

The QNAP logo is located in the top left corner. It consists of the letters "QNAP" in a bold, white, sans-serif font. The background of the entire slide is a green-tinted night photograph of a city with a complex highway interchange and illuminated buildings.

QTS 4.3.5

Preview

Dive Deep Into Storage Technology

**Software-defined Additional SSD
Over-provisioning and
Advanced SSD Cache**

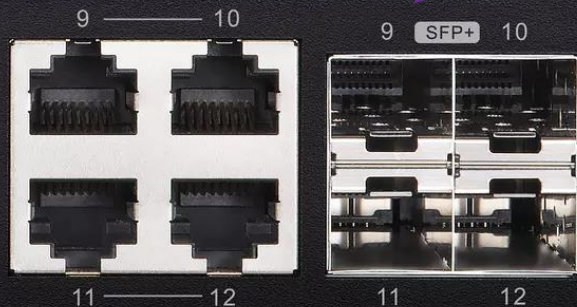
**Storage Space
Management and
Monitoring**

**Remote Snapshot
Vault Restore and
Export**

Boost efficiency with 10GbE Networking

- When transferring a 50 GB file with 1GbE (110MBps) = 8 min.
- With 10GbE, < 2 min.
- With 10GbE around the corner, are you fully ready?

Your first 10GbE switch:
QSW-1208-8C



Is your SSD Cache fast enough for 10GbE?



Is your storage space flexible and safe enough to store all the files?



Is your backup and recovery plan utilizing 10GbE?

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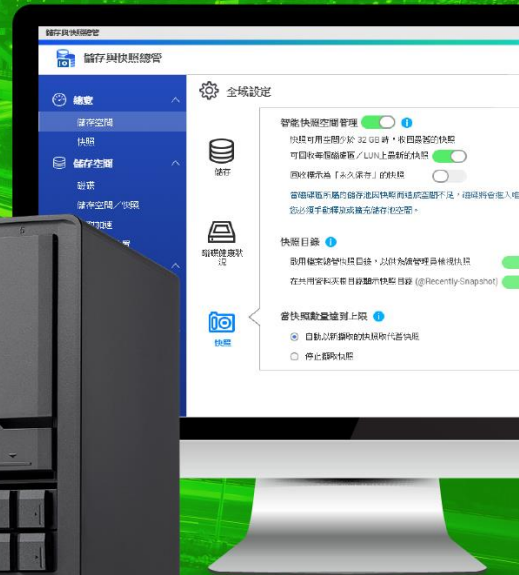
QNAP



QTS 4.3.5 Preview

Software-defined Additional SSD Over-provisioning and Advanced SSD Cache

- 
- A black QNAP TS-453P-8G 4-bay Network Attached Storage (NAS) unit. The front panel features a vertical array of status LEDs on the left, labeled 1 through 13. The main section contains four large drive bays, each with a silver-colored front door. Below the drive bays are two rows of ports: the top row has two USB 3.0 ports and two eSATA ports, and the bottom row has two USB 2.0 ports and two eSATA ports. A power button and a copy button are located on the left side of the front panel. The QNAP logo is visible in the top left corner.



Challenge

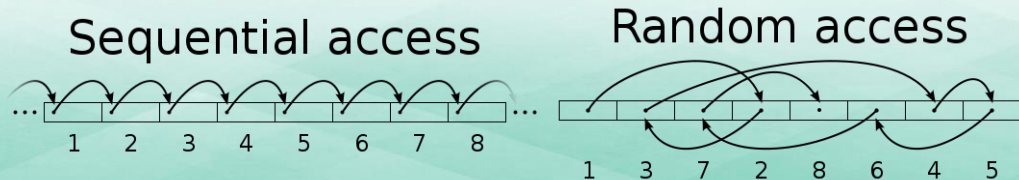
**SSD Cache
performance is
not as expected
in 10GbE or
Thunderbolt
environments?**



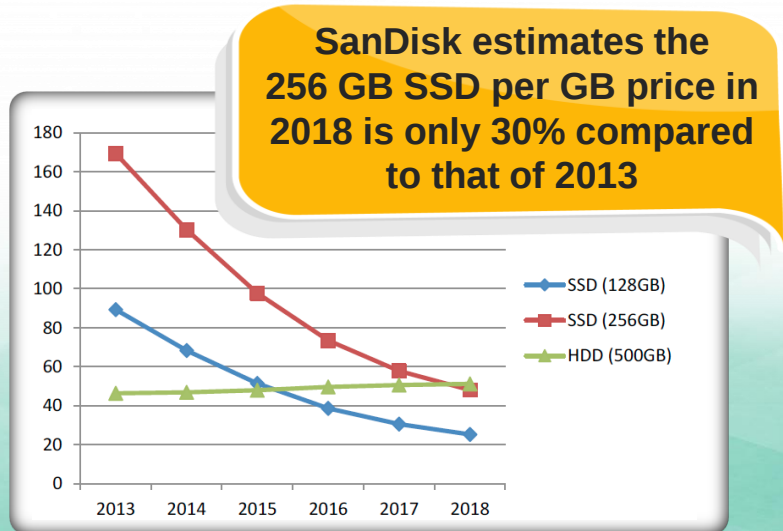
SSD Usage in Network Attach Storage

- SSD can provide high random IOPS for multi-client sync and business applications that can not be achieved with HDD.
- In 2018, SSD price also comes close to the sweet spot.
- You need not only choose the right SSD, but also choose right NAS!

Drive Type	Sequential Access (MB/s)	Random Access (IOPS)
HDD	100	350
SSD	300	60000



<https://www.sandisk.com/business/datacenter/resources/white-papers/the-ssd-enabled-pc-total-cost-of-ownership>



QNAP SSD Global Cache and Qtier

- For real-time performance boost, deploy SSD Global Cache or All flash storage
- For continuous data tiering between hot and cold data, deploy the Hybrid Storage Qtier™ Auto Tiering

SSD Cache lets all data enter cache and read hot data from the storage in real time

SSD Global

Volume

Block-based LUN

Storage Pool

HDD

HDD

HDD

HDD

Qtier utilizes SSD space and let data block be reallocated based on hot or cold in the storage

Volume

Block-based LUN

Qtier SSD Tier

Qtier HDD Tier

SSD

SSD

HDD

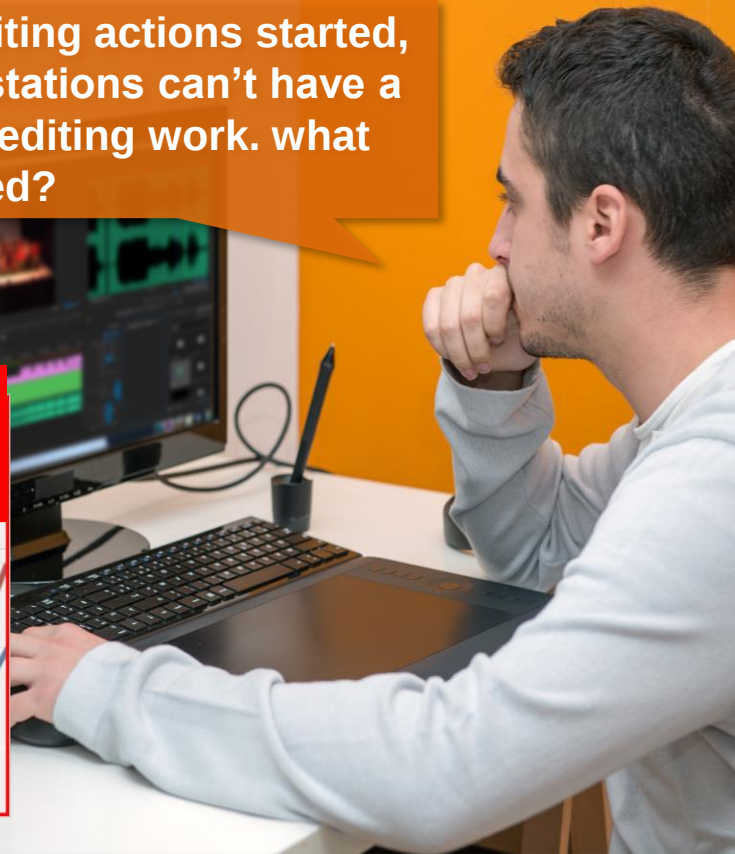
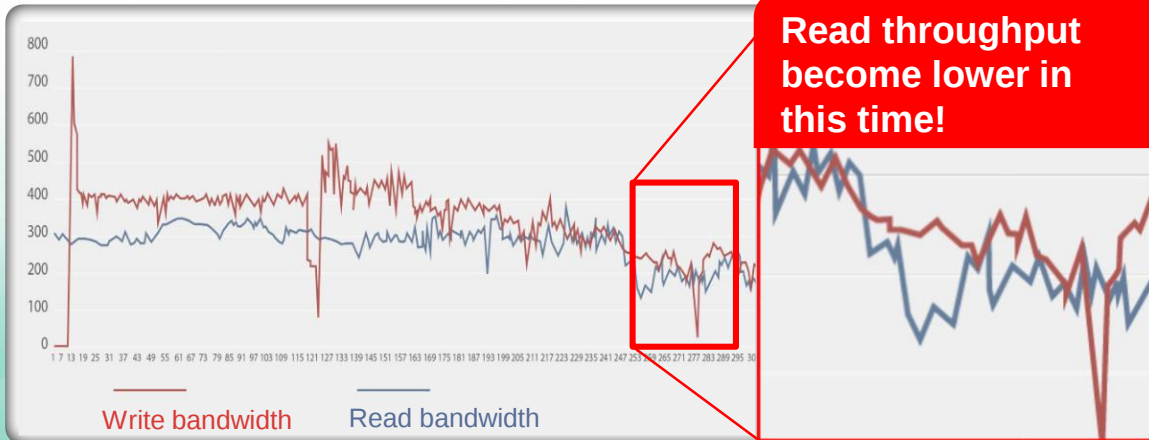
HDD

When SSD Cache Performance Degraded

True user story:

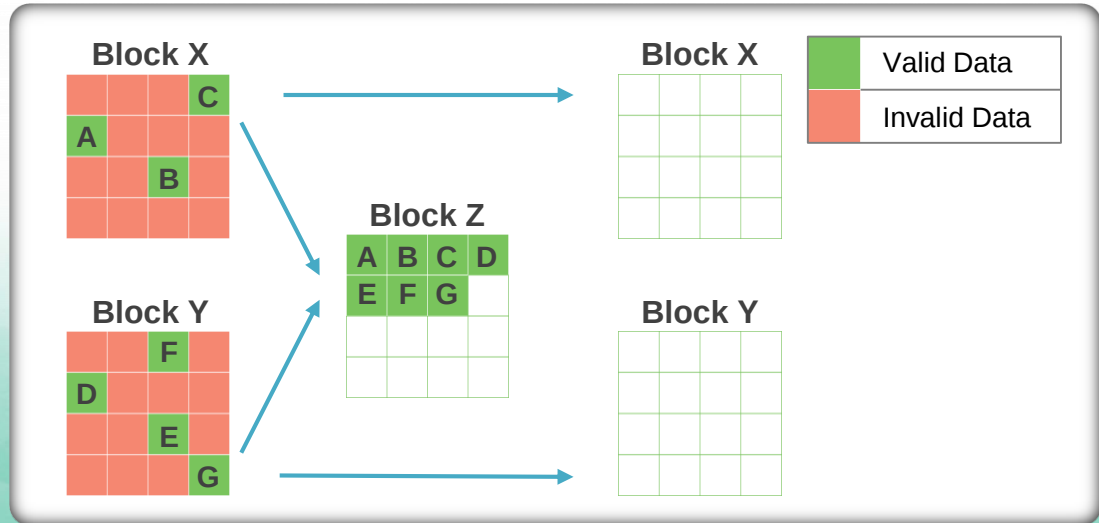
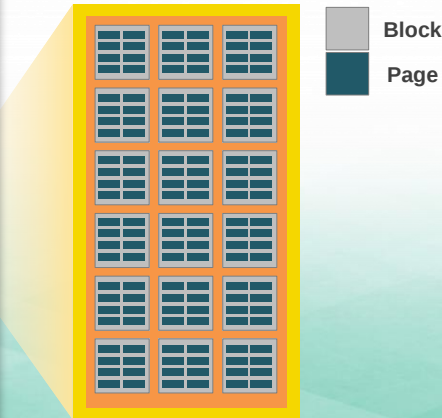
Spain TV Stations use SSD Cache to increase the material upload speed for multiple workstations while editing at the same time for urgent news.

After writing actions started, editing stations can't have a smooth editing work. what happened?



