces

This screen provides access to basic network settings and allows the configuration of physical adapters. This screen also contains settings related to IPv4, IPv6, DNS, port trunking, VLAN, Thunderbolt, USB QuickAccess, and Wi-Fi.



IP Address

Configuring IPv4 Settings

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Identify the adapter that you want to configure, then click ⋮ > **Configure** .
   The **Configure** window opens.
4. Configure the IPv4 settings.

Setting	Description
Obtain IP address settings automatically via DHCP	If the network supports DHCP, the adapter automatically obtains the IP address and network settings.

Setting	Description
Use static IP address	Manually assign a static IP address. You must specify the following information: • Fixed IP Address • Subnet Mask • Default Gateway
Jumbo Frame	Jumbo Frames are Ethernet frames that are larger than 1500 bytes. They are designed to enhance Ethernet networking throughput, and to reduce CPU usage when transferring large files. QTS supports the following MTU sizes: • 1500 bytes (default) • 4074 bytes • 7418 bytes • 9000 bytes **Important** • All connected network devices must enable Jumbo Frames and use the same MTU size. • Only certain NAS models support Jumbo Frames. • Using Jumbo Frames requires a network speed of 1000 Mbps or faster.
Network Speed	Select the network transfer rate allowed by the network environment. **Tip** Selecting **Auto-negotiation** will automatically detect and set the transfer rate. **Important** The Network Speed field is automatically set to **Auto-negotiation** and hidden when configuring 10GbE & 40GbE adapters.

5. Click **Apply**.

Configuring IPv6 Settings

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .

3. Identify the adapter that you want to configure and then click > **Configure** .
   The **Configure** window opens.
4. Go to the **IPv6** tab.
5. Configure the IPv6 settings.

Setting	Description
Disable	Do not assign an IPv6 address.
IPv6 Auto-Configuration (Stateful)	The adapter automatically acquires an IPv6 address and DNS settings from the DHCPv6-enabled server. **Important** This option requires an available DHCPv6-enabled server on the network.
IPv6 Auto-Configuration (Stateless)	The adapter automatically acquires an IPv6 address and DNS settings from the router. **Important** This option requires an available IPv6 RA(router advertisement)-enabled router on the network.
Use static IP address	Manually assign a static IP address to the adapter. You must specify the following information: • Fixed IP Address • Prefix length **Tip** Obtain the prefix length information from your network administrator. • Default Gateway

6. Click **Apply**.

DNS

A Domain Name System (DNS) server translates a domain name into an IP address.

Configuring DNS Settings

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Identify the adapter that you want to configure, then click ⋮ > **Configure** .
   The **Configure** window opens.
4. Go to the **DNS** tab.
5. Select one of the following options:

Setting	Description
Obtain DNS server address automatically	Automatically obtain the IP address using DHCP.
Use the following DNS server address	Manually assign the IP address for the primary and secondary DNS servers. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

6. Click **Apply**.

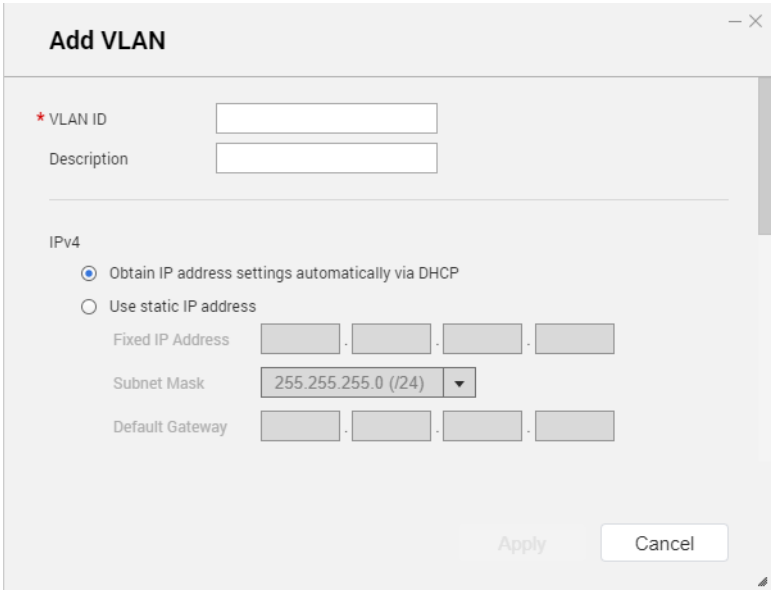
Virtual LANs (VLANs)

A virtual LAN (VLAN) groups multiple network devices together and limits the broadcast domain. Members of a VLAN are isolated and network traffic is only sent between the group members. You can use VLANs to increase security and flexibility while also decreasing network latency and load.

Adding an Interface to a VLAN

Important
When using both port trunking and a VLAN, port trunking must be configured first.

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Identify the adapter that you want to configure, then click ⋮ .
4. Select **Add VLAN**.
   The **Add VLAN** window opens.



5. Specify a VLAN ID.

Important
The VLAN ID must be between 1 and 4094.

6. Specify a description for the VLAN.
7. Select one of the following options.

Option	Steps
Automatically obtain the IP address using DHCP	Select **Obtain IP address settings automatically via DHCP**.
Use a static IP address	**a.** Select **Use static IP address** **b.** Specify a fixed IP address. **c.** Select a subnet mask. **d.** Specify the default gateway.

8. Click **Apply**.

Port Trunking

Port trunking combines two or more Ethernet interfaces for increased bandwidth, load balancing and fault tolerance (failover). Load balancing is a feature that distributes workloads evenly across multiple Ethernet interfaces for higher redundancy. Failover ensures that a network connection remains available even if a port fails.

Configuring Port Trunking

Important
Before configuring Port Trunking, ensure at least two network interfaces are connected to the same switch.

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Click **Port Trunking**.
   The **Port Trunking** window opens.
4. Click **Add**.
   The **Port Trunking (Add)** window opens.
5. Select two or more network interfaces to add to the trunking group.
6. Click **Next**.
7. Select a switch type.
8. Click **Next**.
9. Select a trunking mode.

Important
Some port trunking modes must be supported by your network switches. Selecting an unsupported mode may affect network performance or cause the network interface to freeze.

Mode	Description
Fault Tolerance (Failover)	
Active-Backup	All traffic is sent and received using the interface that was first added to the trunking group. If this primary interface becomes unavailable, the secondary interface will become active.
Broadcast	Transmits the same network packets to all the network interface cards.
Load balancing & Failover	
Balance-tlb	Incoming traffic is received by the current interface. If the interface fails, a slave interface takes over the MAC address of the failed interface. Outgoing traffic is distributed based on the current load for each interface relative to the interface's maximum speed.
Balance-alb	Similar to Balance-tlb, but offers additional load balancing for incoming IPv4 traffic.
Balance-rr	Transmits network packets sequentially to each network interface card in order to distribute the internet traffic among all the NICs.
Balance-xor	Transmits network packets using the Hash algorithm, which selects the same NIC slave for each destination MAC address.
802.3ad dynamic	Uses a complex algorithm to aggregate NICs and configure speed and duplex settings.

10. Click **Apply**.

System Default Gateway

The system default gateway serves as the network access point for the NAS. By default, all external network traffic will pass through the gateway. A network interface must be specified for the default gateway.

Configuring the System Default Gateway

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Click **System Default Gateway**.
   The **System Default Gateway** window opens.
4. Configure the system default gateway.

Setting	Description
Auto-select system default gateway	QTS automatically detects all adapter, virtual switch, PPPoE, and VPN connections that can be used to connect to the internet. It selects one of these connections and then sets it as the default gateway.

Setting	Description
Select the system default gateway	Manually assign an adapter to serve as the system default gateway. Optionally, set a backup failover gateway. The failover default gateway field is only available when multiple interfaces are connected. **Tip** When assigning a PPPoE or VPN connection as the default gateway, ensure a stable physical connection is also set as the failover default gateway.

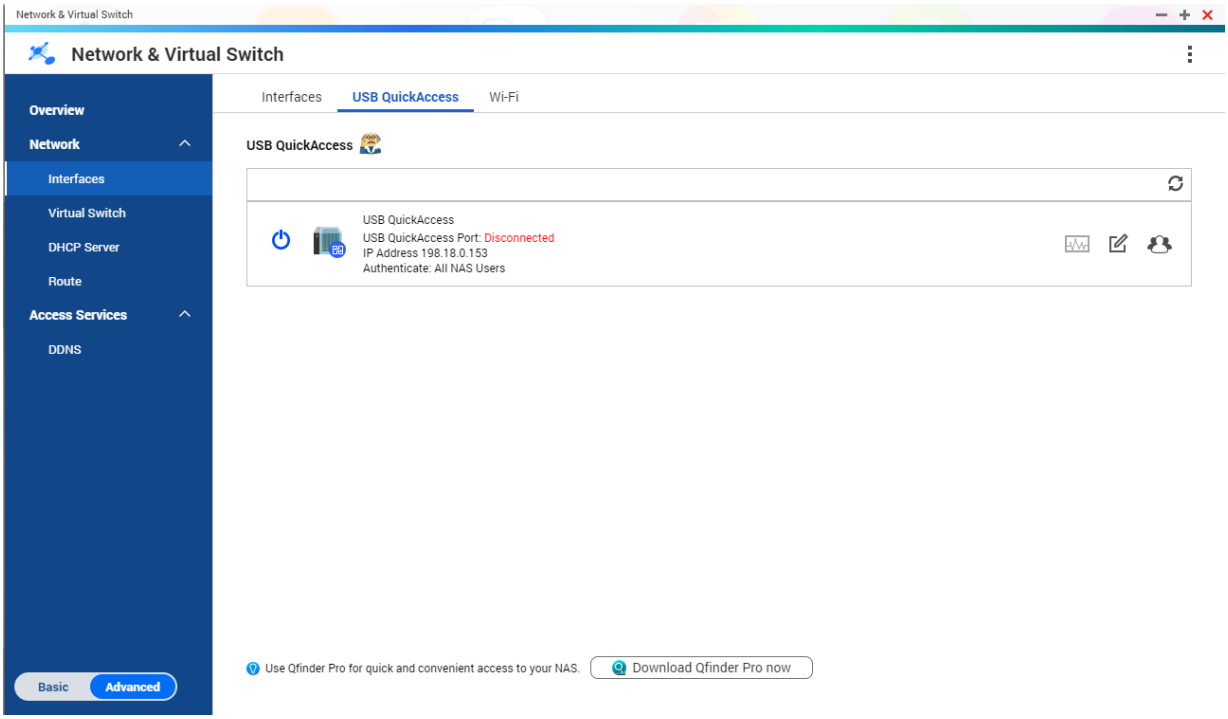
5. Optional: Disable the NCSI service.

Tip
The QTS Network Connectivity Status Indicator (NCSI) periodically performs tests to check the speed and status of NAS network connections.

6. Click **Apply**.

USB QuickAccess

This screen controls the configuration and management of USB QuickAccess services on the NAS. USB QuickAccess allows a computer to connect to the NAS using a USB cable and the Common Internet File System (CIFS).



Tip

- USB QuickAccess is only available on certain models.

- It is not possible to configure, delete, or disable DHCP servers created with USB QuickAccess.

Enabling USB QuickAccess

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **USB Quick Access** tab.
4. Click .

Configuring the USB QuickAccess IP address

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **USB Quick Access** tab.
4. Click .
   The **Configure** window opens.
5. Enter a static IP Address.
6. Click **Apply**.

Configuring USB QuickAccess Authentication

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **USB Quick Access** tab.
4. Click .
   The **Configuration** window opens.
5. Select an authentication method:

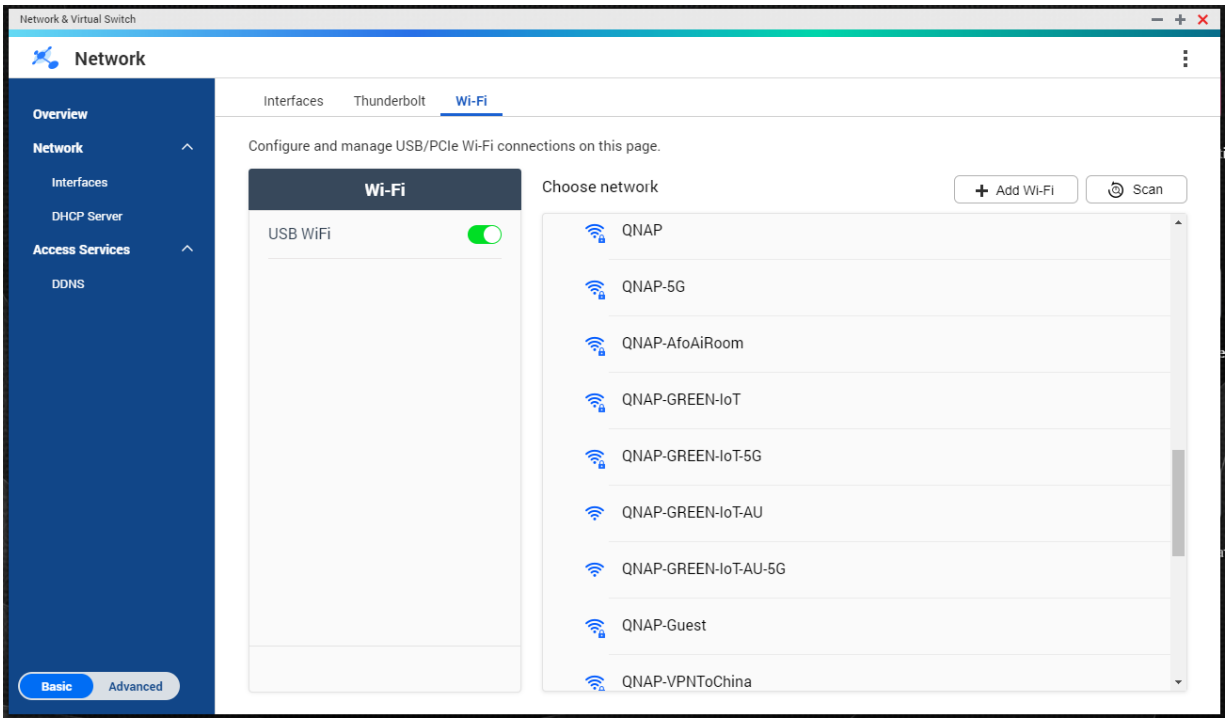
Authentication Method	Description
All NAS Users	A QTS username and password is required to access files.
Everyone	No username or password is required to access files.

Authentication Method	Description
Selected Users/Groups	Administrators can grant access to specific QTS users or groups. A QTS username and password is required to access files. **Tip** To grant access to domain users, first set up Domain Security. Go to **Control Panel** > **Privilege** > **Domain Security** .

6. Click **Apply**.

Wi-Fi

This screen controls the configuration and management of Wi-Fi connections accessible from the NAS.



Important

- A USB or PCIe Wi-Fi device must be installed to access these features.
  - For a list of compatible USB Wi-Fi dongles, visit http://www.qnap.com/compatibility, then select **Search by Devices** > **USB Wi-Fi** .
  - For a list of compatible PCIe Wi-Fi cards, visit http://www.qnap.com/compatibility, then select **Search by Devices** > **Expansion Card** > **QNAP** .
- QTS supports the simultaneous use of multiple PCIe Wi-Fi cards, but only one USB Wi-Fi dongle can be in used at a time.

Enabling Wi-Fi

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **Wi-Fi** tab.
4. Click .

Connecting to a Wireless Network

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **Wi-Fi** tab.
4. Optional: Click **Scan** to search for accessible networks.
5. Select a wireless network from the list.

Icon	Description
	The Wi-Fi network requires a password.
	Connect to a Wi-Fi network without a password.
	• The Wi-Fi connection cannot access the internet. • The Wi-Fi connection requires an additional login. **Tip** QTS does not support networks that require an additional login.

   The settings panel expands.
6. Click **Connect**.
7. Optional: Configure connection settings.

Setting	Description
Password	Enter the password provided by the network administrator. **Tip** Click to make the password visible.
Connect automatically	Automatically connect to this network whenever it is in range.

Setting	Description
Connect even if hidden	Attempt to connect to this network even if the SSID is hidden.

8. Click **Apply**

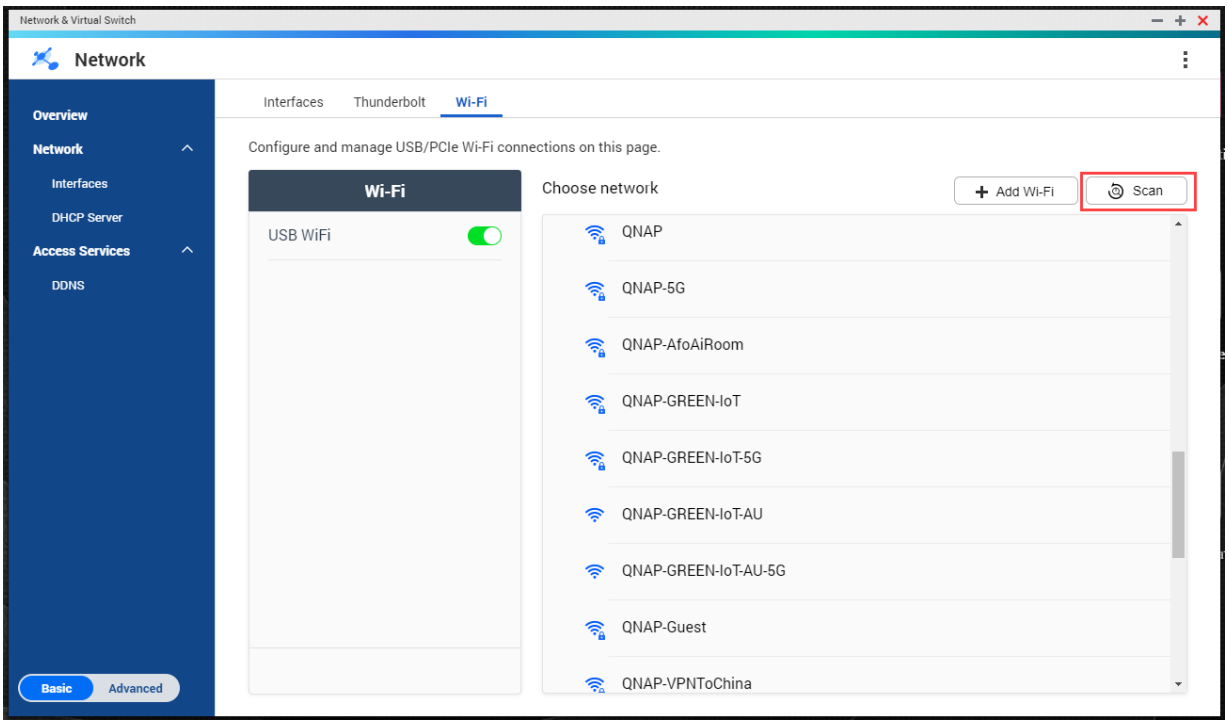
Connecting to a Captive-Portal-Enabled Wireless Network Using Browser Station

Captive portal allows organizations to easily share their network environment with customers, employees, and other guests.

QTS supports the captive portal function that connects to the internet through an access point in the wireless network.

Note
Download and install Browser Station from App Center to access the captive portal functions.
Alternatively, QNAP recommends installing Qfinder Pro(6.9.2 or later) to utilize the captive portal function on a wireless network.
For details, see Connecting to a Captive-Portal-Enabled Wireless Network Using Qfinder Pro.

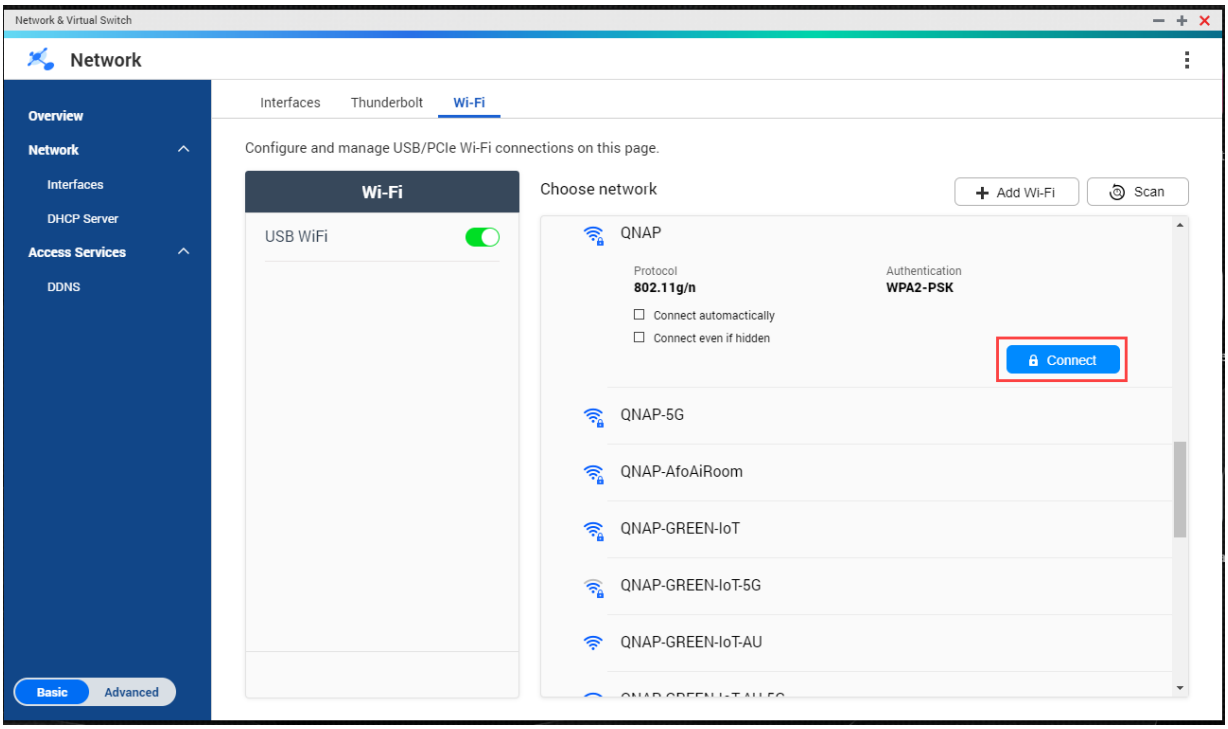
1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **Wi-Fi** tab.
4. Optional: Click **Scan** to search for accessible wireless networks enabled with captive portal.



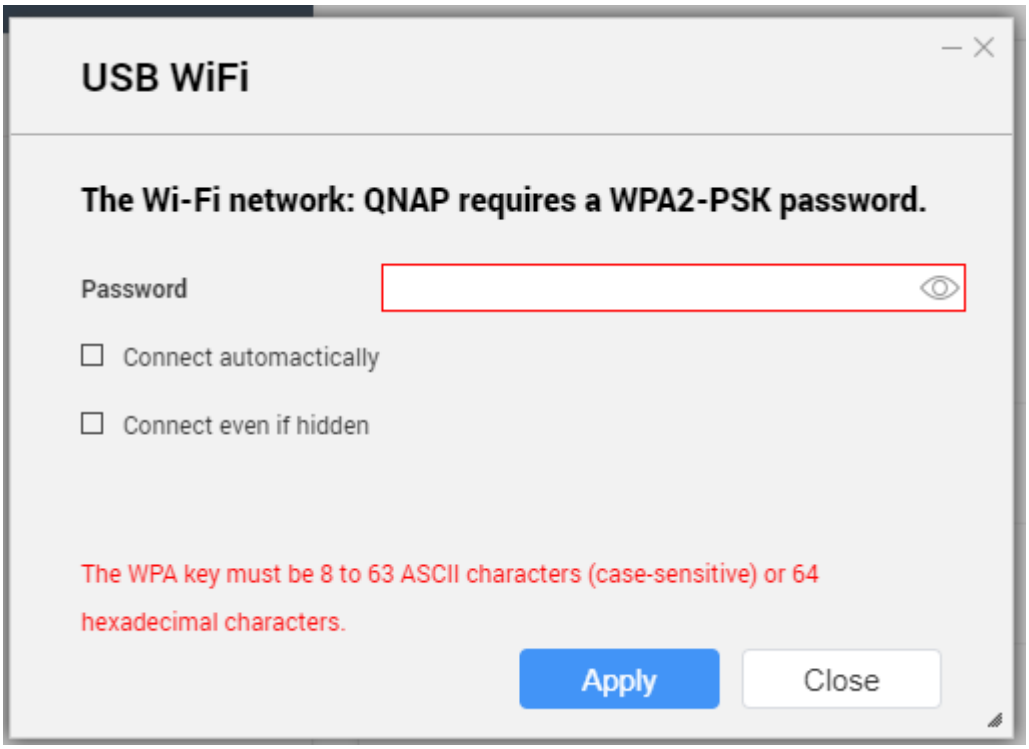
5. Select the captive-portal-enabled wireless network from the list.

The settings panel expands.

6. Click **Connect**.

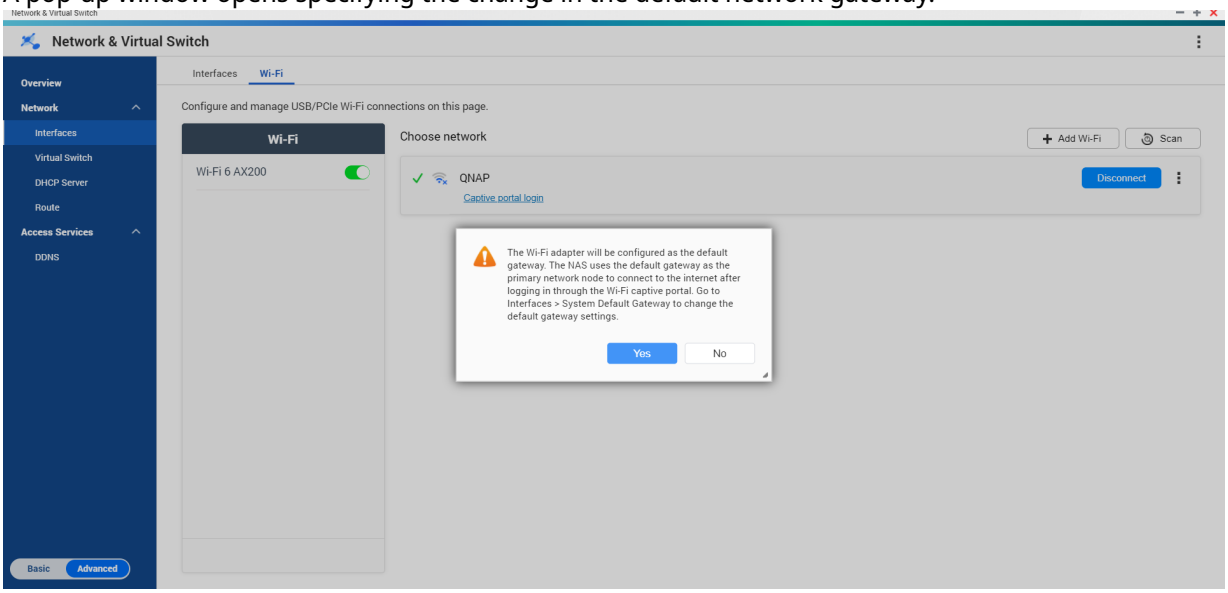


7. Optional: Configure connection settings.

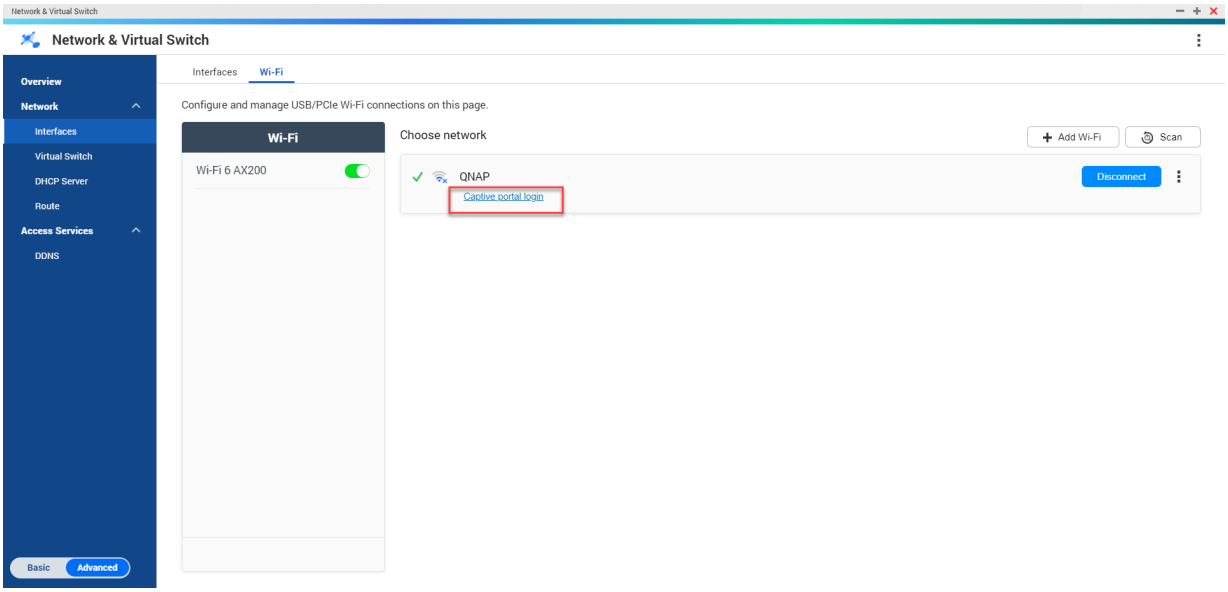


For configuration details and wireless icon descriptions, see Connecting to a Wireless Network.

8. Click **Apply**.
   A pop-up window opens specifying the change in the default network gateway.



9. Click **Yes**.
10. Optional: Go to **Interfaces** > **System Default Gateway** to change the default network gateway settings.
11. Click **Captive portal login**.



Browser Station automatically redirects you to the captive portal landing page.

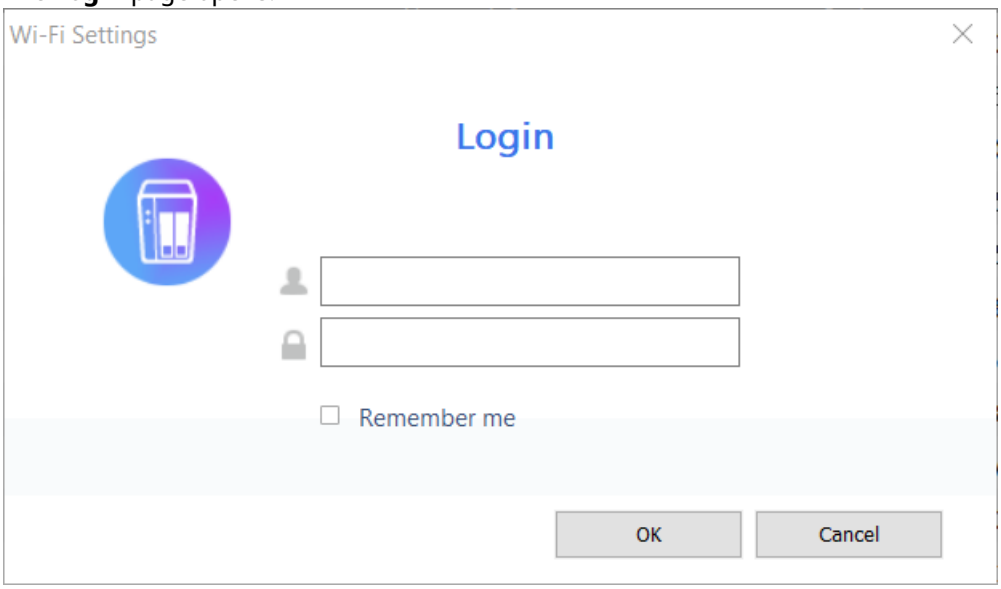
12. Enter the username and password to connect to the wireless network.

