3 Leading Technologies to Maximize ROI

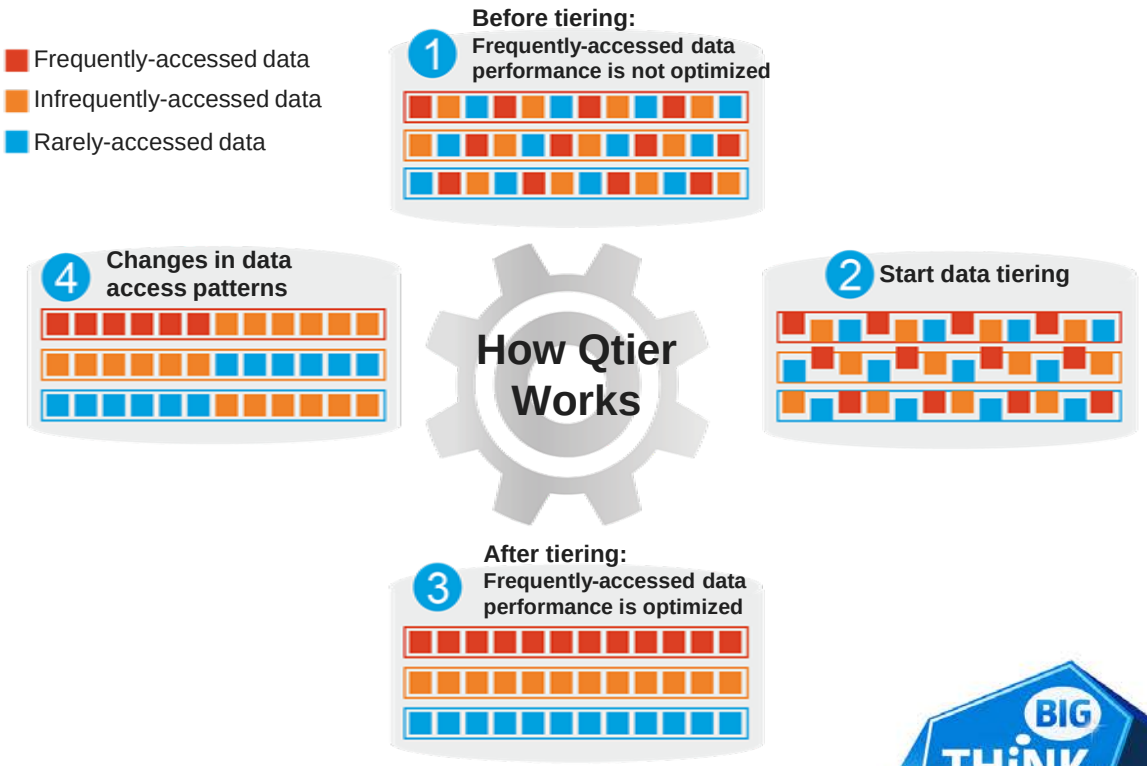
Qtier Pool | RAID 50/60 | iSCSI VJBOD

Your problem, our solution:

Maximize the Value of Expensive SSD

Hybrid Storage System

- Automatically moves data between different tiers
- SSD cache capacity will not be limited by RAM size



