QNAP

STORAGE SOLUTIONS GUIDE

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Storage solutions

QNAP NAS offers storage solutions for a variety of usage scenarios.

What storage media can be used?

SAS HDD/SSD
Used in systems requiring high performance and high availability. Used for storage for core systems.

SATA HDD
Save high volumes of data at relatively low price. Multiple grades are available. Always use hard drives intended for use in NAS or servers.

SATA SSD
An affordable way to improve random access performance. Useful for cases in which detailed files are handled.

U.2/U.3 SSD
Extremely high speed. Recommended for cases where high-volume and high-bit rate files are being handled, such as 8K videos.

M.2/E1.S SSD
Extremely high speed. Ideally used as an SSD cache in an HDD base system, and cases in which a hot swap is necessary in a small model that requires high speed.

LTO
High volume at a low price. Although the read/write speed is inferior to other media, LTO is the best option for long-term data archives.

Synchronization/Backups/Archives

It's common to think that it's "just fine" to export and copy data to storage. Is your current method good enough? If we clarify the activity by reviewing the definition of synchronization/backups/archives here, the answer should be clear. Synchronization is a 1-to-1 copy, and normally if a source file is changed or deleted, the same changes and deletions are applied to the synchronized file. Synchronization is not used for function such as returning a deleted file to what it was. Meanwhile, with a backup, it is possible to return to any state by choosing the month and date of the desired state. Normal backup source data is active and is not deleted. For archives, data is copied to something like USB storage and the source data is deleted to acquire space. Archiving is when you need to keep files for potential future use, but are not actively using it at the moment.

Scenarios where QNAP NAS is used

The characteristics of these storage medias are used in QNAP NAS and can be adapted for use across a variety of scenarios.

Companies
Utilized in companies as core system storage, file servers accessed by employees, remote access from outside the company, and as a backup storage destination

Education and research
Utilized as laboratory file servers, high-volume/high-speed servers that store research data, and as a storage destination for student data.

Airports and public transport
Utilized for signage and other facility IT infrastructure.

Smart homes
Utilized as a destination for scans and printouts, a backup location for smartphone data, and for streaming multimedia to TVs.

Factories
Stores surveillance camera video as "evidence data" to confirm that there were no problems in work processes. Utilized for linking production systems and core systems. Also utilized for things like remotely monitoring machine tools.

Supermarkets and retail
Utilized as easy-to-use, safe, and high-volume storage as well as surveillance system recording servers.

TV, film, and creative media
Utilized as storage for video editing and archive storage, taking advantage of high speed, high volume, and multi-user editing.

Outdoors
Utilized as portable, high-volume and high-speed storage as well as data storage destinations for outdoor locations.

Healthcare
Utilized for efficient storage of relatively large data, such as X-ray images, as well as long-term archives for legal compliance, taking advantage of its compactness, high speed and high volume.

Types of Storage and Characteristics

Types of storage for normal use include storage connected by USB and Thunderbolt. NAS connects to your network and cloud storage. Here we will review the characteristics of NAS.

Comparisons of DAS (Direct Attached Storage), NAS, and Cloud Storage

	DAS (USB/Thunderbolt)	NAS (Ethernet)	Cloud Storage
Data Sharing	• Requires physically connecting DAS to your PC/device. • Does not support real-time data sharing. • The file system of the DAS must be compatible with the operating system of the connected PC/device. • Compatibility may be limited to specific devices or operating systems.	• Accessed via your network. • Supports real-time data sharing. • Access data using any device, including Windows, macOS, iOS, Android, and Linux devices.	• Data is accessed via the Internet. • Supports real-time data sharing. • Access data using any device, including Windows, macOS, iOS, Android, and Linux devices.
Scalability	• Fixed interface, such as USB or Thunderbolt, which cannot be changed. • Limited, if any, ability to increase capacity. • When using multiple DAS units, they are normally divided into multiple namespaces (such as D drive and E drive.)	• Can add additional connections, including 10G/25G/100GbE network cards, M.2 and others. • Capacity can be scaled up by using higher-capacity storage devices or expansion enclosures. • When using expansion enclosures, they can be integrated into one namespace.	• Most cloud storage uses HTTPS to access data. • Speed is restricted to the user's internet speeds and local network. • Capacity is usually subscription-based and can be scaled on demand. • When expanding capacity, it can be integrated into one namespace.
Data Sharing	• Physically connect the DAS to your PC/device. • If you have multiple DAS and are looking for specific data, you may need to plug and unplug multiple DAS to find it.	• Provides a high-speed, smooth, and easy-to-use operating system. • Files can be accessed remotely using companion mobile apps.	• Can be accessed through dedicated desktop client or web browser. • Internet access is required.
Data Security	• Backups and snapshots must be managed by the host device. • Files can be accessed while the DAS is connected.	• Centralizes backups and ensures consistent in snapshots. • User accounts and permissions provide privacy and access rights to specific files and folders. • The data stored on a NAS belongs to you, and can only be accessed with your permission.	• Backup relies on the policies of the cloud storage provider, or by you procuring dedicated on-premises storage. • User accounts and permissions provide privacy and access rights to specific files and folders. • Your data is stored on another company's servers and is subject to their terms and conditions.

QNAP NAS Data Protection Mechanism

QNAP NAS offers various mechanisms to protect your data. Here we introduce our leading mechanisms.

RAID: Prepare for disk failures

"Data was lost due to drive failure." This is an issue most people have faced at one point. Every storage device will eventually fail. What's important is how you preemptively act to protect your data against hardware failure. The answer is, RAID. By mirroring data across multiple disks and distributed writing with parity, original data can be read from the remaining disks, even if another disk fails.

RAID1

Data is duplicated on two disks, providing redundancy. If one disk fails, data is safe on the other.

RAID5

Data and parity are spread across three or more disks. It provides fault tolerance against one disk failing.

RAID6

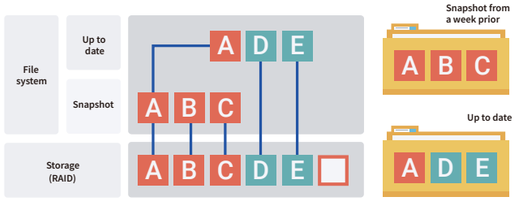
Similar to RAID 5 but with two parity blocks. RAID6 provides fault tolerance against two disks failing.

What is parity?

Do you remember fill-in-the-blank math problems in elementary school? Problems like, "For the equation 1 + X = 2, what is the value of X?" In the same way, by recording both the equation "d1 + d2 = p1" and its answer on the disk, even if part of the data is missing, it is possible to find the missing part. This type of mechanism is used in RAID so that data is recorded so that the source data can be found even if the disk fails.

Snapshot: Protect against accidental or malicious data modification

"I accidentally forgot to change the filename and overwrote it!" "I mixed up the main and backup and accidentally deleted the main files!" We hear about cases like this often. The simplest way to return to the original data in this situation is the snapshot mechanism.



Snapshot Mechanism

Snapshots record changes made to files and data. This allows you to retain the previous versions of the files/ data compared to standard backup which just overwrites them.