Connecting to a Captive-Portal-Enabled Wireless Network Using Qfinder Pro

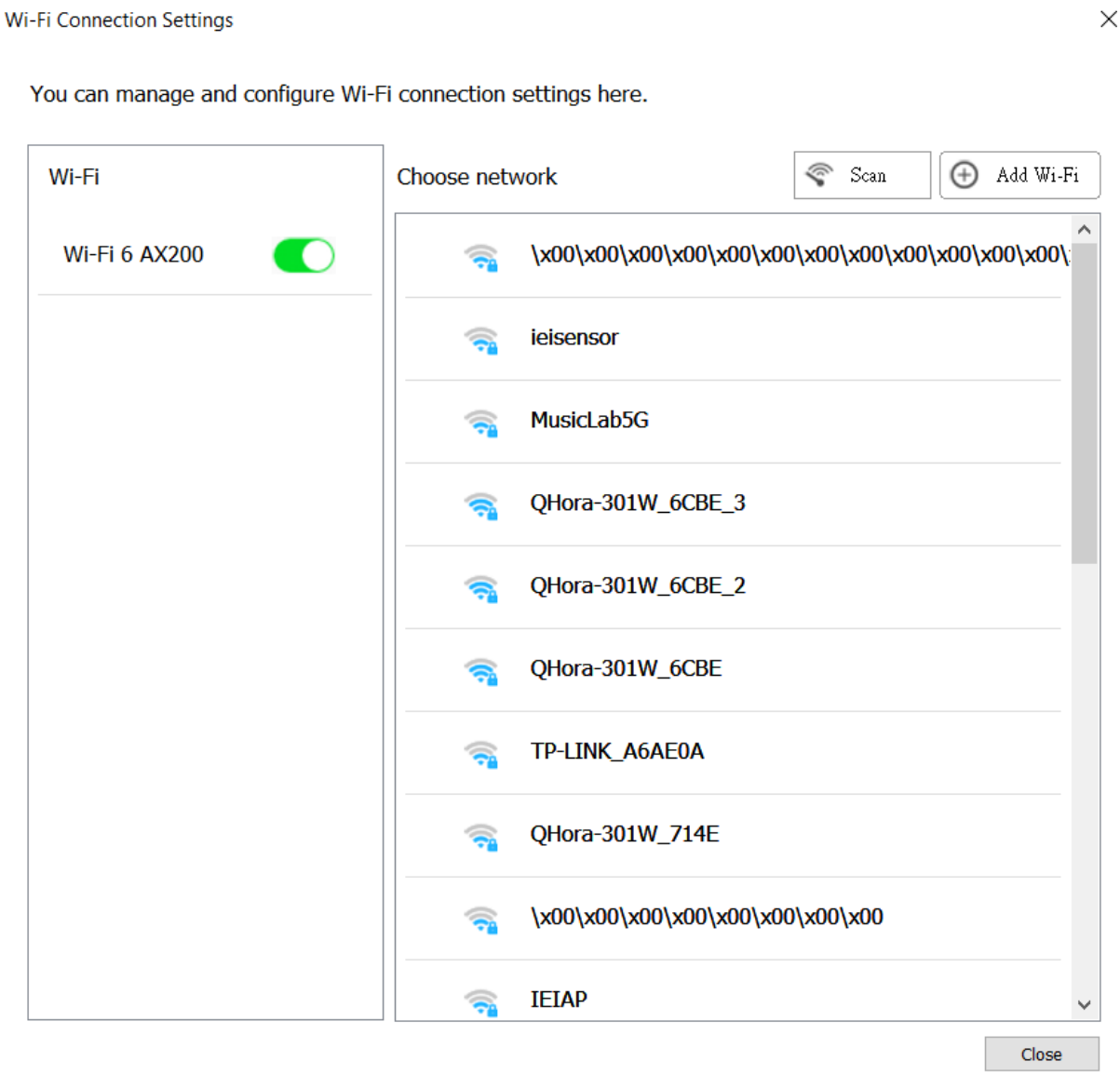
Note
QNAP recommends installing Qfinder Pro (Windows 6.9.2 or later and MacOS/Linux 7.3.2 or later) to utilize the captive portal function on a wireless network.

Important
Connect the NAS directly to the PC using an ethernet cable in order to connect to a wireless network enabled with captive portal.

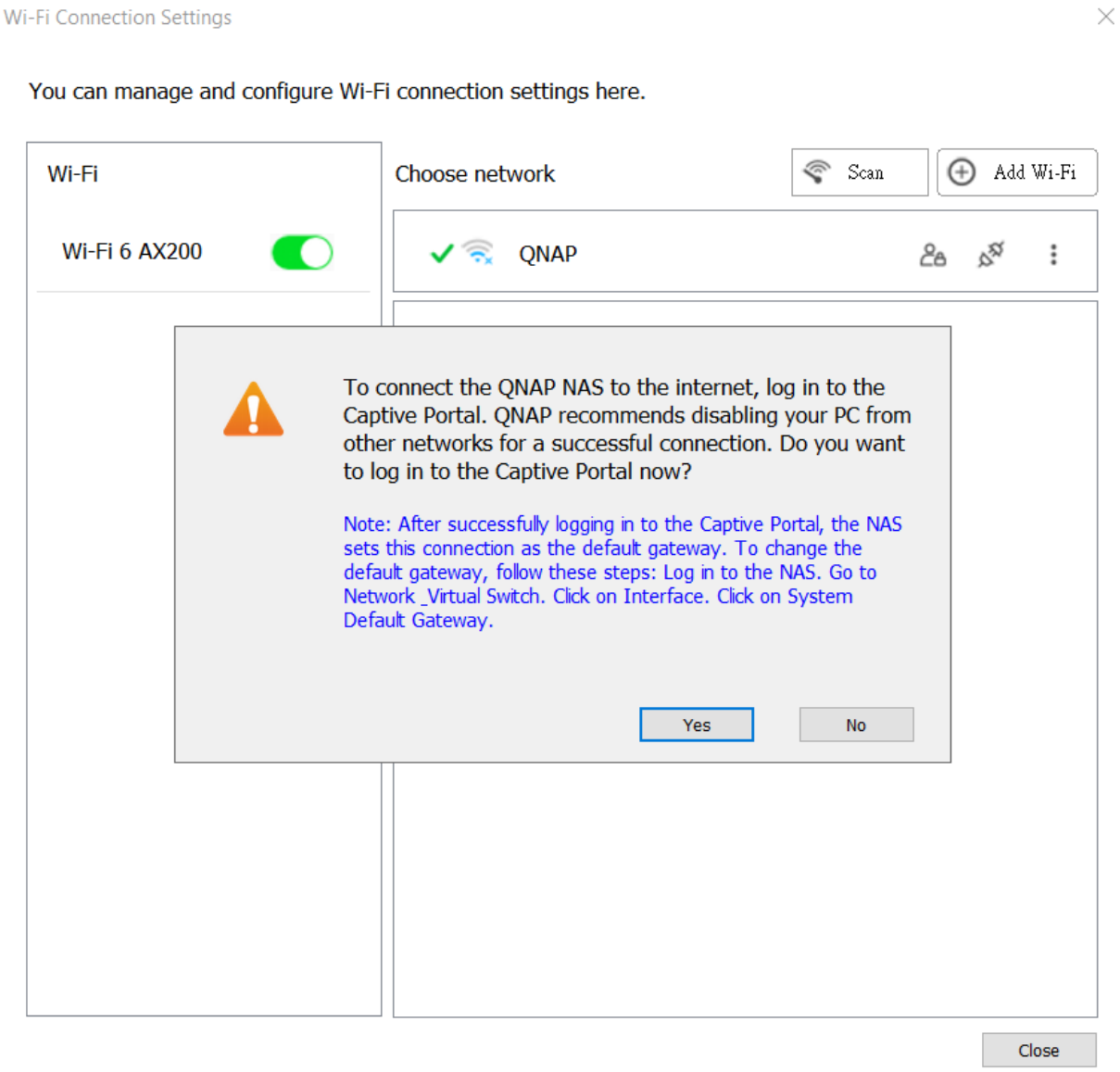
1. Open Qfinder Pro.
2. Locate the NAS in the list and click the unconfigured Wi-Fi icon located under the Status table header.
3. Optional: Alternatively, select the NAS and go to **Settings** > **Wi-Fi Settings** .
   The **Login** page opens.



4. Enter the username and password.
5. Click **OK**.
   The **Wi-Fi Connection Settings** page opens.



6. Select the wireless network from the list.
   The settings panel expands.
7. Click **Connect**.
8. Configure connection settings.
9. Click **Apply**.
   A pop-up window opens.



10. Click **Yes**.
    The default browser automatically opens and redirects you to the captive portal landing page.

> **Note**
> Network & Virtual Switch automatically enables NAT and DHCP on the Wi-Fi adapter in the background.

11. Enter the username and password to connect to the wireless network.

    Qfinder Pro displays the wireless connection icon in the Qfinder Pro NAS status panel.

Adding a Wireless Network

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Interfaces** .
3. Go to the **Wi-Fi** tab.

4. Click **Add Wi-Fi**.
   The **Connect to a Wi-Fi network** window opens.
5. Configure connection settings.

Setting	Description
Network Name	Enter the name of the wireless network.
Security Type	Select the encryption used by the wireless network.
Password	Enter the password provided by the network administrator. **Tip** Click to make the password visible.
Automatically connect when the	Automatically connect to this network whenever it is in range.
Connect even if hidden	Attempt to connect to this network even if the SSID is hidden.

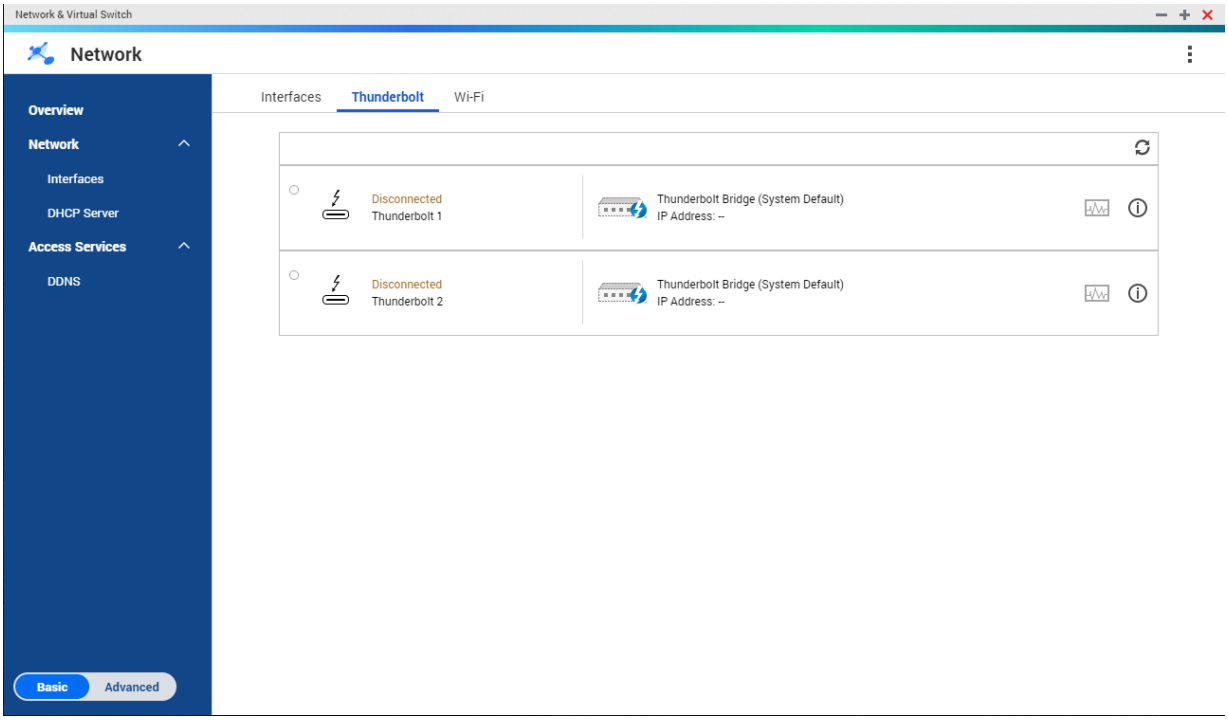
6. Click **Connect**.

Connection Messages

Message	Description
Connected	The NAS is currently connected to the Wi-Fi network.
Connecting	The NAS is trying to connect to the Wi-Fi network.
Out of range or hidden SSID	The wireless signal is not available or the SSID is not being broadcast.
Failed to get IP	The NAS is connected to the Wi-Fi network but could not get an IP address from the DHCP server. Check the router settings.
Association failed	The NAS cannot connect to the Wi-Fi network. Check the router settings.
Incorrect key	The entered password is incorrect.
Auto connect	Automatically connect to the Wi-Fi network. This is not supported if the SSID of the Wi-Fi network is hidden.

Thunderbolt

This screen displays port and connection information related to any Thunderbolt interfaces on the NAS.



Thunderbolt to Ethernet (T2E)

Thunderbolt to Ethernet functionality allows the Thunderbolt port to act as an Ethernet interface.

Tip
QNAP recommends using Qfinder Pro when configuring Thunderbolt to Ethernet.

Important
Due to Thunderbolt driver issues, T2E connections using Thunderbolt 2 may have connectivity problems when connecting to Windows. Thunderbolt 3 connections are unaffected.

Enabling T2E with Qfinder Pro

Qfinder Pro is a utility for Windows, Mac, and Linux that allows you to quickly find and access a QNAP NAS over a LAN.

For the current version of Qfinder Pro, please visit https://www.qnap.com/utilities.

Tip
Qfinder Pro automatically configures the /etc/sysctl.conf settings file on macOS.

1. Open **Qfinder Pro**.
2. Locate the NAS using **Qfinder Pro**.
3. Click the Thunderbolt icon.
   The T2E window opens.
4. Select **Enable T2E**.
5. Click **Apply**.

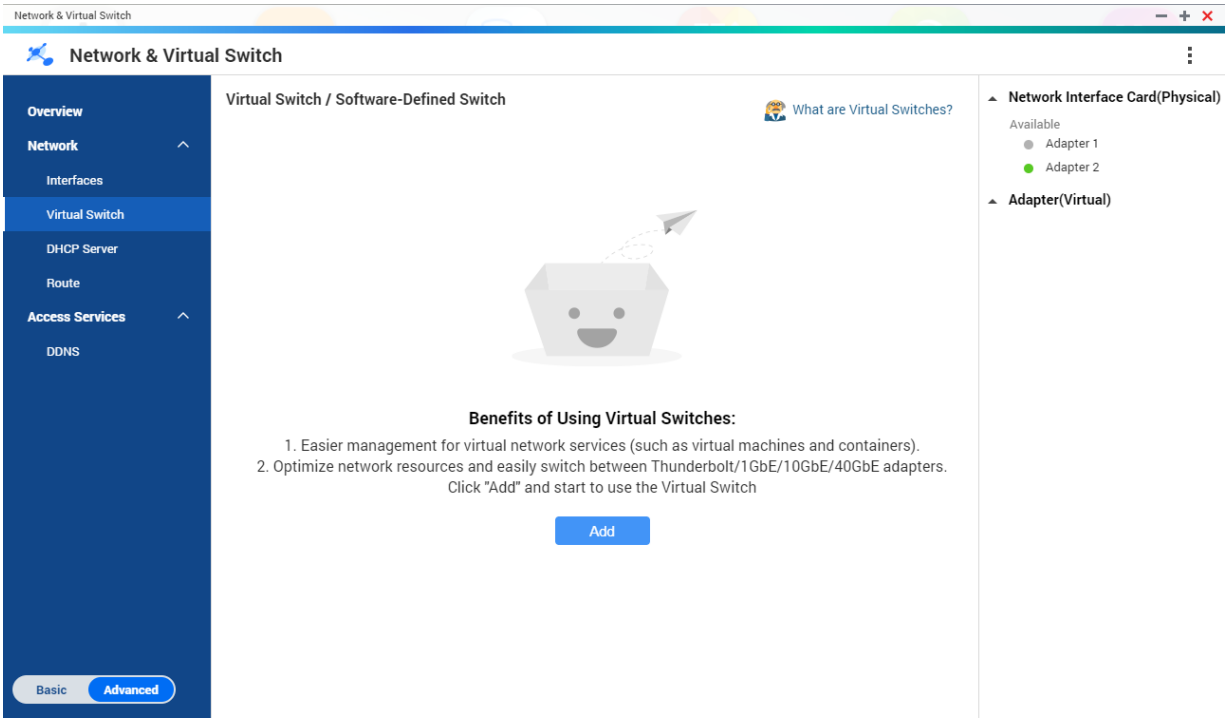
Enabling T2E on macOS

1. Open the Terminal.
2. Run the command.

Command	Notes
sudosysctlnet.inet.tcp.path_mtu_discovery=0 && sudosysctlnet.inet.tcp.tso=0	This command will only temporarily enable T2E. Restarting the Mac will delete the connection.
sudo bash –c 'printf "#QNAP\nnet.inet.tcp.path_mtu_discovery=0\nnet.inet.tcp.tso=0\n#QNAP\n" >> /etc/sysctl.conf'	This command will permanently apply these settings.

Virtual Switches

This screen controls the configuration and management of virtual switches running on the NAS. Virtual Switches allow physical interfaces and virtual adapters to communicate with each other.



QTS supports three different virtual switch modes.

Mode	Description
Basic	This mode is well-suited for most users, and requires minimal configuration of network settings.
Advanced	This mode is best-suited for power-users who need more control over the configuration of network settings.

Mode	Description
Software-Defined Switch	This mode is suited for power-users who need to simulate an L2 physical switch. **Important** Packet forwarding rates are limited when using this mode.

Tip
To access this page, Network & Virtual Switch must be operating in Advanced Mode.

Creating a Virtual Switch in Basic Mode

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Virtual Switch** .
3. Click **Add**.
   The **Create a Virtual Switch** window opens.
4. Select **Basic Mode**.
5. Select one or more adapters.
6. Optional: Select **Enable the Spanning Tree Protocol**.

Tip
Enabling this setting prevents bridge loops.

7. Click **Apply**.

Creating a Virtual Switch in Advanced Mode

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Virtual Switch** .
3. Click **Add**.
   The **Create a Virtual Switch** window opens.
4. Select **Advanced Mode**.
5. Select one or more adapters.
6. Optional: Select **Enable the Spanning Tree Protocol**.

Tip
Enabling this setting prevents bridge loops.

7. Click **Next**.
8. Configure the virtual switch IP address.

Address Type	Description
DHCP Client	Assigns a dynamic IP address to the virtual switch.
Static IP	Assigns a static IP address to the virtual switch. **Tip** Examine your network setup for guidance on how to best configure these settings.
Do not assign IP Addresses	Does not assign an IP address to the virtual switch after creation. **Tip** This setting should be used when creating a virtual switch for special purposes, such as when building an external or isolated network.

9. Click **Next**.
10. Configure the virtual switch services.
    a. Enable the NAT service.

Important

- The virtual switch must be configured with a static IP address. The IP address cannot be within the subnet of an interface that is currently in use.
- The IP address of the virtual switch cannot be in a reserved range that doesn't support forwarding:
  - 127.xxx.xxx.xxx
  - 169.254..xxx.xxx
  - 192.0.2.xxx
  - 198.51.100.xxx
  - 203.0.113.xxx

    b. Optional: Enable the DHCP Server.

Important

- The virtual switch must be configured with a static IP address. The IP address cannot be within the subnet of an interface that is currently in use.
- To avoid IP address conflicts, do not enable DHCP server if there is another DHCP server running on the local network.

Setting	Description
Start IP Address	Specify the starting IP address in a range allocated to DHCP clients.
End IP Address	Specify the ending IP addresses in a range allocated to DHCP clients.

Setting	Description
Subnet Mask	Specify the subnet mask used to subdivide your IP address.
Lease Time	Specify the length of time that an IP address is reserved for a DHCP client. The IP address is made available to other clients when the lease expires.
Default Gateway	Specify the IP address of the default gateway for the DHCP server.
Primary DNS Server	Specify a DNS server for the DHCP server.
Secondary DNS Server	Specify a secondary DNS server for the DHCP server. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.
WINS Server	Specify the WINS server IP address. **Tip** Windows Internet Naming Service (WINS) converts computer names (NetBIOS names) to IP addresses, allowing Windows computers on a network to easily find and communicate with each other.
DNS Suffix	Specify the DNS suffix. **Tip** The DNS suffix is used for resolving unqualified or incomplete host names.
TFTP Server	Specify the public IP address for the TFTP server. **Tip** QTS supports both PXE and remote booting of devices
Boot File	Specify location and file name of the TFTP server boot file. **Tip** QTS supports both PXE and remote booting of devices

11. Click **Next**.
12. Configure the virtual switch IPv6 address.

Setting	Description
Disable	Do not assign an IPv6 address.
IPv6 Auto-Configuration (Stateful)	The adapter automatically acquires an IPv6 address and DNS settings from the DHCPv6-enabled server. **Important** This option requires an available DHCPv6-enabled server on the network.

Setting	Description
IPv6 Auto-Configuration (Stateless)	The adapter automatically acquires an IPv6 address and DNS settings from the router. **Important** This option requires an available IPv6 RA(router advertisement)-enabled router on the network.
Use static IP address	Manually assign a static IP address. You must specify the following information: • Fixed IP Address • Prefix length **Tip** Obtain the prefix length information from your network administrator. • Default Gateway

13. Click **Next**.
14. Configure the DNS settings.

Setting	Description
Obtain DNS server address automatically	Automatically obtain the DNS server address using DHCP.
Use the following DNS server address	Manually assign the IP address for the primary and secondary DNS servers. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

15. Click **Next**.
16. Confirm the virtual switch settings.
17. Click **Apply**.

Creating a Virtual Switch in Software-defined Switch Mode

Important
To avoid bridge loops, please ensure any Ethernet cables are connected to the same switch before configuring a Software-defined Switch.

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Virtual Switch** .
3. Click **Add**.
   The **Create a Virtual Switch** window opens.
4. Select **Software-defined Switch Mode**.

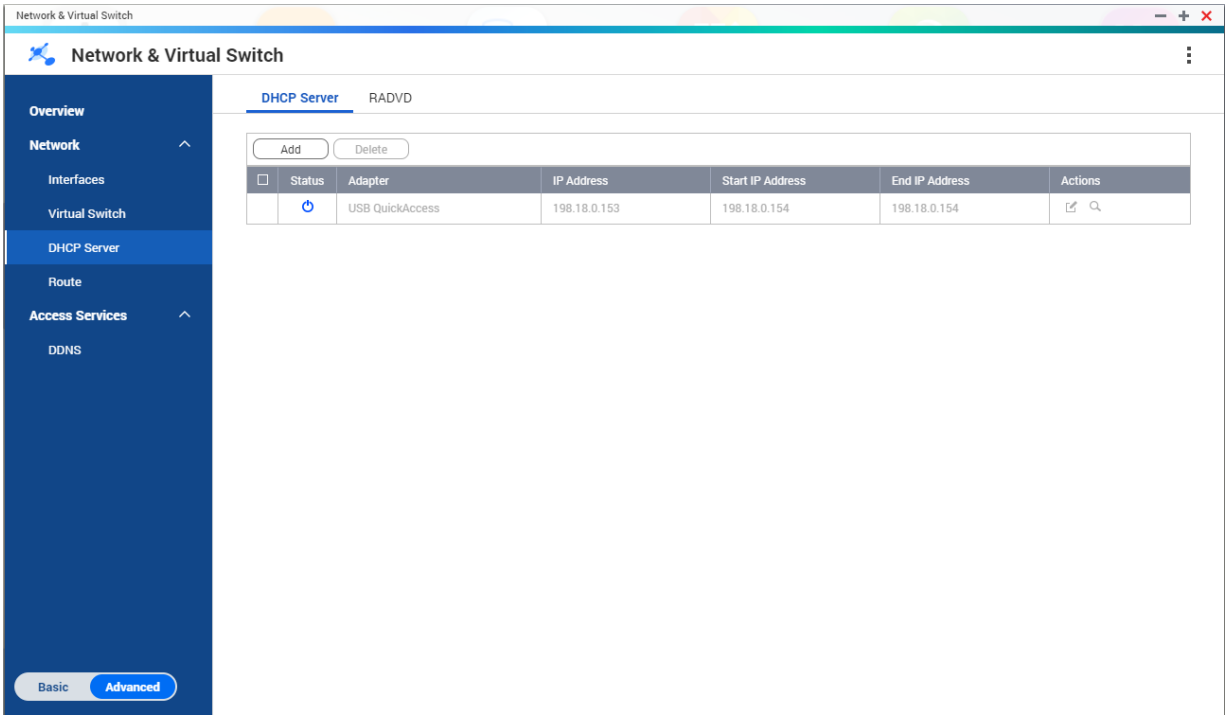
5. Select one or more adapters.
6. Optional: Select **Enable the Spanning Tree Protocol**.

Tip
Enabling this setting prevents bridge loops.

7. Click **Apply**.

DHCP Server

This screen controls the creation and management of Dynamic Host Configuration Protocol (DHCP) servers. DHCP servers can assign IPv4 addresses to clients on the network, while RADVD servers assign IPv6 addresses.



Important
Do not create a new DHCP server if one already exists on the network. Enabling multiple DHCP servers on the same network can cause IP address conflicts or network access errors.

Creating a DHCP Server

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **DHCP Server** .
3. Click **Add**.
   The **DHCP Server** window opens.
4. Select an interface.

5. Click **Next**.
6. Select the network environment for the DHCP server.

Option	Description
Enable DHCP server on the current network.	• The adapter keeps the existing IP address and subnet mask. • The DHCP server shares the subnet mask with the adapter and is assigned the next available IP address.
Reassign an IP address to the adapter and enable a DHCP server on a new subnet.	• The adapter is assigned a new IP address and subnet mask. • The DHCP server uses a different subnet mask and IP address.
Enable DHCP server for another subnet.	• The adapter keeps the existing IP address and subnet mask. • The DHCP server uses a different subnet mask and IP address.

7. Click **Next**.
8. Configure a static IP address for the adapter.

Important
A static IP address must be configured when creating a DHCP server.

   a. Click **Yes**.
   b. Configure IP address settings.

Setting	Description
Fixed IP Address	Specify a fixed IP address. **Tip** Examine your network setup for guidance on how to best configure these settings.
Subnet Mask	Specify the subnet mask used to subdivide your IP address.
Default Gateway	Specify the IP address of the default gateway for the adapter.

Setting	Description
Jumbo Frame	Jumbo Frames are Ethernet frames that are larger than 1500 bytes. They are designed to enhance Ethernet networking throughput, and to reduce CPU usage when transferring large files. QTS supports the following Jumbo Frame sizes: • 1500 bytes (default) • 4074 bytes • 7418 bytes • 9000 bytes **Important** • Jumbo Frames are only supported by certain NAS models. • Using Jumbo Frames requires a network speed of 1000 Mbps or faster. All connected network devices must enable Jumbo Frames and use the same MTU size.
Network Speed	Specify the speed at which the adapter will operate. **Tip** **Auto-negotiation** will automatically detect and set the transfer rate.
Primary DNS Server	Assign an IP address for the primary DNS server.
Secondary DNS server	Assign an IP address for the secondary DNS server. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

c. Click **Next**.

9. Configure DHCP settings.

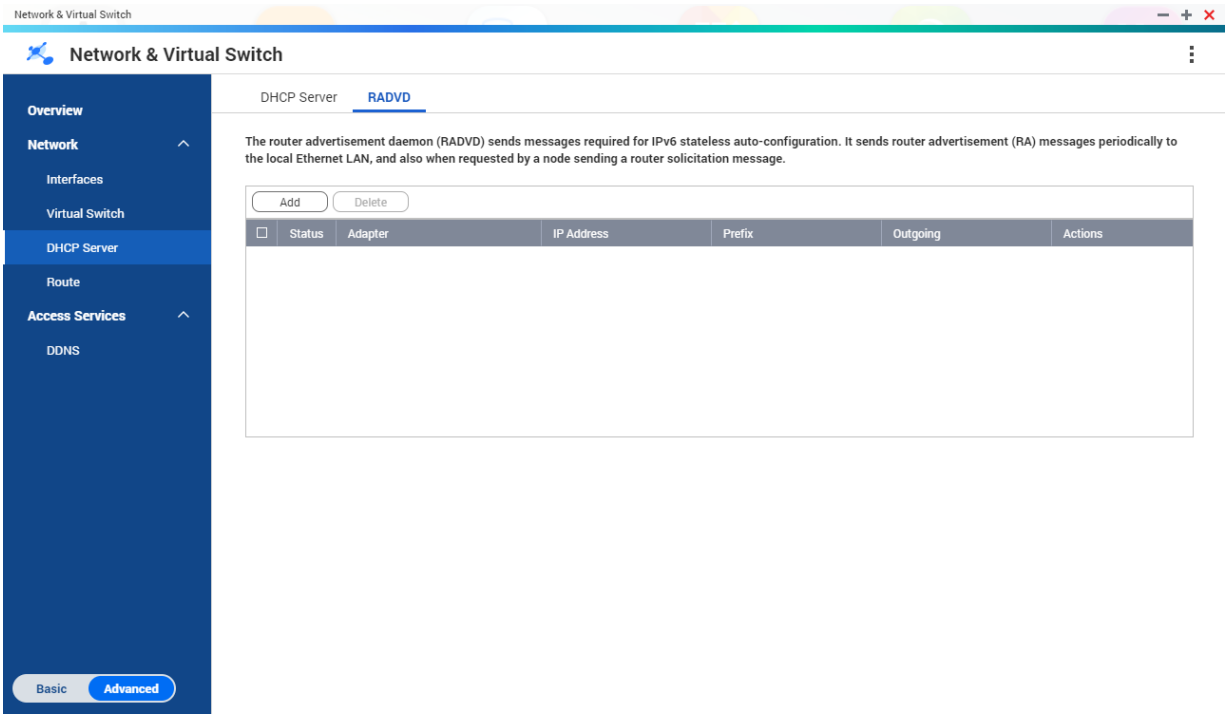
Setting	Description
Start IP Address	Specify the starting IP address in a range allocated to DHCP clients.
End IP Address	Specify the ending IP addresses in a range allocated to DHCP clients.
Subnet Mask	Specify the subnet mask used to subdivide your IP address.
Lease Time	Specify the length of time that an IP address is reserved for a DHCP client. The IP address is made available to other clients when the lease expires.
Default Gateway	Specify the IP address of the default gateway for the DHCP server.
Primary DNS Server	Specify a DNS server for the DHCP server.