The SSD Works Differently from HDD

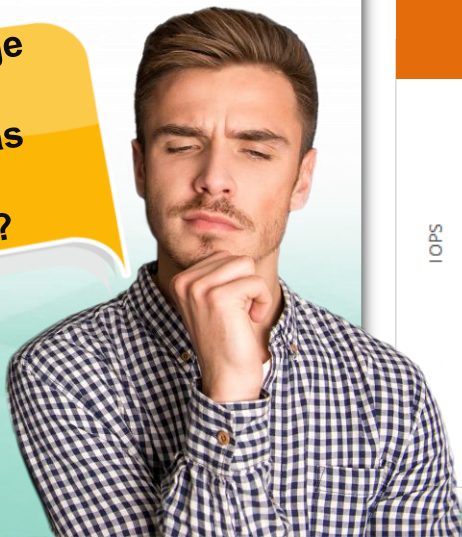
- When HDD write new data: Overwrite the existed sector directly.
- When SSD write new data: SSD need to clear whole block first.
- Result: The SSD must collect valid page and rewrite them into new block before new data can be written (Garbage Collection).



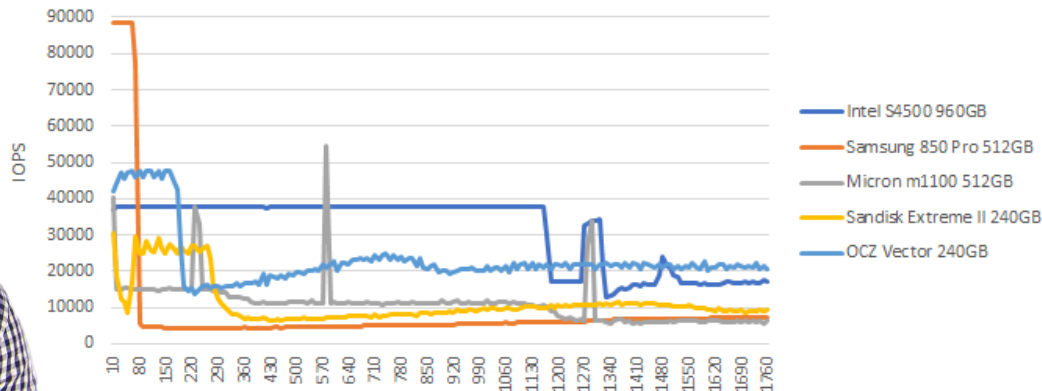
Different SSDs have Different Performance!

- In QNAP Lab, engineers use FIO to test different SSDs, and all SSD have showed consistent write performance degrade.
- Different SSD controllers' algorithm and Garbage Collection mechanism will affect the long term performance

How can storage vendor help to ensure SSD has expected performance ?



Different SSD in QNAP NAS's FIO consistent performance (IOpattern: RW-4K):



SSD Internal Over-provisioning

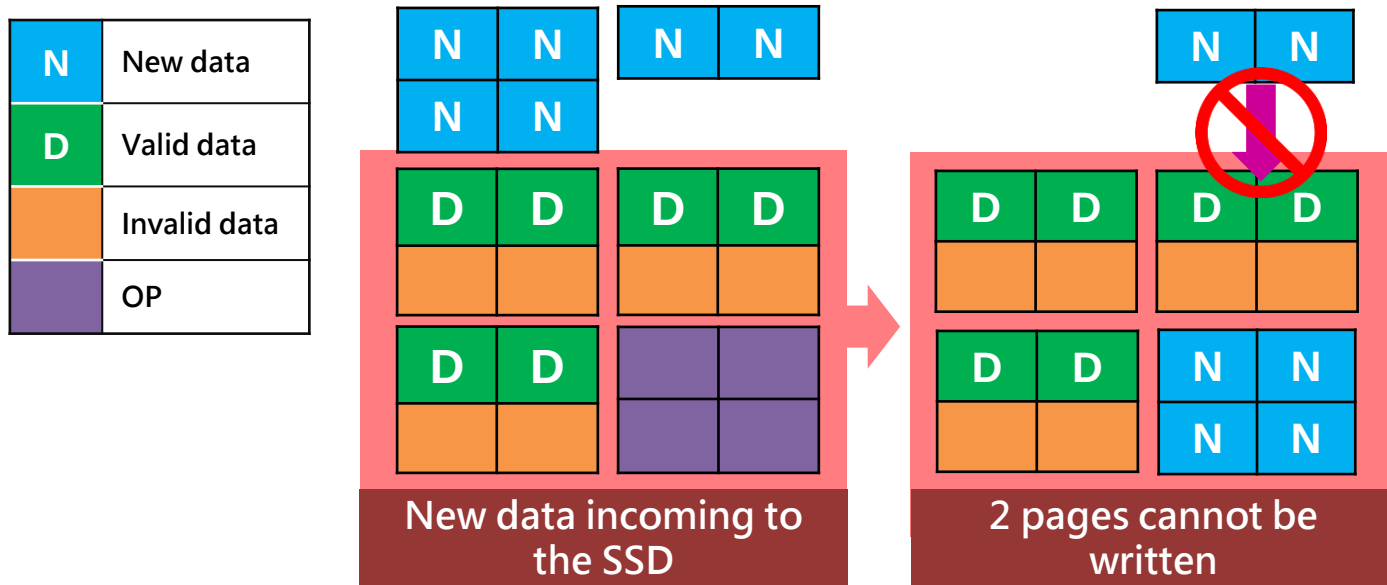
- SSD as Flash storage, its capacity should be presented with Gibibyte (GiB)
 $2^{30} = 1,073,741,824$ Bytes °
- As storage device, SSD actually reports its capacity back with Gigabyte (GB)
 $10^9 = 1,000,000,000$ Bytes °
- Every GB in SSD contains 73,741,824 Bytes (7.37%) for the Garbage Collection operation, and enterprise SSD may reserve more!

SSD actual size (GiB)	SSD present size (GB)	Vendor designed OP %	Actual internal OP %	Size shown in the NAS (GiB)
256 GB	256 GB	0%	7%	238 GB
256 GB	240 GB	7%	15%	223 GB
256 GB	200 GB	28%	37%	186 GB

How Over-provisioning can Affect SSD

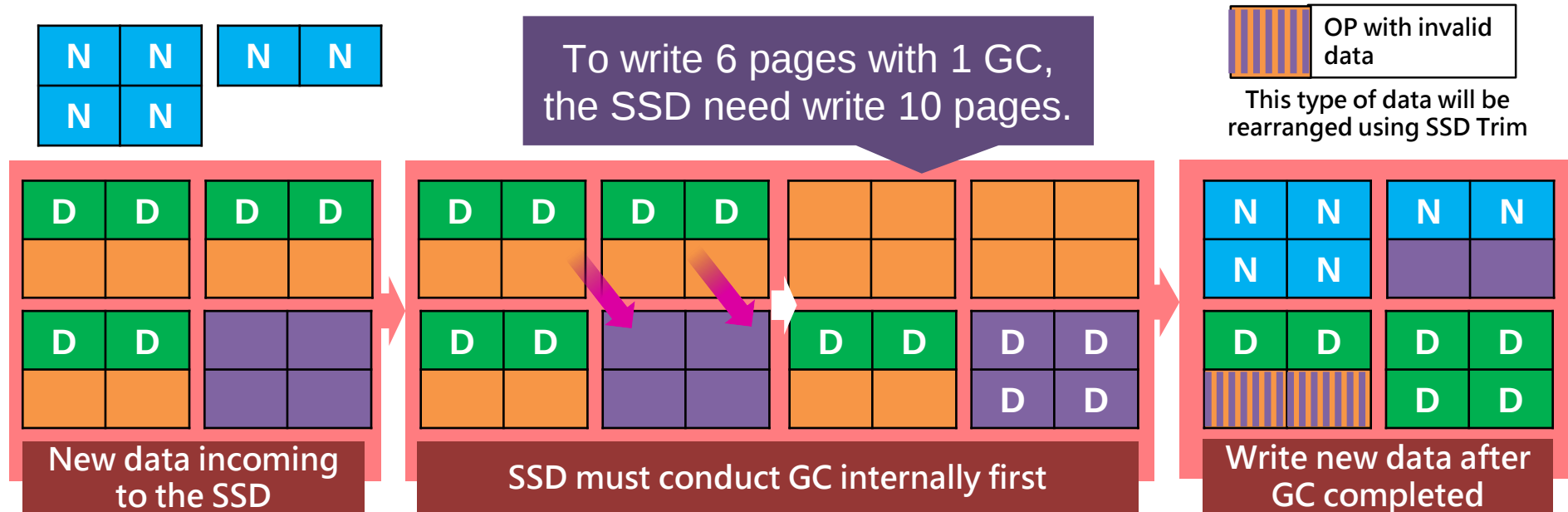
Performance and Endurance (1)

- In below simplified example, SSD contains 1 block as OP and 3 blocks contain both valid and invalid data.
- If 4 pages of new data are directly written to the last OP block first, the remaining 2 pages cannot be written anymore.



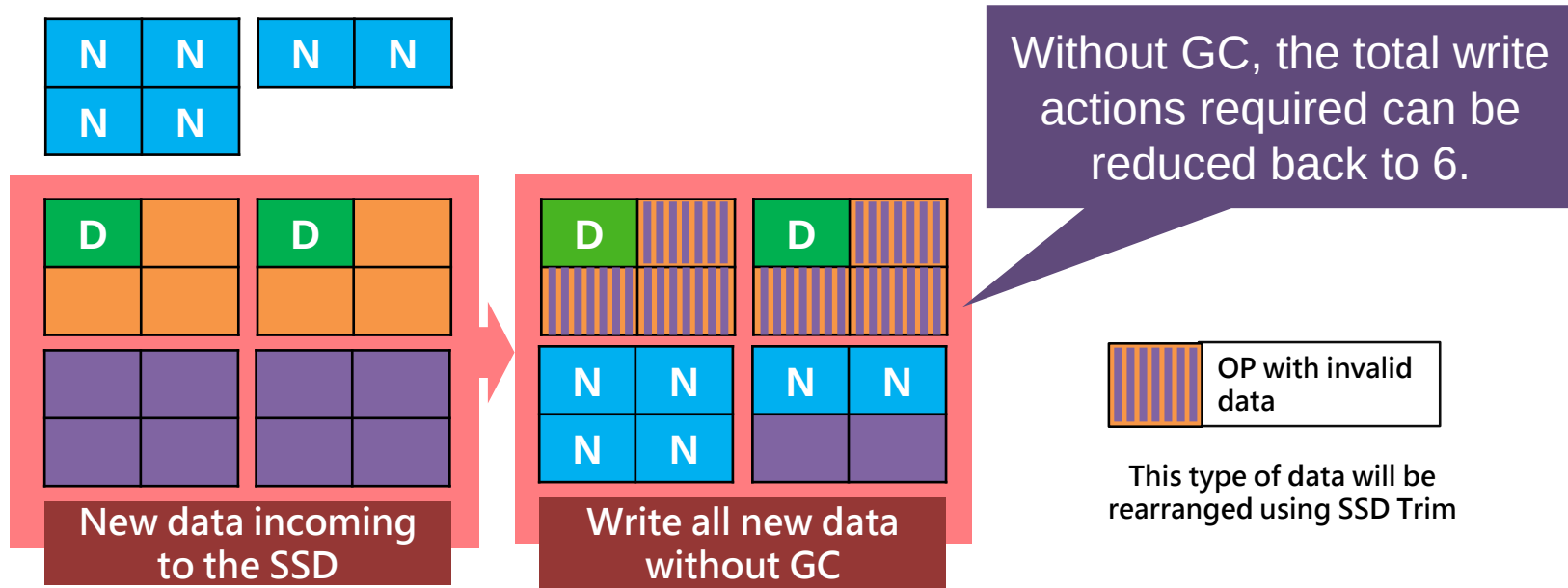
How Over-provisioning can Affect SSD Performance and Endurance (2)

- To write all new data into SSD, the SSD must conduct GC first.
- During the GC, more write actions need to be taken, and this is known as “Write Amplification.”