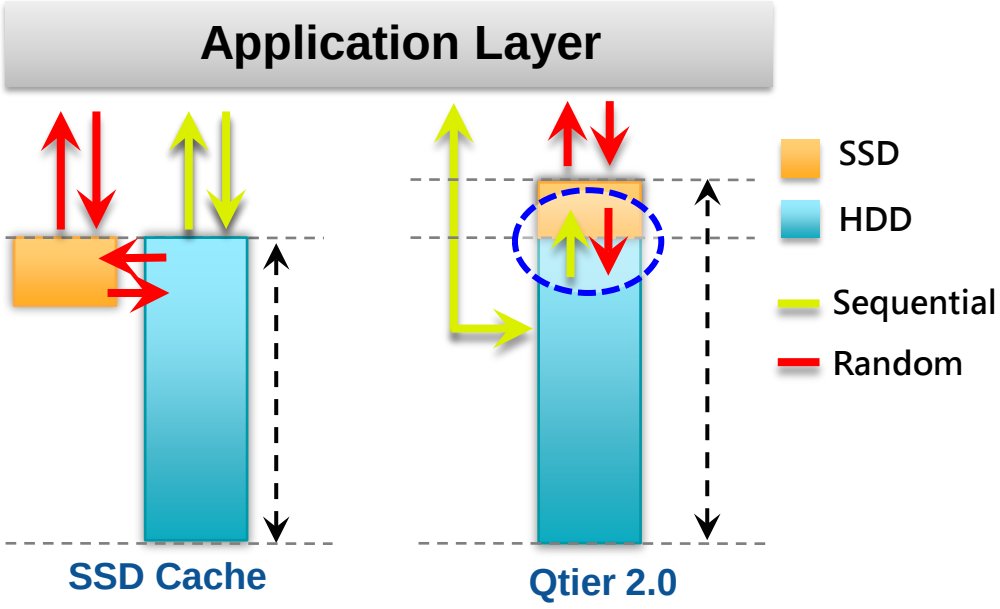
Replace SSD Cache with Qtier 2.0™

SSD Cache

- Cannot be used to store data
- Fixed bypass options
  > For short term performance boost

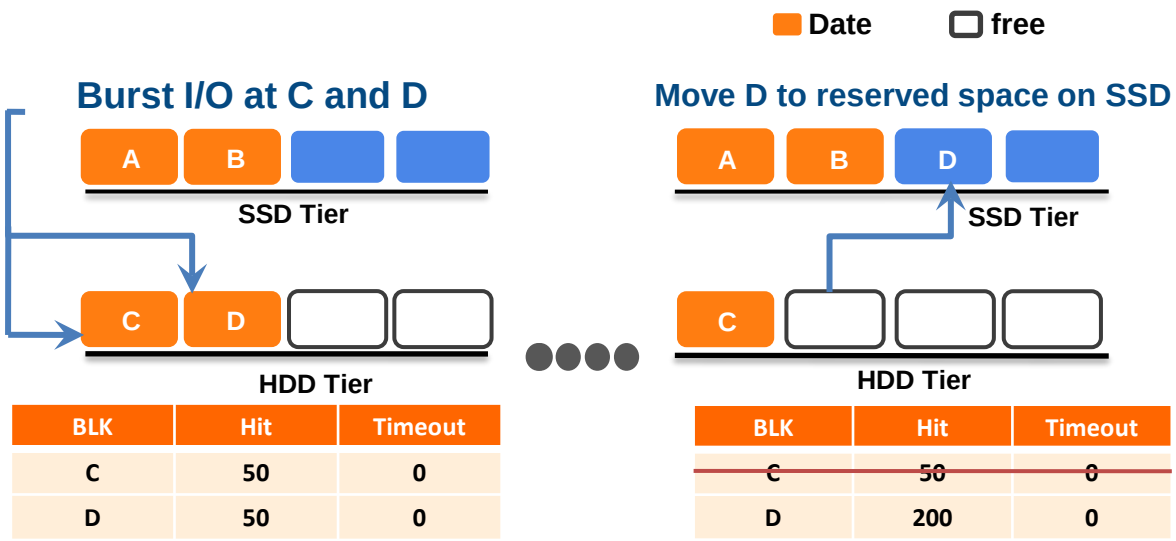
Qtier 2.0

- Tier can store data
- IO Aware and Tiering On Demand
  > For both short and long term performance improvements



Qtier 2.0 IO Aware Qtier

- SSD tier has a cache-like reserved space to handle burst IO in real time
- Increased performance is more obvious compared to SSD cache on applications with sequential pattern but still need to access metadata (for example, backup)