Setting	Description
Secondary DNS Server	Specify a secondary DNS server for the DHCP server. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.
WINS Server	Specify the WINS server IP address. **Tip** Windows Internet Naming Service (WINS) converts computer names (NetBIOS names) to IP addresses, allowing Windows computers on a network to easily find and communicate with each other.
DNS Suffix	Specify the DNS suffix. **Tip** The DNS suffix is used for resolving unqualified or incomplete host names.
TFTP Server	Specify the public IP address for the TFTP server. **Tip** QTS supports both PXE and remote booting of devices.
Boot File	Specify location and file name of the TFTP server boot file. **Tip** QTS supports both PXE and remote booting of devices.

10. Click **Apply**.

RADVD

This screen controls the creation and management of Router Advertisement Daemon (RADVD) servers. This service sends messages required for IPv6 stateless auto-configuration. This service periodically sends router advertisement (RA) messages to devices on the local network, and can also send a router solicitation messages when requested from a connected node.



Creating an RADVD Server

1. Go to **Control Panel** > **Network & File Services** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **DHCP Server** .
3. Go to the **RADVD** tab.
4. Click **Add**.
   The **RADVD - Outgoing Interface** window opens.
5. Select the outgoing interface.
6. Click **Next**.
7. Configure a static IP address for the adapter.

Important
A static IP address must be configured when creating a RADVD server.

   a. Click **Yes**.

   b. Optional: Configure Static IP address settings.

Setting	Description
Fixed IP Address	Specify a fixed IP address. **Tip** Examine your network setup for guidance on how to best configure these settings.

Setting	Description
Prefix Length	Specify the prefix length for the adapter. **Tip** Obtain the prefix and the prefix length information from your ISP.
Default Gateway	Specify the IP address of the default gateway for the DHCP server.
Primary DNS Server	Assign an IP address for the primary DNS server.
Secondary DNS server	Assign an IP address for the secondary DNS server. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

c. Click **Next**.

8. Select a second adapter for the RADVD service interface.
9. Click **Next**.
10. Optional: Configure a static IP address for the second RADVD adapter.

Important
Creating an RADVD interface requires that the adapter use a static IP address. If the adapter already uses a static IP address, skip this step.

a. Click **Yes**.

b. Configure Static IP address settings.

Setting	Description
Fixed IP Address	Specify a fixed IP address. **Tip** Examine your network setup for guidance on how to best configure these settings.
Prefix Length	Specify the prefix length for the adapter. **Tip** Obtain the prefix and the prefix length information from your ISP.
Default Gateway	Specify the IP address of the default gateway for the adapter.
Primary DNS Server	Specify the DNS server address.
Secondary DNS server	Specify the DNS server address. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

c. Click **Apply**.

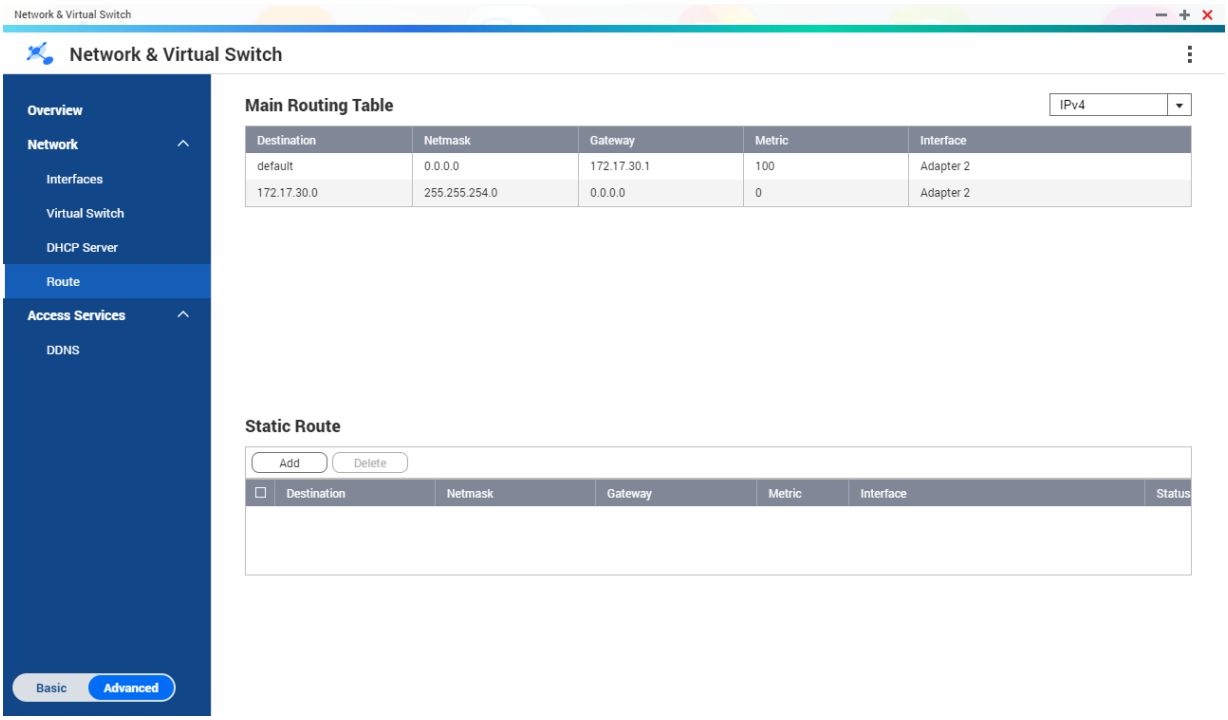
11. Configure the RADVD server settings.

Setting	Description
Prefix	Specify the routing prefix for the adapter. **Tip** Examine your network setup for guidance on how to best configure these settings.
Prefix Length	Specify the prefix length for the adapter. **Tip** Obtain the prefix and the prefix length information from your ISP.
Lease Time	Specify the length of time that an IP address is reserved for a DHCP client. The IP address is made available to other clients when the lease expires.
Primary DNS Server	Specify the DNS server address.
Secondary DNS server	Specify the DNS server address. **Important** QNAP recommends specifying at least one DNS server to allow URL lookups.

12. Click **Apply**.

Route

This screen controls the creation of static routes. Under normal circumstances, QTS automatically obtains routing information after it has been configured for Internet access. Static routes are only required in special circumstances, such as having multiple IP subnets located on your network.



Creating a Static Route

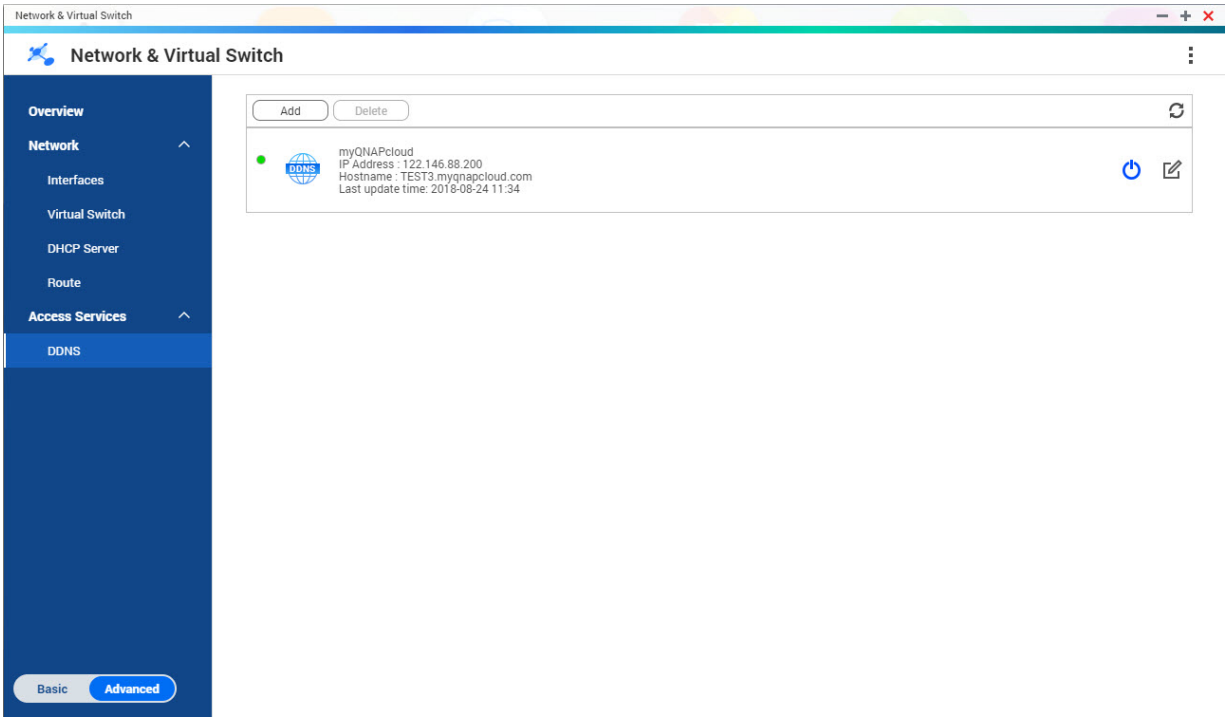
1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **Route** .
3. Click **Add**.
   The **Static Route (IPv4)** window opens.
4. Configure the IP address settings.

Setting	Description
Destination	Specify a static IP address where connections are routed to.
Netmask	Specify the IP address of the destination's netmask.
Gateway	Specify the IP address of the destination's gateway.
Metric	Specify the number of nodes that the route will pass through. **Note** Metrics are cost values used by routers to determine the best path to a destination network.
Interface	Select the interface that connections should be routed through.

5. Click **Apply**.

DDNS

This screen controls the management of Dynamic Domain Name System (DDNS) services. DDNS allows access to the NAS from the internet using a domain name rather than an IP address.



Adding a DDNS Service

1. Go to **Control Panel** > **Network & Virtual Switch** .
   The **Network & Virtual Switch** window opens.
2. Go to **Network** > **DDNS** .
3. Click **Add**.
   The **DDNS (Add)** window opens.
4. Configure the DDNS settings.

Setting	Description
Select DDNS server	Select the DDNS service provider.
Username	Specify the username for the DDNS service.
Password	Specify the password for the DDNS service.
Hostname	Specify the hostname or domain name for the DDNS service.
Check the External IP Address	Specify how often to update the DDNS record.

5. Click **Apply**.

10. iSCSI & Fibre Channel

iSCSI & Fibre Channel is a QTS utility that enables you to configure iSCSI and Fibre Channel storage settings on your NAS.

Storage Limits

iSCSI Storage Limits

iSCSI Storage Limit	Maximum
iSCSI LUNs and targets per NAS	255 (combined)
Connections per iSCSI session	8
iSCSI sessions per target	The maximum number of sessions is determined by available NAS CPU resources, memory, and network bandwidth.
iSCSI sessions per NAS	The maximum number of sessions is determined by available NAS CPU resources, memory, and network bandwidth.

Fibre Channel Storage Limits

Fibre Channel Storage Limit	Maximum
Fibre Channel ports + port groups	256 (combined)
WWPN aliases	256
LUN masking rules	256
Port binding rules	256
LUNs mapped to 1 Fibre Channel port	256

iSCSI & Fibre Channel Global Settings

You can access global settings by clicking in the **iSCSI & Fibre Channel** window.

Setting	Description
Enable iSCSI and Fibre Channel services	Enable these services to use iSCSI and Fibre Channel on your NAS.
iSCSI service port	View and modify the port that iSCSI initiators connect to. **Tip** The default port is 3260.
Enable iSNS	SNS enables the automatic discovery and management of iSCSI initiators and targets within a TCP/IP network. **iSNS server IP**: Specify the IP address of the iSNS server.

LUNs

QTS LUN Types

QTS supports the following types of LUN.

Tip
Block-based LUNs support more features and have faster read/write speeds. QNAP recommends using block-based LUNs over file-based LUNs if possible.

Feature	Block-based LUN	File-based LUN	VJBOD Cloud LUN
Parent storage space	Storage pool	Thick volume	Cloud space
VAAI Full Copy	Supported	Supported	Supported
VAAI Block Zeroing	Supported	Supported	Supported
VAAI Hardware-Assisted Locking	Supported	Supported	Supported
VAAI Thin Provisioning and Space Reclaim	Supported	Not supported	Supported
Thin provisioning	Supported	Supported	Not supported
QTS space reclamation	Supported (when using VAAI or the host is Windows Server 2012, Windows 8 or later)	Not supported	Supported (when using VAAI or the host is Windows Server 2012, Windows 8 or later)
Microsoft ODX	Supported	Not supported	Supported
LUN export	Supported	Supported	Supported
LUN snapshots	Supported	Partially supported (You can take a snapshot of the LUN's parent volume.)	Supported
Read/write speeds	High	Medium to low	High when using caching (stored space) Low when not using caching

Creating a Block-Based LUN

1. Go to one of the following screens.
   - **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage**
   - **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Storage**
2. Click **Create**, and then select **New Block-Based LUN**.
   The **Block-Based LUN Creation Wizard** opens.
3. Select the storage pool that this LUN will be created in.
4. Select a LUN allocation method.

Allocation	Description
Thick instant allocation	QTS allocates storage pool space when creating the LUN. This space is guaranteed to be available later.

Allocation	Description
Thin provisioning	QTS allocates storage pool space only when needed, such as when data is being written to the LUN. This ensures efficient use of space but there is no guarantee that space will be available.

5. Click **Next**.
6. Configure the following LUN settings.

Setting	Description
LUN name	• Length: 1 to 32 characters • Valid characters: 0-9, a-z, A-Z, underscore (_)
LUN capacity	Specify the maximum capacity of the LUN. The maximum capacity depends on the LUN allocation method: • Thick provisioning: Equal to the amount of free space in the parent storage pool. • Thin provisioning: 250 TB **Tip** Select **Maximum** to allocate all remaining free space to the LUN.

7. Optional: Configure any of the following advanced settings.

Setting	Description
Sector size	Changing the sector size to 4 KB increases LUN performance for specific applications and disk types. **Important** VMware does not currently support a 4 KB sector size.
Alert threshold	QTS issues a warning notification when the percentage of used LUN space is equal to or above the specified threshold.
Accelerate performance with SSD cache	The SSD cache will be used to improve LUN access performance. **Important** This setting is only available when the SSD cache is enabled.
Report volatile write cache for data safety	When enabled, QTS informs iSCSI initiators connected to this LUN that volatile write-cache is being used on the NAS. As a result, initiators might frequently tell QTS to flush cached LUN data to disk, which increases data safety but decreases LUN performance.
FUA bit support	When enabled, iSCSI initiators are able to tell QTS to flush important cached data to disk, instead of the whole read-write cache. **Important** Both the iSCSI initiator and the application using the LUN must support this feature.

8. Click **Next**.
9. Optional: Deselect **Do not map it to a target for now**.
   If deselected, the **Edit LUN Mapping** wizard appears after QTS has finished creating the LUN.
10. Click **Finish**.
11. Optional: Map the LUN to an iSCSI target or Fibre Channel port group.
    For details, see the following topics:
    - Mapping a LUN to an iSCSI Target
    - Mapping a LUN to a Fibre Channel Port Group

Creating a File-Based LUN

1. Go to one of the following screens.
   - **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage**
   - **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Storage**
2. Click **Create**, and then select **New File-Based LUN**.
   The **File-Based LUN Creation Wizard** opens.
3. Select the thick volume that this LUN will be created on.
4. Select a LUN allocation method.

Allocation	Description
Thick instant allocation	QTS allocates storage pool space when creating the LUN. This space is guaranteed to be available later.
Thin provisioning	QTS allocates storage pool space only when needed, such as when data is being written to the LUN. This ensures efficient use of space but there is no guarantee that space will be available.

5. Click **Next**.
6. Configure the following LUN settings.

Setting	Description
LUN name	• Length: 1 to 32 characters • Valid characters: 0-9, a-z, A-Z, underscore (_)
LUN capacity	Specify the maximum capacity of the LUN. The maximum capacity depends on the LUN allocation method: • Thick provisioning: Equal to the amount of free space in the parent storage pool. • Thin provisioning: 250 TB

7. Optional: Configure any of the following advanced settings.

Setting	Description
Sector size	Changing the sector size to 4 KB increases LUN performance for specific applications and disk types. **Important** VMware does not currently support a 4 KB sector size.
Alert threshold	QTS issues a warning notification when the percentage of used LUN space is equal to or above the specified threshold.
Report volatile write cache for data safety	When enabled, QTS informs iSCSI initiators connected to this LUN that volatile write-cache is being used on the NAS. As a result, initiators might frequently tell QTS to flush cached LUN data to disk, which increases data safety but decreases LUN performance.
FUA bit support	When enabled, iSCSI initiators are able to tell QTS to flush important cached data to disk, instead of the whole read-write cache. **Important** Both the iSCSI initiator and the application using the LUN must support this feature.

8. Click **Next**.
9. Optional: Deselect **Do not map it to a target for now**.
   If deselected, the **Edit LUN Mapping** wizard appears after QTS has finished creating the LUN.
10. Click **Finish**.
11. Optional: Map the LUN to an iSCSI target or Fibre Channel port group.
    For details, see the following topics:
    - Mapping a LUN to an iSCSI Target
    - Mapping a LUN to a Fibre Channel Port Group

iSCSI

iSCSI enables computers, servers, other NAS devices, and virtual machines to access NAS storage in the form of LUNs over a TCP/IP network. Hosts can partition, format, and use the LUNs as if they were local disks.

Getting Started with iSCSI

1. Create an iSCSI target on the NAS.
   For details, see Creating an iSCSI Target.
2. Create a LUN on the NAS.
   A LUN is a portion of storage space, similar to a volume. LUNs are created from storage pool space (block-based) or from space in a thick volume (file-based).
   For more information, see:
   - QTS LUN Types
   - Creating a Block-Based LUN
   - Creating a File-Based LUN

3. Map the LUN to the iSCSI target.
   Multiple LUNs can be mapped to one target.
   For details, see iSCSI LUN Actions.
4. Install an iSCSI initiator application or driver on the host.
   The host is the service, computer, or NAS device that will access the LUN.
5. Connect the iSCSI initiator to the iSCSI target on the NAS.

Warning
To prevent data corruption, multiple iSCSI initiators should not connect to the same LUN simultaneously.

   The LUNs mapped to the iSCSI target appear as disks on the host.
6. In the host OS, format the disks.

iSCSI Performance Optimization

You can optimize the performance of iSCSI by following one or more of these guidelines:

- Use thick provisioning (instant allocation). Thick provisioning gives slightly better read and write performance than thin provisioning.
- Create multiple LUNs, one for each processor thread on the NAS. For example, if the NAS has four processor threads, then you should create four or more LUNs.

Tip
Go to **Control Panel** > **System** > **System Status** > **System Information** > **CPU** to view the number of processor threads.

- Use separate LUNs for different applications. For example, when creating two virtual machines which intensively read and write data, you should create one LUN for each VM to distribute the load.
- You can use iSER (iSCSI Extensions for RDMA) for faster data transfers between QNAP NAS devices and VMware ESXi servers. Enabling iSER requires a compatible network card and switch. For a list of compatible network devices, see https://www.qnap.com/solution/iser.

iSCSI Storage

The **iSCSI Storage** screens allows you to view iSCSI targets. On this screen you can enable, disable, and edit targets, view each target's mapped LUNs, edit LUN mappings, take snapshots of LUNs, and configure the ISCSI access control list (ACL).

iSCSI LUNs

Mapping a LUN to an iSCSI Target

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Select a LUN.

Tip
Double-click an iSCSI target to view all of its mapped LUNs.

3. Optional: If the LUN is already mapped to a target, disable the LUN.
   a. Click **Action**, and then select **Disable**

A confirmation message appears.

b. Click **OK.**
QTS disables the LUN.

4. Click **Action**, and then select **Edit LUN Mapping**.
The **Edit LUN Mapping** window opens.
5. Select **Map to iSCSI target**.
6. Select an iSCSI target.
7. Optional: Select **Enable LUN**.
If selected, QTS will enable the LUN after mapping it to the target.
8. Click **OK**.

iSCSI LUN Actions

LUN Action	Description
Disable	Disable the LUN. The LUN will become inaccessible to connected iSCSI initiators.
Enable	Enable a disabled LUN.
Modify	Edit the LUN settings.
Delete	Delete the LUN and all data stored on it. **Important** This action is only available if the LUN is unmapped.
Edit LUN Mapping	Unmap the LUN, or map it to a different iSCSI target or Fibre Channel Port group. For details, see the following topics: • Mapping a LUN to a Fibre Channel Port Group • Mapping a LUN to an iSCSI Target
Show in Storage & Snapshots	Manage the LUN at **Storage & Snapshots** > **Storage** > **Storage/Snapshots**
LUN Import/Export	Export the LUN to another server, a local NAS folder, or an external storage device. For details, see Creating a LUN Export Job.

iSCSI LUN Status

Status	Description
Enabled	The LUN is active and visible to connected initiators.
Disabled	The LUN is inactive and invisible to connected initiators.

iSCSI Targets

Creating an iSCSI Target

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .

2. Click **Create**, and then select **New iSCSI Target**.
   The **iSCSI Target Creation Wizard** window opens.
3. Click **Next**.
4. Specify a target name.
   QTS appends the specified name to the iSCSI qualified name (IQN). IQNs are unique names used to identify targets and initiators.
   - Valid characters: 0 to 9, a to z, A to Z
   - Length: 1 to 16 characters
5. Optional: Specify a target alias.
   An alias enables you to identify the target more easily on the initiator.
   - Length: 1 to 32 characters
   - Valid characters: 0 to 9, a to z, A to Z, underscore (_), hyphen (-), space ( )
6. Optional: Select **Allow clustered access to this target**.
   When enabled, multiple iSCSI initiators can access this target and its LUNs simultaneously.

Warning
To prevent data corruption, the initiators and LUN filesystems must all be cluster-aware.

7. Optional: Enable CRC checksums.
   Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately.

Checksum Type	Description
Data Digest	The checksum can be used to verify the data portion of the PDU.
Header Digest	The checksum can be used to verify the header portion of the PDU.

8. Click **Next**.
9. Optional: Enable CHAP authentication.
   An initiator must authenticate with the target using the specified username and password. This provides security, as iSCSI initiators do not require a NAS username or password.
   - Username
     - Length: 1 to 127 characters
     - Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
   - Password
     - Length: 12 to 16 characters
     - Valid characters: 0 to 9, a to z, A to Z, all special characters
10. Optional: Enable mutual CHAP authentication.
    Both the initiator and the target must authenticate with each other for additional security. First, the initiator authenticates with the target using the CHAP authentication username and password. Next, the target authenticates with the initiator using the mutual CHAP username and password.

- Username
  - Length: 1 to 127 characters
  - Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
- Password
  - Length: 12 to 16 characters
  - Valid characters: 0 to 9, a to z, A to Z, all special characters

11. Click **Next**.
12. Optional: Select **Create a LUN and map it to this target**.
    If selected, QTS opens the **Block-Based LUN Creation Wizard** immediately after finishing this wizard. The new LUN will then be automatically mapped to this target.
13. Click **Apply**.

QTS creates the iSCSI target, and then opens the **Block-Based LUN Creation Wizard** window if **Create an iSCSI LUN and map it to this target** was enabled.

Editing iSCSI Target Settings

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Select an iSCSI target.
3. Click **Action**, and then select **Modify**.
   The **Modify iSCSI Target** window opens.
4. Modify any of the following settings.

Setting	Description
Target Alias	An alias enables you to identify the target more easily on the initiator. • Length: 1 to 32 characters • Valid characters: 0 to 9, a to z, A to Z, underscore (_), hyphen (-), space ( )
Enable clustered access to the iSCSI target from multiple initiators	When enabled, multiple iSCSI initiators can access this target and its LUNs simultaneously. **Warning** To prevent data corruption, the initiators and LUN filesystems must all be cluster-aware.
CRC/Checksum	Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately. • Data Digest: The checksum can be used to verify the data portion of the PDU. • Header Digest: The checksum can be used to verify the header portion of the PDU.

Setting	Description

Use CHAP authentication	An initiator must authenticate with the target using the specified username and password. This provides security, as iSCSI initiators do not require a NAS username or password.
	• Username
	  • Length: 1 to 127 characters
	  • Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
	• Password
	  • Length: 12 to 16 characters
	  • Valid characters: 0 to 9, a to z, A to Z, all special characters

Mutual CHAP	Both the initiator and the target must authenticate with each other for additional security. First, the initiator authenticates with the target using the CHAP authentication username and password. Next, the target authenticates with the initiator using the mutual CHAP username and password.
	• Username
	  • Length: 1 to 127 characters
	  • Valid characters: 0 to 9, a to z, A to Z, colon (:), period (.), hyphen (-)
	• Password
	  • Length: 12 to 16 characters
	  • Valid characters: 0 to 9, a to z, A to Z, all special characters

5. Click **Apply**.

iSCSI Target Actions

Action	Description
Deactivate	Disable an active target and disconnect all connected iSCSI initiators.
Activate	Enable a deactivated target.
Modify	Edit the target's settings. For details, see Editing iSCSI Target Settings.
View Connections	View the IP addresses and IQN information of all iSCSI initiators connected to this target.
Delete	Disconnect all connected iSCSI initiators and delete the target. Any LUNs mapped to the target will be unmapped and then added to the unmapped LUN list.

iSCSI Target Status

Status	Description
Ready	The target is accepting connections but no initiators are currently connected.
Connected	An initiator is connected to the target.
Offline	The target is not accepting connections.

iSCSI ACL

The iSCSI access control list (ACL) allows you to configure a LUN masking policy for each connected iSCSI initiator. A LUN masking policy determines which LUNs the initiator is able to see and access. If no policy is specified for an iSCSI initiator, then QTS applies the default policy to it.

Tip

- The default policy gives all iSCSI initiators full read/write access to all LUNs.
- You can edit the default policy so that all LUNs are either read-only or not visible to all iSCSI initiators, except for initiators with specific permissions from a policy.

Adding an iSCSI LUN Masking Policy

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Click **iSCSI ACL**.
   The **iSCSI ACL** window opens.
3. Click **Add a Policy**.
   The **Add a Policy** window opens.
4. Specify the policy name.
   The name must consist of 1 to 32 characters from any of the following groups:
   - Letters: a-z, A-Z
   - Numbers: 0-9
   - Special characters: Hyphen (-), space ( ), underscore (_)
5. Specify the initiator IQN.
6. Configure the access permissions for each LUN.

Permission	Description
Read Only	The iSCSI initiator can read data on the LUN, but cannot write, modify, or delete data.
Read/Write	The iSCSI initiator can read, write, modify, and delete data on the LUN.
Deny Access	The LUN is invisible to the iSCSI initiator.

Tip
Click the values in the columns to change the permissions.

7. Click **Apply**.

Editing an iSCSI LUN Masking Policy

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Click **iSCSI ACL**.
   The **iSCSI ACL** window opens.
3. Select a policy.
4. Click **Edit**.
   The **Modifiy a Policy** window opens.
5. Optional: Edit the policy name.
   The name must consist of 1 to 32 characters from any of the following groups:
   - Letters: a-z, A-Z
   - Numbers: 0-9
   - Special characters: Hyphen (-), space ( ), underscore (_)
6. Optional: Configure the access permissions for each LUN.

Permission	Description
Read Only	The iSCSI initiator can read data on the LUN, but cannot write, modify, or delete data.
Read/Write	The iSCSI initiator can read, write, modify, and delete data on the LUN.
Deny Access	The LUN is invisible to the iSCSI initiator.

Tip
Click the values in the columns to change the permissions.

7. Click **Apply**.

Deleting an iSCSI LUN Masking Policy

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Click **iSCSI ACL**.
   The **iSCSI ACL** window opens.
3. Select a policy.
4. Click **Delete**.
   A confirmation message appears.
5. Click **OK**.

iSCSI Target Authorization

Each iSCSI target can be configured either to allow connections from all iSCSI initiators, or to only allow connections from a list of authorized initiators.

Important
By default, iSCSI target authorization is disabled.

Configuring an iSCSI Target's Authorized Initiators List

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Select an iSCSI target.
3. Click **Action**, and then select **Modify**.
   The **Modify an iSCSI Target** window opens.
4. Click **Initiators**.
5. Select **Allow connections from the list only**.
6. Optional: Add one or more iSCSI initiators to the authorized iSCSI initiators list.
   a. Click **Add**.
   b. Specify the initiator IQN.
   c. Click **Confirm**.
   d. Repeat the previous steps for each additional iSCSI initiator that you want to add.
7. Optional: Delete one or more iSCSI initiators from the authorized iSCSI initiators list.
   a. Select an initiator IQN.
   b. Click **Delete**.
   c. Repeat the previous steps for each additional iSCSI initiator that you want to delete.
8. Click **Apply**.

Disabling iSCSI Target Authorization

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** .
2. Select an iSCSI target.
3. Click **Action**, and then select **Modify**.
   The **Modify an iSCSI Target** window opens.
4. Click **Initiators**.
5. Select **Allow all connections**.
6. Click **Apply**.

QNAP Snapshot Agent

QNAP Snapshot Agent enables QTS to take application-consistent snapshots of iSCSI LUNs on VMware or Microsoft servers. Application-consistent snapshots record the state of running applications, virtual machines, and data. When QTS takes a LUN snapshot, QNAP Snapshot Agent triggers the following actions:

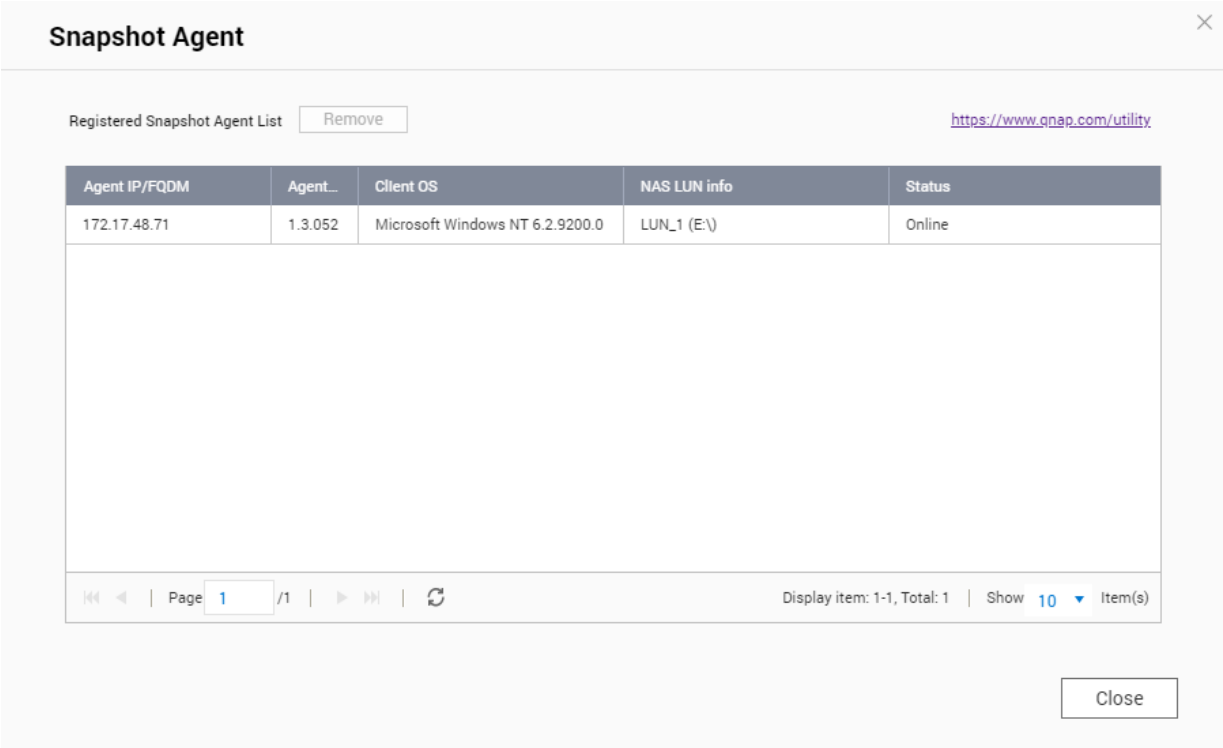
- Windows: The server flushes data in memory, logs, and pending I/O transactions to the LUN before the snapshot is created.
- VMware: The server takes a virtual machine snapshot.