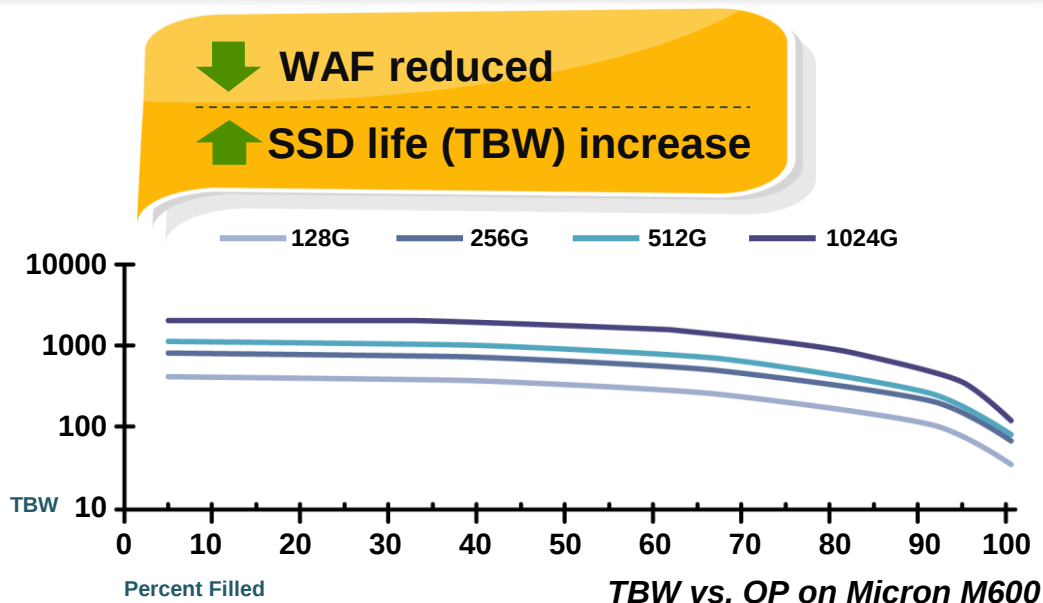
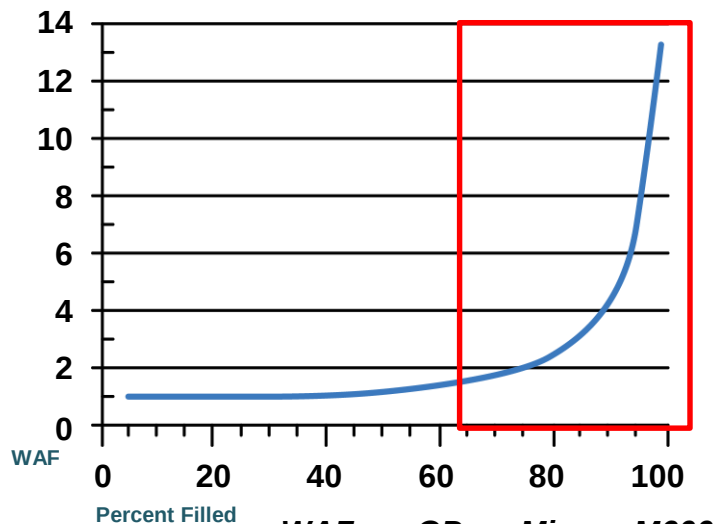
How Over-provisioning can Affect SSD Performance and Endurance (3)

- When more space is reserved for Over-provisioning, data can be written directly without Garbage collection.
- Write Amplification has be reduced.



How Over-provisioning can Effect SSD Performance and Endurance (4)

With the additional Over-provisioning, the Write Amplification can be reduced dramatically. And with reduced write actions, SSD endurance can be increased.



SSD Additional Over-provisioning effect on performance

- In QNAP Lab, a TVS-882 uses 2 Micron1100 512GB SSD as Cache with RAID 1.
- Random IOPS can increase to 300%
- This result can also apply to different brand of SSD

Test condition:
Configure SSD RAID with different additional OP and test its performance when cache is filled.

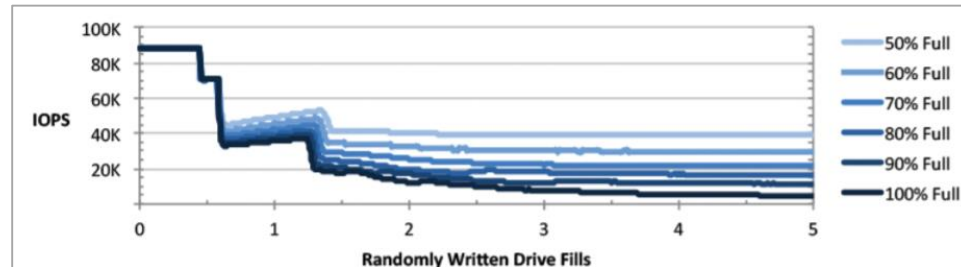
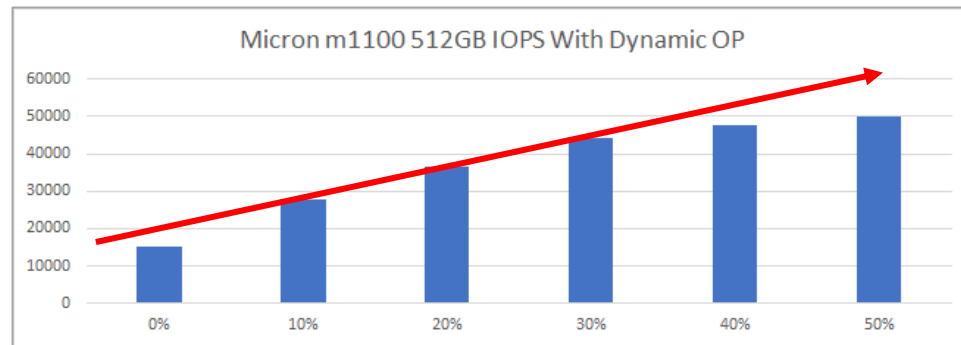
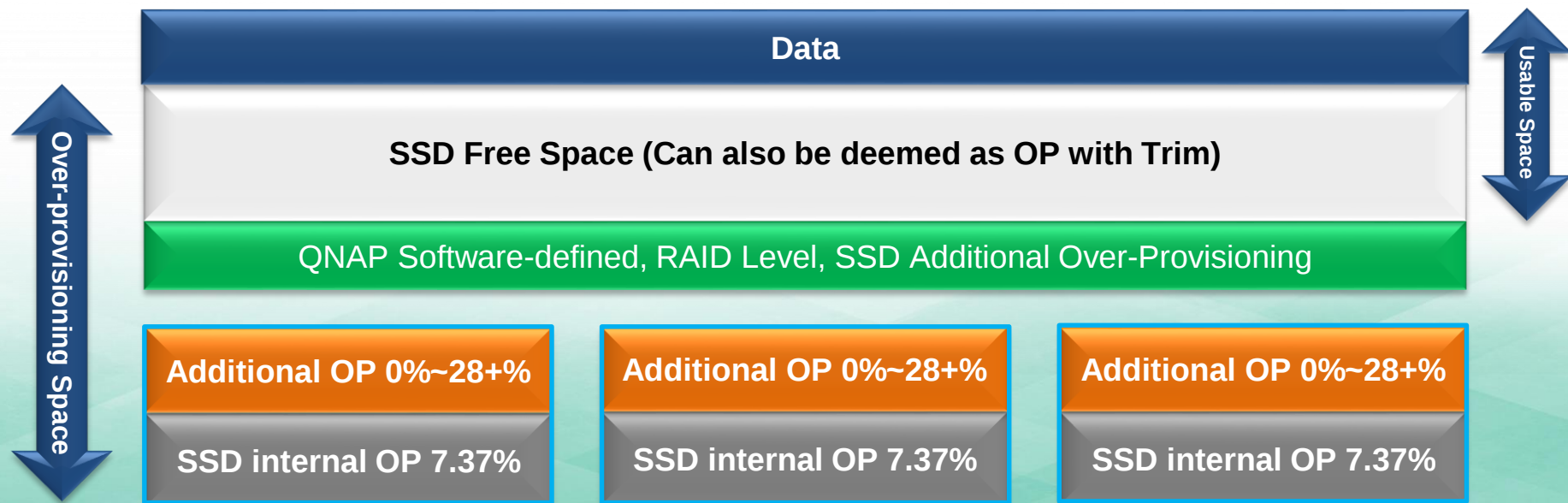


Figure 2: Sustained Write Performance on 256GB M600 with DWA

Using FIO for the test with --direct=0 --bs= 4k(random)1M(sequential), --io depth=1(random) 32(sequential), --file size= 90G

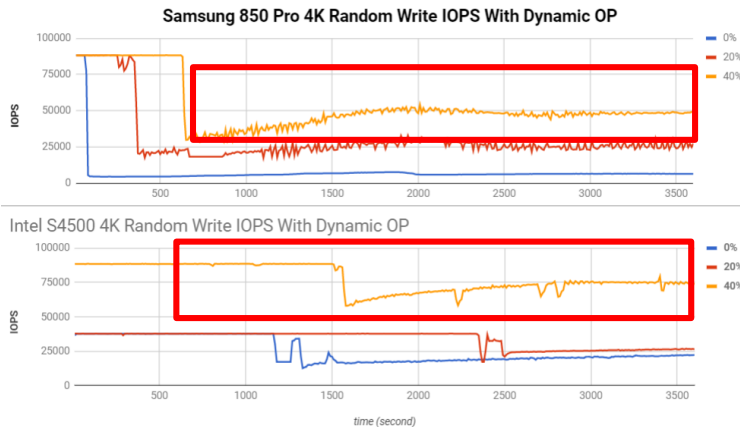
QNAP Software-defined SSD Additional Over-Provisioning

- Having more over-provisioning is proven to be beneficial.
- Besides SSD internal Over-provisioning, QTS introduces the additional Over-provisioning that can be adjusted based on usage.



The Advantage of Software-defined Over-provisioning

- Performance and endurance of SSD can be increased.
- Let consumer SSD reach enterprise SSD performance, and further enhance enterprise SSD advantage, reduce TCO (Total Cost of Ownership)
(Although usable space is reduced, actual used space is unchanged.)



Configure the Software-defined SSD Additional Over-provisioning

- After QTS 4.3.5, user can decide OP amount for SSD cache, Qtier pool and static volume.
- A number between 1% to 60% in addition to vendor defined amount

Note:

The over-provisioning can only be configured when a storage space is created and cannot be enabled for existing cache/volume unless recreating the storage.

Create SSD Cache

Introduction Select Disk(s) **Configure** Summary

Customize the SSD cache settings to optimize performance

Over-provisioning: **New**

Reserve space on the SSDs to improve write performance and disk life span. To find the optimal over-provisioning ratio for your SSDs, run [SSD Profiling Tool](#).

☒ Enable SSD over-provisioning % ⓘ

Estimated Capacity: 433.25 GB ☒ Over-provisioning: 43.33 GB ☐ Cache Capacity: 389.93 GB

Cache Mode:

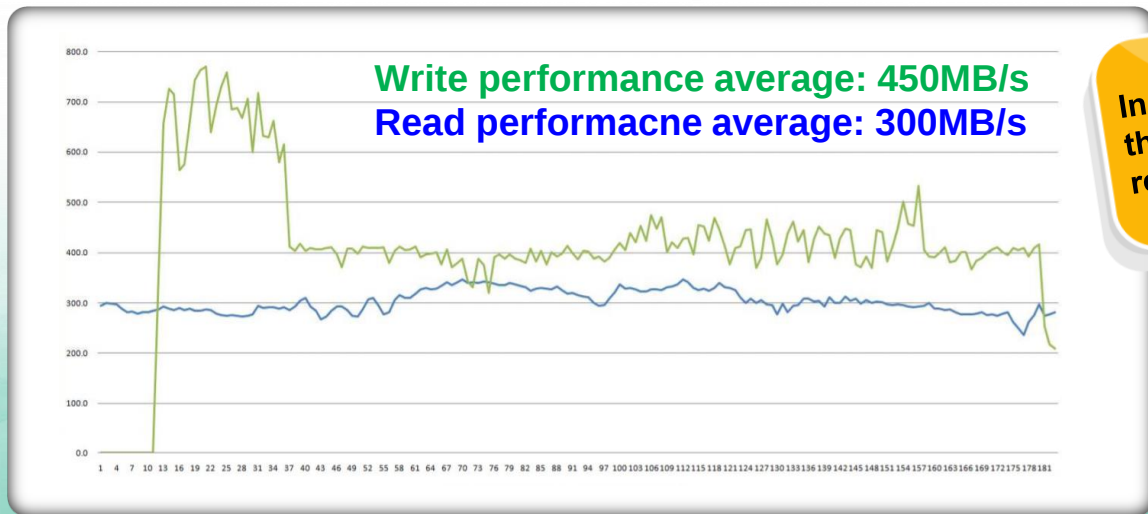
☒ Random I/O. Recommended for virtualization and database applications.

☐ All I/O. Recommended for file serving and media streaming.

Cancel Back Next

Choose SSD is Hard, Choose QNAP is Simple

- SSD sustained performance can only be observed after used over time
- With the SSD additional Over-provisioning, the TV station editors gain a smooth editing experience
- **Achieve the goal of investing 10GbE and SSD**



In 10GbE environment,
the total throughput
reach a stable 750MB/s



Is All SSD Support / Require The additional Over-provisioning?