In the figure above, the latest data version is the combination of "A, D, E." Meanwhile, the data in the snapshot is "A, B, C." The data can be read from each. When accessing the latest data, "A, D, E" is read from the disk or RAID, when accessing data on the snapshot, "A, B, C" is read from the disk or RAID.

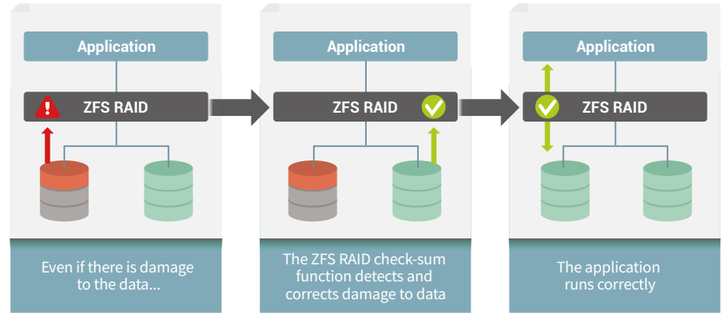
This mechanism achieves the convenience of allowing access to data before it is switched in while also achieving capacity efficiency.

A Snapshot is not a Backup?

With snapshots you can easily go back to previous data, but beware that it does not function as backup. Using "A, D, E" and "A, B, C" as an example. What happens if the area on the disk where A is recorded can no longer be accessed? The latest data also won't be readable from a snapshot. Beware that at the very least, if it is not exported to a different shared file or volume, snapshots will not function as a backup.

ZFS Self-healing: Fix silent data corruption

On rare occasions, data corruption occurs due to a reading error or weak write. In cases such as these, ZFS checks the data and heals it if corruption is detected.



QSAL: Maximize the potential of SSD lifespans

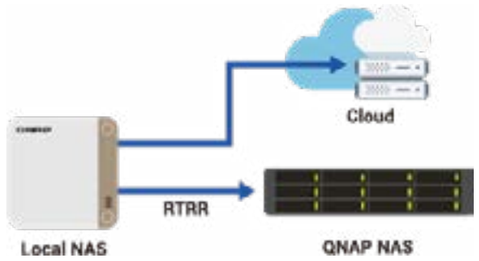
SSD has superior performance than HDD, and is used for bandwidth-demanding tasks such as 8K video editing and AI learning storage. However, unlike, HDD, SSD lifespan is measured in number of writes. Such as Terabytes Written (TBW) or Drive Writes per Day. This limited number of writes is why care must be taken when using SSDs in a RAID configuration.

QNAP's patented QSAL (QNAP SSD Antiwear Leveling) automatically adjusts the writes to SSD in a RAID and prevents SSD from reaching TBW at the same time. This allows for safe replacement of SSDs that have reached TBW.

HBS3: Unified backup, synchronization, and restore

There is risk that NAS itself will stop working due to unexpected events such as natural disasters. HBS3 (Hybrid Backup Sync 3) supports backup and synchronization to NAS and restoration from NAS.

Data can be easily backed up to external devices, another NAS on the network, remote NAS via VPN, and cloud storage.



DA Drive Analyzer: Predict disk failure

In addition to disk failure prediction using conventional S.M.A.R.T. attributes, it also supports failure prediction using cloud-based AI. This allows you to prepare to replace drives in advance and protect yourself from potential data loss. DA Drive Analyzer provides failure prediction with a higher level of accuracy based on AI learning of analyzed data from drives of over a million devices.

RAID rebuild time is massively reduced with the RAID disk automatic replacement function!

In QNAP NAS, if a drive error is detected, data is moved from the malfunctioning disk to the hot spare before the disk becomes inaccessible. This eliminates the wait time from after the malfunction occurs to when the drive is replaced. In doing so, it prevents potential data loss or failure which may occur during RAID reconstruction, improving system reliability.

QNAP NAS Security Mechanism

QNAP NAS is equipped with a mechanism that prevents unauthorized access from users or malware. Here we introduce mechanisms that achieve QNAP NAS security.

Security Center: Monitors NAS overall security status

In the Security Center, you can view overall NAS security. Whether or not risks were found in security checkup. Whether or not viruses were found by anti-virus. Has malware been detected? At what frequency are attempts being made to breach the Firewall? This sort of information can be checked. If you are concerned about an issue, you can check the details or settings in the apps.

Security Diagnosis: Security status monitoring/advice

Is the Firmware updated to the latest version? Has the administrator user password been changed from the default password? Are risky ports, like Telnet, open? Checks and advises changes to NAS settings based on potential risks.
In case of risk, you can go directly from the diagnostic results to the settings screen and easily fix security risks.

Antivirus: Check if files and data are infected

You should always have an active antivirus solution on your computers, servers, and NAS.
QNAP provides the free open-source ClamAV, and also offers subscriptions to McAfee Antivirus.
McAfee supports real-time scanning, so files infected with virus are detected before they are written to your NAS.

PSIRT (Product Security Incident Response Team)

QNAP has a dedicated security team called PSIRT. If a security-related issue, such as vulnerabilities or ransomware are detected, PSIRT pledges to investigate it within 9 hours, resolve it within 14 hours, and respond within 24 hours. We collect security information and make improvements daily so our customers can use NAS safely.

QuFirewall: Zero Trust Solutions to prevent unauthorized access

Traditional firewalls are trusted by many, but in most cases, they are only installed at the intranet entrance. Are all packets in the intranet safe?
With the zero-trust concept, it is possible to achieve high-level security by determining whether each network device should have an individual Firewall and individual access. QuFirewall has a profile and can prevent access from unintended IP addresses and to unintended ports.

Monitor Abnormal File Activity: Monitor ransomware activities

When a system has been infected with ransomware, it travels through the network and encrypts files and data. QNAP NAS can learn data access patterns from client devices. When irregular data access patterns are detected it may indicate a ransomware attack. This provides the potential to react ASAP to attacks.
The actions of taking a snapshot, setting it as read-only, and not taking anymore snapshots, are performed automatically, facilitating prevention of expansion of ransomware damage.

2FA Certification and SSH Certificate Authentication: Even stronger authentication method support

Passwords are normally categorized as “cognitive information”. To implement safer authentication, it is recommended to use a combination of “held information” and “biological information”. 2FA = 2-factor authentication using “information on your smartphone” is supported in QNAP NAS. Even stronger corrupt access prevention methods that can't be achieved with only a password are supported.
Certificate authentication is supported when accessing SSH as well. Prevents corrupt access from users without key information.

Personal Cloud Storage Solutions

QNAP NAS allows secure access to your files and data using a relay service. It's convenient to use for synchronizing laptop files with NAS from outside the home, checking pet cameras installed at home, and for viewing and sharing photos saved in NAS.

Set up Personal Cloud on myQNAPcloud Link

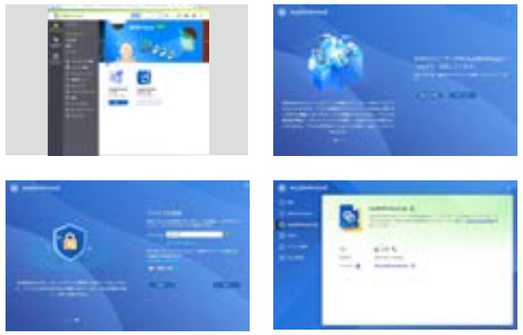
You must set up Person Cloud on myQNAPcloud Link to use it as a personal cloud. But the procedure is simple.