Tip
To download QNAP Snapshot Agent, go to https://www.qnap.com/utilities.

Snapshot Agent Server List

To view a list of all iSCSI initiators that are using QNAP Snapshot Agent with this NAS, go to **iSCSI & Fibre Channel** > **iSCSI** > **iSCSI Storage** . Click **Snapshot**, and then select **Snapshot Agent**.

Tip
To unregister an iSCSI initiator, select it in the list and then click **Remove**.



Remote Disk

Remote disk enables QTS to act as an iSCSI initiator, allowing you to expand NAS storage by adding iSCSI LUNs from other NAS or storage servers as remote disks. When connected, remote disks are automatically shared on the **Shared Folders** screen. If a remote disk is disconnected, the disk will become inaccessible and QTS will try to reconnect to the target after 2 minutes. If the target cannot be reached, the status of the remote disk will change to `Disconnected`.

This feature is only available on NAS models that support iSCSI.

Remote Disk Limitations

Limit	Value
Maximum number of remote disks per NAS	8
Supported file systems	ext3, ext4, FAT32, NTFS, HFS+
Maximum remote disk size	16 TB

Adding a Remote Disk

1. Go to **iSCSI & Fibre Channel** > **iSCSI** > **Remote Disks** .
2. Click **Add Virtual Disk**.
3. Specify the IP address or hostname of the remote server.
4. Optional: Specify the iSCSI port of the remote server.
5. Click **Get Remote Disk**.
   QTS connects to the remote server and then lists all available iSCSI targets.
6. Select an iSCSI target.
7. Optional: Specify a CHAP username and password.
   This is required if the remote server has CHAP authentication enabled.
8. Optional: Enable CRC checksums.
   Initiators and targets communicate over TCP connections using iSCSI protocol data units (PDU). The sending device can send a checksum with each PDU. The receiving device uses this checksum to verify the integrity of the PDU, which is useful in unreliable network environments. There are two checksum types, which can be enabled separately.

Checksum Type	Description
Data Digest	The checksum can be used to verify the data portion of the PDU.
Header Digest	The checksum can be used to verify the header portion of the PDU.

9. Click **Next**.
10. Optional: Specify a disk name.
    The name must consist of 1 to 50 characters from the following groups:
    - Letters: a to z, A to Z
    - Numbers: 0-9
    - Special characters: space ( ), hyphen (-), underscore (_), period (.)

    The following are not allowed:
    - The last character is a space
    - The name starts with "_sn_"
11. Select a LUN.
12. Optional: Format the disk.
    Select one of the following options.

File System	Compatible Operating Systems and Devices
ext4	Linux, NAS devices
ext3	Linux, NAS devices

File System	Compatible Operating Systems and Devices
FAT32	Windows, macOS, NAS devices, most cameras, mobile phones, video game consoles, tablets **Important** The maximum file size is 4 GB.
NTFS	Windows
HTS+	macOS

Warning
All data on the LUN will be deleted.

13. Configure synchronous I/O.
    If the remote server is using ZFS, select the ZFS Intent Log I/O mode for the LUN to improve data consistency or performance.

Mode	Description
Synchronous	All I/O transactions are treated as synchronous and are always written and flushed to a non-volatile storage (such as a SSD or HDD). This option gives the best data consistency, but might have a small impact on performance.
Asynchronous	All I/O transactions are treated as asynchronous. This option gives the highest performance, but has a higher risk of data loss in the event of a power outage. Ensure that a UPS (uninterrupted power supply) is installed when using this option.

14. Click **Next**.
15. Click **Finish**.

QTS adds the remote disk and shares it at **Control Panel** > **Privilege** > **Shared Folders** . By default only the admin account has access.

Remote Disk Actions

Action	Description
Edit	Edit the name of the disk.
Delete	Disconnect the remote disk and delete its shared folder. Existing data on the disk will not be deleted.
Format	Format the remote disk. Select one of the following options: • ext4 • ext3 • FAT32 • NTFS • HTS+

Fibre Channel

FC Ports

The **Fibre Channel (FC) Ports** screen displays all of the Fibre Channel ports and port groups on the NAS.

Fibre Channel Port Groups

A Fibre Channel port group is a group of one or more Fibre Channel ports. Fibre Channel port groups help you organize and manage LUN mappings more easily. When a LUN is mapped to a Fibre Channel port group, QTS automatically maps the LUN to every Fibre Channel port in the group.

Important

- Each Fibre Channel port can be in one or more Fibre Channel port groups.
- Each LUN can only be mapped to one Fibre Chanel group.
- There is a default port group that contains all Fibre Channel ports.

Creating a Fibre Channel Port Group

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Ports** .
2. Click **Create Port Group**.
   The **Create Port Group** window opens.
3. Specify a group name.
   Name requirements:
   - Length: 1–20 characters
   - Valid characters: A–Z, a–z, 0–9
4. Select one or more Fibre Channel ports.
5. Click **Create**.

Mapping a LUN to a Fibre Channel Port Group

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Storage** .
2. Select a LUN.
3. Click **Action**, and then select **Edit LUN Mapping**.
   The **Edit LUN Mapping** window opens.
4. Select **Map to FC port group**.
5. Select a Fibre Channel port group.

Tip
The default group contains all Fibre Channel ports.

6. Choose whether you want to configure LUN masking.

Option	Description
Enable LUN and do not configure LUN masking	Do not configure LUN masking. Any initiator that is able to connect to a Fibre Channel port in the port group will be able to see the LUN.
Keep LUN disabled and configure LUN masking in the next step	Configure LUN masking. You can restrict which initiators can see the LUN.

7. Click **OK**.
8. Optional: Configure LUN masking.
   a. Add one or more initiator WWPNs to the LUN's authorized initiators list.

Method	Steps
Add from WWPN list	1. Select one or more initiator WWPNs in the WWPN list. 2. Click **Add**.
Add WWPNs as text	1. Specify one WWPN per line using any of the following formats: • `XXXXXXXXXXXXXXXX` • `XX:XX:XX:XX:XX:XX:XX:XX` 2. Click **Add**.

   b. Optional: Select **Add unknown WWPNs to the FC WWPN Aliases List**.
   When selected, QTS will add any unknown WWPNs to the list of known aliases. To view the list, go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
   c. Optional: Select **Enable LUN**.
   If selected, QTS will enable the LUN after mapping it to the target.
   d. Click **OK**.

Fibre Channel Port Actions

Action	Description
Edit Alias	Specify an alias for the Fibre Channel port. The alias must consist of 1 to 20 characters from any of the following groups: • Letters: A-Z, a-z • Numbers: 0-9 • Special characters: Hyphen (-), underscore (_)
View initiators	View a list of all Fibre Channel initiators currently logged into the port.
Edit port binding	Modify the port binding for the port. Port binding allows you to restrict which initiators are allowed to connect to the port. For more information, see Fibre Channel Port Binding.

Fibre Channel Port Status

Status	Description
Connected	The port has an active network connection.
Disconnected	The port does not have an active network connection.

Fibre Channel Port Binding

Port binding is a Fibre Channel security method that enables you to restrict which initiator WWPNs are allowed to connect through a Fibre Channel port. It is similar to iSCSI target authorization.

Tip
By default, port binding is disabled on all Fibre Channel ports.

Configuring Fibre Channel Port Binding

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Ports** .
2. Select a Fibre Channel port.
3. Click **Action**, and then select **Edit Port Binding**.
   The **Fibre Channel Port Binding** window opens.
4. Add one or more initiator WWPNs to the LUN's authorized initiators list.

Method	Steps
Add from WWPN list	**a.** Select one or more initiator WWPNs in the WWPN list. **b.** Click **Add**.
Add WWPNs as text	**a.** Specify one WWPN per line using any of the following formats: • `XXXXXXXXXXXXXXXX` • `XX:XX:XX:XX:XX:XX:XX:XX` **b.** Click **Add**.

5. Optional: Select **Add unknown WWPNs to the FC WWPN Aliases List**.
   When selected, QTS will add any unknown WWPNs to the list of known aliases. To view the list, go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
6. Click **OK**.

FC Storage

The **FC Storage** screen displays the LUN and Fibre Channel port group mappings.

Fibre Channel LUN Masking

LUN masking is a security feature that enables you to make a LUN visible to some Fibre Channel initiators and invisible to other initiators.

Configuring Fibre Channel LUN Masking

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC Storage** .
2. Select a LUN.

Important
The LUN must be disabled.

3. Click **LUN Masking**.
   The **LUN Masking** window opens.
4. Add one or more initiator WWPNs to the LUN's authorized initiators list.

Method	Steps
Add from WWPN list	**a.** Select one or more initiator WWPNs in the WWPN list. **b.** Click **Add**.
Add WWPNs as text	**a.** Specify one WWPN per line using any of the following formats: • `XXXXXXXXXXXXXXXX` • `XX:XX:XX:XX:XX:XX:XX:XX` **b.** Click **Add**.

5. Optional: Select **Add unknown WWPNs to the FC WWPN Aliases List**.
   When selected, QTS will add any unknown WWPNs to the list of known aliases. To view the list, go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
6. Select **Enable LUN**.
   If selected, QTS will enable the LUN after mapping it to the target.
7. Click **OK**.

Fibre Channel LUN Actions

LUN Action	Description
Edit LUN Mapping	Unmap the LUN, or map it to a different iSCSI target or Fibre Channel Port group. For details, see the following topics: • Mapping a LUN to a Fibre Channel Port Group • Mapping a LUN to an iSCSI Target
Edit LUN Masking	LUN masking is an authorization method that makes a Logical Unit Number (LUN) visible to some initiators and invisible to other initiators. For details, see Configuring Fibre Channel LUN Masking.
Show in Storage & Snapshots	Manage the LUN at **Storage & Snapshots** > **Storage** > **Storage/Snapshots**
Modify	Edit the LUN settings.

LUN Action	Description
Enable	Enable a disabled LUN.
Disable	Disable the LUN. The LUN will become inaccessible to connected iSCSI initiators.
Delete	Delete the LUN and all data stored on it. **Important** This action is only available if the LUN is unmapped.
LUN Import/Export	Export the LUN to another server, a local NAS folder, or an external storage device. For details, see Creating a LUN Export Job.

Fibre Channel LUN Status

Status	Description
Enabled	The LUN is active and visible to connected initiators.
Disabled	The LUN is inactive and invisible to connected initiators.

FC WWPN Aliases

On the **FC WWPN Aliases** screen, you can view, edit, and add WWPNs and WWPN aliases. A WWPN (World Wide Port Name) is a unique identifier for Fibre Channel ports. A WWPN alias is a unique human-readable name for a Fibre Channel port that makes it easier to identify it.

Adding WWPNs

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
2. Click **Add**.
   The **Add WWPN** window appears.
3. Add one or more WWPNs to the list of known WWPNs using any of the following methods.

Method	Steps
Add WWPNs from logged-in Fibre Channel initiators.	Select **Add WWPNs from all logged-in FC initiators.**
Add WWPNs as text	Specify one WWPN per line using any of the following formats: • `XXXXXXXXXXXXXXXX` • `XX:XX:XX:XX:XX:XX:XX:XX`

4. Click **Add**.

Configuring a WWPN Alias

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
2. Locate a WWPN.

3. Under **Alias**, specify an alias for the WWPN.
   The alias must consist of 1 to 20 characters from any of the following groups:
   - Letters: A-Z, a-z
   - Numbers: 0-9
   - Special Characters: Underscore (_), hyphen (-)
4. Click **Save**.

Removing a WWPN Alias

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
2. Locate a WWPN.
3. Clear the **Alias** field.
4. Click **Save**.

Exporting a List of WWPN Aliases

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .
2. Click **Export**.
   The file browser window opens.
3. In the file browser window, navigate to the folder where you want to save the file.
4. Specify a filename.
5. Click **Save**.

The list of WWPN aliases is saved to your local computer as a CSV file, in the format:

- Field 1: WWPN
- Field 2: Alias

```
11:00:24:5e:be:00:00:06,ja882c32p1
11:00:24:5e:be:00:00:07,ja88c32p2
11:00:00:24:5e:be:00:06,ja88c16p1
11:00:00:24:5e:be:00:07,ja882c16p2
10:00:00:10:9b:1b:cc:99,z640Emulex2
11:00:f4:e9:d4:54:89:49,z640Q32gport2
10:00:00:99:99:99:99:87,test3
10:00:00:99:99:99:99:99,test1
10:00:00:10:9b:1b:cc:98,z640Emulex1
11:00:f4:e9:d4:54:89:48,z640Q32gport1
10:00:00:99:99:99:99:89,test2
11:00:f4:e9:d4:58:23:46,QL16c1p1
11:00:f4:e9:d4:58:23:47,QL16c1p2
11:00:f4:e9:d4:58:31:bc,QL16c2p1
11:00:f4:e9:d4:58:31:bd,QL16c2p2
```

Example CSV Output

Importing a List of WWPN Aliases

You can import a list of WWPNs and aliases from a CVS file in the following format:

- Field 1: WWPN
- Field 2: Alias

```
11:00:24:5e:be:00:00:06,ja882c32p1
11:00:24:5e:be:00:00:07,ja88c32p2
11:00:00:24:5e:be:00:06,ja88c16p1
11:00:00:24:5e:be:00:07,ja882c16p2
10:00:00:10:9b:1b:cc:99,z640Emulex2
11:00:f4:e9:d4:54:89:49,z640Q32gport2
10:00:00:99:99:99:99:87,test3
10:00:00:99:99:99:99:99,test1
10:00:00:10:9b:1b:cc:98,z640Emulex1
11:00:f4:e9:d4:54:89:48,z640Q32gport1
10:00:00:99:99:99:99:89,test2
11:00:f4:e9:d4:58:23:46,QL16c1p1
11:00:f4:e9:d4:58:23:47,QL16c1p2
11:00:f4:e9:d4:58:31:bc,QL16c2p1
11:00:f4:e9:d4:58:31:bd,QL16c2p2
```

Example CSV File

Important

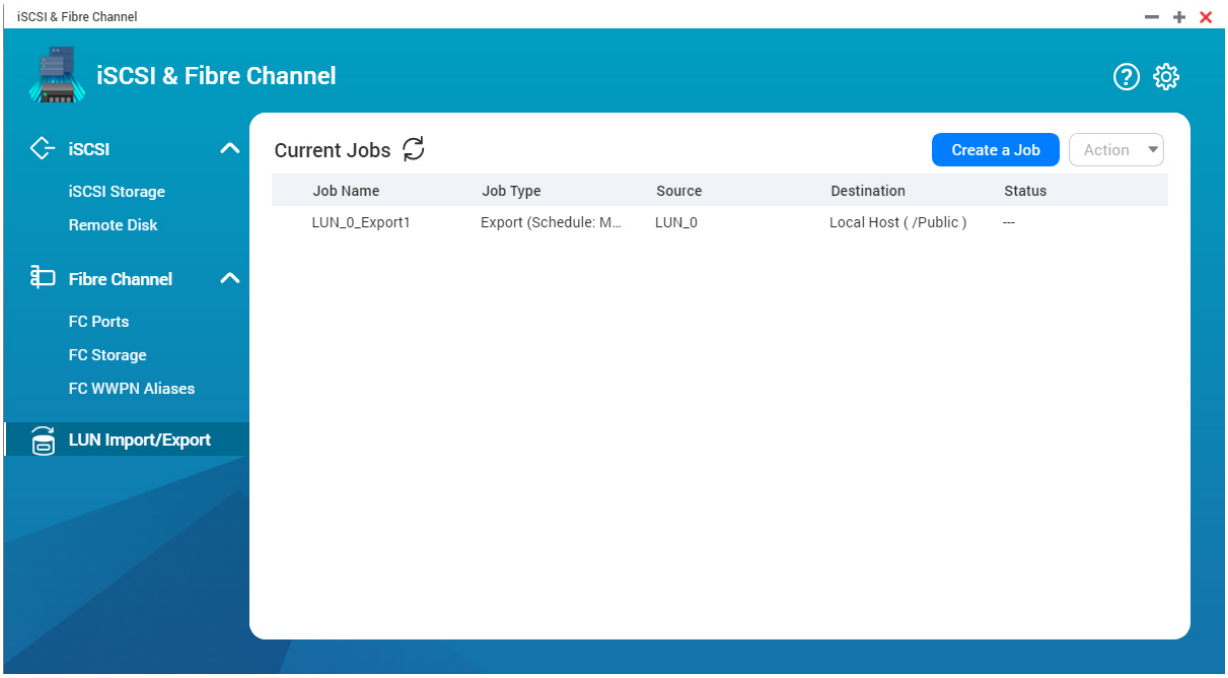
- Identical aliases will be overwritten from the CSV file.
- Lines not formatted correctly will be ignored.

1. Go to **iSCSI & Fibre Channel** > **Fibre Channel** > **FC WWPN Aliases** .

2. Click **Import**.
   The file browser window opens.
3. Locate and open the CSV file.

LUN Import/Export

With LUN Import/Export, you can back up a LUN as an image file to an SMB or NFS file server, local NAS folder, or external storage device. You can then import the LUN image file and restore the LUN on any QNAP NAS.



Creating a LUN Export Job

1. Go to **iSCSI & Fibre Channel** > **LUN Import/Export** .
2. Click **Create a Job**.
   The **Create LUN Export Job** windows opens.
3. Select **Export a LUN**.
4. Select a LUN.
5. Optional: Specify a job name.
   The name must consist of 1 to 55 characters from any of the following groups:
   - Letters: A to Z, a to z
   - Numbers: 0 to 9
   - Special characters: Underscore (_)
6. Click **Next**.
7. Select the destination folder.

Option	Description	Required Information
Linux Share (NFS)	NFS share on an external server	• IP address or host name • NFS folder or path
Windows Share (CIFS/SMB)	CIFS/SMB share on an external server	• IP address or host name • Username • Password • CIFS/SMB folder or path
Local Host	Local NAS shared folder or connected external storage device	• NAS shared folder or external device • Sub-folder

8. Click **Next**.
9. Optional: Specify a LUN image name.
    - The name must consist of 1 to 64 characters from any of the following groups:
        - Letters: A to Z, a to z
        - Numbers: 0 to 9
        - Special characters: Underscore (_), hyphen (-), space ( )
    - The name cannot begin or end with a space.
10. Optional: Select **Use Compression** to compress the image file.
    When enabled, the image file will be smaller but exporting will take longer and will use more processor resources.
11. Select when the job will run.

Option	Description
Now	Run the job immediately after the job has been created. After this first run, the job will only run when manually started.
• Hourly • Daily • Weekly • Monthly	Run the job periodically according to the specified schedule.

12. Click **Next**.
13. Click **Apply**.

QTS creates the job. The job then starts running if **Now** was selected as the scheduling option.

Importing a LUN from an Image File

1. Go to **iSCSI & Fibre Channel** > **LUN Import/Export** .

2. Click **Create a Job**.
   The **Create LUN Export Job** windows opens.
3. Select **Import a LUN**.
4. Optional: Specify a job name.
   The name must consist of 1 to 55 characters from any of the following groups:
   - Letters: A to Z, a to z
   - Numbers: 0 to 9
   - Special characters: Underscore (_)
5. Click **Next**.
6. Select the source folder.

Option	Description	Required Information
Linux Share (NFS)	NFS share on an external server	• IP address or host name • NFS folder or path
Windows Share (CIFS/SMB)	CIFS/SMB share on an external server	• IP address or host name • Username • Password • CIFS/SMB folder or path
Local Host	Local NAS shared folder or connected external storage device	NAS shared folder or external device

7. Click **Next**.
8. Select the LUN image file.
9. Click **Next**.
10. Specify the import destination.

Option	Description	Required Information
Overwrite existing LUN	Import the image file data to an existing LUN. **Warning** All existing data on the LUN will be overwritten.	An existing LUN with the same type (block-based or file-based) as the LUN being imported
Create a new LUN	Import the image file as a new LUN.	• LUN name • LUN location. This will be a storage pool or volume.

11. Click **Next**.
12. Click **Apply**.

QTS creates the job, and then immediately runs it.

LUN Import/Export Job Actions

Action	Description
Edit	Edit the job.
Delete	Delete the job.
Start	Start the job.
Stop	Stop a running job.
View Logs	View the job's status, properties, details of its last run, and event logs.

LUN Import/Export Job Status

Action	Description
--	The job has not run yet.
Initializing	The job is preparing to run.
Processing	The job is running. The job's progress is displayed a percentage next to the status.
Finished	The job has finished running or was canceled by a user.
Failed	The job failed. View the job's event log for details.

11. SSD Profiling Tool

SSD Profiling Tool controls the creation and execution of SSD over-provisioning tests. These tests help determine the optimum amount of SSD over-provisioning to set when creating an SSD RAID group.

SSD Over-Provisioning

When an SSD is full, the disk's firmware frees up space in a process called garbage collection. Garbage collection results in an effect called write amplification, which reduces the lifespan and random write performance of the SSD. Write amplification can be reduced by over-provisioning, which means reserving space on the disk for garbage collection. Most SSDs are manufactured with 7% or more of their capacity reserved for over-provisioning.

SSD Extra Over-Provisioning

SSD Extra Over-Provisioning enables to you reserve additional space for over-provisioning at the RAID level when creating an SSD RAID group in QTS. Reserving extra space can increase the consistent random write performance and lifespan of the SSD group.

Important

- Space reserved for SSD Extra Over-Provisioning cannot be used for data storage. The total storage capacity of the SSD RAID group will be reduced by the specified amount.
- SSD Extra Over-Provisioning can only be enabled during RAID group creation.
- After creating a RAID group with SSD Extra Over-Provisioning enabled, you can disable the feature or decrease the amount of reserved space. It is not possible to increase reserved space.
- Results will vary depending on the SSD model. Enabling SSD Extra Over-Provisioning may have no effect on some SSDs.

SSD Over-Provisioning Tests

During an SSD over-provisioning test, SSD Profiling Tool first fills the SSDs with random data. It then tests the random write performance of the SSDs over several test phases, each using a different amount of over-provisioning. For example, if a test is created with a test range of 0-20% and a test interval of 5%, SSD Profiling Tool will test SSD write performance in 5 phases, with over-provisioning set to 0%, 5%, 10%, 15%, and 20%. If the random write performance of the disk is very low during any phase, SSD Profiling Tool will end the phase early and move to the next one.

Creating an SSD Over-Provisioning Test

1. Go to **SSD Profiling Tool** > **Review** .
2. Click **+ Create Test**.
   The **Create SSD Test** wizard opens.
3. Click **Next**.
4. Optional: Select an expansion unit from the **Enclosure Unit** list.

Important

- You cannot select disks from multiple expansion units.

5. Select one or more disks.
   Selecting a single SSD determines the optimum amount of over-provisioning for all SSDs of the same model and capacity. Selecting multiple SSDs determines the optimum amount of over-provisioning for that specific combination of disks and RAID type. Testing multiple disks gives more accurate results, but takes significantly longer than testing a single disk.

Warning
All data on the selected disks will be deleted.

6. Select a RAID type.
7. Click **Next**.
8. Optional: Configure the test settings.

Setting	Description
Test data size	SSD Profiling Tool writes the specified amount of test data to the SSD during each test phase. Decreasing the test data size decreases test time but gives less accurate results.
Over-provisioning test range	Specific the minimum and maximum amount of over-provisioning to test.
Test interval	Specific over-provisioning increments to test.
End a test phase early if consistent performance is too low	SSD Profiling Tool will end a test phase after 5 minutes of testing if the random write speeds during the phase are lower than a system-defined threshold. **Tip** Enabling this avoids wasting time testing disks when the specified amount of over-provisioning is producing no measurable benefits.

9. Review the estimated time required.
   For multiple SSDs, the test may take more than 24 hours.

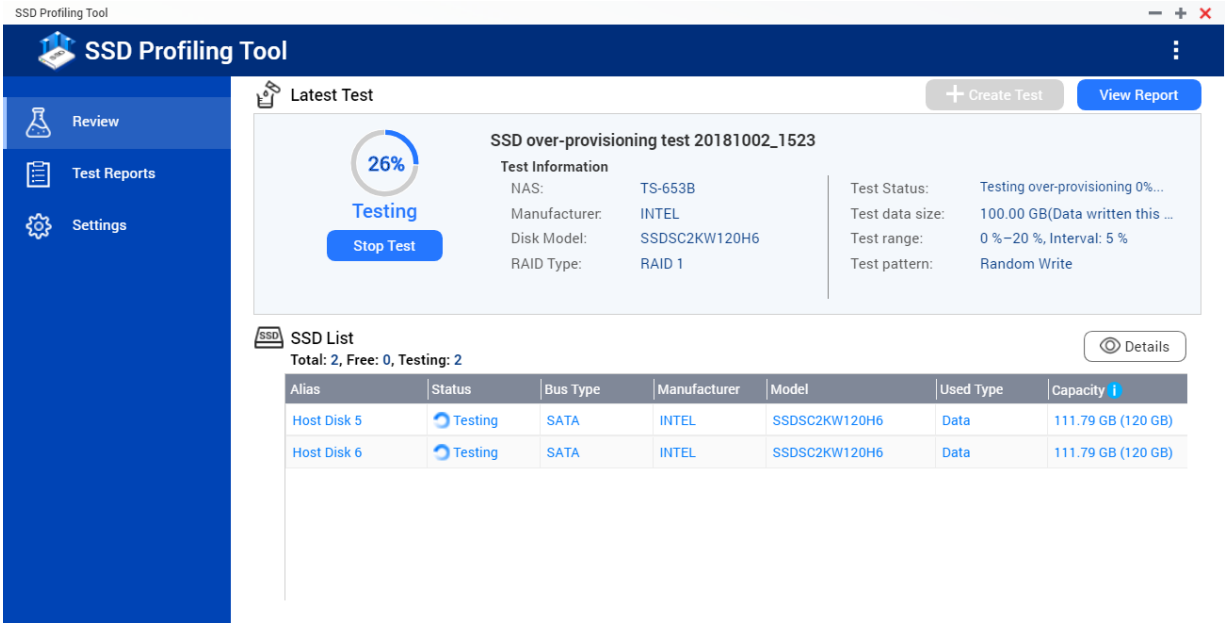
Tip
If the estimated test time is too long, reduce the test range, test interval or the test data size.

10. Click **Next**.
11. Verify the test information.
12. Click **Finish**.
    A confirmation message appears.
13. Click **OK**.

SSD Profiling Tool creates and starts running the test. The test appears as a background task in QTS.

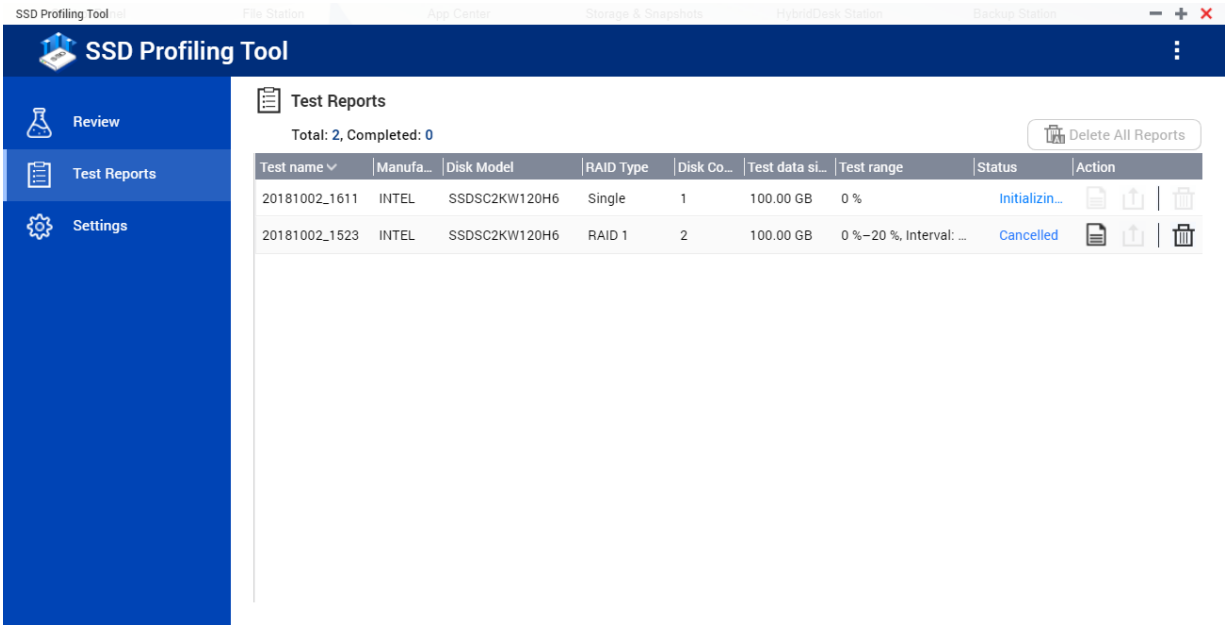
Review

This screen controls the creation and management of SSD tests and displays information about SSDs installed in the NAS.



Test Reports

On this screen you can view, export, and delete test results.



Test Report Actions

Icon	Description
	Open the report in a new window.
	Download a copy of the report in XLSX format.

Icon	Description
	Delete the report.