- Not all SSDs' performance are increased in QNAP Lab test.
- SSD with higher internal over-provisioning or special controller design, additional over-provisioning may not be needed.
- Intel® Optane™: With 3D Xpoint™ technology, the M.2 SSD can reach a sustained performance higher than data center SSD.

Model	Size	Random Read IOPS (100% Span)	Random Write IOPS (100% Span)
Intel® Optane™ M.2 SSD	16GB	240K	65K
Intel® SSD DC S4600 2.5 SSD	240GB	72K	38K



Use SSD Profiling Tool to measure the Best Additional OP Amount On Your NAS

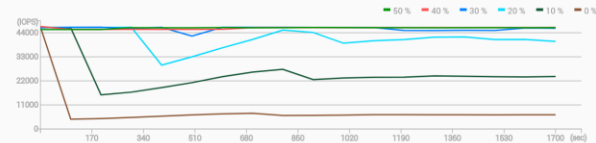
- Capacity still matters! For example, more space in the read cache mean more data can be boosted at the same time
- The upcoming App will give advice for the best configuration based on your required IOPS

Intel® SSD DC S4600 2.5 SSD

Test Information

NAS : ~
Disk Model: Samsung 850 pro
RAID Type: Single
Test Status: Completed
Test range: 0 % ~ 50 %
Test interval: 10 %
Test pattern: Random Write

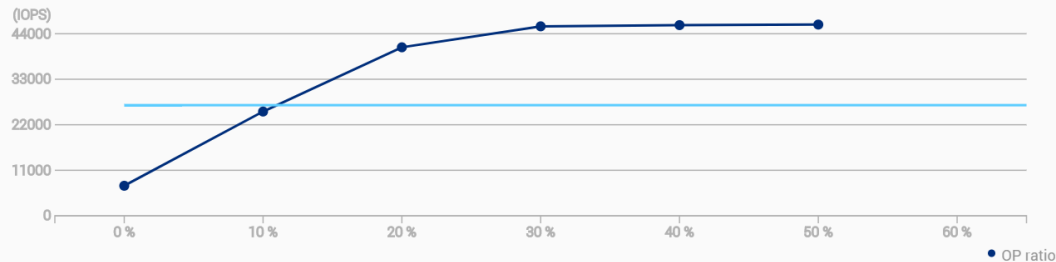
Test Results



OP Evaluation Results

Target write performance: 26737 IOPS

Recommended over-provisioning ratio: 10% or higher



Close



Demo

**Use SSD Profiling Tool to Measure the Best
SSD Additional Over-provisioning amount**

In Intensive Write Environment, SSD Over-provisioning is a Must

QNAP

Multi-Cams 3D Scanning With Thunderbolt NAS

1. Ensure multi-client combined write IOPS requirement can be met.
2. Ensure the SSD lifespan in high workload environment.



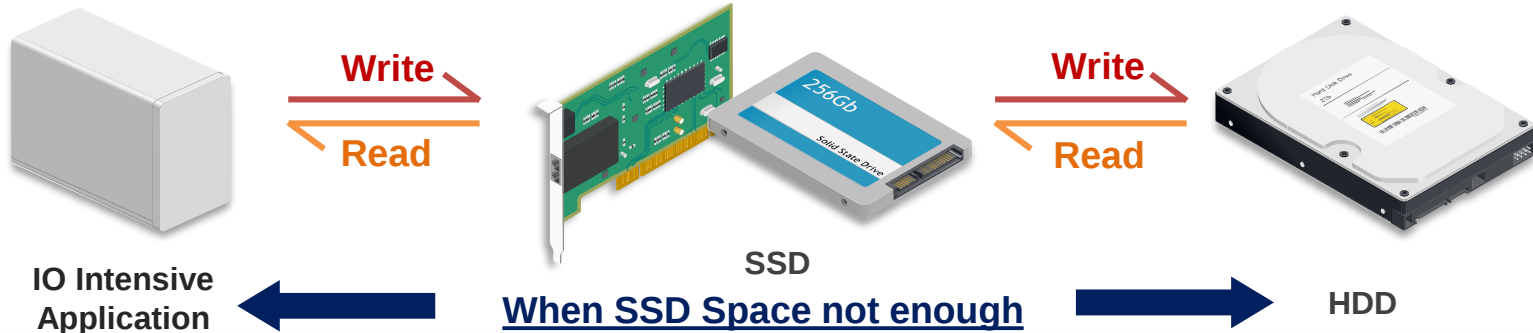
https://portal.jp-seagate-mktg.com/user_testimonials/rowland_kirishima/

QNAP Global SSD Cache

- The QNAP SSD Cache can be applied to multiple volume / LUN
 - **Cache Type:**
 - Store hot data for accessing (Read-Cache)
 - Allow new data be written. (Read-write Cache)
 - **RAID configuration:** Single, RAID 0, RAID 1, RAID 10
 - **SSD type:** SATA, SAS, M.2, PCIe SSD

How Read-write Cache work:

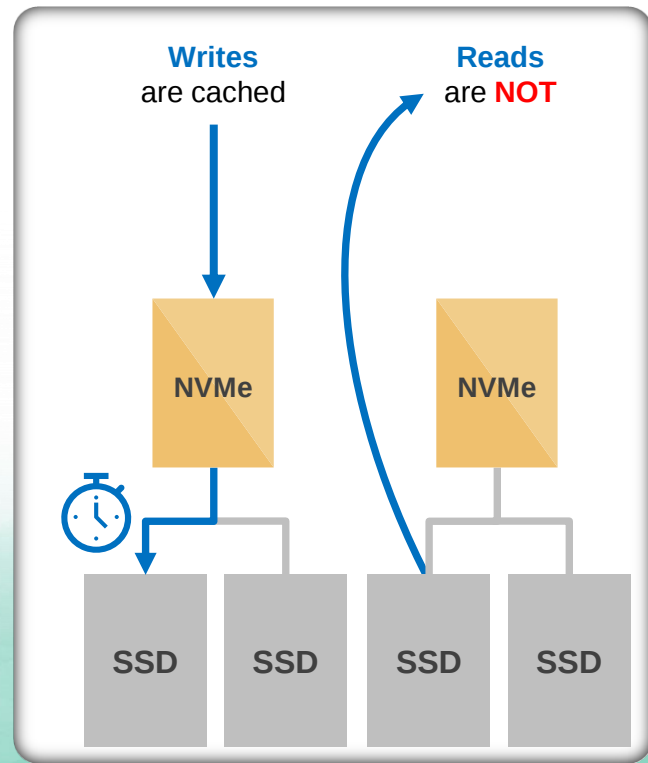
Data from clients and storage will both be cached



The Write-only Cache Increase ROI of SSD Cache with high Writing Demand

- Write-only cache is promoted by Microsoft for endurance control.
- QNAP believe Write-only Cache can increase the ROI of purchasing SSD in below scenario:

1. File Server focusing on write operations
2. Database with more write operation (Such as IoT monitoring server)
3. Use high endurance SSD (Intel Optane™) with other SSD



Combining Write-only Cache & Over-provisioning with All Flash Storage

- In RAID 5/6 All Flash Storage, Add Write-only cache to avoid write penalty
- For example, The TES-3085U with all flash RAID 60 can pair with RAID 10 SSD Write-only Cache.
- Add the SSD additional Over-provisioning on the RAID 10 to create a 3H (high capacity, high performance, high endurance) all flash storage array.



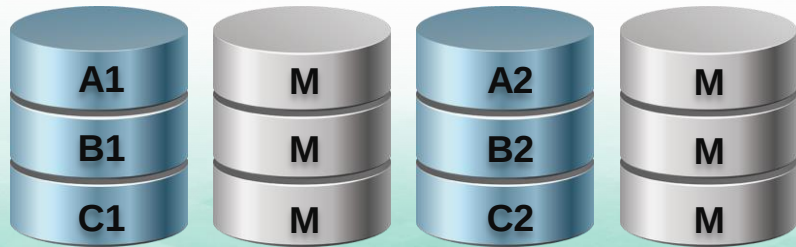
Using Samsung 850 Pro, FIO For the test: --direct=0 --bs= 4k(random)1M(sequential), --io depth=1(random) 32(sequential), --file size= 90G

SSD Cache Support RAID 5/6

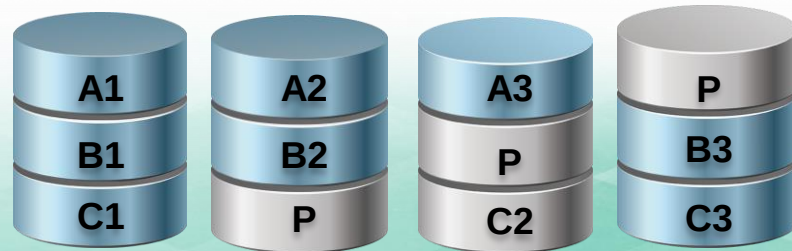
Increase ROI for Read-only Cache

- What is RAID 5/6 write penalty ? RMW (Read Modify Write)
1 Write= Read Parity+Read Data+Calculate Parity+Write Parity+Write Data
- However, if the SSD will only be used as Read-only Cache, the write action will be limited and RAID 5/6 can increase Cache capacity

RAID 10 Capacity = $N/2$



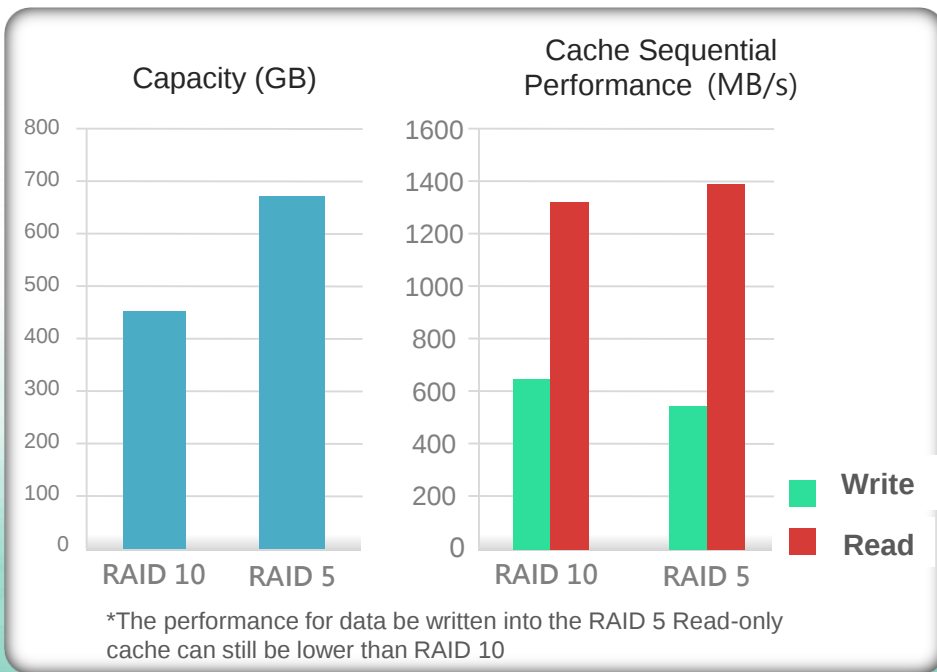
RAID 5 Capacity = $N-1$



Also, the write penalty is proved to be less obvious on sequential access, in which not all chunk will need to be checked.

Create SSD Cache With RAID 5/6

- In QNAP Lab · four 240GB Samsung SSD 850 Pro is used as Cache
- Compare the performance between RAID 5 and RAID 10 with 100% Cache hit rate*



SSD RAID 5 throughput can match with RAID 10

Create SSD Cache

Introduction Select Disk(s) Configure

You can only select SSDs installed in the NAS to create the SSD

Select and configure disks:

☒	Disk	Model	Type	Size	Health
☐	Disk 12	Samsung SSD 850 PRO 25...	SSD	238.47 GB	Data
☒	Disk 13	INTEL SSDSC2KF240H6 (...)	SSD	223.57 GB	Good
☒	Disk 14	Samsung SSD 850 PRO 12...	SSD	953.87 GB	Good
☐	Disk 15			223.57 GB	Data
☒	Disk 16			894.25 GB	Good

Selected: 7 Estimated Capacity: 1.24 TB

Cache Type: RAID Type:

Single

RAID 0

RAID 1

RAID 5

RAID 6

RAID 10

RAID 5

For write cache, a protected RAID type (RAID 1, 5, 6, 10) should be used to protect data in the cache. For multiple SSDs, you should use RAID 10 for the best write performance.