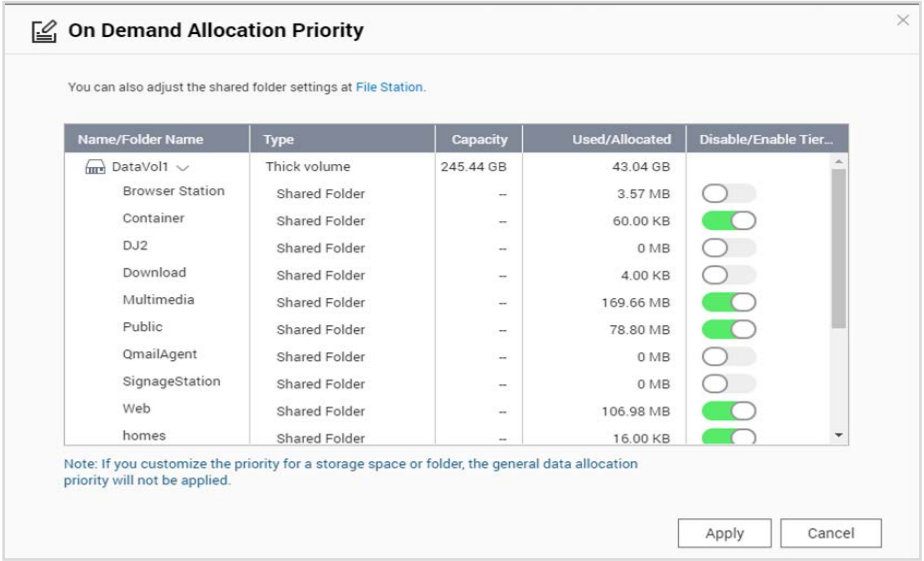


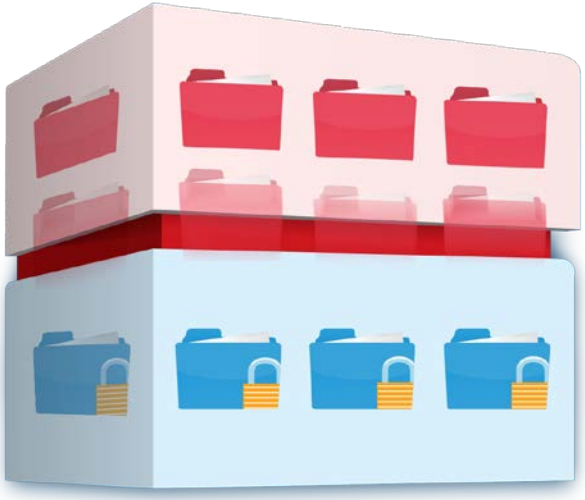
BLK	Hit	Timeout
C	50	0
D	50	0

BLK	Hit	Timeout
~~C~~	~~50~~	~~0~~
D	200	0

Qtier 2.0 Tiering On Demand

- SSD only has limited capacity that can be used on key applications
- Enable or disable auto-tiering for individual shared folder or iSCSI LUN





Hot data and reserved block

Cold and archived data

Uninterrupted Upgrade to Qtier Pool

- Storage pool created after 4.2 can be upgraded
- Add SSD/HDDs using free bays, an expansion unit, or the new QM2 SSD expansion card

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Switch from SSD Cache to Qtier

Step 1

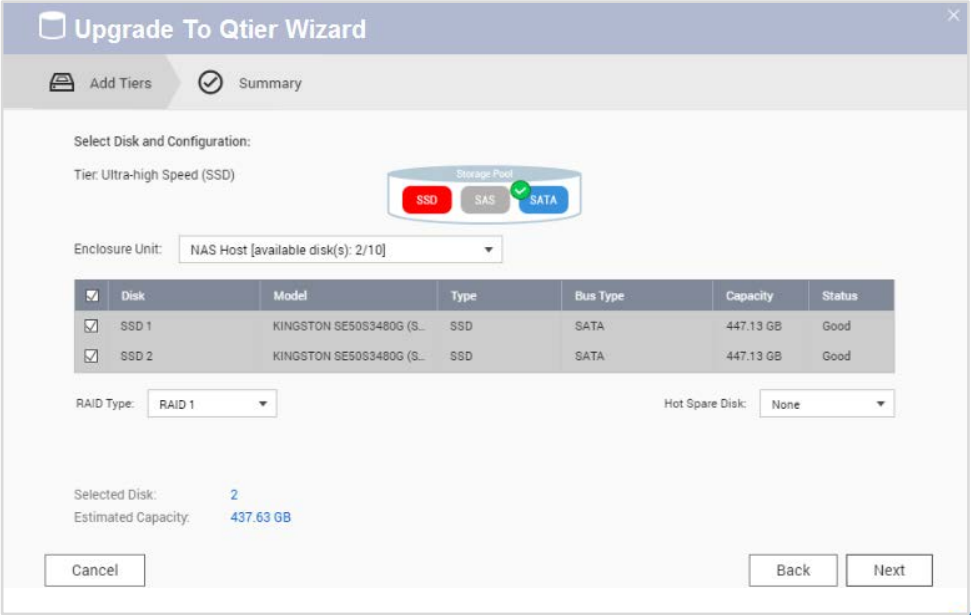
Disable SSD Cache Online

Step 2

Confirm the SSD that will be added to the Storage Pool

Step 3

Upgrade to Qtier Pool !