Test Report Information

Section	Description
Test Information	View information about the NAS, the disks being tested, and the settings used in this test.
Test Result	View the test results as a graph. Choose from the following views: • IOPS / Time • IOPS / Data Written • Data Written / Time **Tip** Use these graphs to compare what effect different amounts of over-provisioning had on random write speeds (IOPS).
Over-Provisioning Evaluation Results	Enter an IOPS value in **Target write performance**. SSD Profiling Tool will recommend the amount of over-provisioning needed to consistently achieve the target random write performance.
Temperature	View the temperature of the SSDs during each test phase.
Test RAID Group	View information about the test SSD RAID group. Details include the RAID type, number of disks, model and capacity of each disk, and disk read/write performance.

Settings

Setting	Description
Maximum number of reports	SSD Profiling Tool retains the specified number of reports. Creating additional reports deletes the oldest ones.

12. Multimedia

QTS provides a range of applications and utilities for viewing, playing, and streaming multimedia files stored on the NAS.

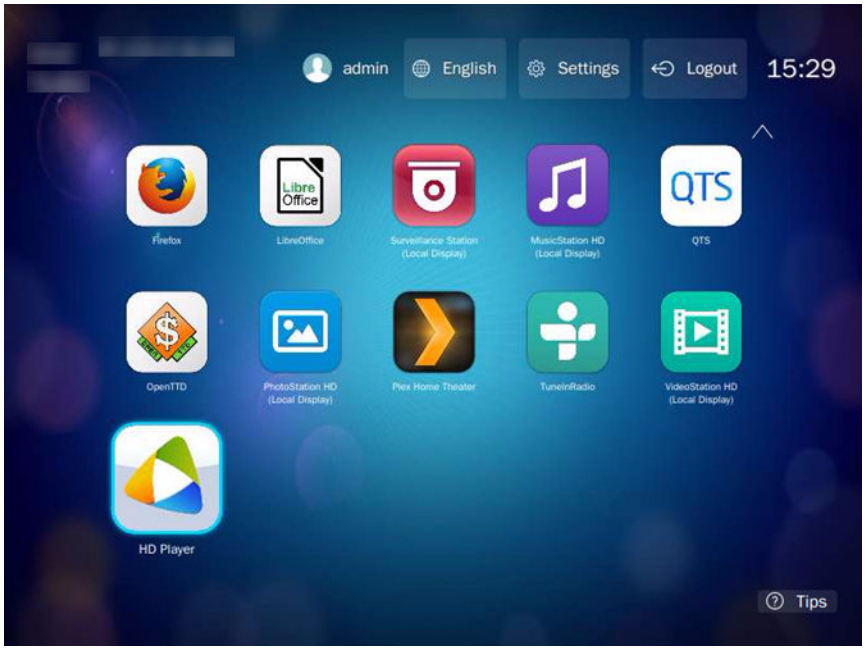
Application/Utility	Description
HybridDesk Station (HD Station)	Connect to an HDMI display to access multimedia content on your NAS.
DLNA Media Server	Configure your NAS as a Digital Living Network Alliance (DLNA) server to access media files on your NAS from devices on your home network.
Media Streaming Add-on	Stream media from your NAS to DLNA, Chromecast, and HDMI-connected devices.
Multimedia Console	Manage multimedia apps and content on the NAS. You can index files, transcode videos, and generate thumbnails for multimedia content.

HybridDesk Station (HD Station)

HybridDesk Station (HD Station) allows you to connect to an HDMI display and directly access multimedia content and use other applications on your NAS. You can use your NAS as a home theater, multimedia player, or desktop substitute. After installing HD Station and connecting the NAS to an HDMI display, you can navigate your NAS using HD Station.

HD Station requires:

- A TV or monitor with an HDMI port
- A mouse, keyboard, or remote control for navigation
- A graphics card (some NAS models only). Go to https://www.qnap.com to check the software specifications for your NAS and verify that it is compatible with HD Station.



Installing HD Station

1. Go to **Control Panel** > **Applications** > **HDMI Display Applications** .
2. Choose one of the following installation methods.

Installation Method	Steps
Guided installation	**a.** Click **Get Started Now**. The **HybridDesk Station** window appears. **b.** Review the list of selected applications. **Tip** All applications are selected by default. You can deselect applications that you do not want to install. **c.** Click **Apply**.
Manual installation	**a.** Under **Install Manually**, click **Browse**. **b.** Select the HD Station QKPG. **c.** Click **Install**.

QTS installs HD Station and the selected applications.

Note
Multimedia Services must be enabled to play multimedia content in HD Station. Go to **Main Menu** > **Applications** > **Multimedia Console** to enable Multimedia Services. HD Player, Photo Station, Music Station, and Video Station must also be installed on the NAS to play multimedia content from the respective applications.

Configuring HD Station

1. Go to **Control Panel** > **Applications** > **HDMI Display Applications** > **Local Display settings** .
2. Perform any of the following actions.

Action	Steps
Enable HD Station	Click **Enable**. **Note** HD Station must be disabled to perform this action.
Disable HD Station	Click **Disable**. **Note** HD Station must be enabled to perform this action.
Install all HD Station applications	**a.** Click **Install All Apps**. A dialog box appears. **b.** Click **OK**.
Update installed apps	Click **Update**.
Restart HD Station	Click **Restart**.
Remove HD Station and related applications	**a.** Click **Remove**. A dialog box appears. **b.** Click **OK**.
Edit HD Station settings	**a.** Click **Settings**. The **Settings** window appears. **b.** Modify any of the following settings: • **Output resolution**: Change the resolution of HD Station. • **Overscan**: Reduce the visible area of a video displayed in HD Station. • **Enable Remote Desktop**: View the NAS HDMI output using your web browser. **Note** • Enabling Remote Desktop may affect the playback quality of local videos. • You must restart Remote Desktop after changing the output resolution. **Tip** You can also open and restart Remote Desktop from this screen.
Install HD Station apps	**a.** Under **Install Manually**, click **Browse**. **b.** Select the application QKPG. **c.** Click **Install**.

HD Station Applications

Go to **App Center** > **HybridDesk Station** to install or configure applications used with HD Station.

Using HD Player in HD Station

You can use HD Player to browse and play multimedia content in Photo Station, Music Station, and Video Station.

1. Connect an HDMI display to the NAS.
2. Select your NAS account.
3. Specify your password.
4. Start HD Player.
5. Select your NAS account.
6. Specify your password.

DLNA Media Server

You can configure your NAS as a Digital Living Network Alliance (DLNA) server, allowing you to access media files on your NAS through your home network using DLNA devices such as TVs, smartphones, and computers.

The contents displayed in DLNA Media Server are based on user account permissions and Multimedia Console settings.

Important

- You must enable Multimedia Services before using DLNA Media Server. Go to **Control Panel** > **Applications** > **Multimedia Console** > **Overview** to enable Multimedia Services.
- The first time you enable DLNA Media Server, QTS automatically installs the Media Streaming Add-on if it is not already installed on the NAS. For details, see Media Streaming Add-on.

Enabling DLNA Media Server

1. Go to **Control Panel** > **Applications** > **DLNA Media Server** .
2. Select **Enable DLNA Media Server**.
3. Optional: Specify the following information.

Field	Description
Service Name	Specify a name for the DLNA Media Server.
Select default user account	Select the user account that will be the directory for the DLNA Media Server.

4. Click **Apply**.

Configuring DLNA Media Server

1. Go to **Control Panel** > **Applications** > **DLNA Media Server** .
2. Perform any of the following actions.

Action	Steps
Scan for multimedia content	Click **Scan now**.
Restart DLNA Media Server	Click **Restart**.
Configure advanced settings	**a.** Click **Advanced Settings**. The **Media Streaming Add-on** portal opens in a new browser window. **b.** Configure the settings. **Note** Media Streaming Add-on must be installed to configure advanced settings. For details, see Media Streaming Add-on.

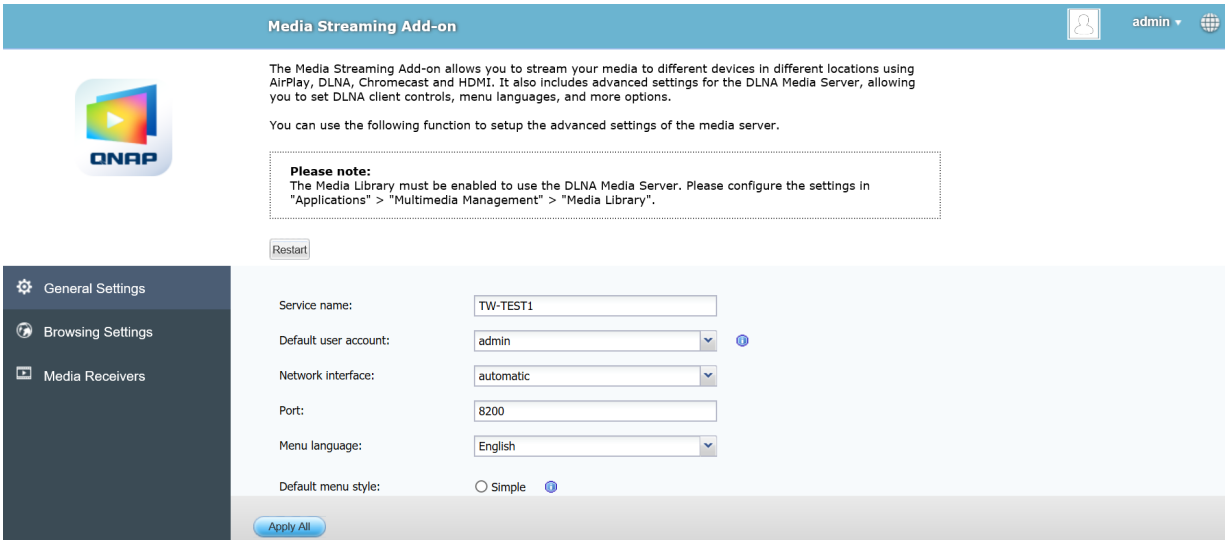
Media Streaming Add-on

Media Streaming Add-on allows you to stream media from your NAS to different DLNA, Chromecast, and HDMI-connected devices simultaneously using the following QTS multimedia applications:

- File Station
- Photo Station
- Music Station
- Video Station

Go to App Center to install Media Streaming Add-on.

Tip
You can restart Media Streaming Add-on anytime by clicking **Restart** on the home screen.



Configuring General Settings

1. Open **Media Streaming Add-on**.
   Media Streaming Add-on opens in a new tab.

> **Note**
> Media Streaming Add-on logs you in based on your QTS user credentials. If a login screen appears, you will need to specify your username and password to log in.

2. Go to **General Settings**.
3. Modify any of the following settings.

Setting	Description
Service name	This is the name that devices on the local network will see when connecting to the NAS.
Default user account	Select the user account that media devices receive content from. To connect using a different user account, you must specify the account's username and password in the connection settings of the media receiver.
Network interface	Select the network interface.
Port	Specify the port number.
Menu language	Select the language displayed for menu items.
Default menu style	Select the type of menu style. • **Simple** • **All categories** • **Custom** Select one of the **Custom** options and click **Customize** to configure the display options for the menu.

Setting	Description
Always stream videos to Apple TV and Chromecast in original file formats	When selected, the NAS streams videos to these devices without transcoding or embedding subtitles. **Important** Ensure that Apple TV and Chromecast support the file formats of videos on your NAS when selecting this option.

4. Click **Apply All**.

Configuring Browsing Settings

1. Open **Media Streaming Add-on**.
   Media Streaming Add-on opens in a new tab.

Note
Media Streaming Add-on logs you in based on your QTS user credentials. If you see a login screen, you will need to specify your username and password and log in.

2. Go to **Browsing Settings**.
3. Modify any of the following settings.

Setting	Description
Display Photo	Select the display size of the thumbnail for photo albums.
Music title display style	Select the type of information that is displayed for music files.
Video title display style	Select whether video titles display the file name of the video or the embedded information.

4. Click **Apply All**.

Configuring Media Receivers

1. Open **Media Streaming Add-on**.
   Media Streaming Add-on opens in a new tab.

Note
Media Streaming Add-on logs you in based on your QTS user credentials. If you see a login screen, you will need to specify your username and password and log in.

2. Go to **Media Receivers**.
3. Perform any of the following actions.

Action	Steps
Enable device sharing	Select **Enable sharing for new media receivers automatically**. When enabled, newly discovered devices will automatically be allowed to connect to DLNA Media Server.
Scan for new devices	Click **Scan for devices** Media Streaming Add-on searches for new media devices connected to the NAS.

Action	Steps
Modify device connections	Select or deselect media devices. Only selected devices can connect to DLNA Media Server.

4. Click **Apply All**.

Multimedia Console

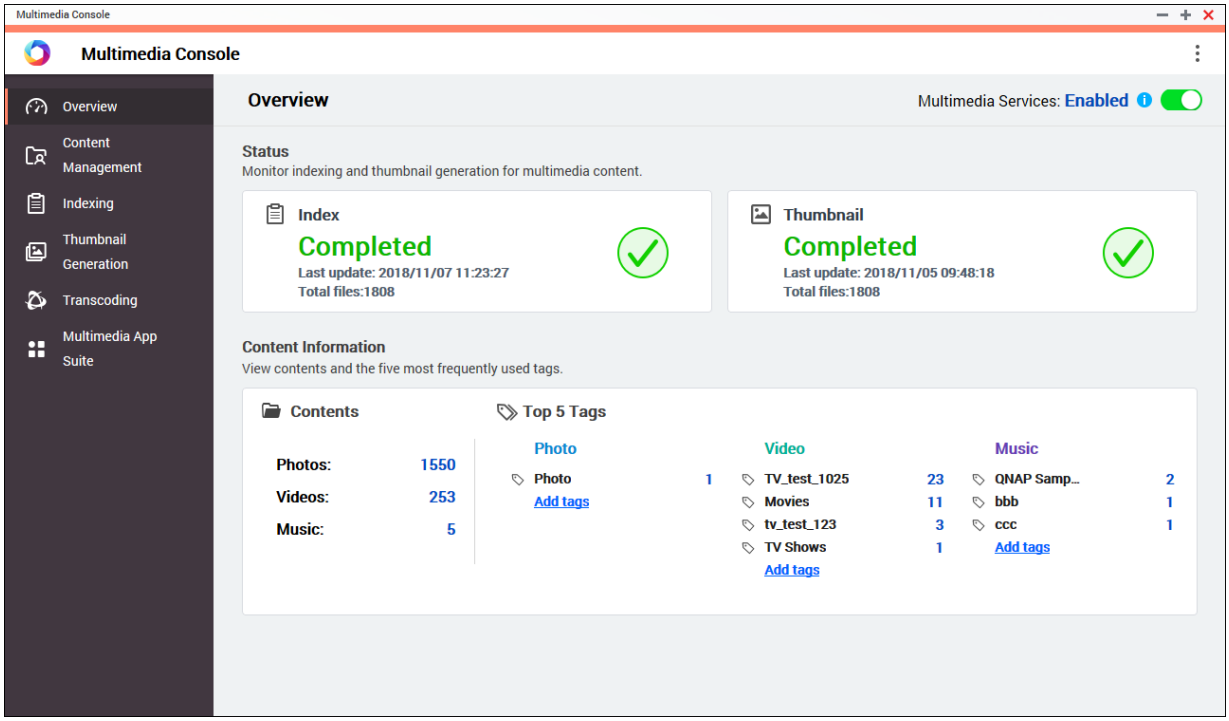
Multimedia Console helps you manage installed multimedia apps and content stored on the NAS. Multimedia Console can index files, transcode videos, and generate thumbnails for apps and system services such as Photo Station, Video Station, Music Station, and DLNA Server.

Overview

The **Overview** screen displays the indexing and thumbnail generation status for multimedia files as well as the total number of photos, videos, and music files on your NAS

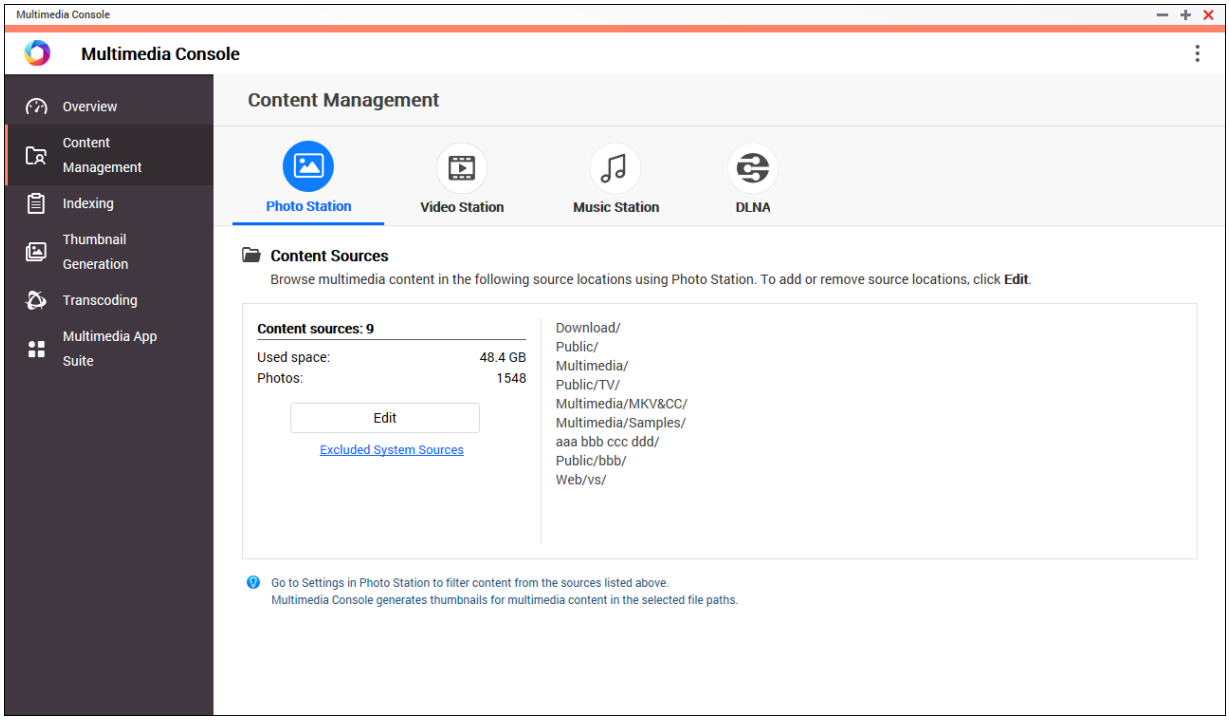
Important
To use third-party applications and Multimedia Console features like indexing and thumbnail generation, Multimedia Services must be enabled.

Tip
You can enable or disable Multimedia Services in the upper right of the **Overview** screen.



Content Management

The **Content Management** screen displays the content source folders for multimedia apps installed on the NAS. You can view and edit the content source folders for apps and system services such as Photo Station, Video Station, Music Station, and DLNA Media Server.



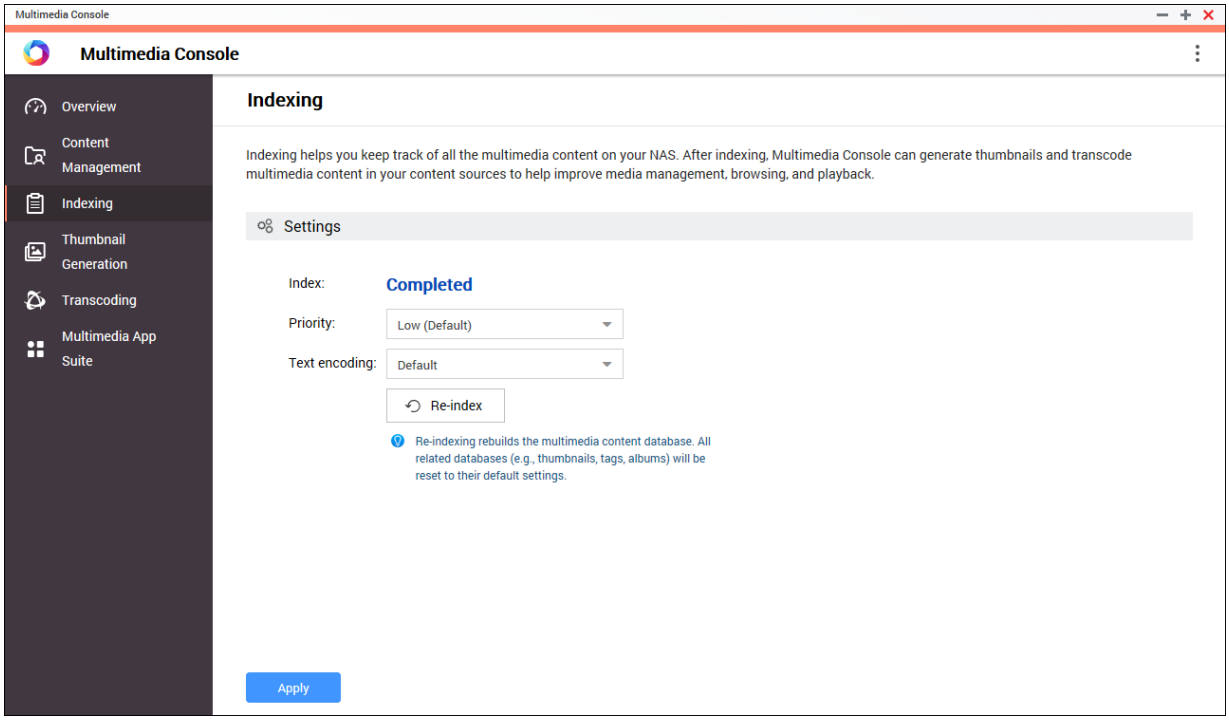
Editing Content Sources

1. Open Multimedia Console.
2. Go to **Content Management.**
3. Select an app or service.
4. Click **Edit**.
   The **Edit Content Sources** window appears.
5. Select or deselect content source folders.
   The **Selected Folder Paths** list updates.
6. Click **Apply**.

Tip
Click **Excluded System Sources** on the **Content Management** screen to view system folder paths that are excluded from Multimedia Services.

Indexing

Multimedia Console improves content management, browsing, and playback when accessing files in various multimedia apps by scanning and indexing multimedia files on your NAS.



Configuring Indexing Settings

1. Open Multimedia Console.
2. Go to **Indexing**.
3. Select the **Priority**.
   - **Low (Default)**
   - **Normal**

   The **Priority** determines the amount of system resources allocated to the indexing process.
4. Select the type of **Text encoding**.
   The type of **Text encoding** determines the character encoding scheme that Multimedia Console uses to index text and data in your multimedia files. The default encoding scheme is Unicode.
5. Click **Apply**.

Tip
Click **Re-index** to rebuild the multimedia content database and revert dependent databases to their default settings.

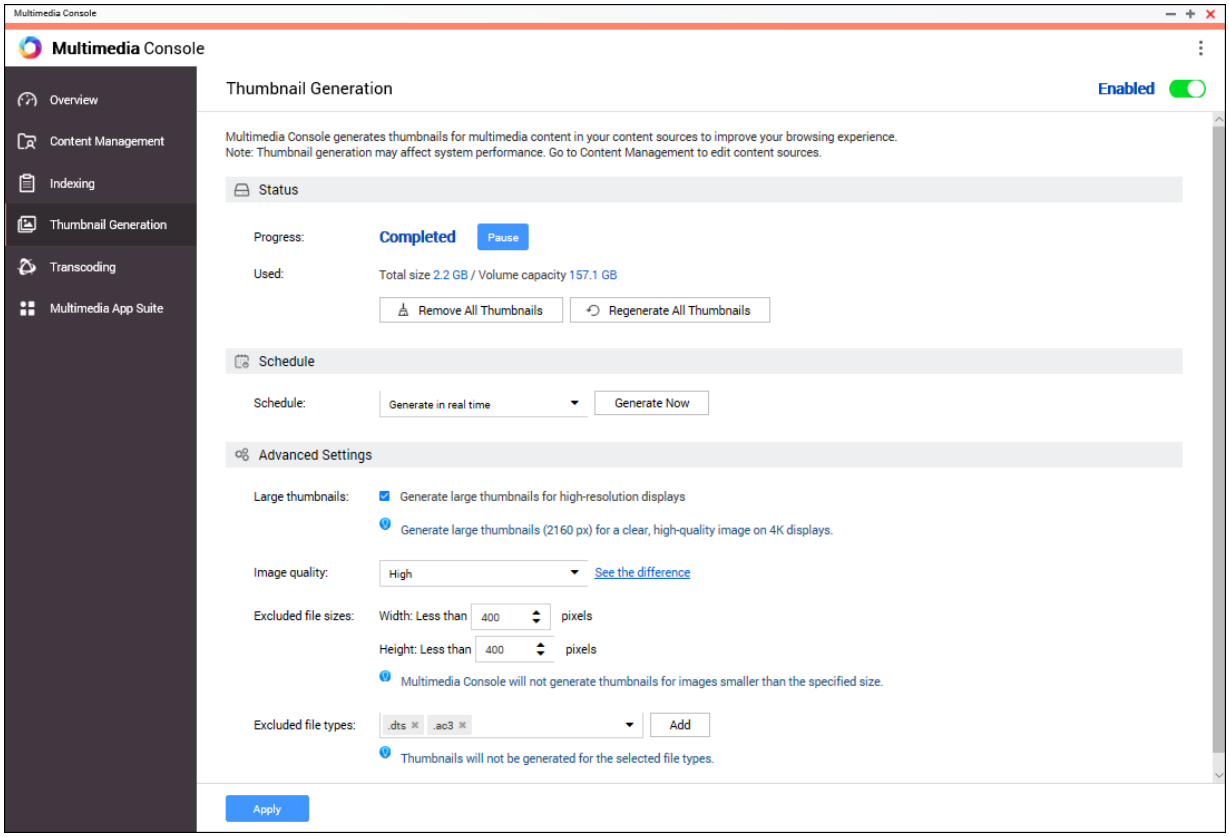
Thumbnail Generation

Multimedia Console generates thumbnails for multimedia files to improve browsing.

Note

- Thumbnail generation is enabled by default if Multimedia Services is enabled.

- You can disable thumbnail generation in the upper right of the **Thumbnail Generation** screen.
- Generating thumbnails may affect system performance.



Configuring Status

1. Open Multimedia Console.
2. Go to **Thumbnail Generation** > **Status** .
3. Perform any of the following tasks.

Task	Steps
Pause thumbnail generation	**a.** Next to **Progress**, click **Pause**. The **Pause** window opens. **b.** Select **Pause**. **c.** Click **OK**. **Tip** Click **Resume** when thumbnail generation is paused to resume thumbnail generation.

Task	Steps
Postpone thumbnail generation	**a.** Next to **Progress**, click **Pause**. The **Pause** window opens. **b.** Select **Postpone**. 1. Select the duration. **c.** Click **OK**. **Tip** Click **Resume** when thumbnail generation is postponed to resume thumbnail generation.
Remove thumbnails	**a.** Under **Used**, click **Remove All Thumbnails**. A dialog box appears. **b.** Click **OK**.
Regenerate thumbnails	**a.** Under **Used**, click **Regenerate All Thumbnails**. A dialog box appears. **b.** Click **OK**.

Configuring Schedule

1. Open Multimedia Console.
2. Go to **Thumbnail Generation** > **Schedule** .
3. Next to **Schedule**, select one of the following options.

Option	Description
Generate in real time	Multimedia Console generates thumbnails for new files as soon as they are detected.
Generate using schedule	Multimedia Console generates thumbnails according to a specified schedule. **Note** When selected, you must specify a thumbnail generation schedule.
Generate manually	Multimedia Console generates thumbnails only after clicking **Generate Now**.

Tip
Click **Generate Now** to force Multimedia Console to start generating thumbnails immediately.

4. Click **Apply**.

Configuring Advanced Settings

1. Open Multimedia Console.
2. Go to **Thumbnail Generation** > **Advanced Settings** .
3. Configure any of the following settings.

Setting	Description
Large thumbnails	When selected, Multimedia Console generates high-resolution thumbnails (2160 px) for media files.
Image quality	Select **High** or **Low**. **Tip** Click **See the difference** to view a side-by-side comparison of high- and low-quality thumbnails.
Excluded file sizes	Multimedia Console only generates thumbnails for images that are larger than the specified resolution.
Excluded file types	Multimedia Console will not generate thumbnails for the selected file types.

4. Click **Apply**.

Transcoding

The transcoding feature in Multimedia Console converts video files to MPEG-4 format for improved compatibility with media players on mobile devices, smart TVs, and web browsers. Transcoding can also scale down the resolution of video files to prevent buffering in slower network environments.

You can create and manage transcoding tasks and configure settings from the **Transcoding** screen in Multmedia Console.

Overview

You can manage Background Transcoding and On-the-Fly Transcoding tasks from the Overview tab on the **Transcoding** screen.

Note

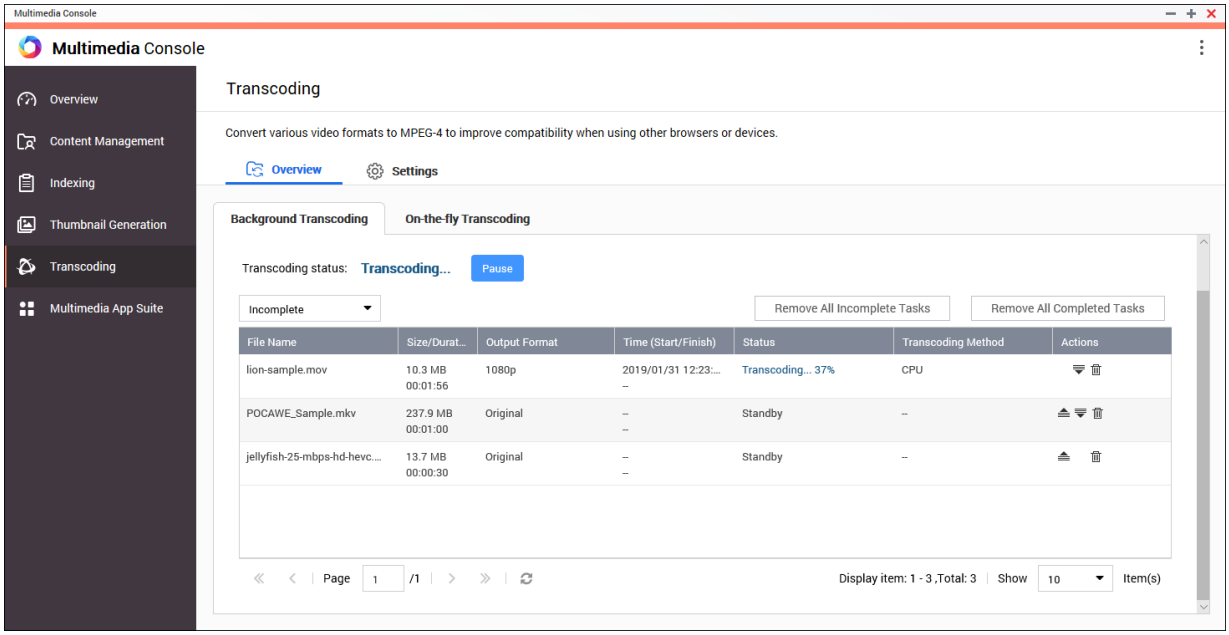
- Transcoding is only available for certain NAS models. Go to https://www.qnap.com/en/compatibility to view specifications for your NAS and verify that it is compatible.
- Transcoding uses additional NAS storage space to store transcoded files.