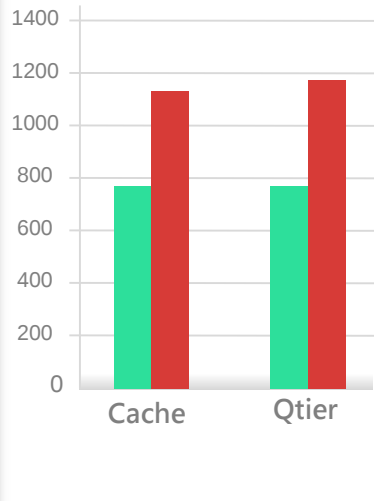
Cancel Back Next

QNAP NAS Provide the Most Flexible SSD Cache Settings

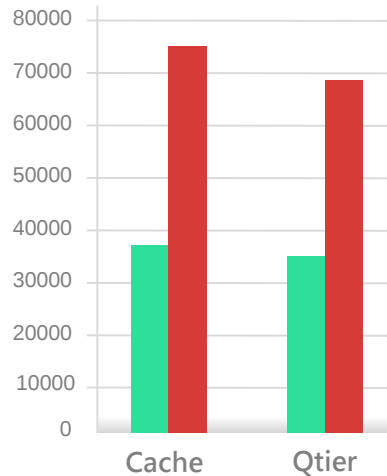
Scenarios	File/ Application Server	Web Server	Online Media Editing Station	Media Material Storage	Business Database Storage
Cache Mode	Read-write C	Read-Only	Read-write	Write-only	Read-write
Cache RAID	RAID 10	RAID 5	RAID 5	RAID 10	RAID 10
SSD additional Over- provisioning	20%	10%	30%	30%	30%
Recommended / reference model	TS-877	TS-963X	TVS-1282T3	TS-1685 TS-1635	TS-EC2480U R2

SSD Cache or Qtier™, Which is Better?

Sequential
Performance (MB/s)



Random Performance
(IOPS)



Write
Read

TVS-871T-i7-16G with QM2 2P Card ADATA SX8000NP 512GB as SSD Cache and Qtier

Global SSD Cache

Real time performance boost

1. Burst read and write requirement such as news editing.
2. The cache can be disabled and adjusted at any time.

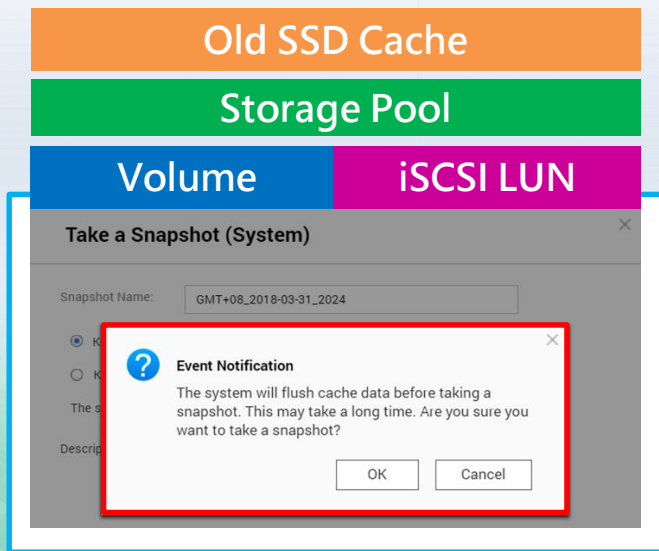
Qtier 2.0

Fully utilize the SSD capacity

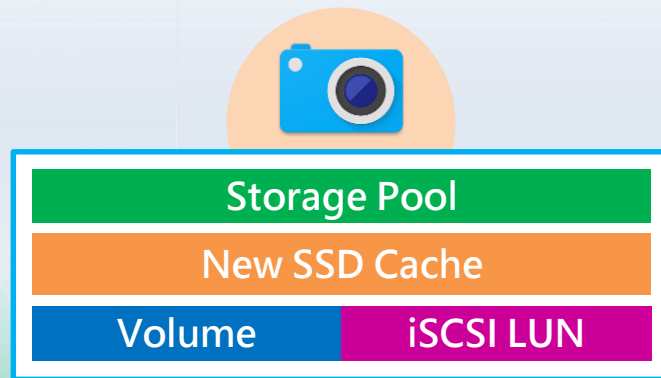
1. For data with hot and cold access pattern to conduct tiering
2. Pair with Qtier IO-aware can also be used on databases.

Storage Structure Change For Snapshots to Include Cache Content

Old SSD Cache: Taking Snapshot must flush SSD Cache data first and may take up to 30 min.



- **New SSD Cache:** Taking snapshots no longer require flushing, enabling high frequency snapshots with SSD cache included.



QNAP



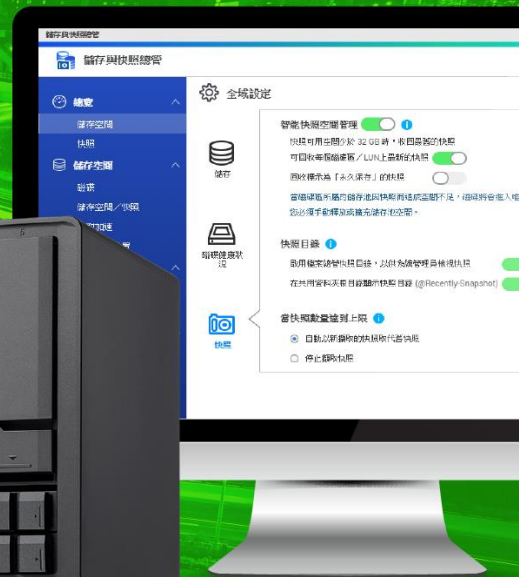
QTS 4.3.5 Preview

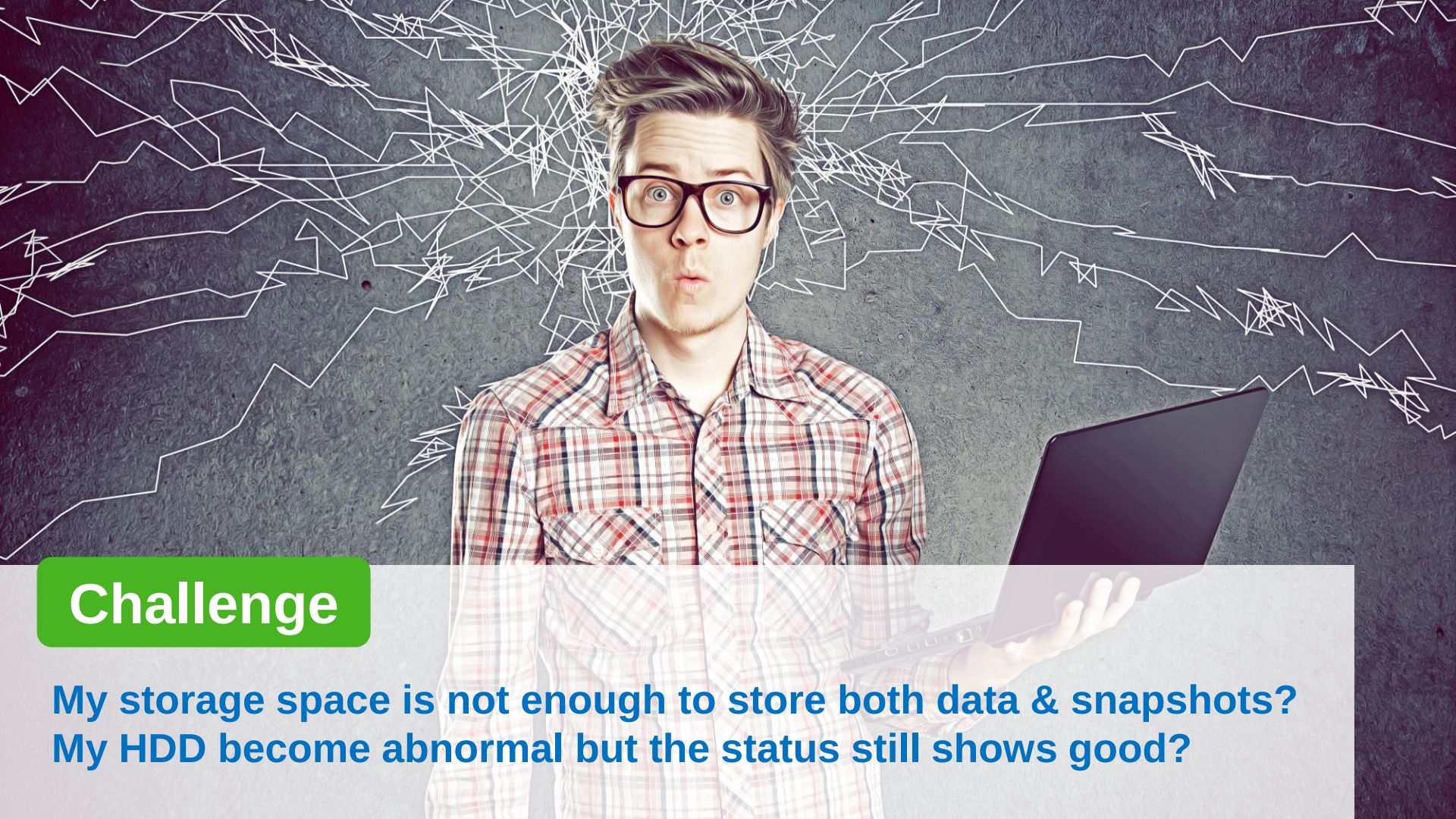
Storage Space Management and Monitoring



Flexibility Storage Management

- Volume Shrink and Convert
- VJBOD Support iSER
- Seagate IronWolf Health Management



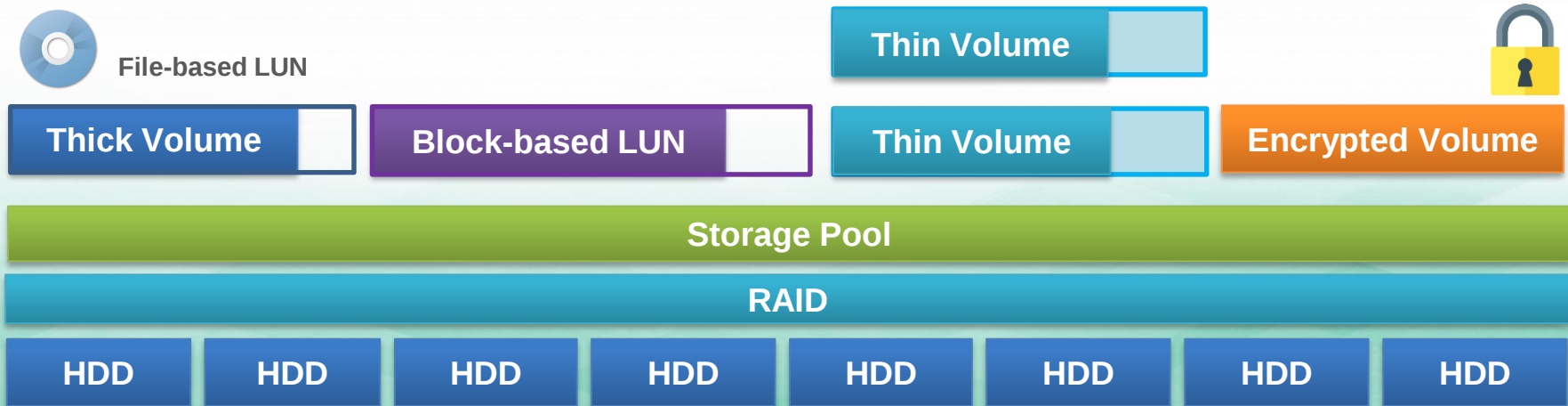


Challenge

**My storage space is not enough to store both data & snapshots?
My HDD become abnormal but the status still shows good?**

QNAP Flexibility Storage Configuration

- Already support various configurations with storage pool
Guaranteed Space : Thick volume and Block-based iSCSI LUN
Thin-provisioning : Thin Volume and Block-based iSCSI LUN
Other functions : Encryption of Thick/Thin Volume and File-based iSCSI LUN



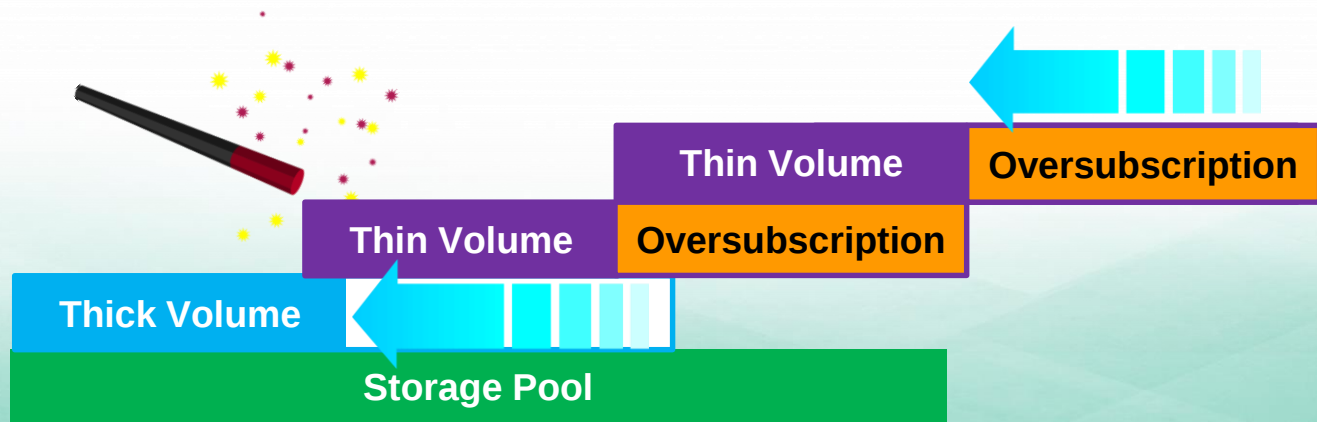
In the Past, Space Allocation Need to be Careful

- Allocate all space to thick volume: free space cannot be utilized
- Over-subscribed space to thin volume: some volume cannot be used
- When Storage Pool Space is limited, snapshot can be auto recycled



Introduce Resize Volume Wizard

- The Thick and Thin Volumes now support Resize Volume Wizard.
- Reduce the allocated thick volume space to free space for the storage pool, other volumes, LUN or Snapshot.
- Reduce the planned thin volume space to avoid risk of “Oversubscription”.