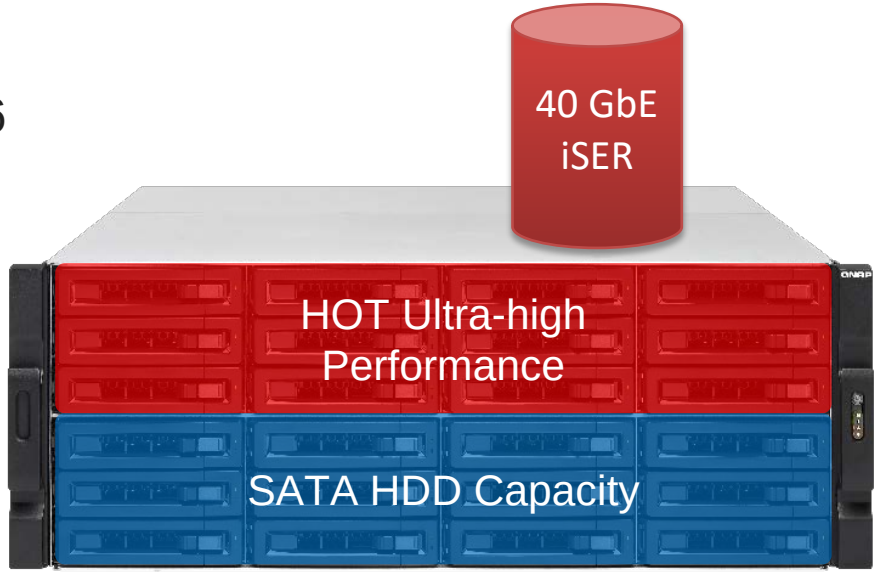
Utilizing the Performance of SSD

<Test> **TVS-EC2480-SAS-RP**

- 12 SSDs in RAID 10, 12 HDDs in RAID 6
- 5 VMs IOmeter test with standard 4K random read-write
- Adopting Mellanox's 40GbE iSER solution