Type	Description
Background Transcoding	Background Transcoding converts videos asynchronously to minimize consumption of system resources if the video is accessed by multiple users simultaneously. You can manually add videos to background transcoding folders using File Station, Photo Station, or Video Station. For details on managing background transcoding folders, see Configuring Background Transcoding Folders

Type	Description
On-the-Fly Transcoding	On-the-Fly Transcoding converts videos in real time as you watch them. **Note** • You cannot specify the output format for On-the-Fly Transcoding. • On-the-Fly Transcoding uses more system resources than Background Transcoding and may affect the performance of your NAS. **Tip** You can install CodexPack to increase transcoding speed and reduce system resource consumption. You can check whether your NAS supports GPU-acclerated transcoding on the **Transcoding Settings** screen. For details, see Configuring Transcoding Resources.

Background Transcoding

The Background Transcoding tab displays the overall background transcoding status as well as additional information about specific background transcoding tasks. You can view and manage background transcoding tasks from this tab.



General Tasks

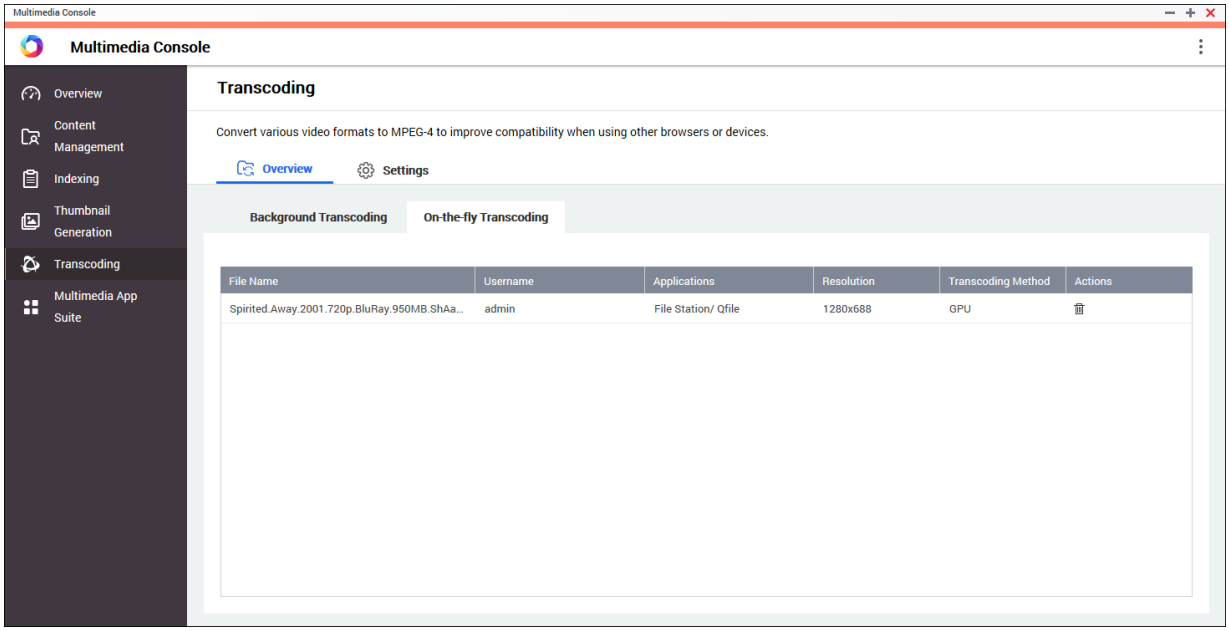
Task	User Action
Pause background transcoding	1. Click **Pause**. The **Pause** window opens. 2. Select **Pause**. 3. Click **OK**. **Tip** Click **Resume** when background transcoding is paused to resume background transcoding.
Postpone background transcoding	1. Click **Pause**. The **Pause** window opens. 2. Select **Postpone**. a. Select the duration. 3. Click **OK**. **Tip** Click **Resume** when background transcoding is postponed to resume background transcoding.
View completed tasks	Above the background transcoding task table, select **Completed** from the drop-down list. Multimedia Console displays completed background transcoding tasks.
View incomplete tasks	Above the background transcoding task table, select **Incomplete** from the drop-down list. Multimedia Console displays incomplete background transcoding tasks.
Remove incomplete tasks	1. Click **Remove All Incomplete Tasks**. A dialog box appears. 2. Click **OK**.
Remove completed tasks	1. Click **Remove All Completed Tasks**. A dialog box appears. 2. Click **OK**.

Task Table Configuration (Incomplete Tasks)

Button	Description
	Moves a task up in the list and increases its priority.
	Moves a task down in the list and decreases its priority.
	Removes a task from the list.

On-the-fly Transcoding

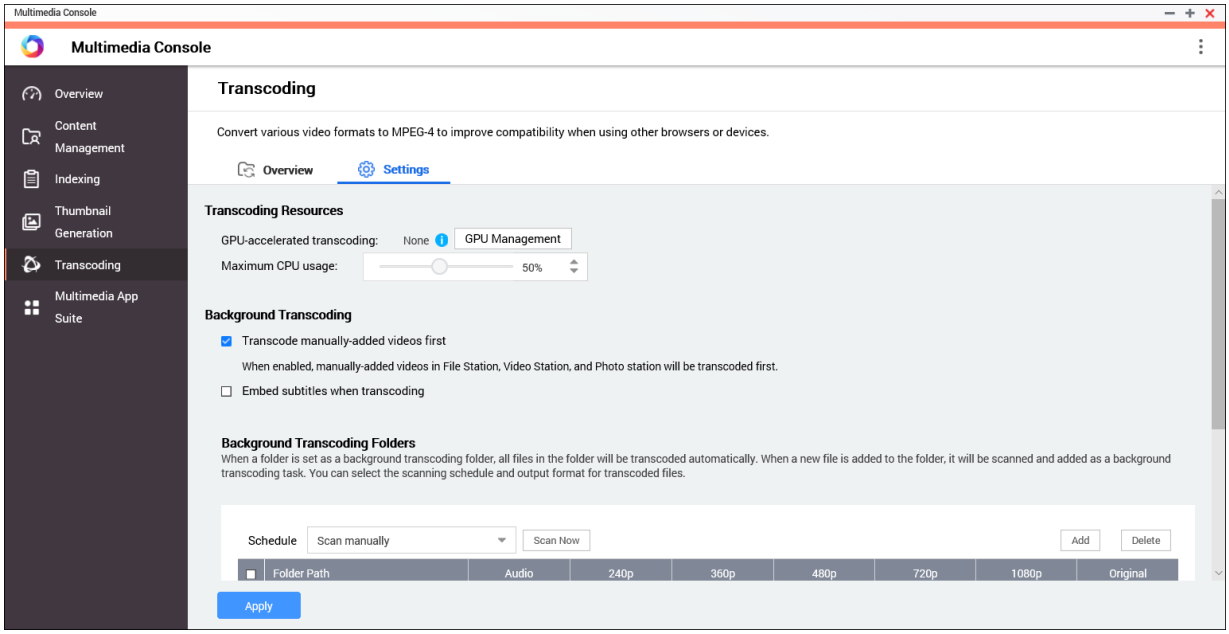
The On-the-Fly Transcoding tab displays information about on-the-fly transcoding tasks. You can view and manage on-the-fly transcoding tasks from this tab.



Tip
Click to remove a task from the list.

Settings

You can manage Background Transcoding and On-the-Fly Transcoding settings from the Settings tab on the **Transcoding** screen.



Configuring Transcoding Resources

1. Open Multimedia Console.

2. Go to **Transcoding** > **Settings** > **Transcoding Resources** .
3. Optional: Enable **GPU-accelerated transcoding**.
   a. Click **GPU Management**.
   The **System** > **Hardware** > **Graphics Card** screen appears.
   b. Configure graphics card settings.
   For details, see Configuring Expansion Cards Settings.
4. Specify the **Maximum CPU usage** allocated to transcoding tasks.
5. Click **Apply**.

Configuring Background Transcoding Settings

1. Open Multimedia Console.
2. Go to **Transcoding** > **Settings** > **Background Transcoding** .
3. Configure any of the following settings.

Setting	Description
Transcode manually-added videos first	Videos in File Station, Video Station, and Photo Station that are manually added will be transcoded first.
Embed subtitles when transcoding	Multimedia Console automatically embeds subtitles to videos when transcoding them.

4. Click **Apply**.

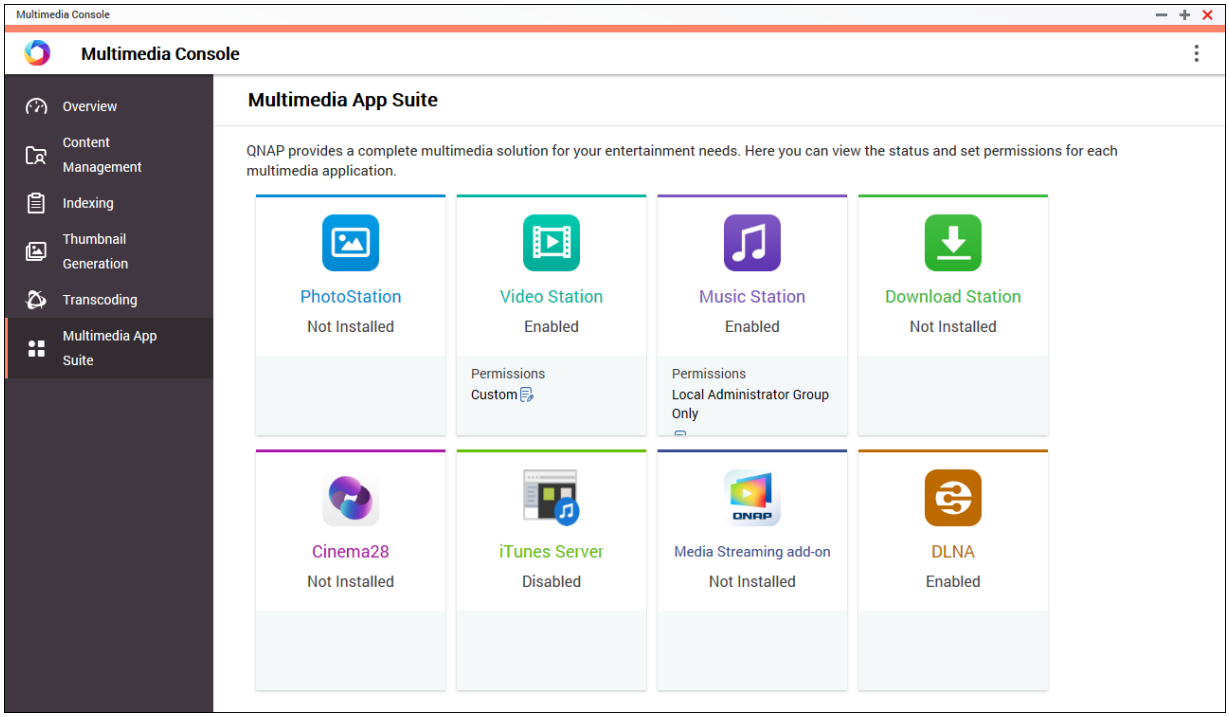
Configuring Background Transcoding Folders

1. Open Multimedia Console.
2. Go to **Transcoding** > **Settings** > **Background Transcoding Folders** .
3. Perform any of the following tasks.

Task	User Action
Configure the scanning schedule for background transcoding folders	Select one of the following options: • **Scan in real time**: Multimedia Console scans background transcoding folders for new files and adds the files as background transcoding tasks as soon as they are detected. • **Scan using schedule**: Multimedia Console scans background transcoding folders for files according to a specified schedule. **Note** When selected, you must specify the time of day that Multimedia Console generates thumbnails. • **Scan manually**: Multimedia Console scans background transcoding folders only when you click **Scan Now**.
Add a background transcoding folder	**a.** Click **Add**. The **Add Background Transcoding Folders** window appears. **b.** Select a folder. **c.** Specify the output format. **d.** Click **Apply**.
Remove a background transcoding folder	**a.** Select a background transcoding folder. **b.** Click **Delete**.
Configure transcoding output format	**a.** Locate a background transcoding folder on the list. **b.** Select the output format. **Note** Multimedia Console upscales the video if the selected resolution is higher than the original resolution of the video. **c.** Click **Apply**.

Multimedia App Suite

You can view statuses and configure user and group access permissions for installed multimedia apps and services from the **Multimedia App Suite** screen.



Configuring Multimedia Apps and Services

1. Open Multimedia Console.
2. Go to **Multimedia App Suite**.
3. Perform any of the following tasks.

Task	User Action
Install an app or service	**a.** Locate an app or service with the status **Not Installed** under the app or service name. **b.** Click **Not Installed**. The **App Center** and app installation windows open. **c.** Click + Install.
Enable an app or service	**a.** Locate an app or service with the status **Disabled** under the app or service name. **b.** Click **Disabled**. **c.** The app or service opens in a new window. **d.** Enable the app or service.
Disable an app or service	**a.** Locate an app or service with the status **Enabled** under the app or service name. **b.** Click **Enabled**. **c.** The app or service opens in a new window. **d.** Disable the app or service.

Configuring Multimedia App Permissions

1. Open Multimedia Console.
2. Go to **Multimedia App Suite**.
3. Locate an app with access permissions.
4. Under **Permissions**, click the permission status.
   The **Permission Settings** window opens.
5. Select a permission type.

Permission Type	Description
All Users	All users can access the app.
Local Administrator Group Only	Only users in the local administrator group can access the app.
Custom	Specified users and user groups can access the app.

   A dialog box appears.

6. Click **OK**.
7. Perform any of the following actions.

Permission Type	User Action
All Users	Click **Close**.
Local Administrator Group Only	Click **Close**.

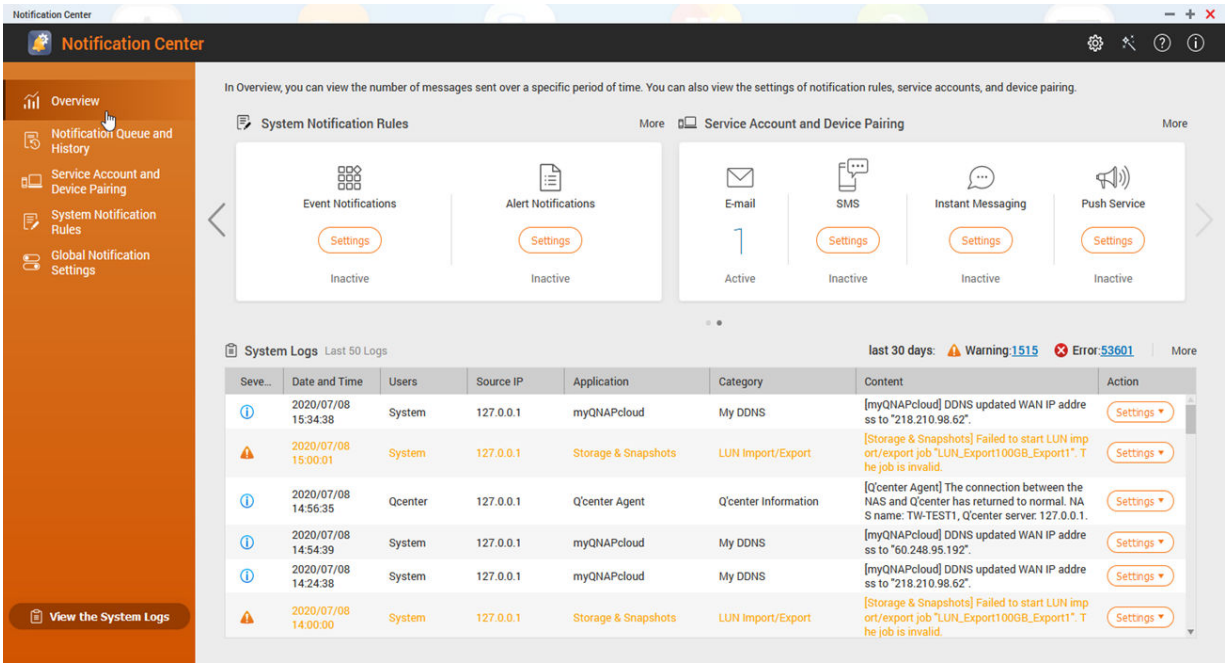
Permission Type	User Action
Custom	**a.** Select a user or user group type: • **Local** • **Domain** **b.** Choose to deny or allow access to selected users or groups. A dialog box appears. 1. Click **OK**. **c.** Filter the list by users or groups. **Tip** Use the **Search** field to quickly find users or groups. **d.** Select a user or group. **e.** Click **Add**. The user or group is added to the Selected Users/Groups list. **Tip** • Select a user or group and click **Delete** to remove the user or group from the list. • Click **Delete All** to remove all users or groups from the list. **f.** Click **Save**. **g.** Click **Close**.

13. Notification Center

Notification Center consolidates all QTS notifications to help you monitor the status of your NAS and its applications and address potential issues more closely and promptly. You can send notifications to recipients through different channels including emails, SMS, instant messaging, and other push services. Notification Center also lets you create custom notification rules and criteria, ensuring that you receive notifications that are most relevant to your needs.

Overview

The **Overview** screen displays the number of notifications delivered over a specific period of time. It also displays the number of notification rules, service accounts, and paired devices you configured.



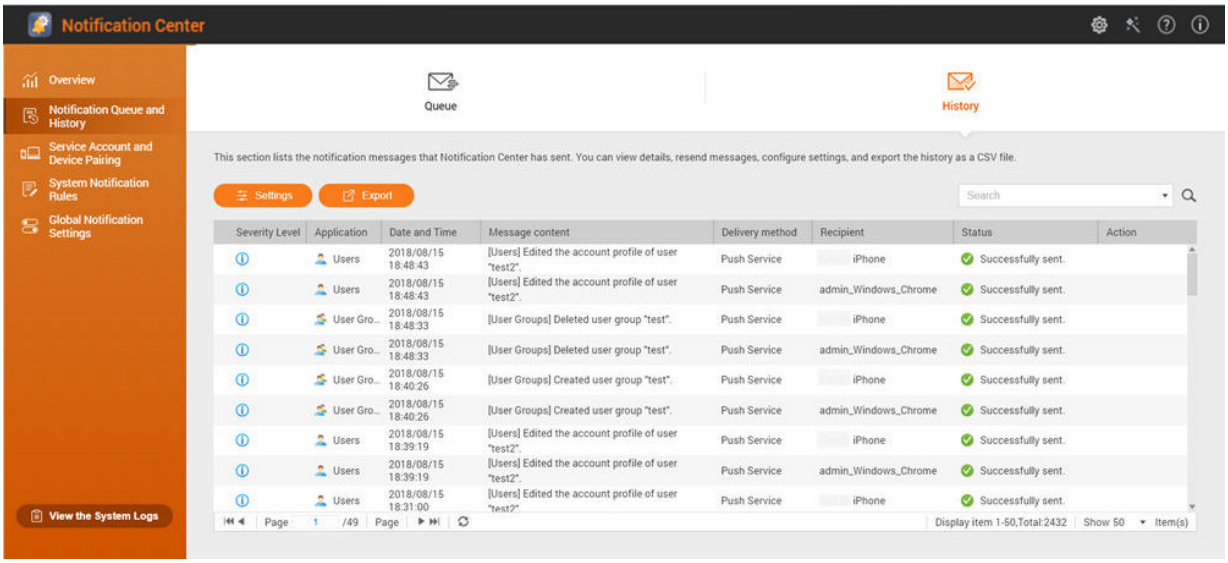
Notification Queue and History

Queue

The **Queue** screen displays the messages that Notification Center is going to send. The required transmission time depends on the current status of your NAS. You can remove a message from the queue before it is sent. Messages removed from the queue will not appear in the **History** screen.

History

The **History** screen displays the messages that Notification Center has sent. You can view details, resend messages, configure settings, and export the history as a CSV file. In the settings, you can specify how long your notification records are retained and where they are stored.



No.	Task	User Action
1	Export the notification message history.	Click **Export**. Notification Center saves the CSV file on your computer.
2	Resend the notification.	Identify the notification you want to resend, and then click . This button only appears when Notification Center is unable to send the notification to the recipient.

Configuring History Settings

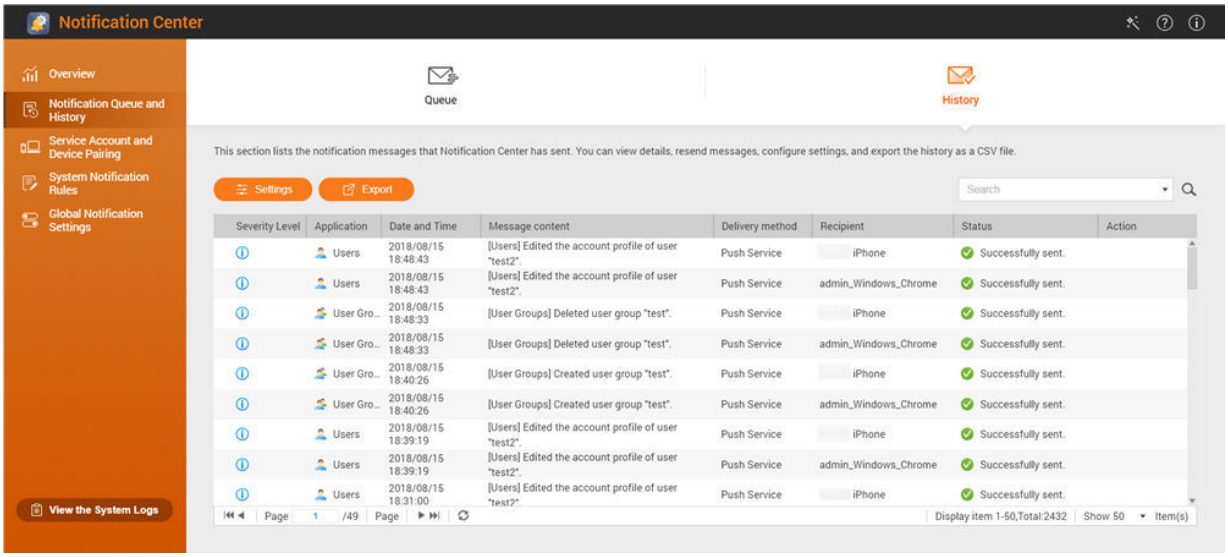
1. Open Notification Center.
2. Go to **Notification Queue and History** > **History** .
3. Click **Settings**.
   The **Settings** window appears.
4. Configure the following information.
   - Retention period: Specify the maximum number of days Notification Center retains notification records before deleting them.
   - Notification record storage: Select whether or not you want to keep notification records in a specified local folder.
5. Click **Confirm**.
   Notification Center saves your settings.

Service Account and Device Pairing

Service Account and Device Pairing allows you to configure the simple mail transfer protocol (SMTP) and short message service center (SMSC) settings so you can receive notifications through email and SMS. You can also pair your instant messaging accounts and devices with your NAS to receive notifications through instant messaging or push services.

Email Notifications

The **Email** screen allows you to add and view email notification recipients and configure your simple mail transfer protocol (SMTP) service settings.



Button	Task	User Action
	Send a test message to a specified recipient.	**1.** Click . The **Send test message** window appears. **2.** Specify an email address. **3.** Click **Send**.
	Edit the configurations of an existing email server.	**1.** Click . The **Edit SMTP Service Account** window appears. **2.** Edit the settings. **3.** Click **Confirm**.
	Remove an email server.	**1.** Click . A confirmation message appears. **2.** Click **Confirm**.

Configuring an Email Notification Server

1. Go to **Service Account and Device Pairing** > **E-mail** .
2. Click **Add SMTP Service**.
   The **Add SMTP Service** window appears.
3. Select an email account.
4. Configure the following.

Service Provider	User Action
Outlook	**a.** Click **Add account**. The email account window appears. **b.** Specify the email address that will act as the sender for QTS notifications. A confirmation message appears. **c.** Click **Allow**.
Gmail	**a.** Click **Add account**. The email account window appears. **b.** Specify the email address that will act as the sender for QTS notifications. A warning notification appears. **c.** Click **Advanced**. **d.** Click **Go to connector alpha-myqnapcloud.com (unsafe)**. **e.** Click **Allow**.
Yahoo	**Important** Before configuring the Yahoo Mail settings, do the following. **a.** Log in to your Yahoo Mail account. **b.** Go to **Help** > **Account Info** > **Account Security** . **c.** Enable **Allow apps that use less secure sign in**. Specify a valid Yahoo mail address and its account password.
Custom	**a.** Specify the domain name or the IP address of your SMTP service such as `smtp.gmail.com`. **b.** Specify the port number for the SMTP server. If you specified an SMTP port when you configured the port forwarding settings, use this port number. **c.** Specify the email address that will act as the sender for QTS notifications. **d.** Specify a username that contains a maximum of 128 ASCII characters. **e.** Specify a password that contains a maximum of 128 ASCII characters. **f.** Select one of the following secure connection options. • **SSL**: Use SSL to secure the connection. • **TLS**: Use TLS to secure the connection. • **None**: Do not use a secure connection. QNAP recommends enabling a secure connection if the SMTP server supports it.
Others	Specify a valid email address and its account password.

Tip
To configure multiple email servers, click **Add SMTP Service**, and then perform the previous steps.

5. Optional: Select **Set as default SMTP service account**.
6. Optional: Click .
   The SMTP server sends a test email.
7. Click **Create**.
   Notification Center adds the SMTP service to the list.
8. Optional: Click **Re-configuration**.

Note
Click **Re-configuration** if you want to immediately reset the email notification server. You must repeat steps 1 to 7 for re-configuration.

Configuring an Email Server Account Using Browser Station

You can add an email server account using **Browser Station** authentication to secure your remote email server without setting up a VPN.

Important
Before you authenticate an email server account using **Browser Station**, please ensure the following:

- You have **File Station** access permission.
- Your device is compatible with **Browser Station**.
  For details, see How to Use Browser Station.
- **Browser Station** is installed on your device.
  For details about installation requirements, see How to Use Browser Station.
- **Container Station** is installed on your device.
- If you are using a proxy server to access **Browser Station**, the proxy server must support WebSocket.

1. Go to **Service Account and Device Pairing** > **E-mail** .
2. Click **Add SMTP Service**.
   The **Add SMTP Service** window appears.
3. Click **Authenticate with Browser Station**.
   The **Browser Station** window appears.

Note
It may take a few minutes for the **Browser Station** window to load.

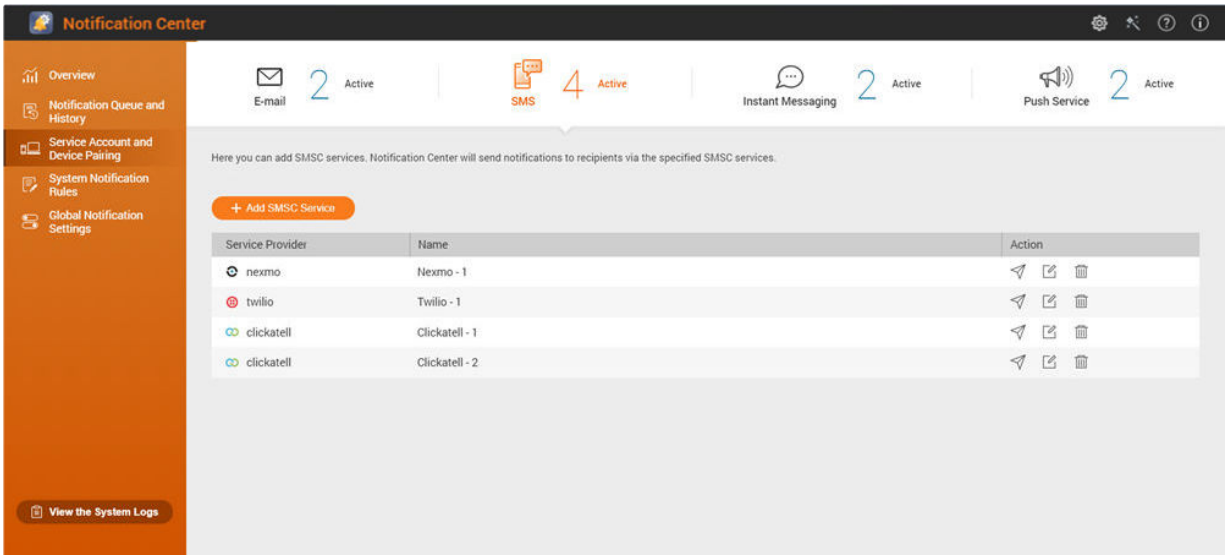
4. Specify your gmail account.
5. Click **Next**.
6. Enter your password.
7. Click **Next**.
   A warning appears.
8. Click **Allow**.
   Add SMTP Service window appears.

9. Optional: Select **Set as default SMTP service account**.

10. Click **Create**.
    The SMTP service is added.

SMS Notifications

The SMS screen allows you to view and configure your short message service center (SMSC) settings. You can either configure a custom SMSC or use any of the currently supported SMS service providers: Clickatell, Nexmo, and Twilio.



Button	Task	User Action
	Send a test message to a specified recipient.	**1.** Click . The **Send test message** window appears. **2.** Specify a country code and phone number. **3.** Click **Send**.
	Edit the configurations of an existing SMS server.	**1.** Click . The **Edit SMSC Service Account** window appears. **2.** Edit the settings. **3.** Click **Confirm**.
	Remove an SMS server.	**1.** Click . A confirmation message appears. **2.** Click **Confirm**.

Configuring an SMS Notification Server

1. Go to **Service Account and Device Pairing** > **SMS** .

2. Click **Add SMSC Service**.
   The **Add SMSC Service** window appears.
3. Select a service provider.
4. Specify an alias.
5. Specify the following information.