Oversubscription

The space that thin volume has planned but its storage pool cannot currently provide.

3 Three Steps to Reduce the Volume Space

1

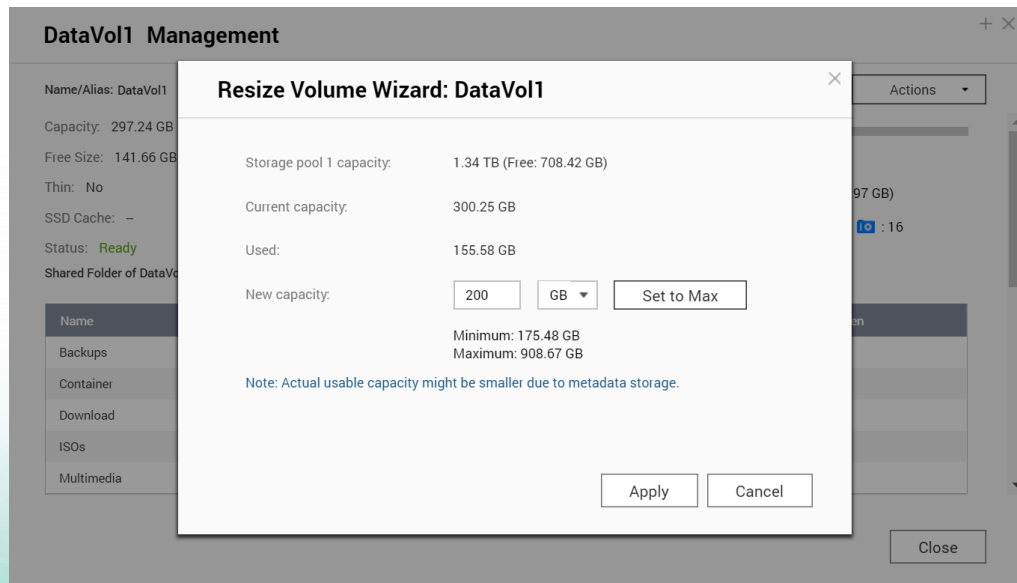
Ensure all the written actions of the volumes are stopped

2

Storage/Snapshot > Volume Management > Resize > Input the reduced size

3

Waiting for the action to complete and continue usage!



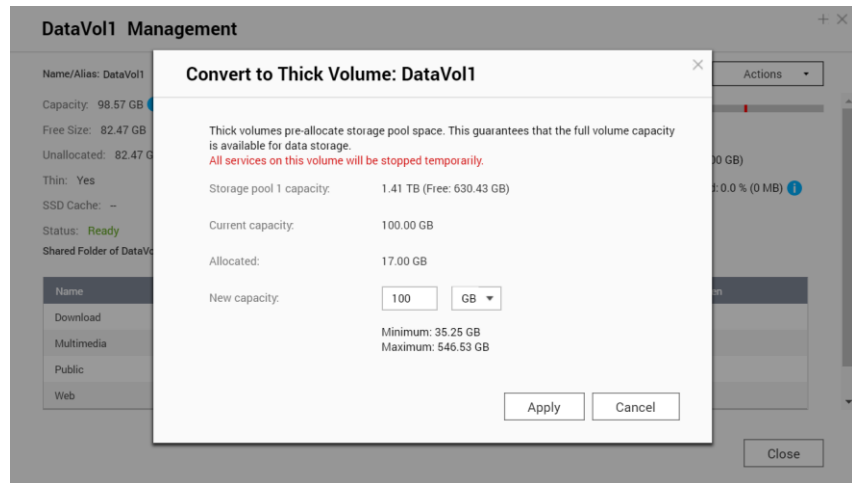
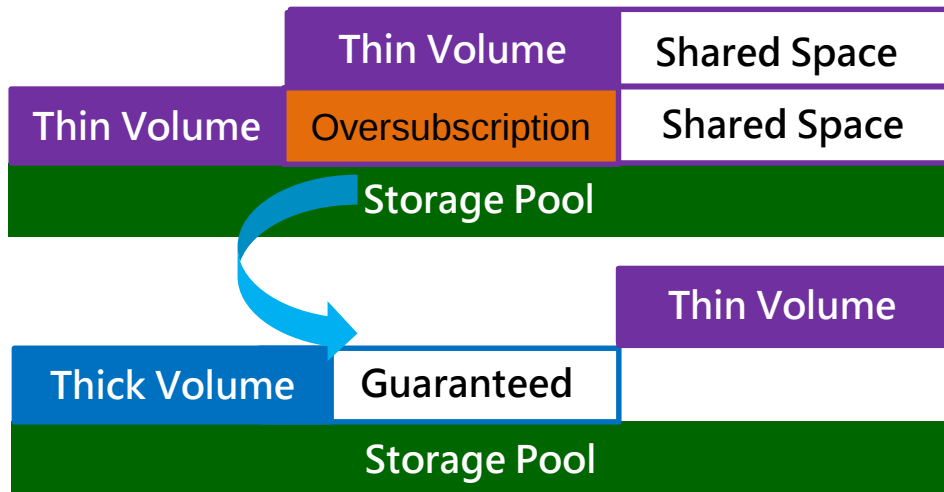
A hand is shown interacting with a futuristic, circular, semi-transparent interface. The interface features a large white play button in the center, surrounded by concentric circles and small white dots. The background is a blurred server room with multiple computer monitors and racks of equipment.

Demo

Shrinking Volume Capacity in 3 Steps

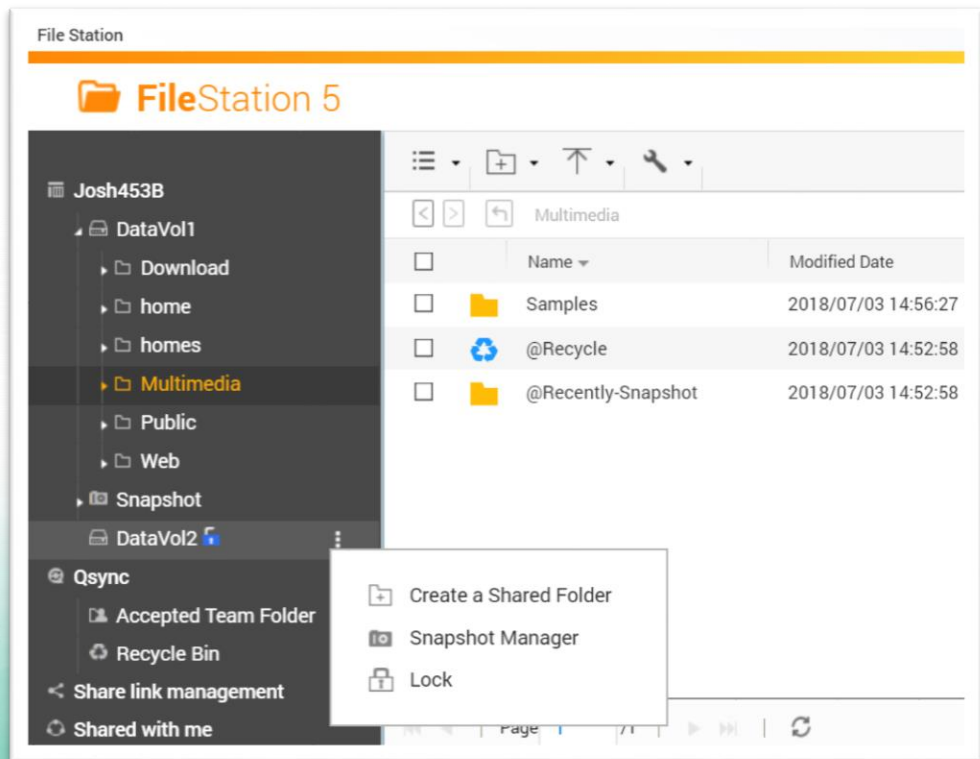
Convert Thin Volume Back to Thick

- QTS 4.3.5 now support convert Thin to Thick in contrast to Thick to Thin conversion introduced in QTS 4.3.4.
- The volume space can be converted to guaranteed space or flexible allocation to maximize space allocation efficiency.



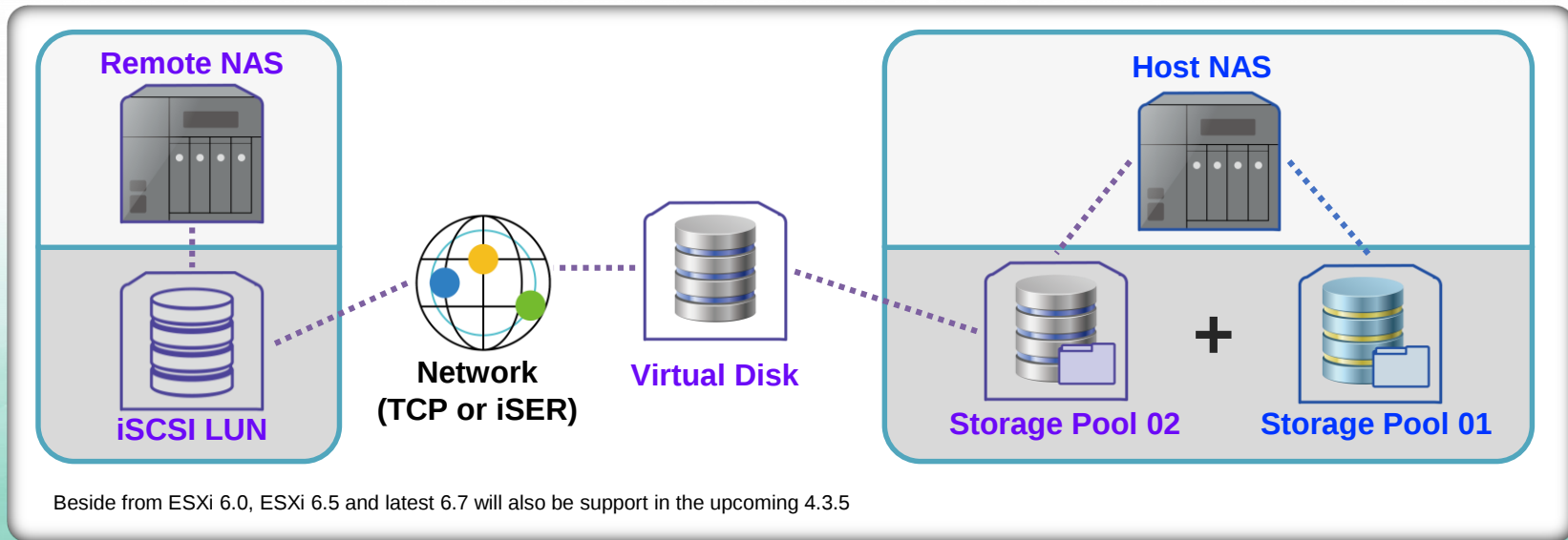
Using File Station to Control Encrypted Volume

- Use can create encrypted thick or thin volume with National Cyber Security certified (FIPS 140-2 CAVP) AES-256 bits encryption.
- In 4.3.5 User can quickly lock a data volume in File Station.