180,000 IOPS with 40TB

<1 ms Response time



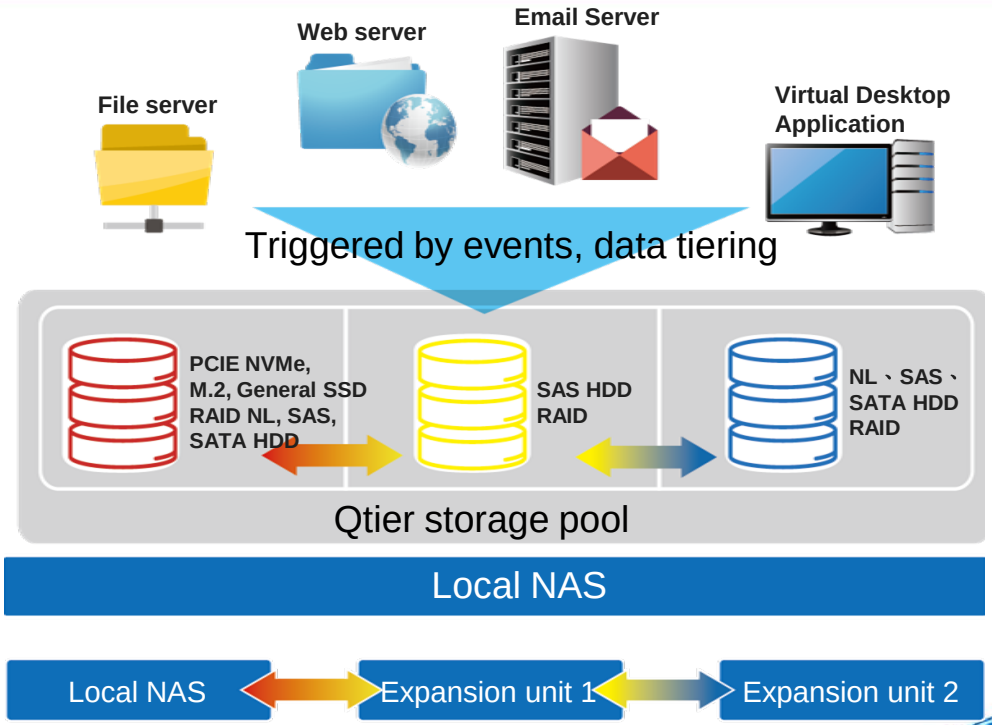
The Leading Tiering Technology

Advantages

- SSD as storage
- Satisfy both random and sequential usages

Use Cases

- File Server
- Web Server
- Mail Server
- VDI Hosting



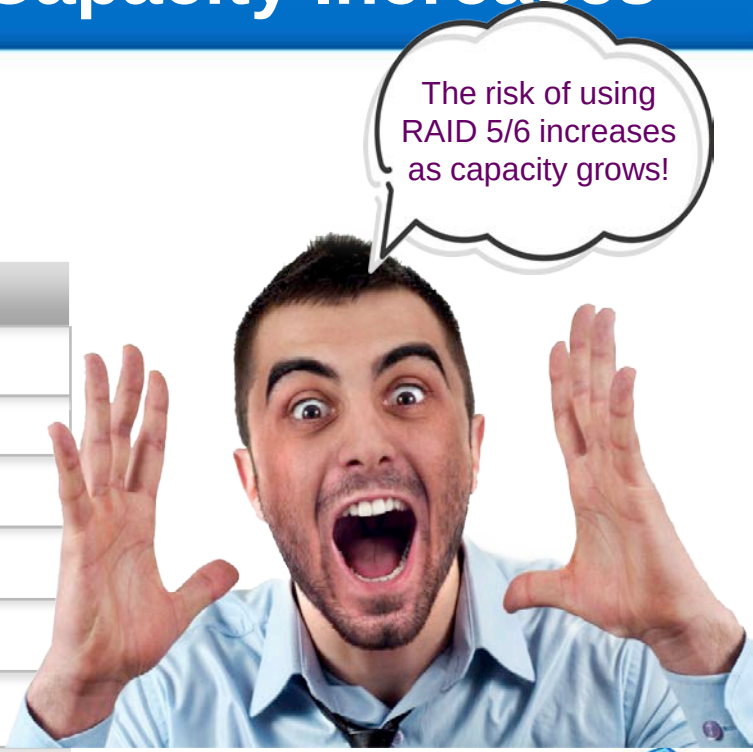
Your problem, our solution:

RAID 5/6 is not suitable when more than 8 disks are used

RAID Protection Decreases as Capacity Increases

- According to ServeTheHome RAID Calculator
- Chance of a RAID 5 group failing within 5 years

Disks	Capacity	Risk
4	4TB	0.1%
4	8TB	0.2%
8	4TB	1%
8	8TB	2.2%
12	4TB	4.1%
12	8TB	6.5%

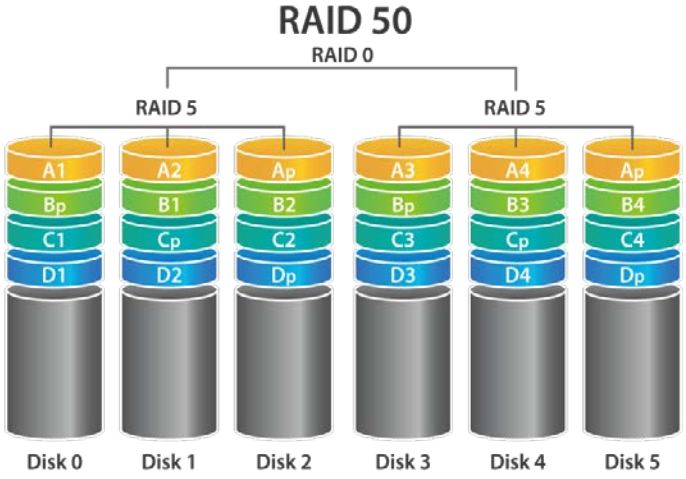


https://www.servethehome.com/raid-calculator/ · conservative estimate assuming bit error chance is 10^(-15), 150MB/sec rebuild speed

RAID 50 & 60 Reduce the Risk of RAID Failure

Less space used for redundancy + increased RAID protection

RAID type	Disks	Disk Failure Tolerance	Capacity	Chance of Failure
RAID 5	**12**	**1**	**66TB**	**6.15%**
QNAP RAID 50	**12**	2 or more	**60TB**	**0.6%**
RAID 10	**12**	**6**	**36TB**	**0.2%**



Actual disk failure tolerance depends on the number of RAID 50/60 sub-arrays.