1. QID Registration
2. Just install myQNAPcloud Link on NAS, link to the created QID account to complete personal cloud setup.

Step 1. Register for a QID

Go to https://www.myqnapcloud.com/

Select sign up and enter the required fields.
You will receive a confirmation email to finish the signup process. Check your spam/bulk folder if you do not receive this email.
Alternatively, sign up using your Google or Facebook account.



Step 2. Install and link myQNAPcloud Link

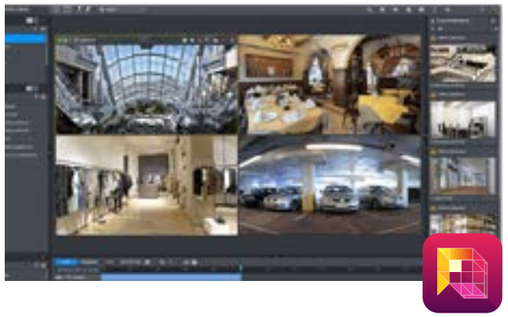
Log in to your NAS and open the App Center. Enter "myQNAP" in the search window and find "myQNAPcloud Link". Click "Install".
Click "Sign in" and log in with your QID.

When you add your unique name to your own NAS, setup is complete. The myQNAPcloud Link status is displayed, so check to make sure everything is "normal."

QuMagie: View and share photos saved in NAS

If you install QuMagie, photos saved on NAS are automatically categorized by date taken, people appearing in photos, location, and objects appearing in photos. You can safely and easily enjoy your photos anywhere without any hassle.

Using the companion mobile app allows you to automatically upload photos to your NAS.

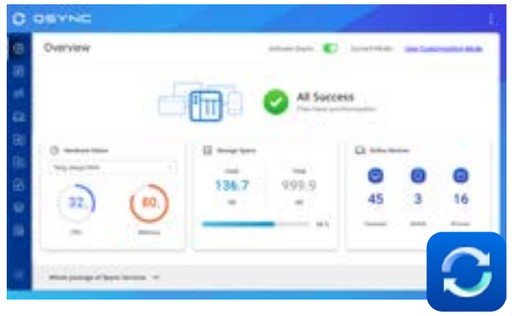


QVR Pro: Video recording with surveillance camera and remote viewing

Using QVR Pro allows recording to NAS from network cameras authenticated by QNAP and ONVIF-compatible network cameras. You can bookmark scenes in the videos with movement for easy checking, and you can also watch recorded videos remotely.
Recorded videos are saved as normal video files on your NAS, so you can also easily watch, edit, or share them.

Qsync: Synchronize NAS files across devices

Use Qsync to synchronize designated folders on your laptop, and other devices, with NAS folders. You can synchronize files even when away from your NAS.
Also, files are not downloaded to your devices until they are used for the first time, helping to save device space.



Storage solutions for virtual machines

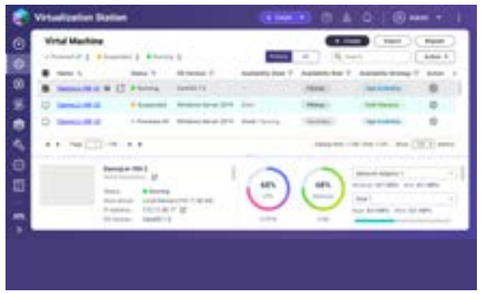
QNAP NAS can run virtual machines, as well as storing data from external virtual machines.

Virtualization Station: QNAP NAS virtualization hypervisor

Virtualization Station can host and run virtual machines directly on your QNAP NAS. With Virtualization Station, you can create/import virtual machines, have them automatically start when the NAS starts, and also perform live migration.

Even when creating and using a virtual machine, it doesn't pass through the normal IO and Ethernet bottlenecks, so it's extremely high speed.

Create a Virtual Machine



You can create virtual machines in Virtualization Station just as you would with another hypervisor. Namely,

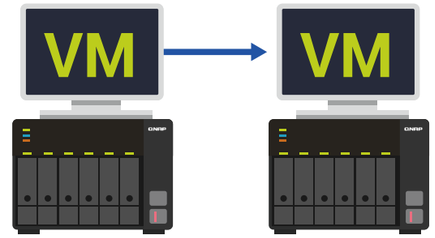
1. Assign virtual hardware settings
2. Insert ISO files
3. Start the virtual machine, boot from ISO file, start the installer, and install the operating system
4. Start using the virtual machine

Output virtual machine via HDMI

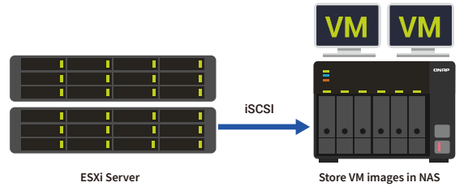
There are QNAP NAS models with HDMI output. This allows displaying Virtual machines to a monitor or TV. Connecting a USB keyboard and mouse to NAS also allows you to operate the virtual machine as if it was a PC. It can be used for use cases such as RPA (Robotics Process Automation), servers, or for using legacy software.

Live Migration

Live migration is supported by Virtualization Station. Even in cases where it is necessary to regularly update NAS firmware, it's possible to update after temporary live migration of the virtual machine to another NAS. This allows maintenance to be performed without suspending services running on virtual machines.



iSCSI and NFS support: Use QNAP NAS as storage for hypervisors



QNAP NAS has passed all the hypervisor HCL (Hardware Compatibility List) tests. You can check it as a certified hypervisor storage too, so you can feel secure using it.

Snapshot Agent: Link to hypervisor and acquire snapshots

QNAP offers various applications to make using virtual environments safer and more convenient. Install Snapshot Agent on the virtual machine to link to the NAS when the virtual machine acquires a snapshot. Snapshot Agent also supports acquiring application-consistent snapshots. We offer various other applications such as management tools for large-scale environments.

Recommended NAS for virtualization

TS-h1290FX : In addition to using high-speed U.2 SSD as storage, up to 1 TB memory can be installed, allowing for effective management of virtual machines with optimum deduplication.

TS-1655 : Supports twelve 3.5-inch HDDs. It uses an 8-core CPU, so it is the best entry-level NAS for virtualization When higher performance is necessary, configure an SSD cache to take advantage of lower latency and higher bandwidth.

TS-h3087XU-RP: Includes 10GbE as standard. You can install twenty-four 3.5-inch HDDs, so it has huge capacity potential. Ideally used as storage for hypervisors.

High-volume archival storage solution

Adding an expansion enclosure allows expansion of QNAP NAS petabyte-level storage.
As you can achieve high-capacity storage in a single namespace without dividing shared folders or drive letters, it is also extremely convenient.

Supports a volume with up to 5PB capacity.