VJBOD Support RoCE-based iSER

- Earlier in QTS 4.3.3 QNAP and Mellanox collaborated so the QNAP NAS iSCSI target can support RoCE iSER with VMware ESXi
- At QTS 4.3.5, The VJBOD that based on iSCSI can also utilize this technology to increase the storage performance



What is iSER (iSCSI Extensions for RDMA)

- Based on different technologies (RoCE, iWARP, InfiniBand), the goal of iSER protocol is to allow network data to reach the memory of the systems directly
- RoCE based iSER can be active when both host and remote system used the specific network card, and can increase transferring performance by more than 25%.



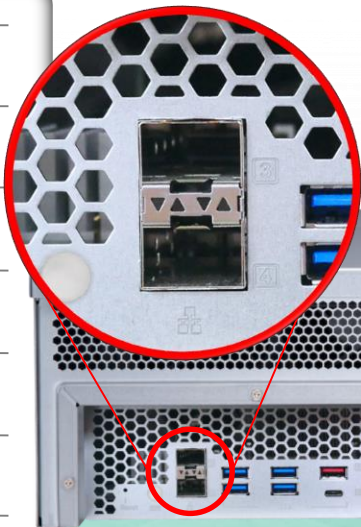
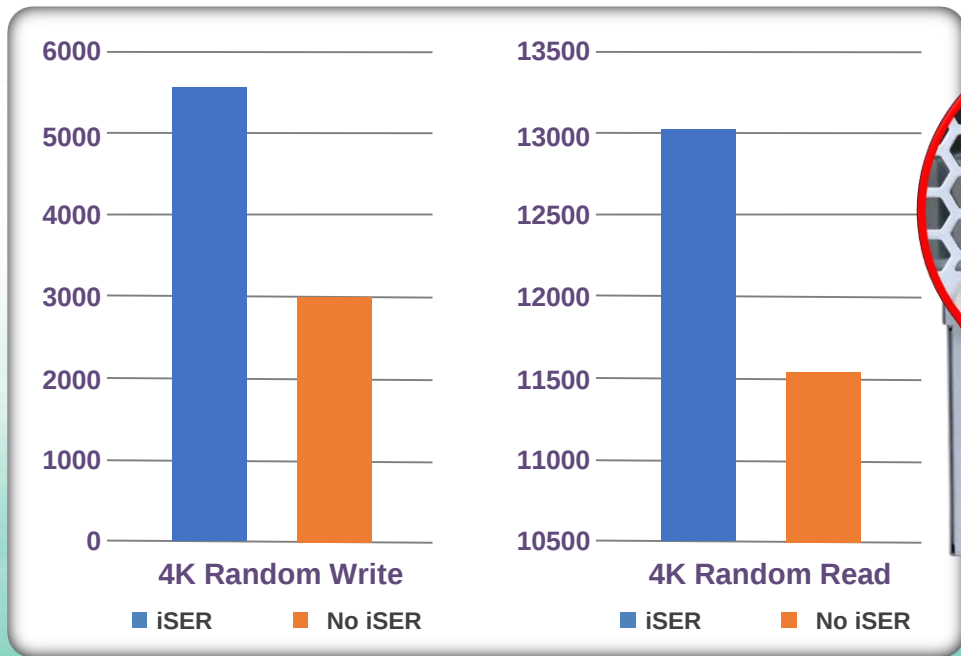
Tested in QNAP Lab. Figures may vary by environments.

QNAP RoCE based iSER can only be enabled with specific Mellanox NICs as well as a switch that support Priority Flow Control

Using iSER to Increase VJBOD Performance

In QNAP Lab, the TS-1677XU with built-in Mellanox CX4 10GbE

The disk performance of Virtual Machine that mount iSER VJBOD disks can be faster than other normal VJBOD disk from the same NAS.

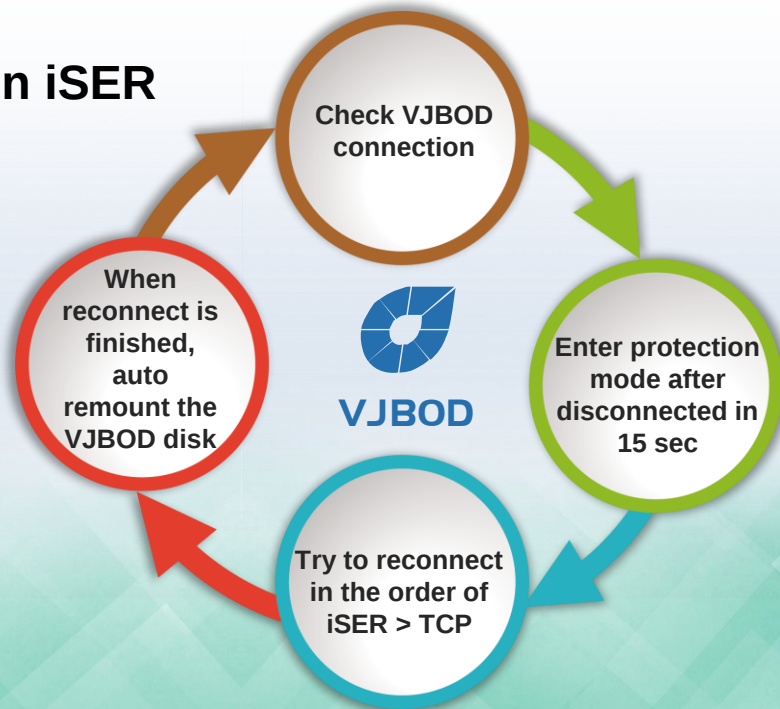
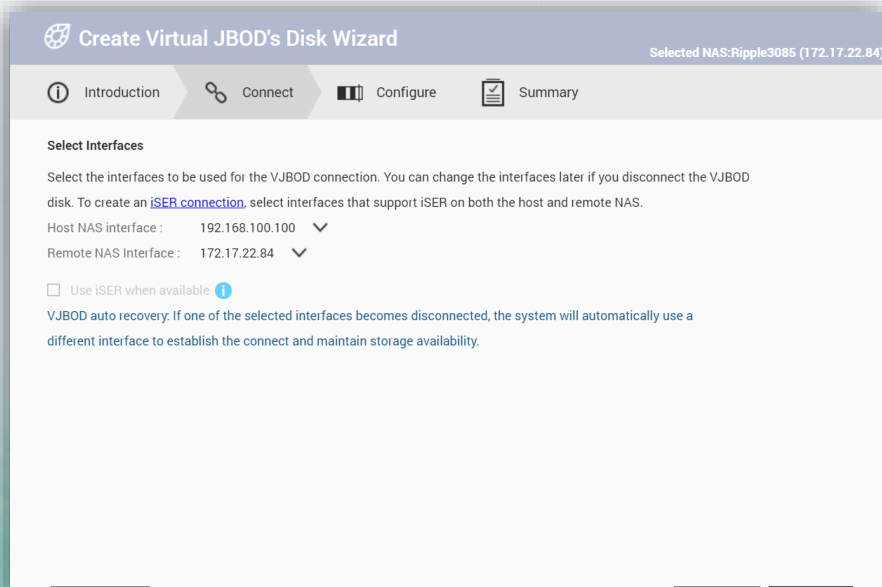


With iSER, VJBOD random write performance from the same NAS can increase by 80%

Test condition: Mount a TES-3085 iSCSI LUN as VJBOD disk and create virtual disk image for a VM on 1677XU to test the disk performance with iometer, 64GB 4 Outstanding, Standard 4K random read/write test

Easily Enable iSER Connection For VJBOD

- Use iSER in VMware might be hard, but it is one click to go in QTS
- VJBOD connection wizard can easily identify which interface supports iSER for user to select from
- Auto reconnection is also supported in iSER



A hand is shown holding a large, white, 3D play button icon. The play button is centered within a circular, futuristic digital interface that features concentric circles, dashed lines, and small white dots. The background is a blurred server room with multiple computer monitors and racks of equipment, creating a sense of a high-tech environment.

Demo

**Use iSER VJBOD to create a local
VM disk and test its performance**

How to Intelligently Monitor Disk Condition

- Disk issue is generally reported by S.M.A.R.T., but S.M.A.R.T. only reported error after it has been detected.
- Is there a way to actively analyze disk conditions, to prevent errors from happening such as:

Bad connection between NAS & Disk

Cause continuous reset

Excessive vibration on the HDD

Cause future bad sector



Disk Health

Monitor disk health, temperature, and usage status using the disk S.M.A.R.T. mechanism.

NAS Host

Disk 4

Summary

Disk Information

SMART Information

Test

Settings

ID	Description	Value	Wors...	Thre...	Raw Value	Status
16	Gas_Gauge	002	198	000	15562321...	Good
183	Runtime_Bad_Block	100	100	000	0	Good
192	Power-Off_Retract_Count	200	200	000	250	Good
193	Load_Cycle_Count	200	200	000	1275	Good
194	Temperature_Celsius	107	099	000	45	Good
196	Reallocated_Event_Count	200	200	000	0	Good
197	Current_Pending_Sector	200	200	000	1	Warning
198	Uncorrectable_Sector_Count	200	200	000	1	Warning
199	SATA_R_Error_Count	200	200	000	0	Good
200	Multi_Zone_Error_Rate	200	200	000	3	Good

Seagate IronWolf Health Management

- IronWolf Health Management is incorporated in QTS 4.3.5
- Using the Seagate Official Analysis Tool to find potential risk that might lead to disk abnormality

The risk that IHM can help to detect:

Excessive host resets have been detected.

Connection issues on NAS and hard drive interface.

Excessive physical shock to the hard drive.

Excessive vibration on the hard drive.

Abnormally high operating temperature.

Analysis S.M.A.R.T. values for future failure

Disk Health

Monitor disk health, temperature, and usage status using the disk S.M.A.R.T. mechanism.

NAS Host

Disk 3

Summary

IronWolf Health Manage...

Disk Information

SMART Information

Test

Settings

Disk :

IronWolf 3.64 TB

IronWolf Health Management: **Healthy**

Version: 1.2.1-1_11_4 A

Last IHM Test: 2018/07/05 03:30:26 [Download Logs](#)

Healthy

Warranty Expiry Date: 2016/09/23

 Rescue Plan Coverage: **Not available**

The Seagate Rescue Plan provides the Data Recovery Service ("DRS") feature for hard drive failure, viruses, software issues, and other problems that can cause data loss. If you have not purchased a rescue plan yet, please click [here](#).

Statistics

Set Schedule

Test

QNAP X Seagate Exclusive Functions

- QNAP and Seagate are committed to provide more advanced features to protect customer data

- Default Warranty Expiry Day
Provide info on the out of factory warranty for reminding early replacement

- Workload statistic

Determine warranty based on total data write while monitoring application workload at disk level



QNAP



QTS 4.3.5

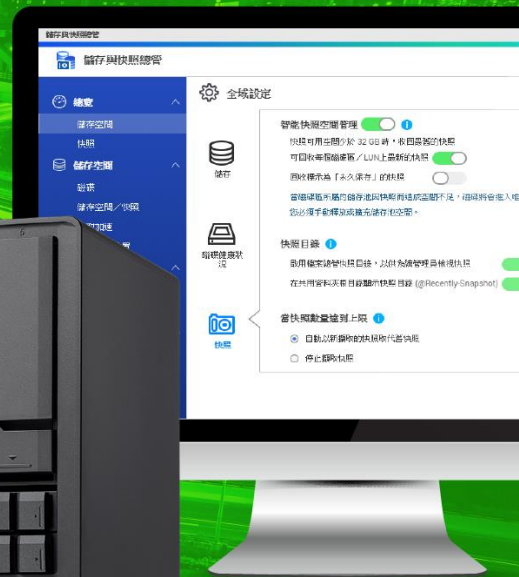
Preview

Snapshot Remote Restore and Export/Import



Snapshot Replica Remote Restore :

- Restore from Remote Snapshot Vault
- Snapshot Export/Import
- Export Snapshot In first Snapshot Replica Task
- LUN Export/Import



Challenge

Backup data recovery can not be completed in time when disaster happens?



Business Need Shorter RTO!

In the survey of 300 Enterprise and SMB at Taiwan:

- **60%** have used Remote Replication as Backup Plan.
- **50%** of business expected the recovering time should be within **1 Hour**.
- But **also 50%** of business experience actual recovery time > **1 Day!**

Can business only manually transfer data back from the remote end when disaster happen?