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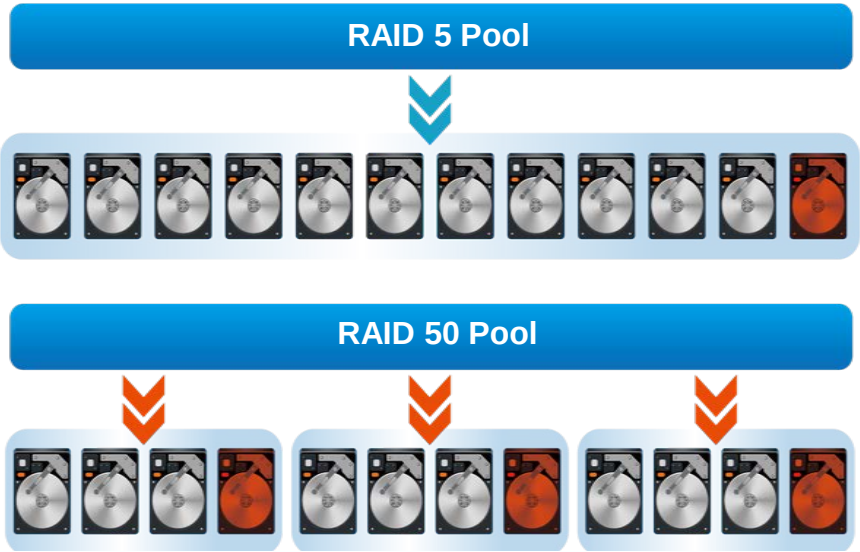
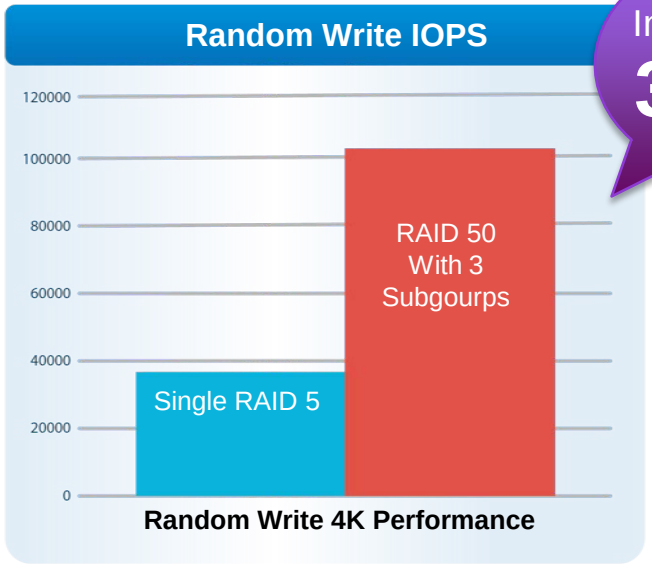
RAID 50 & 60 Increase “Random Write” Performance

Multiple RAID groups calculating parity at the same time



Comparison between RAID 50 (3 sub-groups) and RAID 5 (SSD RAID)



Increased to **300%**

Different Types of RAID Offered by QNAP

RAID Type	RAID 5	RAID 6	RAID 10	RAID 50	RAID 60
# of Disks	At least 3	At least 4	At least 4	At least 6	At least 8
Disk Failure Protection	1	2	Half of the disk	2~5	4~10
Write Performance	★★	★	★★★★	★★★	★★★
Capacity	★★★★	★★★	★	★★★	★★
Use Cases	Backup only	General application	For VDI hosting and database	High frequency backup	For VDI or media editing that need high capacity