High-capacity volume is necessary in various scenarios such as backup, Big Data, storing RAW multimedia assets, and archiving surveillance recordings.
When preparing high-volume space, will it be the same namespace? Or separate volumes? This is where you can see the biggest difference in convenience. (Will the D drive be expanded? Or will there be a D drive and E drive?) QNAP NAS can create and use up to 5 PB volume in the same namespace. This is the optimum solution for high-volume data archives.

4.5PB structure example

Achieve optimum performance by using sufficient memory.

Pool capacity	Recommended memory size
1PB (<1PB)	128GB
1PB (<=1PB) to 5PB	256GB

Memory capacity is required for managing high-volume space effectively. You can upgrade your NAS to achieve the necessary memory size. Increasing memory at the same time as adding an expansion enclosure allows for effective storage volume expansion.

Expansion enclosures that can be used with the same volume

Is it possible to duplicate the exceptional robustness and path of the interface in QNAP? Considering this characteristic, it's determined whether or not it can be set to the same storage pool as the volume of other disks in the casing.
Using SAS and PCIe enclosures allows for use as high capacity in the same name space.

Enclosure by type	Can it be set to the same pool as the other disks?
USB enclosure	Not possible
SATA enclosure	Not possible
SAS enclosure	Possible
PCIe enclosure	Possible

What situations will cause a problem if the same namespace is not used?

When separated into multiple storage pools on the NAS, there will be multiple shared folders. It will end up with one employee's PC backing up to "Shared Folder A" while another person's backs up to "Shared Folder B," making management more complicated. Furthermore, in the same way, video data is saved to a separate shared folder by year, surveillance camera videos are saved to separate shared folders depending on period, making management harder.

Example of achieving 1 PB using Seagate Exos E 5U84

	Model used	Number of drives
NAS	1 x TS-h2287XU-RP	HDD: 16 SSD: 6
Expansion Cards	1 x QXP-1620S-B3616W	-
Expansion Enclosure	1 x Seagate Exos E 5U84	HDD: 84
Total drives	22TB SATA HDD	HDD: 100 SSD: 6

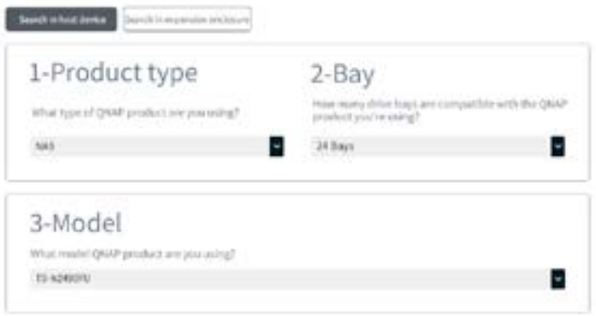
*84 HDD are used in groups of 14 to construct RAID60 (6 sets of RAID 6 bundled in RAID0). Secure 20% for snapshots and effective capacity of about 1267 TB

*Requires at least 128GB RAM

How can expandability be confirmed for each NAS?

You can find the maximum volume expansion supported your NAS on the QNAP website.
You can find the number of PCIe slots in which expansion cards can be installed, the maximum memory that can be installed, supported expansion enclosures, and other necessary information.

https://www.qnap.com/en/compatibility-expansion

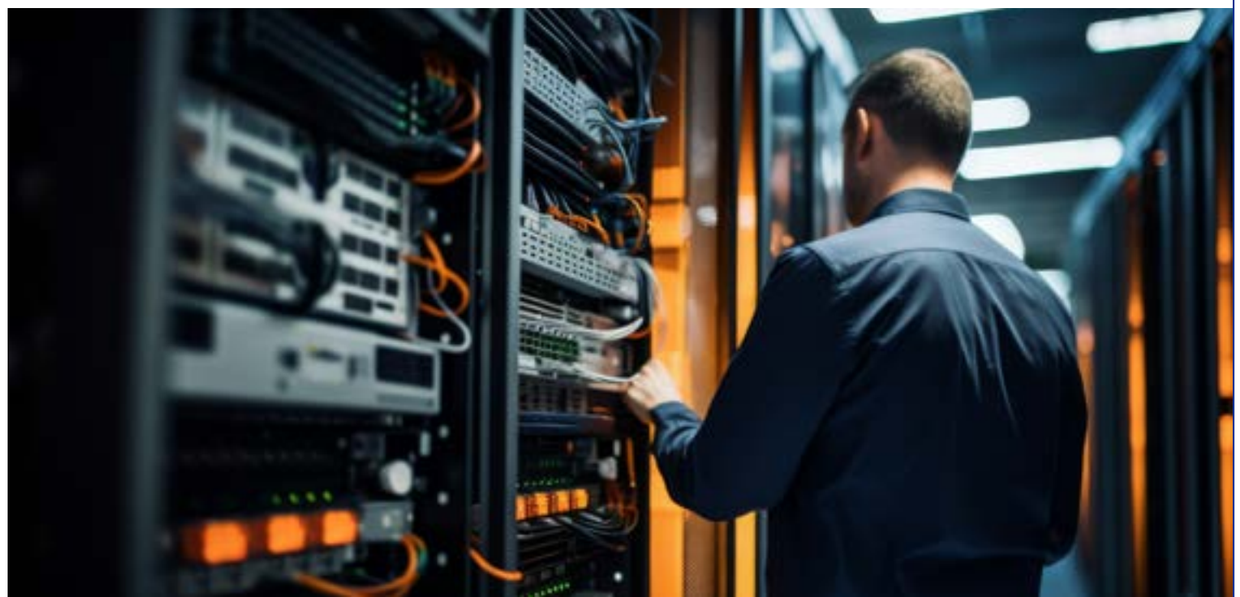


Where can I find examples of NAS configuration?

The biggest collection of PB-class storage structure examples are available on the QNAP website.

I don't need high volume, but I want to keep an online archive safely! What should I do?

QNAP offers solutions for data export to LTO tape and safe archiving. In addition to remote access to NAS, archive operations can be done while viewing a screen connected to the HDMI port. Please check here when considering storage at a scale of tens of TB.



Storage solutions for high-speed 100Gb/25GbE

The QNAP All-Flash NAS Series comes with 25 GbE as standard. In addition, it comes with a PCIe slot so a 100 GbE card can be installed.

It can be utilized in scenarios where high speed is required, such as team editing of high-resolution videos, Big Data, and saving AI learning data.

QNAP 100GbE solutions

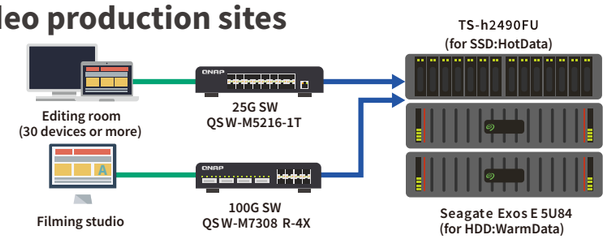
In addition to 100 GbE network cards, QNAP also offers a 100 GbE L3 switch. The 100 GbE network card can be used with both Windows and Linux systems. This allows users to quickly upgrade their network and devices to take advantage of 100 GbE.

Distributed data processing utilizing 100 GbE

Processing Big Data requires huge bandwidth. There are cases in which the time it takes for data processing is a higher ratio than what it takes for data throughput. In such cases, by importing and processing data from multiple workstations, data can be processed more effectively.