Data Backup Time

Disaster Happen

Server Online



● Recover Point Objective

● Recover Time Objective



Restore From Remote Snapshot Vault

- The Snapshot Manager now actively connected to Snapshot Vault
- Support Monitor and restore select folder and files at the Source NAS directly!



Remote Snapshot Vault

DataVol1 (V_DataVol1 At Ripple3085, 192.168.100.10)
Ready

Select snapshot location : Remote | Ripple3085 (DataVol1_rep) ▾

Local
Demo1677U

Remote
✓ Ripple3085 (DataVol1_rep)

Now 10:13
10:10

2018/07/

07/09

07/03

06/20

GMT+08_2018-07-12_1100
GMT+08_2018-07-12_1000
GMT+08_2018-07-12_0900
GMT+08_2018-07-12_0800
GMT+08_2018-07-12_0500
GMT+08_2018-07-12_0400

IMG_3635.JPG
IMG_3642.JPG
IMG_6437.JPG

@Recycle

2018-06-28 15:12:30
2018-06-28 15:14:04
2018-06-29 13:51:34

JPG
JPG
JPG

3.21 MB
3.00 MB
2.11 MB

10:28:36 Folder
18:44:00 Folder
14:25:20 JPG 3.19 MB
14:29:08 JPG 4.07 MB
14:38:54 JPG 2.64 MB

Page 1 /1 | Display item: 1-9, Total: 9 | Show 50 Item(s)

Restore Clone Revert volume snapshot

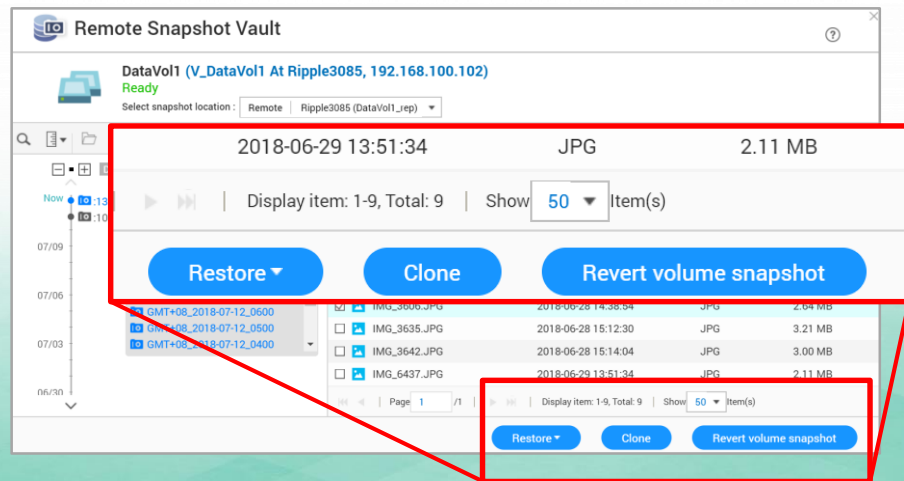
Both the source and destination NAS must be upgraded to 4.3.5 to support this function

Support 3 Types of Restoring

- From the source snapshot manager, user can
 1. Select file and folder to restore back to source
 2. Select and clone remote snapshot as new volume/LUN
 3. Select snapshot and revert the whole volume or LUN from remote



The restore, clone and revert speed is highly depended on the network speed and conditions



A hand is shown holding a large, white, 3D play button icon. The hand is positioned in the center of the frame. Overlaid on the hand and the background is a circular digital interface with white lines and dots, resembling a futuristic control panel or a data visualization. The background is a blurred server room with multiple computer monitors and racks of equipment, creating a sense of a high-tech environment.

Demo

**Using QNAP 10GbE Solution to
Restore File From Remote**

The Forth Way: Snapshot Export/Import

- Export a snapshot from snapshot manager or snapshot vault
- Using external storage device, the exported image can be imported to another NAS to create new volume or LUN
- The same image can also be used to revert source volume or LUN

When network speed is unstable, external disk can also be utilized.



The exported image file size is same as the source volume or LUN

Multiple Restore Solutions For File Server or iSCSI Storage

- **File Server:**
Restore selected data from remote snapshot vault directly
- **iSCSI Storage Server:**
Revert the iSCSI LUN from remote or clone the LUN at remote end for fast remount.

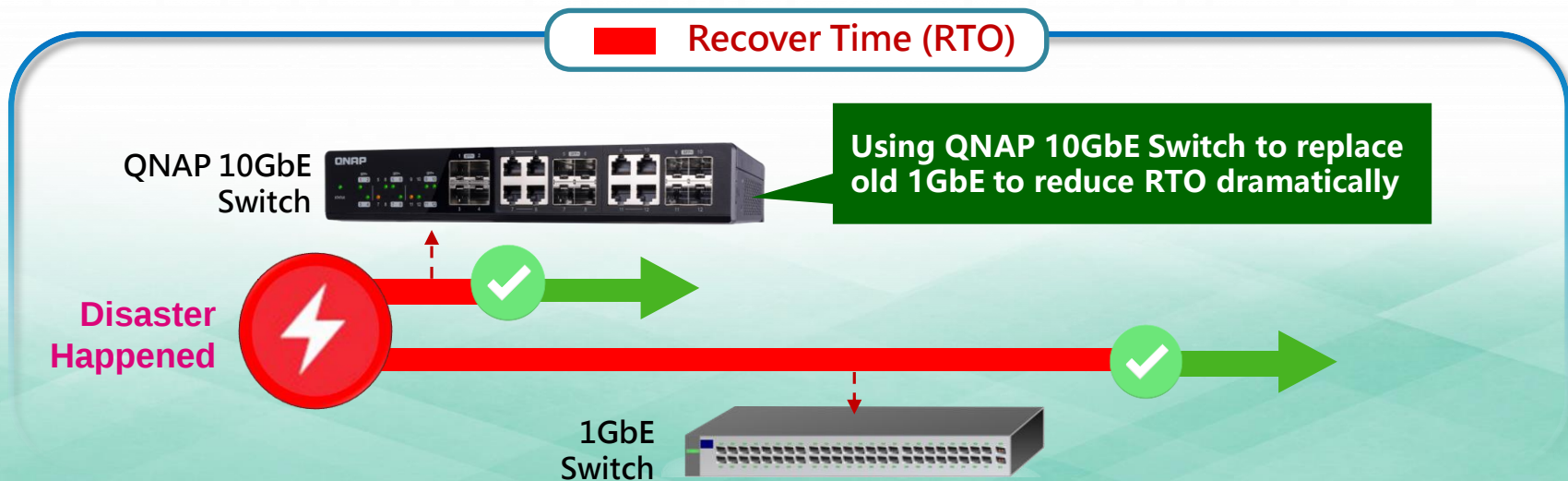
File-level file restoration from remote

Block-level remote restoration or clone the LUN directly at remote end



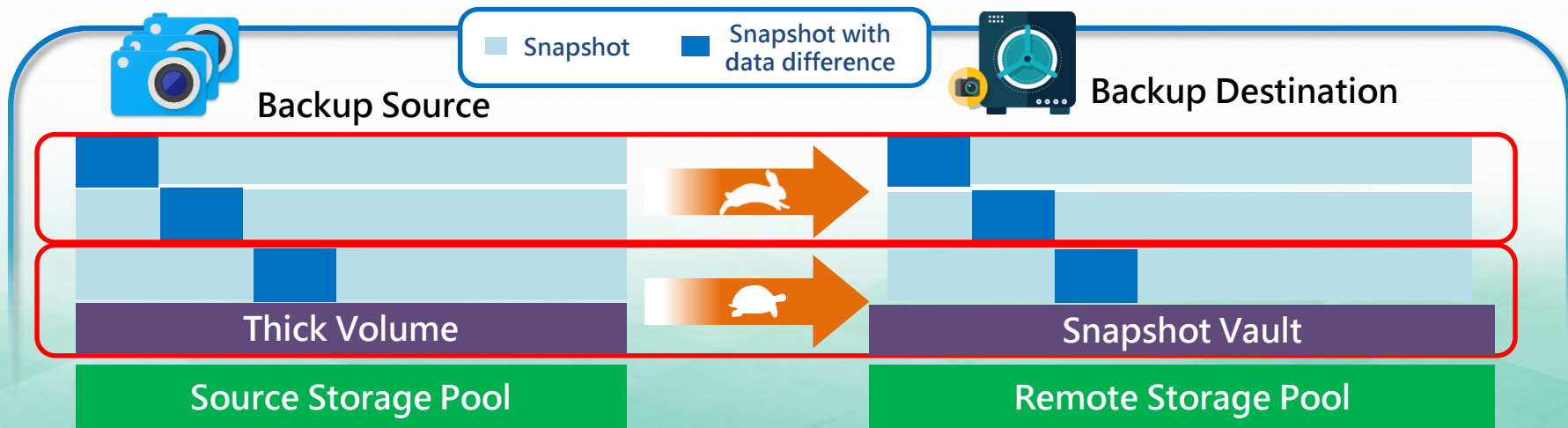
Drastically Reduce Recover Time With 10GbE Network

- The Remote Snapshot Vault Recovering is based on Ethernet service.
- Using 1GbE network, recovering large amount of data still take hours.
- Pair the Snapshot Replica Solution with 10GbE or even faster Network to increase both the backup and recovery speed !



Why First Snapshot Replica Take Longer Time?

- In the survey, 30% of IT managers do not feel comfortable with the long backup time.
- For Snapshot Replica, the whole Volume and LUN need to be transferred first before snapshot can be backup*
- Without faster network, setting up a backup can take days.



Thin volume or LUN are not limited by this as space will only be allocated after data usage.

Snapshot Replica Support Export/Import

- Snapshot Replica support options to Export Source to External Storage
- Once exported, go to remote side and import image file to the vault

Create a Snapshot Replication Job

Select Source Select Destination Backup Plan Summary

Select Backup Plan

☐ Enable encryption ⓘ

☐ Enable maximum transfer rate Maximum transfer rate (KB/s):

☐ Compress files during transmission

Export Source

Data to be transferred on the first job run: 197.78 GB

☒ Export source data to external storage on first run ⓘ

☐ Skip the export, I have an existing copy of the source data.

USB Disk2 (400GB Free) ↻

When the export has finished, go to "Snapshot Vault" > "Action" > "Import" on the destination NAS to import the source data.

Thick Volume

Cancel Back Next

Use External RAID Storage with Snapshot Replica Export to quickly setup multiple backup site.



iSCSI LUN Support Export/Import

- Besides using QNAP NAS to do Snapshot Replica, iSCSI LUN can also be exported to an Windows/Linux server
- The exported image can be later imported to same or different NAS



Create LUN Export Job

Introduction | Select Location | **Configure** | Summary

Select Destination:

Linux Share (NFS) | **Windows Share (CIFS/SMB)** | Local Host

IP Address/Host Name:

Examples: 192.168.0.100, nas.com, nas,...

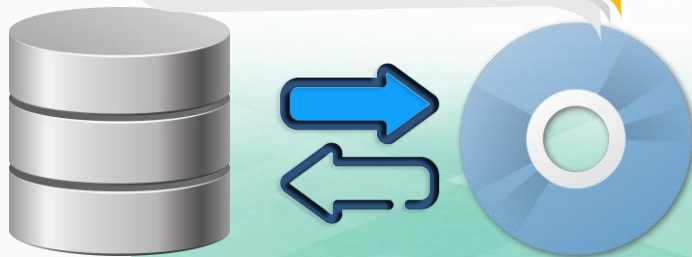
Username:

Password:

Folder or Path:

Remote Host Testing:

Even when only 1 QNAP NAS present, iSCSI LUN can still be properly backup



Work Smart With the Snapshot Replica

With Remote Snapshot Vault Restore, Snapshot Replica is the best option to backup whole volume for file server

Backup Solution	Snapshot Replica	RTRR	Rsync
Backup Method	Block-level snapshot-based	File-level file-based	Block-level file-based
Backup Type	Differential backup (Only Transfer difference)	Overwrite different file (Transfer whole file)	Differential backup (Only Transfer difference)
Backup Time	Schedule	Real time/Schedule	Schedule
Recovery Solution	Remote recovery/Source recovery/ Import recovery	Remote recovery/ Synchronizing	Remote recovery
Backup Destination	NAS	NAS	Rsync Server
Using Scenario	Backup whole volume/LUN with many small files	Data synchronizing	Backup specified large files such as VM images

Work Smarter in the Age of Speed!

1

Software-defined SSD Additional Over-provisioning / SSD Write-only cache / RAID 5, 6 Cache

2

Volume Shrink and covert / VJBOD support RoCE based iSER/ Seagate IronWolf Health Management

3

Remote Snapshot Vault Restoration / Snapshot Export and Import





QNAP NAS

Is Your Best Choose



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