SMS Service Provider	Information
Clickatell - Communicator/Central	Clickatell username, password, and API ID
Clickatell - SMS Platform	Clickatell API key
Nexmo	Nexmo API key and secret question, and a sender name The sender name can contain a maximum of 32 characters.
Twilio	Your Twilio account SID, access token, and the Twilio-provided phone number linked to your account

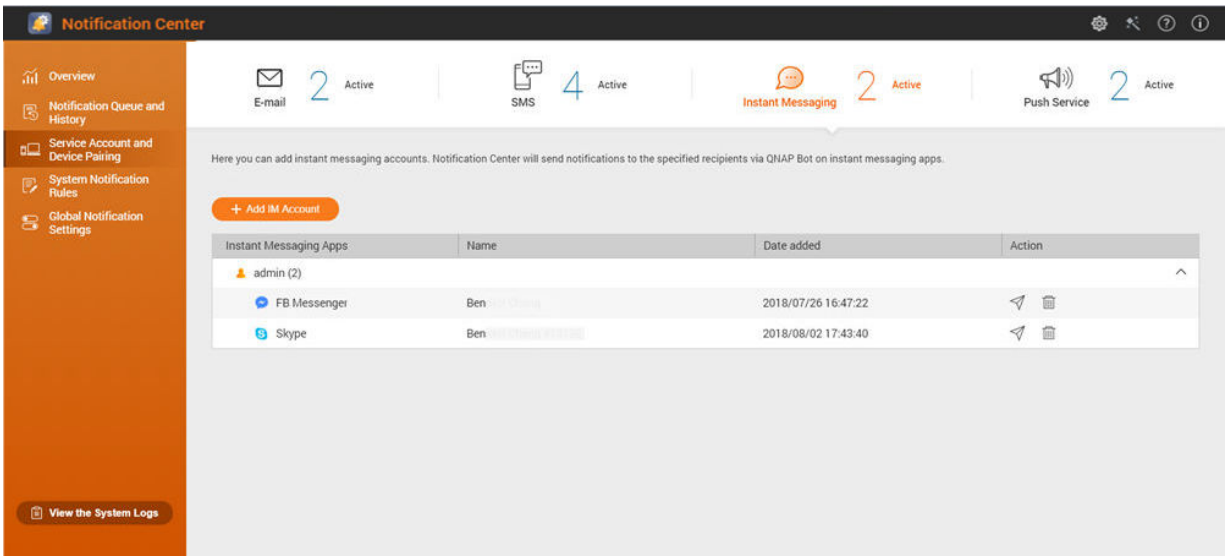
Custom	• URL template text formatted according to the format specified by your SMS service provider.
	Use the following replaceable URL template parameters.
	  • `@@UserName@@`: Specify the username for this connection.
	  • `@@Password@@`: Specify the password for this connection.
	  • `@@PhoneNumber@@`: Specify the phone number where the SMS messages are sent. This parameter is required.
	  • `@@Text@@`: Specify the text content of the SMS message. This parameter is required.
	Important
	You will not be able to receive SMS messages if the template text does not match the format used by your SMS service provider.
	• The name of the service provider. The name can contain a maximum of 32 ASCII characters.
	• A password. The password can contain a maximum of 32 ASCII characters.

Tip
To configure multiple SMS servers, click **Add SMSC Service**, and then perform the previous steps.

6. Click .
   The SMS server sends a test message.
7. Click **Create**.
   Notification Center adds the SMTP service to the list.

Instant Messaging Notifications

The Instant Messaging screen allows you to pair Notification Center with instant messaging accounts such as Skype and Facebook Messenger. Notification Center sends notifications to the specified recipents through QBot, the QNAP instant messaging bot account.



Button	Task	User Action
	Send a test message.	Click .
	Unpair from and remove the instant messaging account.	1. Click . A confirmation message appears. 2. Click **Confirm**.

Pairing Notification Center with Skype

Before configuring Skype notifications, ensure the following.

- Your NAS is registered to an active myQNAPcloud account.
- You have an active Skype account.
- Skype is installed on your device.

1. Go to **Service Account and Device Pairing** > **Instant Messaging** .
2. Click **Add IM Account**.
   The **Notification IM Wizard** appears.
3. Select Skype.
   The **Add Bot to Contacts** window appears.
4. Log in to the Skype account you want to pair.
   Skype adds QNAP Bot as a contact.
5. Close the **Add Bot to Contacts** window.

6. Click **Next**.
   A verification code appears.
7. On Skype, enter the verification code.
   Notification Center verifies and pairs with the Skype account.
8. Click **Finish**.
   Notification Center adds the Skype account to the list.

Pairing Notification Center with Facebook Messenger

Before configuring instant messaging (IM) notifications, ensure the following.

- Your NAS is registered to an active myQNAPcloud account.
- You have an active Facebook Messenger account.

1. Go to **Service Account and Device Pairing** > **Instant Messaging** .
2. Click **Add IM Account**.
   The **Notification IM Wizard** appears.
3. Select Facebook Messenger.
   The **Add Bot to Contacts** window appears.
4. Log in to the Facebook Messenger account you want to pair.
   Facebook Messenger adds QNAP Bot as a contact.
5. Click **Get Started**.
   A verification code appears on the **Notification IM Wizard**.
6. On Facebook Messenger, enter the verification code.
   Notification Center verifies and pairs with the Facebook Messenger account.
7. Click **Finish**.
   Notification Center adds the Facebook Messenger account to the list.

Pairing Notification Center with a Web Browser

Before pairing, ensure the following.

- Your NAS is registered to an active myQNAPcloud account.
- Qmanager is installed on the mobile device.
- Your NAS is added in Qmanager.

1. Open Qmanager on the mobile device.
2. Perform one of the following.

Pairing Option	User Action
Automatic pairing	**a.** From the device list, tap the NAS you want to pair. A confirmation message appears. **b.** Tap **Confirm**.

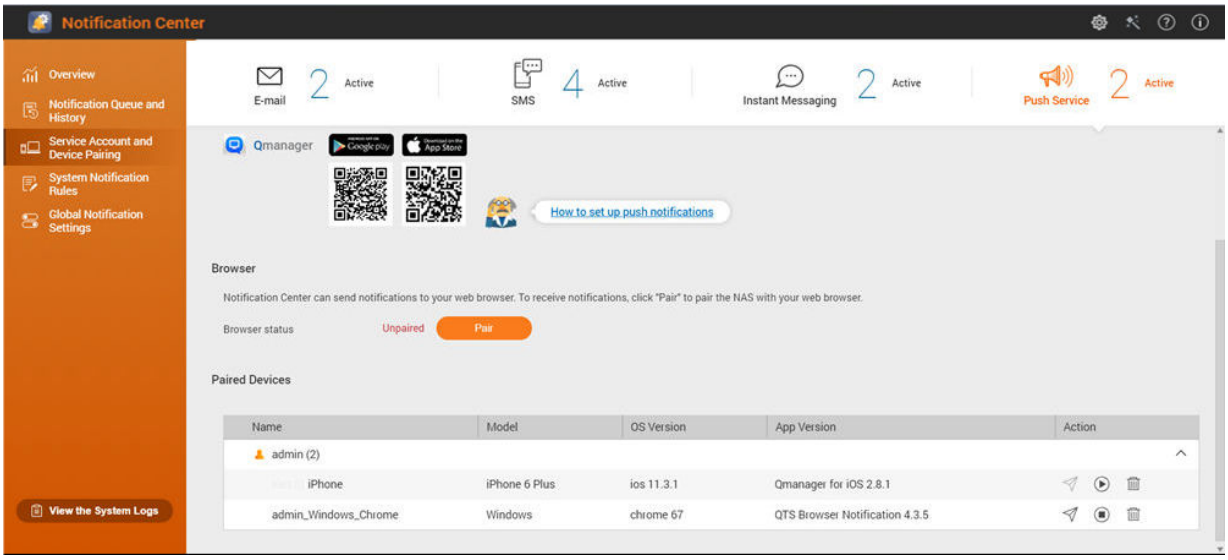
Pairing Option	User Action
Manual pairing	**a.** Identify your NAS from the device list, and then tap . The device settings screen appears. **b.** Select **Push notifications**. **c.** Tap **Save**. A confirmation message appears. **d.** Tap **Confirm**.

Notification Center pairs with the mobile device.

3. In Notification Center, go to **Service Account and Device Pairing** > **Push Service** .
4. Verify that the mobile device appears in the list of paired devices.

Push Notifications

The Push Service screen allows you to configure push services for web browsers and mobile devices.



Button	Task	User Action
	Send a test message.	Click .
	Start sending push notifications to the device or browser.	Click .
	Stop sending push notifications to the device or browser.	Click .
	Unpair and remove the device or browser.	**1.** Click . A confirmation message appears. **2.** Click **Confirm**.

Push Notification Center with a Mobile Device

Before pairing, ensure the following.

- Your NAS is registered to an active myQNAPcloud account.
- Qmanager is installed on the mobile device.
- Your NAS is added in Qmanager.

1. Open Qmanager on the mobile device.
2. Perform one of the following.

Pairing Option	User Action
Automatic pairing	**a.** From the device list, tap the NAS you want to pair. A confirmation message appears. **b.** Tap **Confirm**.
Manual pairing	**a.** Identify your NAS from the device list, and then tap . The device settings screen appears. **b.** Select **Push notifications**. **c.** Tap **Save**. A confirmation message appears. **d.** Tap **Confirm**.

   Notification Center pairs with the mobile device.

3. In Notification Center, go to **Service Account and Device Pairing** > **Push Service** .
4. Verify that the mobile device appears in the list of paired devices.

Pairing Notification Center with a Web Browser

Before pairing, ensure the following.

- Your device is registered to an active myQNAPcloud account.
- You are using one of the following web browsers: Google Chrome, Internet Explorer, Firefox, or Safari.

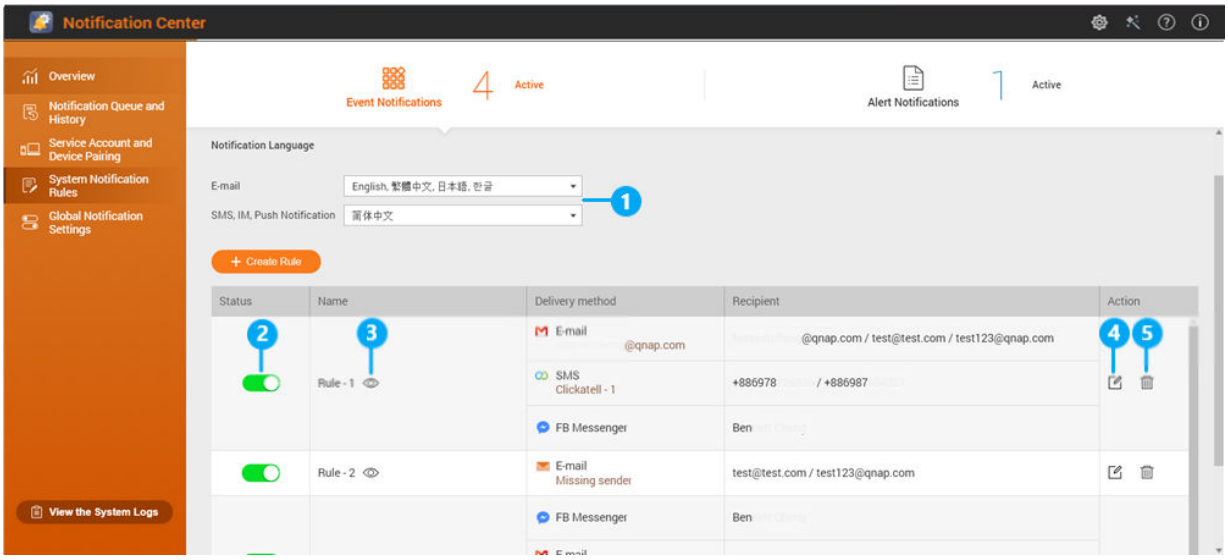
1. Go to **Service Account and Device Pairing** > **Push Service** .
2. Under Browser, click **Pair**.
   Notification Center pairs with your current browser.
   The browser appears in the list of paired devices.
3. Change your browser name.
   a. Beside your browser name, click .
   b. Specify a browser name.
   The field accepts a maximum of 127 ASCII characters.
   c. Press ENTER.

Notification Center saves your browser name.

System Notification Rules

Event Notifications

You can create custom rules and select applications and features that you want to receive event notifications from. You can also specify the message type, keywords, and time range to further define notification types or narrow the scope. Notification Center supports sending event notifications in multiple languages and provides four delivery methods to meet your different needs, including emails, SMS, instant messaging, and push services.



No.	Task	User Action
1	Specify a notification language.	**1.** Select one or more languages for email notifications. **2.** Select a language for SMS, IM, and push notifications.
2	Enable or disable the rule.	Click .
3	Preview the rule settings.	**1.** Click . The **Event Notifications** window appears. **2.** Review the settings, and then click **Close**.
4	Edit the rule.	**1.** Click . The **Edit Rule for Event Notifications** window appears. **2.** Edit the settings. **3.** Click **Confirm**.

No.	Task	User Action
5	Delete the rule.	1. Click . A confirmation message appears. 2. Click **Confirm**.

Creating an Event Notification Rule

Before creating a notification rule, ensure that your NAS is registered to an active myQNAPcloud account.

1. Go to **System Notification Rules** > **Event Notifications** .
2. Click **Create Rule**.
   The **Create event notification rule** window appears.
3. Specify a rule name.
4. Select the events you want recipients to be notified of.

Tip
To select all events, select **Select all**.
To display only the events for a specific application or service, select the item from the **Displayed Items** drop-down menu.

5. Click **Next**.
6. Select a security level.

Security Level	Description
Information	Information messages inform users of changes in the NAS settings or its applications.
Warning	Warning messages inform users of events when NAS resources, such as storage space and memory, are critically low, or when the hardware behaves abnormally.
Error	Error messages inform users of problems that occur when the system tries to update or run applications or processes or when it fails to enable or disable NAS features.

7. Specify a keyword filter.

Filter	Description
All messages	Notification Center sends all notifications that are classified under the types you selected.
Includes	Notification Center sends only the notifications that are classified under the types you selected and includes the keywords you specify. To add keyword filters, click , and then specify one or more keywords.
Excludes	Notification Center sends only the notifications that are classified under the types you selected and excludes the keywords you specify. To add keyword filters, click , and then specify one or more keywords.

Important

The event notification filter only accepts keywords that are in English or in any of the languages specified on the **Event Notifications** screen.

8. Specify a time range when you want to receive notifications.
9. Click **Next**.
10. Select a delivery method.
11. Configure the sender information.

Method	User Action
Email	**a.** Select an SMTP server. **Tip** To add an SMTP server, see Configuring an Email Notification Server. **b.** Optional: Specify a custom subject line. This text replaces the original email subject line. Use this to help recipients better understand the notifications they recieve. **c.** Optional: Select **Send email as plain text**.
SMS	Select an SMSC server. **Note** To add an SMSC server, see Configuring an SMS Notification Server.
Instant Messaging or Push Service	Notification Center automatically assigns Qbot.

12. Configure the recipient information.

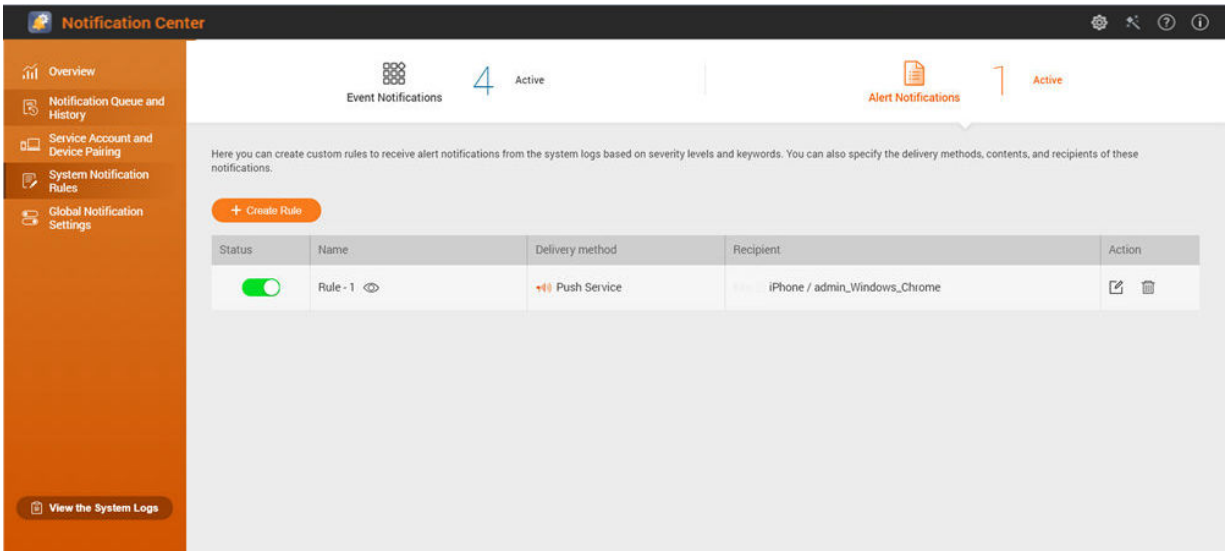
Method	User Action
Email	**a.** Click **Select NAS User**. The **Select NAS User** window appears. **b.** Select one or more NAS users. **c.** Click **Finish**. The **Select NAS User** window closes. **Tip** • To add a recipient, click **Add**, and then specify their email address. • To delete a recipient, click .

Method	User Action
SMS	**a.** Click **Select NAS User**. The **Select NAS User** window appears. **b.** Select one or more NAS users. **c.** Click **Finish**. The **Select NAS User** window closes. **d.** Select a country code for each recipient. **Tip** • To add a recipient, click **Add**, and then specify their cell phone number. • To delete a recipient, click .
Instant Messaging	Select one or more recipients. **Tip** To add instant messaging notification recipients, see the following topics: • Pairing Notification Center with Skype • Pairing Notification Center with Facebook Messenger
Push Service	Select one or more recipients. **Tip** To add push notification recipients, see the following topics: • Pairing Notification Center with a Mobile Device • Pairing Notification Center with a Web Browser

13. Optional: Click to send a test message.
14. Optional: Click **Add Pair** to create a new pair.
15. Click **Next**.
16. Verify the rule settings.
17. Click **Finish**.
    Notification Center displays the new rule on the **Event Notifications** screen.

Alert Notifications

You can create custom rules to receive alert notifications from the System Logs based on the notification type and keywords. You can also specify the delivery methods, contents, and recipients of these notifications.



Button	Task	User Action
	Enable or disable the rule.	Click .
	Preview the rule settings.	1. Click . The **Alert Notifications** window appears. 2. Review the settings, and then click **Close**.
	Edit the rule.	1. Click . The **Edit Rule for Alert Notifications** window appears. 2. Edit the settings. 3. Click **Confirm**.
	Unpair from and remove the device or browser.	1. Click . A confirmation message appears. 2. Click **Confirm**.

Creating an Alert Notification Rule

Before creating a notification rule, ensure that your NAS is registered to an active myQNAPcloud account.

1. Go to **System Notification Rules** > **Alert Notifications** .
2. Click **Create Rule**.
   The **Create alert notification rule** window appears.
3. Specify a rule name.
4. Select the events you want recipients to be notified of.
   a. Select a security level.

Security Level	Description
Information	Information messages inform users of changes in the NAS settings or its applications.
Warning	Warning messages inform users of events when NAS resources, such as storage space and memory, are critically low, or when the hardware behaves abnormally.
Error	Error messages inform users of problems that occur when the system tries to update or run applications or processes or when it fails to enable or disable NAS features.

b. Optional: Specify a keyword filter.

Filter	Description
All messages	Notification Center sends all notifications that are classified under the types you selected.
Includes	Notification Center sends only the notifications that are classified under the types you selected and includes the keywords you specify. To add keyword filters, click +, and then specify one or more keywords.
Excludes	Notification Center sends only the notifications that are classified under the types you selected and excludes the keywords you specify. To add keyword filters, click +, and then specify one or more keywords.

Important
The alert notification filter only accepts keywords that are in English.

5. Optional: Specify a time range when you want to receive notifications.
6. Optional: Specify a notification message threshold.
7. Click **Next**.
8. Select a delivery method.
9. Configure the sender information.

Method	User Action
Email	**a.** Select an SMTP server. **Tip** To add an SMTP server, see Configuring an Email Notification Server. **b.** Optional: Specify a custom subject line. This text replaces the original email subject line. Use this to help recipients better understand the notifications they recieve. **c.** Optional: Select **Send email as plain text**.
SMS	Select an SMSC server. **Note** To add an SMSC server, see Configuring an SMS Notification Server.

Method	User Action
Instant Messaging or Push Service	Notification Center automatically assigns Qbot.

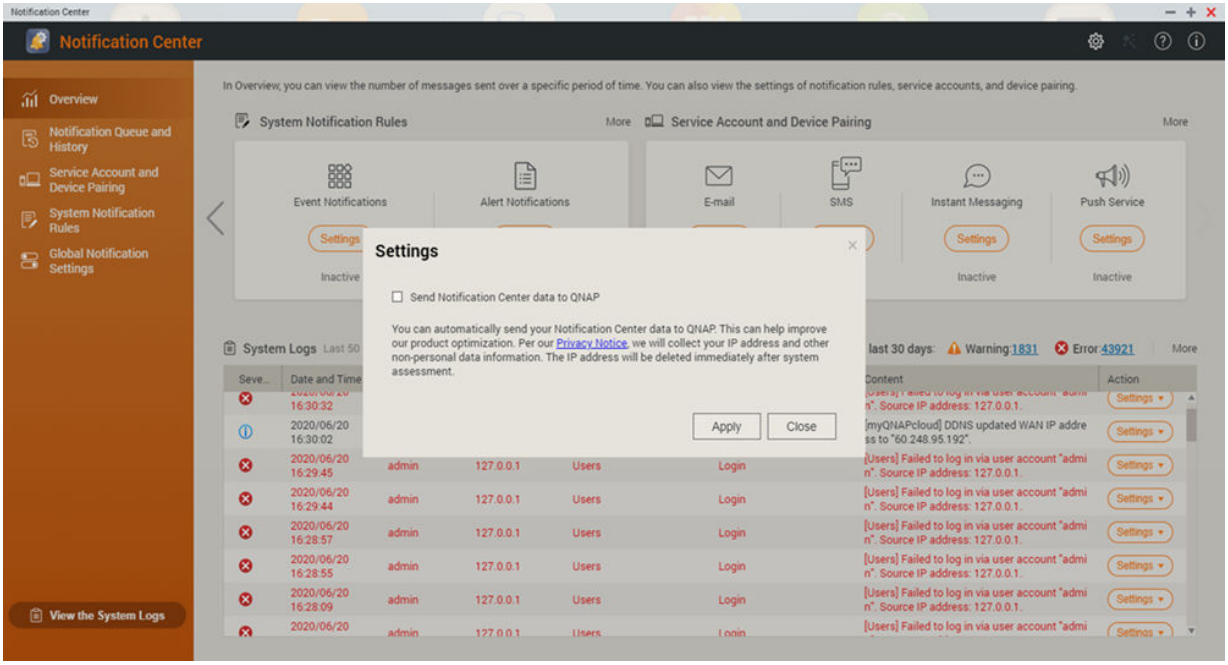
10. Configure the recipient information.

Method	User Action
Email	**a.** Click **Select NAS User**. The **Select NAS User** window appears. **b.** Select one or more NAS users. **c.** Click **Finish**. The **Select NAS User** window closes. **Tip** • To add a recipient, click **Add**, and then specify their email address. • To delete a recipient, click .
SMS	**a.** Click **Select NAS User**. The **Select NAS User** window appears. **b.** Select one or more NAS users. **c.** Click **Finish**. The **Select NAS User** window closes. **d.** Select a country code for each recipient. **Tip** • To add a recipient, click **Add**, and then specify their cell phone number. • To delete a recipient, click .
Instant Messaging	Select one or more recipients. **Tip** To add instant messaging notification recipients, see the following topics: • Pairing Notification Center with Skype • Pairing Notification Center with Facebook Messenger
Push Service	Select one or more recipients. **Tip** To add push notification recipients, see the following topics: • Pairing Notification Center with a Mobile Device • Pairing Notification Center with a Web Browser

11. Optional: Click to send a test message.
12. Optional: Click **Add Pair** to create a new pair.
13. Click **Next**.
14. Verify the rule settings.
15. Click **Finish**.
    Notification Center displays the new rule on the **Alert Notifications** screen.

Settings

The **Settings** screen allows you to enable or disable submitting Notification Center data to QNAP. Click to open the **Settings** window.



Enabling Send Notification Data to QNAP

Important
QNAP does not collect your personal data or information.

1. Open **Notification Center**.
2. Click .
   The **Send Notification data to QNAP** window appears.
3. Select **Send Notification data to QNAP**.
4. Click **Apply**.

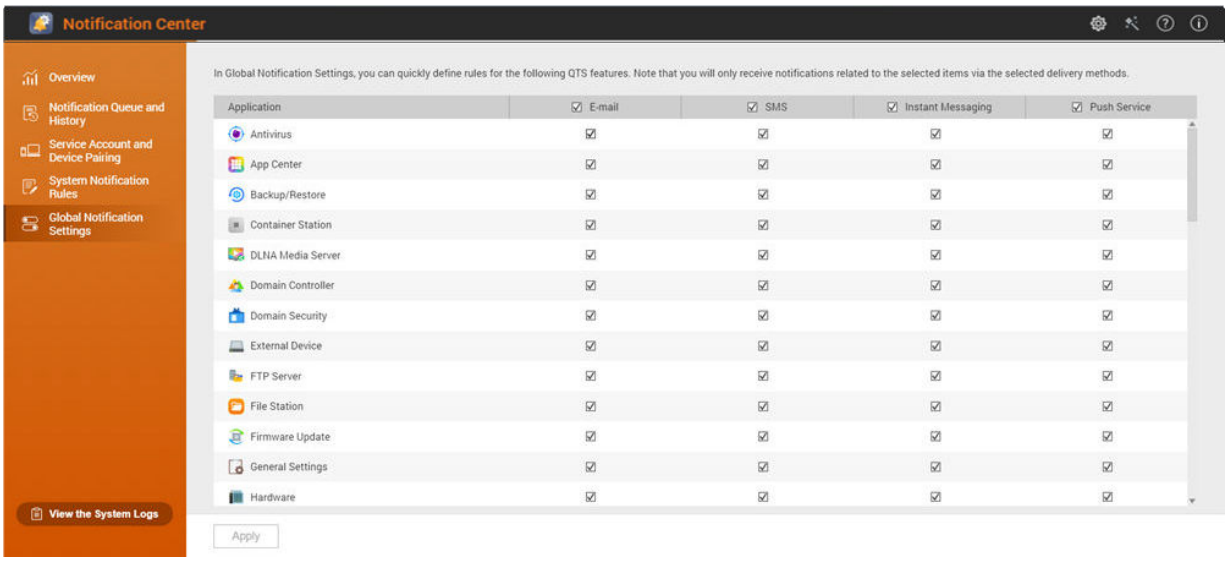
Disabling Send Notification Center Data to QNAP

Important
QNAP does not collect your personal data or information.

1. Open **Notification Center**.
2. Click .
   The **Send Notification data to QNAP** window appears.
3. Deselect **Send Notification data to QNAP**.
4. Click **Apply**,

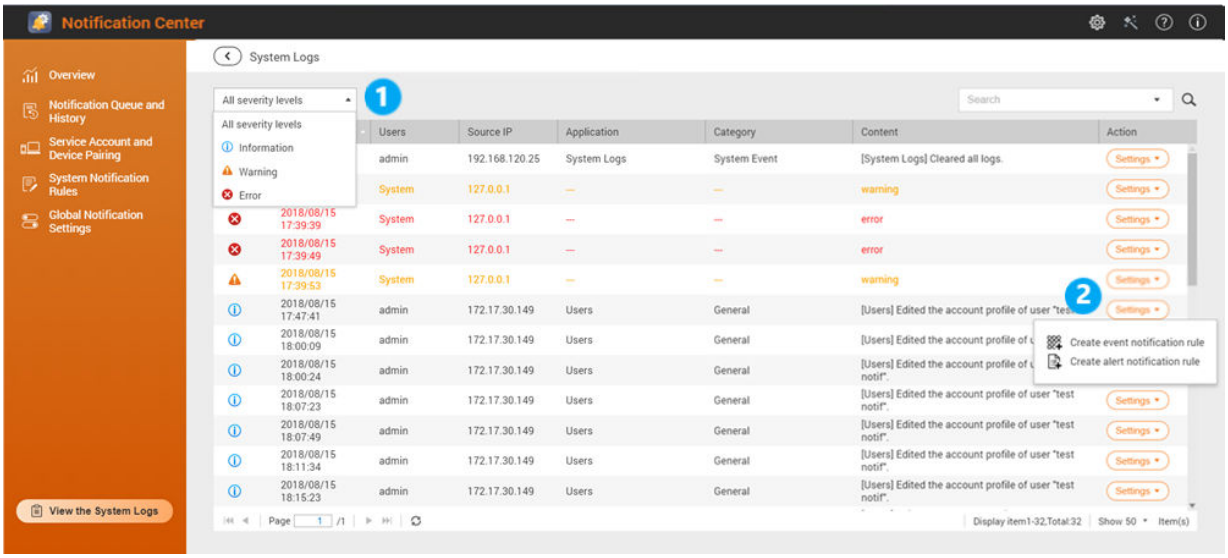
Global Notification Settings

The Global Notification Settings screen allows you to quickly define global notification rules. From the list, you can select or deselect, and then apply the delivery methods for each QTS feature or application. Users only receive notifications related to the selected features through their selected delivery methods.



System Logs

The **System Logs** screen displays all system events on the NAS. On this screen, you can sort and filter the logs or create notification rules based on existing logs.



No.	Task	User Action
1	Filter system logs	Select a security level.
2	Search system logs	Search for logs by keywords or through advanced search. To use advanced search follow the instructions below: **1.** Click ▾ in the search bar. The advanced search option drop down menu appears. **2.** Specify the following parameters where applicable: • Keyword • Severity Level • Date • Users • Source IP • Application • Category **3.** Click **Search**. Lists all log entries that meet the specified conditions.

No.	Task	User Action
3	Create a notification rule	**1.** Click **Settings**. **2.** Select one of the following options. • **Create event notification rule** • **Create alert notification rule** The **Create notification rule** window appears. **3.** Select one of the following options. • **Add as a new rule** • **Add to an existing rule** **4.** Click **Confirm**. **Tip** To add or edit notification rules, see the following topics: • Creating an Event Notification Rule • Creating an Alert Notification Rule

14. Licenses

QNAP licenses enable users to gain access to certain advanced features or premium products. This chapter introduces important concepts and demonstrate essential tasks to help you start using QNAP licenses.

About QNAP Licenses

QNAP offers a wide variety of licenses. Some basic licenses are provided free of charge. You can purchase premium licenses to further enhance the functionality of your QNAP products. QNAP also provides multiple management portals, flexible subscription plans, and various activation options to meet your different needs.

License Types and Plans

The licensing mechanisms and available plans of QNAP licenses vary depending on corresponding software products. They can be divided into the following categories.

License Types

License Types	Description
Device-based	• Allows users to use a software product installed on hardware devices, such as applications. • Multi-seat licenses can be activated and used on multiple devices.
Floating	• Allows users to use a software product in the cloud or on a virtual platform, such as QuTScloud and applications in QuTScloud. • Can be activated and used on a limited number of devices at a time
User-based	• Allows a limited number of authorized users to access a web-based service, such as Qmiix.

License Plans

License Plans	Description
Subscription	Authorizes users to use a software product with a recurring monthly or annual fee
Perpetual	Authorizes users to use a software product indefinitely
One-time	Authorizes users to use a software product within a predefined period of time

Validity Period

The validity period of a QNAP subscription-based license starts from the date of purchase, not from the date of activation.

For example, if a user starts the subscription of an annual license on January 1, 2020, the next billing date will be January 1, 2021, regardless of the date of activation. If the user cancels the subscription, the license will still remain valid until January 1, 2021.

If the user unsubscribes from a license but subscribes to the same product later, the validity period and billing cycle will begin from the date of the new subscription.