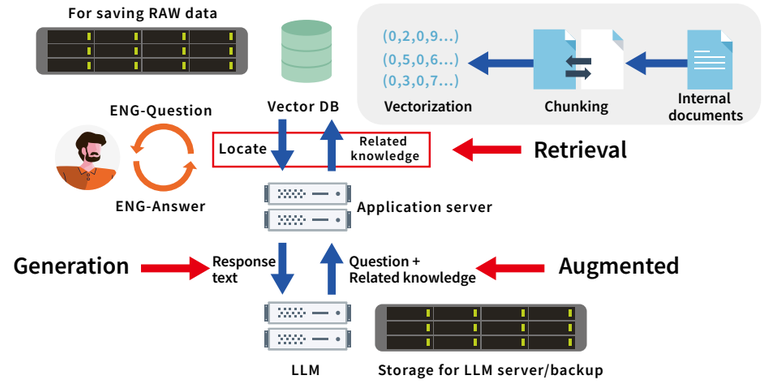
Examples of utilization on video production sites

On video production sites, there are cases where both high speed and high volume are required. Along with achieving high capacity with expansion enclosure, using a HotData field equipped with SSD allows support for filming in virtual production studios that require high speed.



Storage for RAG (Retrieval Augmented Generation) in AI

Utilization of AI in companies has rapidly expanded and most of these companies face the issue of, “Incorporating AI utilization in internal documents.” This is because when importing documents to AI services on the cloud, there is a possibility they will be used as AI learning materials.
Therefore, on-premises AI utilization that combines RAG is being expanded. It can be used for saving data for learning, utilizing previously processed data as a saved DB, and as storage for LLM storage and backups.



Efforts to use AI on-premises

AI can import data, learn it and respond. Therefore, if data used in learning is incorrect, AI will also return an incorrect response. That's why if the expected response was not acquired from AI, you must search for the data that was mistakenly input and correct it. There is a Qsirch full text search engine in QNAP NAS. Storing learning data in the QNAP NAS allows easy designation and correction of files included in the incorrect data.

Products recommended to use in 100GbE

TDS-h2489FU : In addition to using high-speed U.2 SSD as storage, up to 1 TB memory can be installed, allowing securing a sufficient buffer field and high-speed use.

TS-h1887XU-RP : Can be equipped with HDD and constructed with high-capacity storage at a reasonable cost. Recommended in cases with specifications as archiving data from 100 GbE networks.

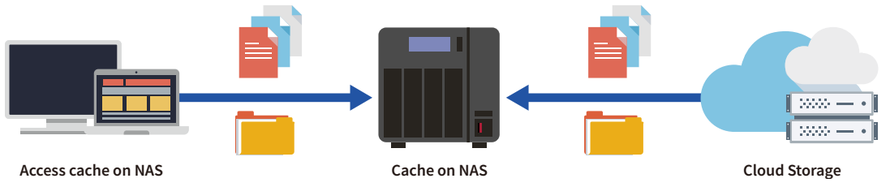
TS-h1290FX : In addition to using high-speed U.2 SSD as storage, up to 1 TB memory can be installed, allowing securing a sufficient buffer field and high-speed use. Recommended in cases where high-speed storage is required in environments without racks, such as laboratories.

Hybrid cloud storage solutions

Most cloud storage users are interested in improving performance when accessing data. Having an on-premises cache allows for using solutions for high-speed access to data in cloud storage in QNAP NAS.

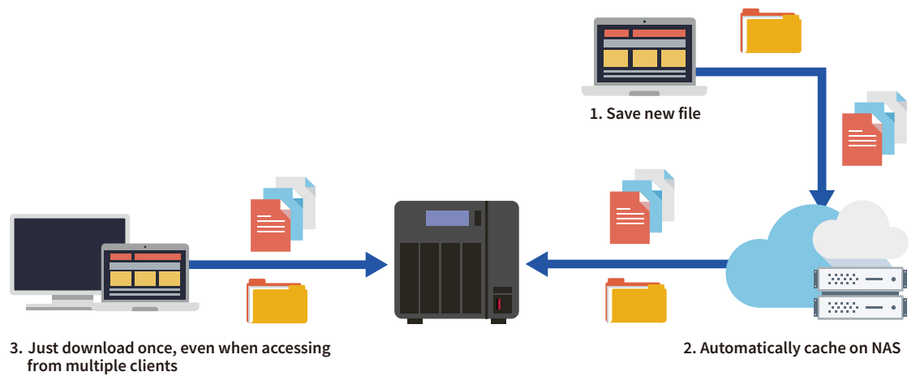
HybridMount: Accelerate access to cloud storage data

By using HybridMount, QNAP NAS caches cloud-based data and updated files.
Accessing the folder on the NAS connected to cloud storage from the on-premises client allows for high-speed access to data equivalent to accessing an on-premises NAS. Files changed on NAS are automatically uploaded to cloud storage, so there is no manual copying or uploading required.



Securing operating performance while using cloud as the main storage

When handling design data, such as CAD or CAM, the files can become extremely large. There are many cases where the data is downloaded and worked on locally, but it may take up bandwidth if multiple members download the same file, and we hear about issues with the time it takes to complete downloads. Using HybridMount allows for high-speed access because new files are automatically downloaded to the NAS and cached.
Furthermore, the downloads are done by proxy by NAS, so multiple downloads occur, and it doesn't take up internet bandwidth.

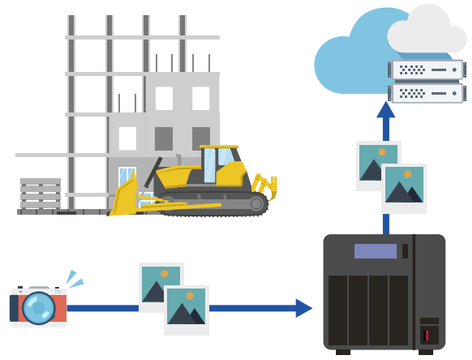


Cloud storage supported by HybridMount

QNAP adds supported cloud storage daily. In addition to major cloud storage such as Amazon AWS, Azure, Google Cloud, Wasabi and Box, cloud storage developed in Japan is also supported, such as DirectCloud.

Automatic daily uploads

As an example in a building site, site photos must be uploaded daily. This meant that someone must wait on site until the upload was complete. In remote locations, this must be done through mobile data. But in some cases the signal or available bandwidth was insufficient.
This changed when they adopted a NAS on the building site along with a surveillance camera recording server of the site. By setting access to cloud storage in HybridMount, photos are automatically uploaded to NAS after they're saved to NAS. It is no longer necessary to wait until the upload is complete.
If there is a wait time when uploading to cloud storage, it is possible to improve services in this way.



Products recommended to use in hybrid cloud storage

TS-453E: Small HDD base NAS.This can be installed and utilized on-site, such as building sites.

TS-h973AX : Features hybrid HDD+SDD storage for the best of both worlds. In environments with many detailed files, we recommend using as a hybrid cloud storage.

TS-h2287XU-RP: HDD-based high-volume NAS.Recommended in cases with a high number of users accessing and when using many high-volume files such as CAD and CAM.

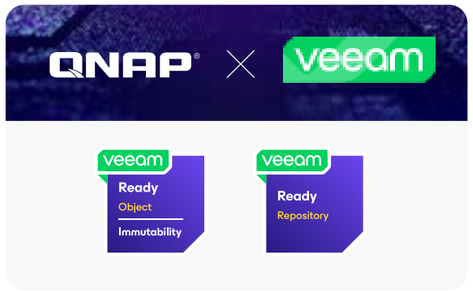
Storage solutions for backups

QNAP NAS supports not only backups to USB devices from NAS but also backups from NAS to NAS and from NAS to the cloud. Furthermore, there are also versions that synchronize files saved in the Windows shared folder to NAS, as well as an official response to backup from the backup software run on Windows. It can be used flexibly based on your environment.

Synchronization from Windows shared folders

Moving data from Windows is easy Synchronization from Windows shared folder is supported in QNAP NAS. Even in cases for which there is already a large amount of data, synchronization gradually proceeds and at the time synchronization is complete, NAS starts to be used as the main file server. Transfer is also possible in this way.

Immutable backup from Veeam



QNAP NAS gets objects from Veeam Ready - (Repository/Veeam Ready), a program certified by QNAP NAS.
It also supports immutable backups, where backup data cannot be modified, and protects your precious backup data from ransomware attacks.

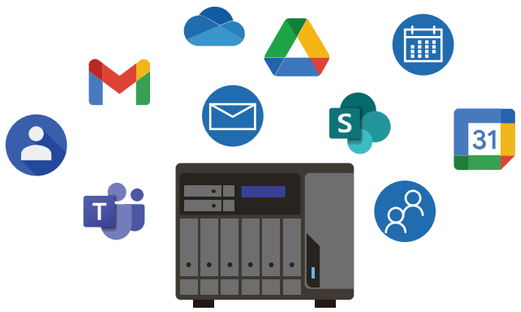
*Immutable backups are object storage solutions provided by QNAP NAS and requires use of QuObjects.

https://www.qnap.com/en/solution/veeam-ready

Microsoft SharePoint, Google Workspace backup

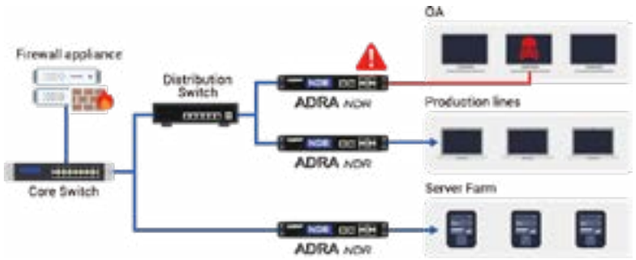
I'm sure many people use cloud storage, but how are your backups? Please take a moment to check the information related to the "responsibility demarcation point," of your cloud storage vendor. It says backups must be the responsibility of the user.
QNAP NAS supports Microsoft SharePoint and Google Workspace backups. You can prepare, just in case, by backing up data to on-premises storage.

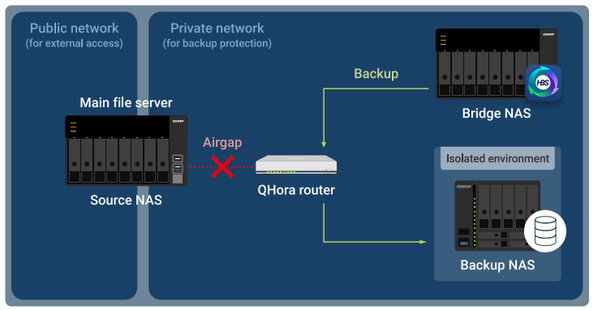
https://www.qnap.com/en/software/boxafe



AirGap+: AirGap Offline Backup Solutions

An AirGap must be created to protect important data from malicious software, such as ransomware.
Ransomware doesn't suddenly attack the NAS. Instead, it infiltrates the network and takes time finding suitable devices to attack. Separating important data from the network and saving it reduces of risk of attack from ransomware.





Combining QNAP NAS and QHora ensures that the network is only available when backup is necessary and allows easy AirGap+operation at other times, which keeps the network ports cut off. There are cases in which the network ports are controlled with scripts and other mechanisms, but if the backup time is longer than anticipated, the backup may fail. AirGap+ is a solution that reliably performs a backup through the minimum network communication time only when a backup is necessary.

HDP + NetBak PC Agent: Backs up entire Windows PC systems

When replacing hardware due to hardware malfunction, PC must be reset from the beginning. Windows systems using HDP and NetBak PC Agent can be fully backed up to QNAP NAS. System backup can be performed without additional license fees.

Backup solution guide

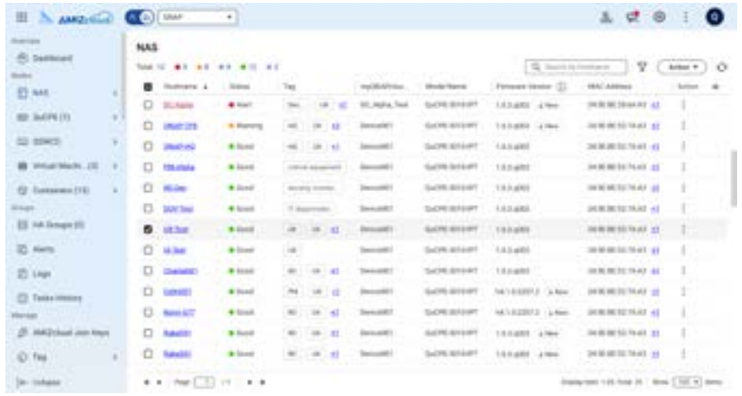
The "Backup Solution Guide" introduces the backup methods offered by QNAP. If you are interested in even more backup solutions, make sure to check out this Backup Solution Guide.

Storage solutions for remote management

QNAP NAS supports remote management using AMIZcloud. AMIZcloud is an online service that can be accessed remotely. Using AMIZcloud connects NAS to the organization and allows for remote management of NAS that the organization manager is authorized for. This can be utilized in cases when NAS is owned by your company, but management is outsourced to multiple other companies.

AMIZcloud: Can manage remotely

Logging into AMIZcloud opens the dashboard that allows you to see an overview of the status of the NAS you are managing. Here you can see status of system errors, name of organizations you're managing, CPU usage rate, memory usage rate and other device statuses that are often referenced.