License Portals and Utility

Portal	Description	URL
QNAP Software Store	The QNAP Software Store is a one-stop shop where you can purchase licenses for QNAP and QNAP-affiliated software.	https://software.qnap.com
QNAP License Center	The QNAP License Center allows you to monitor and manage licenses of applications running on your local device.	-
QNAP License Manager	QNAP License Manager is a portal that allows you and your organizations to remotely activate and manage licenses under your QNAP ID.	https://license.qnap.com
Old QNAP License Store	Users of QTS 4.3.4 (or earlier) can purchase licenses from this online store.	https://license2.qnap.com

Software Store

Software Store allows you to purchase licenses for applications. Through Software Store, you can perform the following actions.

- Purchase or upgrade licenses
- Manage your account information
- View purchased subscriptions
- Cancel your subscriptions
- Request a refund for your orders

License Center

License Center allows you to monitor and manage the licenses of your applications running on your local device. Through License Center, you can perform the following actions.

- Activate and deactivate licenses either online or offline
- Remove licenses from the local device
- Recover licenses if your device is reset, reinitialized, or restored to factory default
- Transfer licenses purchased from the old QNAP License Store to the new QNAP License Manager

License Manager

License Manager is a portal that allows you to manage all licenses under QNAP IDs and organizations. Through License Manager, you can perform the following actions.

- View details of your licenses
- Activate and deactivate licenses
- Assign a user-based license to a QNAP ID

Important
To remotely activate or deactivate licenses, you must enable myQNAPcloud Link on your QNAP device.

Buying a License Using QNAP ID

Before buying a license, ensure the following.

- The application is already installed on your device.
- You are signed in to myQNAPcloud.

1. Go to https://software.qnap.com/.
2. Sign in with your QNAP ID.
3. Locate the product on the list, and then click **Buy** or **Subscribe Now**.
   The license details appear.
4. Select the item you want to buy, and then review the price.
5. Click **Checkout Now**.

Tip
You can also click **Add to Cart** and then continue shopping.

   The purchase summary page appears in your web browser.

6. Select a payment method.

Payment Method	User Action
Credit card	**a.** Specify your card information. **b.** Verify the items and the price on the order. **c.** Agree to QNAP terms and conditions. **d.** Click **Place Order**.
PayPal	**a.** Verify the items and the price on the order. **b.** Agree to QNAP terms and conditions. **c.** Click **Pay with PayPal** PayPal authentication window appears. **d.** Specify your PayPal login credentials. **e.** Click **Next**. **f.** Follow PayPal instructions to complete the payment.
Google Pay	**a.** Verify the items and the price on the order. **b.** Agree to QNAP terms and conditions. **c.** Click **Buy with Google Pay**. Google Pay authentication window appears. **d.** Follow Google Pay instructions to complete the payment.

After the payment, you can view order details in **My Orders** and manage your subscriptions in **My Subscriptions**.

You can activate your license right after the purchase or at a later time.

For details, see License Activation.

License Activation

You need to activate purchased licenses to access features provided by the license. You can activate QNAP or QNAP-affiliated licenses using the following methods.

Activation Method	Description
Using QNAP ID	Licenses purchased through Software Store are stored in your QNAP ID account. They can be accessed through both License Center and the QNAP License Manager website.
Using a license key	You can generate the 25-character license key after purchasing licenses through the QNAP Software Store. For details, see Generating a License Key. You can use license keys to activate licenses in License Center. For details, see Activating a License Using a License Key.
Using a product key	The 25-character product key is purchased together with the product from either QNAP or an authorized reseller. The product key is normally printed on the product package. You can use product keys to activate licenses in License Center. For details, see Activating a License Using a Product Key or PAK.
Using a product authorization key (PAK)	The 24-character PAK is purchased together with the product from either QNAP or an authorized reseller. The product key is normally printed on the product package. If you are using NAS devices running QTS version 4.3.4 or older, use PAKs to activate licenses through License Center. If you are using NAS devices running QTS version 4.3.4 or later, you can transfer PAKs purchased from the Old QNAP License Store to NAS devices. For details, see Activating a License Using a Product Key or PAK.
Offline	Use this method when the NAS is not connected to the internet. For details, see Activating a License Offline.

Activating a License Using QNAP ID

Before activating your license, ensure the following.

- Your device is connected to the internet.
- You are signed in to myQNAPcloud.

Users can activate their licenses using QNAP ID in either License Center or License Manager.

- Activate your license using one of the following methods.

Method	Steps
License Center	**a.** Open License Center. **b.** Go to **My Licenses**. **c.** Click **Activate License**. The **License Activation** window appears. **d.** Select **Activate with QNAP ID**. **e.** Click **Select License**. **f.** Select a license from the list. **Tip** If you select a multi-seat license, you can specify the number of seats that you want to activate. **g.** Click **Add**. License Center activates the license. A confirmation message appears. **h.** Click **Close**. The license appears on the list of active licenses.
License Manager	**a.** Open your web browser. **b.** Go to https://license.qnap.com. **c.** Sign in with your QNAP ID. **d.** Locate a license from the license list. **e.** Click . The **Activate License** window appears. **f.** Select **Online Activation**. **g.** Select a device. **h.** Specify your credentials on the device. **i.** Click **Allow**. A confirmation message appears. **j.** Click **OK**. License Center activates the license. **k.** Click **Close**. The license appears on the list of active licenses.

Activating a License Using a License Key

Before activating your license, ensure that your device is connected to the internet and you have signed in with your QNAP ID.

You can activate a license using a license key. After purchasing a license from QNAP Software Store, you can generate a license key from the License Manager website and apply the key in License Center. A license key contains 25 characters and always starts with the letter L.

For details, see Generating a License Key.

1. Open License Center.
2. Go to **My Licenses**.
3. Click **Activate License**.
   The **License Activation** window appears.
4. Select **Activate with a License Key**.
5. Specify the key.
6. Read and agree to the terms of service.
7. Click **Verify Key**.
8. Verify the license information.
9. Optional: Specify the number of seats to activate.

Note
This option is only available for licenses that support multiple seats.

10. Click **Activate**.
    The license is activated.
    A confirmation message appears.
11. Click **Close**.
    The license appears on the list of active licenses.

Generating a License Key

1. Open your web browser.
2. Go to https://license.qnap.com.
3. Sign in with your QNAP ID.
4. From the list of licenses, select the license you want to generate a key for.
5. Click .
   The **Activate License** window appears.
6. Select **License Key**.
   License Manager generates the license key.

Tip
Click **Renew License Key** to generate a new key.
This renews your license key and protects you from any unauthorized access to your existing license key.

7. Hover the mouse pointer over the license key and click .
   Your system copies the license.
8. Click **Done**.

The copied license key can be pasted later for license activation.

Activating a License Using a Product Key or PAK

Before activating a license using a product key or a product authorization key (PAK), ensure the following.

- Your NAS is connected to the internet.
- You are signed in to myQNAPcloud.

You can activate a license with a product key or PAK. You may find a product key printed on a physical copy of your product. A product key contains 25 characters and always starts with the letter P.

On the other hand, you may obtain a product authorization key (PAK) if you purchase a license from the old QNAP License Store. A PAK contains 24 digits of random numbers.

1. Open License Center.
2. Go to **My Licenses**.
3. Click **Activate License**.
4. The **License Activation** window appears.
5. Select **Activate with a Product Key or PAK**.
6. Specify the key.
7. Read and agree to the terms of service.
8. Click **Verify Key**.
9. Verify the license information.
10. Click **Activate**.
    The license is activated.
    A confirmation message appears.
11. Click **Close**.
    The license appears on the list of active licenses.

Activating a License Offline

You can activate your license offline if your QNAP device is not connected to the Internet. You first need to generate a device identity file (DIF) from Qfinder Pro or from License Center on your device and then upload the DIF to License Manager in exchange for the license install file (LIF). You can then activate the license using the LIF in Qfinder Pro or in License Center on your device.

1. Choose one of the following methods.

Methods	User Action
Offline activation using Qfinder Pro	Qfinder Pro allows you to discover QNAP devices on your local network. **a.** Open Qfinder Pro on your computer. **Tip** You can download Qfinder Pro from the QNAP website. **b.** Select your device from the list. **c.** Right-click the device and then select **Offline License Activation**. **d.** Specify your username and password. The **License Activation** window appears.
Offline activation using License Center	**a.** Log in to your QNAP device. **b.** Open License Center. **c.** Go to **My Licenses**. **d.** Click **Activate License**. The **License Activation** window appears. **e.** Select **Offline Activation**.

2. Read and agree to the Terms of Service.
3. Click **Generate Device Identity File**.
   Qfinder Pro or License Center downloads the device identity file (DIF) to your computer.
4. Read the instructions and click **Go to License Manager**.
   Your web browser opens the **QNAP License Manager** website.
5. Sign in with your QNAP ID.
6. From the list of licenses, select the license you want to activate.
7. Click **(Upload Device Identity File)**.
   The **Activate License** window appears.
8. Click **Browse**.
   The file browser appears.
9. Locate and select the DIF from your computer.
10. Click **Upload**.
    A confirmation message appears.
11. Click **Download**.
    QNAP License Manager downloads the license install file (LIF) to your computer.
12. Click **Done**.
13. Go back to Qfinder Pro or License Center.
14. In the **License Activation** window, click **Upload License File**.

15. Click **Browse**.
    The file browser appears.
16. Locate and select the LIF from your computer.
17. Click **Import**.
    Qfinder Pro or License Center uploads the LIF and displays the license summary.
18. Click **Activate**.
    The license appears on the list of active licenses.

License Deactivation

You can deactivate QNAP or QNAP-affiliated licenses using the following methods.

Activation Method	Description
Using QNAP ID	Licenses purchased through Software Store are stored in your QNAP ID account, and can be accessed through both License Center and the QNAP License Manager website To deactivate this type of license, see Deactivating a License Using QNAP ID.
Offline	Use this method when the NAS is not connected to the internet. For details, see Deactivating a License Offline.

Deactivating a License Using QNAP ID

Before deactivating your license, ensure the following.

- Your device is connected to the internet.
- You are signed in to myQNAPcloud.

Users can deactivate their licenses using QNAP ID in either License Center or License Manager.

- Deactivate your license using one of the following methods.

Method	Steps
License Center	**a.** Open License Center. **b.** Go to **My Licenses**. **c.** Identify the license you want to deactivate, and then click . The **License Deactivation** window appears. **d.** Select **Use QNAP ID**. **e.** Read and acknowledge the warning. **f.** Click **Deactivate**. A confirmation message appears. **g.** Click **Close**. License Center deactivates the license and removes the license from the list of active licenses.

Method	Steps
License Manager	**a.** Open your web browser. **b.** Go to https://license.qnap.com. **c.** Sign in with your QNAP ID. **d.** From the list of licenses, select the license you want to deactivate. **e.** Click . The **Deactivate License** window appears. **f.** Read and acknowledge the warning. **g.** Click **Deactivate**. License Center deactivates the license. A confirmation message appears. **h.** Click **Close**. License Center removes the license from the list of active licenses.

Deactivating a License Offline

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to deactivate, and then click .
   The **License Deactivation** window appears.
4. Select **Offline Deactivation**.
5. Read and acknowledge the warning.
6. Read the instructions, and then click **Generate License Uninstall File**.
   License Center downloads the license uninstall file (LUF) to your computer.
7. Open your web browser.
8. Go to https://license.qnap.com.
9. Sign in with your QNAP ID.
10. From the list of licenses, select the license you want to deactivate.
11. Under **Advanced Options**, click .
    The **Deactivate License** window appears.
12. Read and agree to the terms.
13. Click **Offline Deactivation**.
14. Click **Browse**.
    The file browser appears.
15. Locate and select the LUF from your computer.
16. Click **Upload**.

QNAP License Manager deactivates the license.
A confirmation message appears.

17. Click **Done**.

License Extension

License Center will notify you soon before any of your subscription-based licenses expire. The exact dates vary depending on the type of your licenses (ranging from one week to one month before the expiration date). You can extend your QNAP or QNAP-affiliated licenses using the following methods.

Activation Method	Description
Using QNAP ID	Licenses purchased through License Center or Software Store are stored in your QNAP ID account, and can be accessed through both License Center and the QNAP License Manager website. If you have an existing valid, unused subscription-based license in License Center, you can use this to extend your expiring license. For details, see Extending a License Using QNAP ID.
Offline using an unused license	If you have a valid, unused subscription-based license and your NAS is not connected to the internet, you can use this method to extend your expiring license. For details, see Extending a License Offline Using an Unused License.
Offline using a product key	The 25-character product key is purchased together with the product from either QNAP or an authorized reseller. The product key is normally printed on the product package. If you have a valid, unused product key for a subscription-based license, and your NAS is not connected to the internet, you can use this method to extend your expiring license. For details, see Extending a License Offline Using a Product Key.

Extending a License Using QNAP ID

Before extending licenses, ensure the following.

- Your device is connected to the internet.
- You are signed in to myQNAPcloud.
- You have an existing valid, unused license.

Note
Subscription-based licenses will be automatically renewed in License Manager. You cannot manually extend a subscription-based license.

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to extend, and then click .

Tip
If a license is expiring in 30 days or less, its status is `Expires soon`.

The **License Extension** window appears.

4. Select an unused license.

Warning
License Center will use this license to extend your expiring license. This process is irreversible. Once this license is used for extension, you cannot use it for anything else.

5. Click **Extend**.
   License Center extends the license.
   A confirmation message appears.
6. Click **Close**.

Extending a License Offline Using an Unused License

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to extend, and then click .

Tip
If a license is about to expire, its status is `Expires soon`.

   The **License Extension** window appears.

4. Select **manually extend a license**.
5. Select **Extend offline**.
6. Click **Next**.
7. Read the instructions, and then click **Download**.
   License Center downloads the device identity file (DIF) file to your computer.
8. Read and agree to the terms of service.
9. Click **Next**.
10. Read the instructions, and then click **Go to License Manager**.
    Your web browser opens the QNAP License Manager website.
11. Sign in with your QNAP ID.
12. Go to **My Licenses**.
13. From the list of licenses, select the license you want to activate.
14. In the table below, click **Activation and Installation**.
    The license activation details appear.
15. Click **Extend**.
    The **Extend License** window appears.
16. Select **Use an unused license**, and then click **Next**.
    The list of unused licenses appears.
17. Select an unused license.

Warning
License Center will use this license to extend your expiring license. This process is irreversible. Once this license is used for extension, you cannot use it for anything else.

18. Click **Next**.
19. Click **Browse**.
    The file browser appears.
20. Locate and select the DIF from your computer.
21. Click **Upload**.
    A confirmation message appears.
22. Click **Download**.
    QNAP License Manager downloads the license install file (LIF) to your computer.
23. Click **Done**.
24. Go back to License Center.
25. In the **License Extension** window, click **Next**.
26. Click **Browse Files**.
    The file browser appears.
27. Locate and select the LIF from your computer.
28. Click **Next**.
    License Center uploads the LIF and displays the license summary.
29. Click **Extend**.
    A confirmation message appears.
30. Click **Close**.
    The license appears on the list of active licenses.

Extending a License Offline Using a Product Key

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to extend, and then click .

> **Tip**
> If a license is about to expire, its status is `Expires soon`.

The **License Extension** window appears.

4. Click **manually extend a license**.
5. Select **Extend offline**.
6. Click **Next**.
7. Read the instructions, and then click **Download**.
   A notification message appears.
8. Click **Download**.
   License Center downloads the device identity file (DIF) file to your computer.
9. Read and agree to the terms of service.

10. Click **Next**.
11. Read the instructions, and then click **Go to License Manager**.
    Your web browser opens the QNAP License Manager website.
12. Sign in with your QNAP ID.
13. Go to **My Licenses**.
14. From the list of licenses, select the license you want to activate.
15. In the table below, click **Activation and Installation**.
    The license activation details appear.
16. Click **Extend**.
    The **Extend License** window appears.
17. Select **Use a product key**, and then click **Next**.
18. Specify the product key.
19. Click **Next**.
    A confirmation message appears.
20. Click **Download**.
    QNAP License Manager downloads the license install file (LIF) to your computer.
21. Click **Done**.
22. Go back to License Center.
23. In the **License Extension** window, click **Next**.
24. Click **Browse Files**.
    The file browser appears.
25. Locate and select the LIF from your computer.
26. Click **Next**.
    License Center uploads the LIF and displays the license summary.
27. Click **Extend**.
    A confirmation message appears.
28. Click **Close**.
    The license appears on the list of active licenses.

Upgrading a License

Before upgrading a license, ensure the following.

- The application is already installed on your device.
- You are signed in to myQNAPcloud.

Users can upgrade their existing basic licenses to premium licenses to gain access to advanced features.

1. Open your web browser.
2. Go to https://software.qnap.com.

3. Click your account name and select **MY ACCOUNT**.
4. Click **Upgrade Plans**.
   A list of upgradable subscriptions is displayed.
5. From the list of subscriptions, find the license you want to upgrade and click **Upgrade**.
   The **Current Plan** window appears.
6. From the list of upgrade plans, select an upgrade and click **Add to Cart**.
7. Click .
8. Click **GO TO CHECKOUT**.
9. Select a payment method.

Payment Method	User Action
Credit card	**a.** Specify your card information. **b.** Verify the items and the price on the order. **c.** Agree to QNAP terms and conditions. **d.** Click **Place Order**.
PayPal	**a.** Verify the items and the price on the order. **b.** Agree to QNAP terms and conditions. **c.** Click **Pay with PayPal** PayPal authentication window appears. **d.** Specify your PayPal login credentials. **e.** Click **Next**. **f.** Follow PayPal instructions to complete the payment.
Google Pay	**a.** Verify the items and the price on the order. **b.** Agree to QNAP terms and conditions. **c.** Click **Buy with Google Pay**. Google Pay authentication window appears. **d.** Follow Google Pay instructions to complete the payment.

10. Apply the license upgrade to your QNAP device.
    a. Open your web browser.
    b. Go to https://license.qnap.com.
    c. Sign in with your QNAP ID.
    d. Locate the license from the license list.
    e. Click .
    The **Activate Upgraded License** window appears.

f. Select **Online Activation**

g. Click **Next**.

h. Specify your credentials on the device.

i. Click **Allow**.
A confirmation message appears.

j. Click **Close**.

The upgraded license is activated.

Viewing License Information

1. Open your web browser.
2. Go to https://license.qnap.com.
3. Sign in with your QNAP ID.
4. View the license information using one of the following modes.

Viewing Mode	User Actions
List by Device	This mode displays all the activated licenses on each device. This allows you to quickly view and manage your licenses on a specific device. • Click a device and then click **Device Details** to view the details of the selected device. • Click a device and then click **Activation and Installation** to view the details of your licenses. You can also activate or deactivate licenses.
List by License	This mode displays your purchased licenses and their details, including available seats, license types, validity period, and status. • Click a license and then click **License Details** to view the details. • Click a license and then click **Activation and Installation** to view the details. You can also activate licenses, deactivate licenses, download the license file, or upload the device identity file. • Click a license and then click **Usage Record** to view the history of the selected license.
List by Product	This mode displays your purchased licenses for each product. This allows you to view and manage all related licenses designed for the same product. • Click a product to view the details of your licenses. You can also activate licenses, deactivate licenses, download the license file, or upload the device identity file.

Recovering Licenses

Before recovering licenses, ensure that your device is connected to the internet.

1. Open License Center.
2. Go to **Recover Licenses**.

3. Click **Get Started**.
   The **License Recovery** dialog box appears.
4. Read and agree to the terms of service.
5. Click **Recovery**.
   License Center automatically recovers all available licenses for applications installed on your devices.

Transferring a License to the New QNAP License Server

This task only applies to existing licenses that have been activated using PAK.

Before transferring licenses, ensure the following.

- Your NAS is connected to the internet.
- You are signed in to myQNAPcloud.

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to transfer, and then click .
   A confirmation message appears.
4. Read the terms of service, and then click **Transfer & Activate**.

Warning
After you register a license with your current QNAP ID, it will no longer be transferable.

   License Center transfers the license.
   A confirmation message appears.
5. Optional: Click **QNAP License Manager** to review the license details.
6. Click **Close**.

Deleting a License

Before deleting a license, ensure that you have deactivated this license.

1. Open License Center.
2. Go to **My Licenses**.
3. Identify the license you want to delete, and then click .
   A confirmation message appears.
4. Click **Yes**.
   License Center deletes the license.

Tip
If the license has not yet expired, the license will still be listed in the **License Activation** table.

15. Malware Remover

About Malware Remover

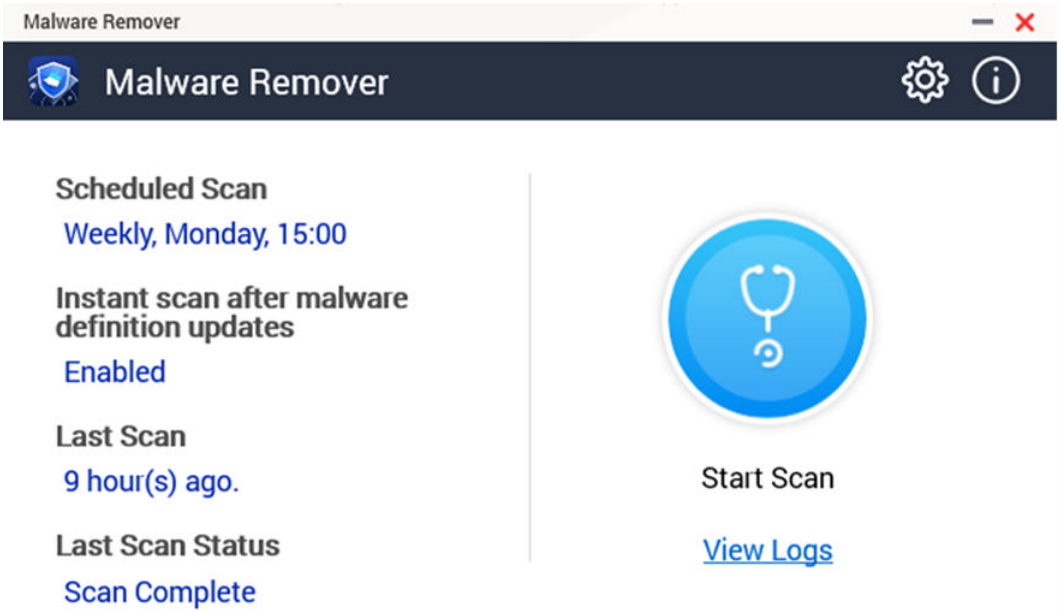
Malware Remover is a built-in utility designed to protect QNAP devices against harmful software. Malware programs are often disguised as or embedded in nonmalicious files and software. They often attempt to gain access to sensitive user information and may negatively impact device performance.

Implementing several layers of protection, Malware Remover allows you to perform instant and scheduled scans on your QNAP device and prevents malicious software from putting your data at risk.

Important
QNAP strongly recommends running routine scans to prevent malware infections and protect the system from advanced risks, threats, and vulnerabilities.

Overview

This screen displays information and controls connected to Malware Remover.



Running a Malware Scan

1. Open Malware Remover.
2. Click .
   Malware Remover begins the scan.
3. Optional: After the scan finishes, click **View Logs** to view the results.

Running a Scheduled Scan

Scheduled scans periodically look for security threats on your QNAP device.

Note
The **Enable scheduled scan** checkbox is enabled by default.

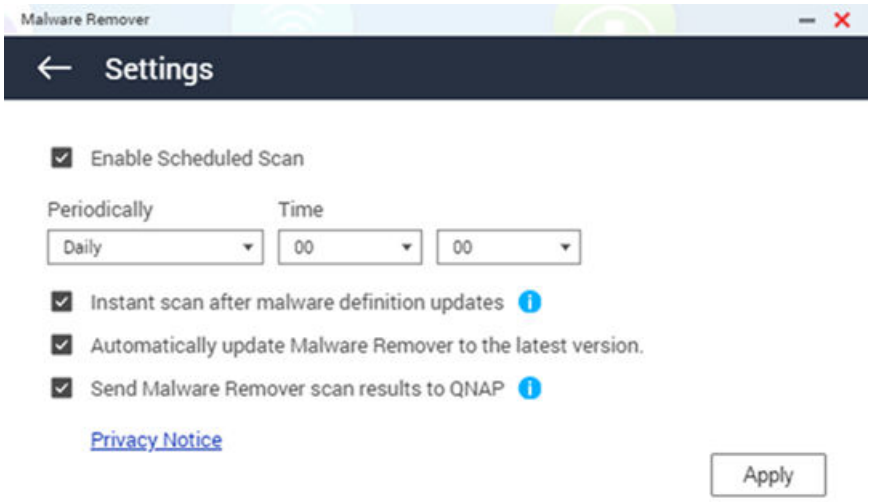
1. Open Malware Remover.
2. Click .
3. Choose from the scheduled scan drop-down menu to configure the settings.

Setting	Description
Daily	The scheduled scan runs daily at the specified time.
Weekly	The schedules scan runs once a week on the specified day and time.
Monthly	The scheduled scan runs once a month on the specified date and time.

4. Click **Apply**.

Settings

This screen contains the Malware Remover configuration options.



Configuring Malware Remover

1. Open Malware Remover.
2. Click .
   The **Settings** window opens.
3. Configure the settings.

Note
All settings are enabled by default to prevent malware threats from infecting the system.

Tip
QNAP recommends running scans during off-peak hours.

Setting	Description
Enable scheduled scan	Enable to scan all applications and files at the user-configured frequency and time. For details, see Running a Scheduled Scan. **Note** Enabling this setting ensures Malware Remover performs routine scans of your device.
Instant scan after malware definition updates	Enable this option to run instant scans once Malware Remover updates the malware definitions. **Note** Malware Remover automatically updates malware signatures and security patches to have the most up-to-date security content.
Send Malware Remover scan results to QNAP	Enable this option to submit the scan results for malware analysis. QNAP collects the following data: • NAS model • NAS IP address (The IP address is immediately deleted after analyzing the malware scan results.) • Scan status • Scan errors • Malware detection date and time • Malware ID **Note** Disabling this option prevents Malware Remover from sending any data to QNAP.

4. Click **Apply**.
   Malware Remover saves the settings.

16. Helpdesk

Helpdesk is a built-in application that allows users to quickly find solutions or contact the QNAP support team when they encounter any issues while using QTS and related applications.

Overview

On the **Overview** screen, you can contact the QNAP support team, browse frequently asked questions and application notes, download QNAP user manuals, find out how to use a QNAP NAS, search the QNAP knowledge base, and find compatible devices. This screen also displays Helpdesk message logs.

Title	Description
Help Request	Contact the QNAP support team by submitting your issues or questions.
QNAP Online Tutorial & FAQ	Browse frequently asked questions and application notes for QNAP NAS and applications.
NAS User Manual	View or download QNAP NAS user manuals.
Help Center	Find how to use a QNAP NAS.
QNAP Helpdesk Knowledge Base	Search the QNAP knowledge base for answers from the support team for different issues.
Compatibility List	Find drives and devices that are compatible with QNAP NAS.
My Tickets	View your submitted tickets status.

Configuring Settings

1. Open **Helpdesk**.
2. Go to **Overview**.
3. Click ⚙.
   The **Settings** window appears.
4. Specify the message retention time.
5. Optional: Click **Retain all messages**.
6. Optional: Click **I am allowing QNAP Support to access my system logs**.
7. Optional: click **Sign In**.
   The **Settings** window appears.
8. Specify your QNAP ID.
9. Specify the password.
10. Click **Sign In**.
11. Click **Apply**.

Help Request

Help Request allows users to directly submit requests to QNAP from your NAS. Helpdesk automatically collects and attaches NAS system information and system logs to your request to help the QNAP technical support team identify and troubleshoot potential issues.

Submitting a Ticket

You can submit a Helpdesk ticket to receive support from QNAP.

1. Open **Helpdesk**.
2. Go to **Help Request**.
3. Sign in with your QNAP ID.
4. Specify the ticket details.

Field	User Action
Subject	Specify the subject.
Issue Category	Select an issue category, and then select an issue.
Issue Type	Select an issue type.
Operating System	Select an operating system.
Description	Specify a short description for each issue.

5. Upload the attachments.
   a. Optional: Select **I am allowing QNAP Support to access my system logs**.
   b. Upload screenshots or other related files.

Note

- You can upload up to 8 attachments, including system logs.
- Each file must be less than 5 MB.

6. Specify the following information.

Field	User Action
Your Email Address	Specify your email address.
Phone number	Specify your phone number.
Customer type	Select a customer type.
Company name	Specify your company name. **Note** This field only appears when Business User is selected in **Customer type**.
Your timezone	Select a timezone.
Apply the changes to my profile in QNAP Account Center	Click to apply the changes to your profile in the QNAP Account Center.
First name	Specify your first name.
Last name	Specify your last name.
Your location	Select a location.

7. Optional: Select **Apply the changes to my profile in QNAP Account Center**.

8. Click **Submit**.

Remote Support

Remote Support allows the QNAP support team to access your NAS directly to assist you with your issues.

Enabling Remote Support

1. Open **Helpdesk**.
2. Go to **Remote Support**.
3. Specify your ticket ID.
4. Specify your email address.
5. Click **Enable Remote Support**.
   The **QNAP Helpdesk Terms of Service** window appears.
6. Click **I agree to these Terms of Service**.
7. Click **Agree**.
   The **Enable Remote Support** window appears.

Note
Steps 6 and 7 are required only when the user enables Remote Support for the first time.

8. Click **Confirm**.
   Helpdesk creates a private key and temporary account.

Extending Remote Support

Extending Remote Support allows the users to extend the remote session by a week in case users want to have the remote session at a specific time. QNAP will also notify the user to extend the session if the issue is unsolved.

1. Open **Helpdesk**.
2. Go to **Remote Support**.
3. Click **Extend**.

Note
The **Extend** button only appears after Remote Support is enabled.

Disabling Remote Support

1. Open **Helpdesk**.
2. Go to **Remote Support**.
3. Click **Disable**.

Note
The **Disable** button only appears after Remote Support is enabled.

4. Click **Finish**.

Note
Remote Support will also be disabled when the support team has completed the remote session, or when the private key has expired.

Diagnostic Tool

The Diagnostic Tool provides several features for checking the stability of the NAS. Users can export system kernel records to quickly check whether abnormal operations have recently occurred. In addition, users can send the records to QNAP technical support for further investigation. The Diagnostic Tool also provides features for checking the file system, hard drives, and RAM.

Downloading Logs

1. Open **Helpdesk**.
2. Go to **Diagnostic Tool** > **Download Logs** .
3. Click **Download**.
   Helpdesk generates a ZIP file.
4. Download the ZIP file.
5. Optional: Send the file to QNAP through Help Request for further investigation.

Performing an HDD Standby Test

1. Open **Helpdesk**.
2. Go to **Diagnostic Tool** > **HDD Standby Test** .
3. Select an enclosure to analyze.
4. Click **Start**.
   Helpdesk performs an HDD standby test.
5. Optional: Click **Download** to download the test reports.

Performing an HDD Stress Test

1. Open **Helpdesk**.
2. Go to **Diagnostic Tool** > **HDD Stress Test** .
3. Click **Start**.
   Helpdesk performs an HDD stress test.
4. Optional: Click **Download** to download the test reports.