More detailed information can be viewed by clicking the NAS host name. You can check anything from basic information such as host name and MAC address that are used remotely for individual identification to disk and pool usage rate and past performance status. Restarting NAS, firmware update, and application update can be done remotely. You can also check the event log and whether or not the backup failed. You can also directly access NAS and acquire detailed information from the icon displayed on the right side of the host name.

https://www.qnap.com/en/software/amiz-cloud

https://amizcloud.qnap.com/nas

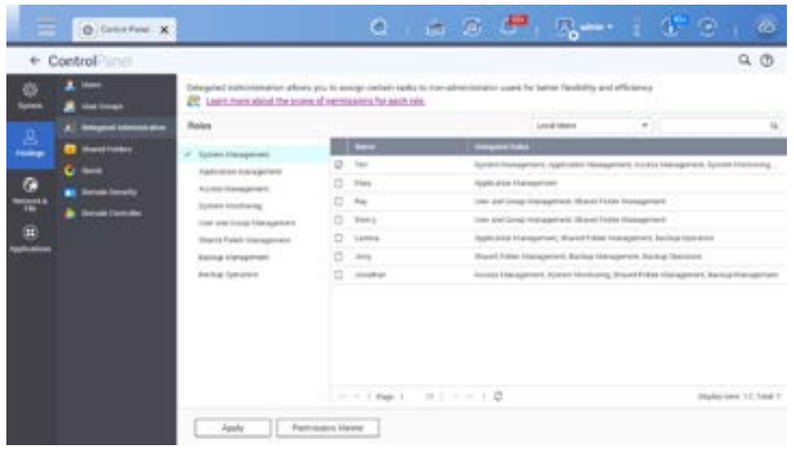
Management using organization and site

Devices can be assigned by concept, such as organization and site, in the AMIZcloud. For example, the site could be school name, and the organization could be the management company that handles that school's NAS. It is possible to use a hierarchical structure to define and manage organizations.

https://organization.qnap.com/

Dedicated system management only without authorized access to files

When checking detailed status, you must remotely access the NAS settings screen. Even in this case, using "Delegated management duties," makes it possible to set "Not allow access to files saved in NAS, but allow log acquisition, checking system performance, etc." This allows for effective, remote management of NAS while protecting confidential information.



https://www.qnap.com/en/solution/role-delegation

Storage solutions for surveillance cameras

Use of IP cameras is expanding for various purposes such as retail, outdoor parking lots, and watching pets, babies and the elderly. There are also more and more people taking video so incidents can be checked. QNAP also offers surveillance storage solutions for viewing, managing, and archiving recordings.

QVR Pro: Network camera video recording

QVR Pro records video from IP cameras. QNAP independently checks compatibility with cameras and when combined with cameras that support video on the standard ONVIF protocol, over 8000 camera models are supported.
Up to 8 channels can be used for free, so with NAS, network camera video recording can be started right away.

QVR Pro client: Video viewer, equipped with features such as event skip.

QVR Pro Client allows playback of recordings. You can also choose the camera video playback position and check the point of videos where events occur.
We also provide AI solutions for facial recognition and person count can be integrated into surveillance.

QVR Face: Recognize faces in surveillance recordings

An example use case in retail would be where shop owners want to notice when regular customers come into the store. QVR Face uses AI to analyze the faces of people on the surveillance camera and identify people. This supports strategic customer service.

*A special camera is not required for facial recognition. You can use the camera you're already using.

About ONVIF Profile

QVR Pro supports ONVIF Profile T or S. As long as the camera supports ONVIF Profile S, connecting to the ONVIF protocol allows control of PTZ. As long as the camera supports ONVIF Profile T, motion detection events detected by the camera can be used to trigger QVR Pro events.

Thunderbolt storage solutions

QNAP NAS can connect with Thunderbolt. As laptops get thinner, most manufacturers are consolidating the I/O ports. Due to its size, this usually means that there is no dedicated ethernet port.

Directly connect your device to your NAS

If your device supports Thunderbolt, it can be directly connected to your NAS. Qfinder Pro can easily access the NAS you're connected to. Another alternative for laptops without Ethernet ports is to use a Thunderbolt to 10 GbE adapter. This allows them to connect their device to the network and take advantage of a high-speed, low-latency wired network connection.

Advantages compared to Thunderbolt DAS

Even when directly connected to a device via Thunderbolt, QNAP NAS is still accessible over the network. This is one of the advantages of QNAP NAS over a Thunderbolt DAS.

	Thunderbolt DAS	Thunderbolt NAS
Collaboration	• The file system may only be compatible with Windows® or macOS®. • Access to the data on DAS is only possible from one computer at a time.	• Supports simultaneous editing of files from multiple Mac® or Windows® devices. • Multiple users can access NAS through the network and perform collaborative work on a project or share resources.
Scalability	• DAS cannot be upgraded to accommodate faster interfaces or higher storage capacity. • If you want to increase capacity, purchase or add another DAS unit (namespace separation).	• Install PCIe 10G/25GbE network cards, M.2 cards, or other expansion cards. • You can easily expand capacity by connecting an expansion enclosure.
Ease of use	• Physically connect the DAS to your PC/device. • If you have multiple DAS and are looking for specific data, you may need to plug and unplug multiple DAS to find it.	• Provides a high-speed, smooth, and easy-to-use operating system. • Files can be accessed remotely using companion mobile apps.
Data Security	• Backups and snapshots must be managed by the host device. • Files can be accessed while the DAS is connected.	• Centralizes backups and ensures consistent in snapshots. • User accounts and permissions provide privacy and access rights to specific files and folders.

Storage solution in tight spaces

QNAP NAS offers not only full-size rackmount NAS but also short-size rack mount NAS. For cases like clinics or small offices which lack space for dedicated server rooms, there are NAS that can be stored together with other compact devices such as network switches.

TS-464eU: Short-depth rack of only 292.1mm

There are also short-depth sizes that fit on small, 19-inch racks.
In scenarios such as, “A desktop size is acceptable, but issues may arise in theft prevention if it is just placed on the desk,” or, “If the network switch is exposed, someone might mess with the network cable or other trouble may occur,” small 19-inch racks are often selected. There are many racks with locks, so you can prevent theft or tampering.

Products recommended to use in tight spaces

TS-435XeU: Short-depth ARM rackmount NAS with a depth of 292.1 mm
Has two 10GbE SFP+ ports and had four hard drive bays.

TS-873AeU: Short-depth rackmount with a depth of 297.4 mm. Uses an AMD Ryzen ™ Embedded CPU. A redundant power supply can be selected with the same depth that allows installing eight hard drives.
It is recommended for when storage space with a higher capacity is necessary.

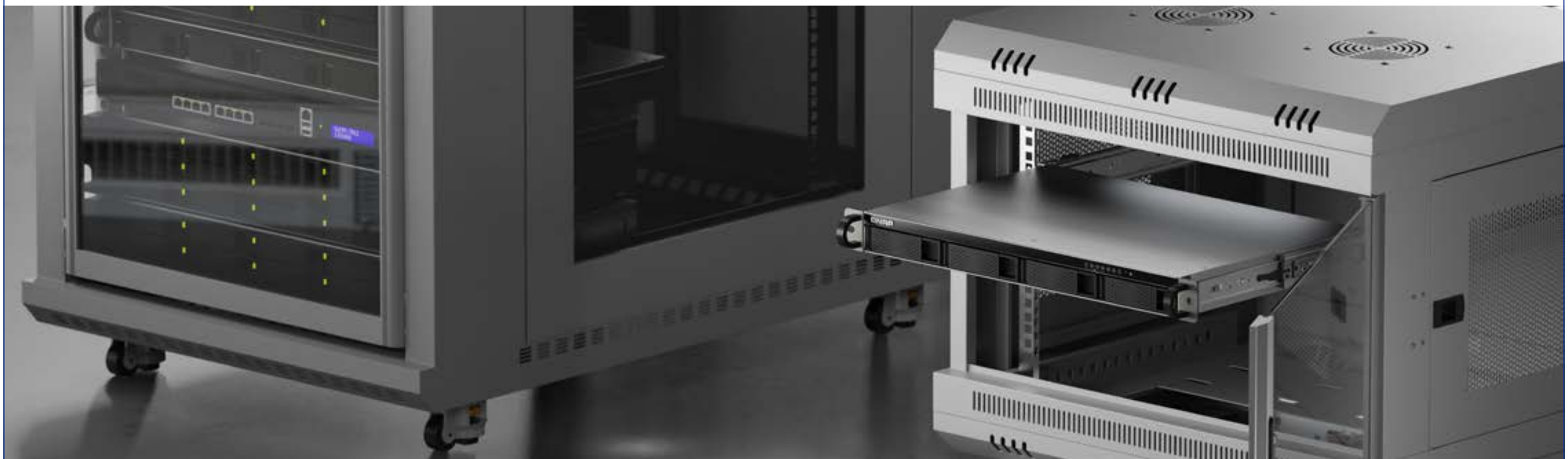
TS-855eU: Short-depth rackmount NAS with a depth of 297.4 mm. Uses an Intel® Atom® CPU. A redundant power supply can be selected with the same depth that allows installing eight hard drives.
The 8-core CPU is suitable for demanding tasks such as virtualization.

RAIL-S01: Use this rail when using a short-depth NAS on racks with depths of 126-415 mm.

RAIL-B02: Use this rail when using a short-depth NAS on racks with depths of 443-815 mm.

More detailed specs related to the various rails.
https://www.qnap.com/en/product/rail-kit

More about QNAP Short-depth NAS Solutions.
https://www.qnap.com/en/solution/short-depth-rackmout-nas



Storage solutions for industry

In addition to use in homes and offices, QNAP NAS also has industrial storage solutions that run in factories, industrial settings, or environments that only offer DC power sources. They can be utilized in warm-temperature environments such as back rooms of shops or factory storage boxes.

Solutions for harsh, high-temperature conditions

QNAP NAS offers NAS products that can run at a high temperature range of -40℃～ 70℃ . At the same time, they can run with power input of 9V-36V DC.

Remotely check factory machines and acquire operation logs

Inspections are important to check factory conditions, but in some cases the personnel capable of inspecting are not available. In such cases, setting up an IP camera allows the personnel to check remotely. Furthermore, there are cases of predictive maintenance of machine tools to improve factory utilization rate and taking images of operational logs in the factory for later use to acquire the optimum profile. QNAP industrial storage solutions operate even in harsh environments, so it is possible to continue taking images of information for later use.

Products recommended to use for industrial storage

TS-i410X: Operates in temperatures between -40℃ -70℃ and with power sources from 9V-36V DC.It is perfect for factories, warehouses, transport, and the back room at shops.

QSW-IM3216-8S8T: Operates in temperatures between -30℃ -65%℃ and with power sources from 9V-54V DC.It's recommended as a switch used with industrial storage.

Storage for surveillance cameras on building sites

On building sites there are cases of recording operational processes and checking surveillance recordings to check if there were any issues.

It can even be used as storage for surveillance cameras in outdoor environments with harsh temperature changes.

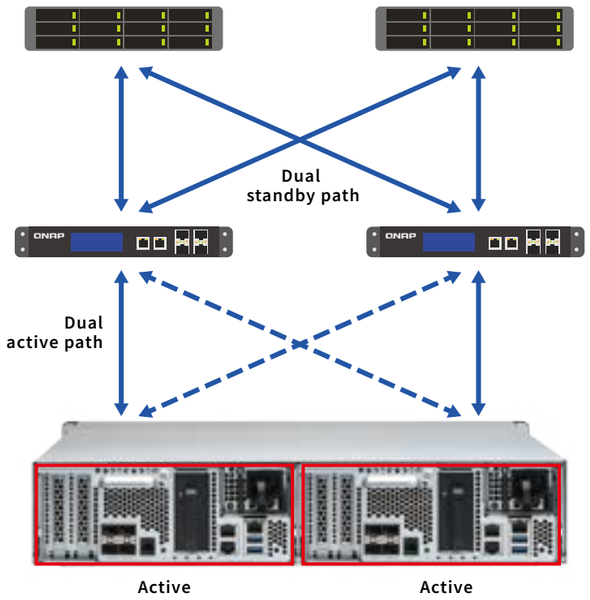
Dual active high-availability storage solutions

Dual-active high-availability NAS in the QNAP ES series. Equipped with two CPU boards so if one CPU board malfunctions, the other CPU board takes over. Redundant power supplies and fans also provide near-zero downtime and high availability.

Active/active high-availability with optimum storage efficiency

Since it has an active-active structure, multiple storage pools are created and by distributing controller ownership to each of them, both controllers can be used, improving load-balancing capabilities.

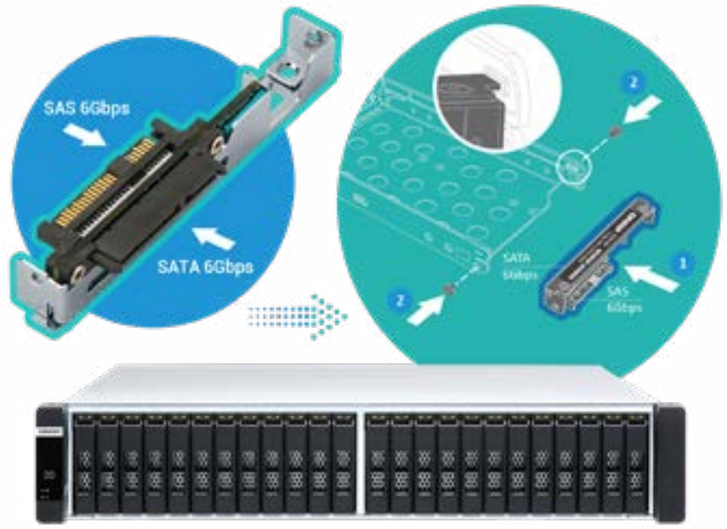
High-speed, nonstop, high-availability storage services are offered through protocols such as SMB, NFS, and iSCSI.



SATA SSD Activity

SAS SSD must be installed to achieve high availability. QNAP offers an adapter to connect SATA SSD to the SAS connectors. We can achieve enterprise storage environments with high availability and fault tolerance using adapters to fit within the customer's budget.

*The only model that uses SAS SSD is ES2486dc.



Dual active high-availability storage

ES2486dc: All-flash NAS equipped with dual active controller. Supports inline data deduplication and inline data compression. It can be used while optimizing write volume to SSD and storage consumption. It is essential for using with business applications that require performance such as mission critical file servers, virtual servers, VDI, and data centers.

ES1686dc: HDD-based NAS equipped with dual active controller. Supports inline data deduplication and inline data compression. Using a DRAM cache with a protected battery improves random access performance. It is essential for using with business applications that require performance such as mission critical file servers, virtual servers, VDI, and data centers.

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