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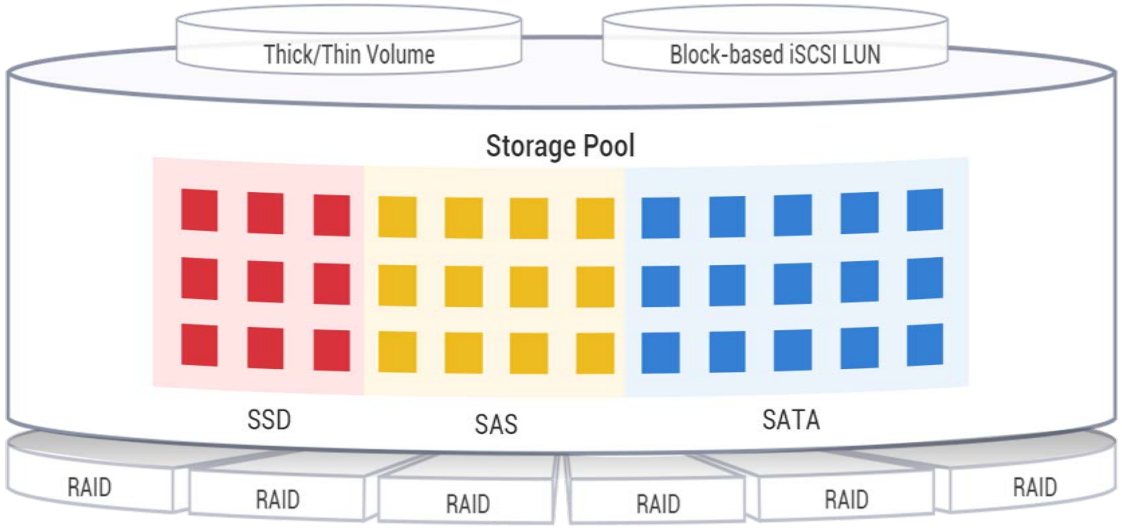
Deploying RAID 50/60 With Qtier

- HDD RAID 50 = High capacity backup server
- HDD RAID 60 + Read-Only SSD Cache = High capacity file server
- SSD RAID 50 + HDD RAID 60 = High capacity and performance virtual storage server



The RAID 50/60 Pool cannot be expanded with striping after creation .

QNAP 2017

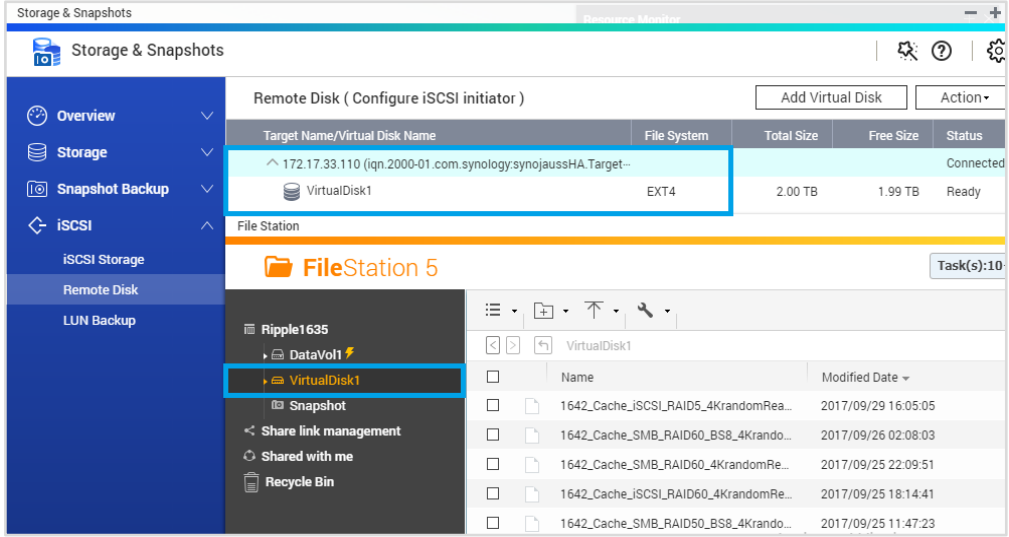
Your problem, our solution:

iSCSI VJBOD

Expansion with Maximized ROI

Dual Mode: iSCSI Initiator and Target

Major storage vendors support iSCSI Target



QNAP NAS supports both iSCSI Initiator and iSCSI Target

1. Mount iSCSI target from other storage
2. Use the unique iSCSI expansion (VJBOD)

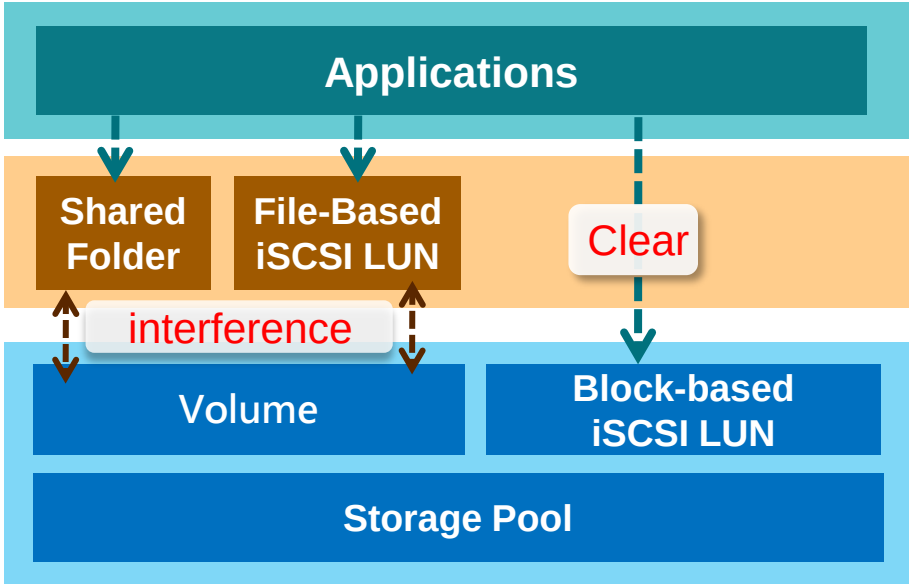
Use iSCSI Initiator to Mount Other Storage

- iSCSI Initiator and Target are industry standards
- QNAP iSCSI Initiator can be used with EMC, NetApp, Synology, QSAN iSCSI target without modifications
- Unused space can be mounted to QNAP for various features

* Logo belong to each company.

Block-based vs File-based iSCSI LUN

File-based iSCSI LUN
Allocate space in Volume



Blocked-based iSCSI LUN
Allocate space in pool

- Easily allocate and manage space
- Support VAAI thin provisioning
- Avoid interference from volume

Block-based iSCSI LUN

Effectively provide stable performance

- TS-1635 Block-based / File-based LUN with RAID 50, 12HDD, no Cache
- When shared folders are being accessed

Maximum Response Time Test

333 ms

File-based

Difference

6 Times

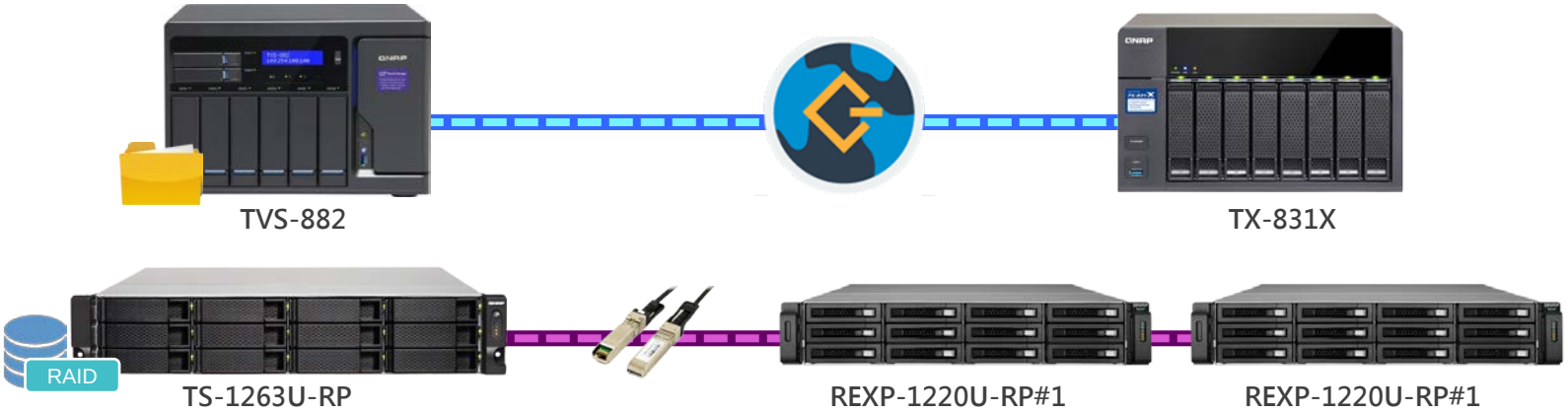
51 ms

Block-based

Higher means mean higher latency

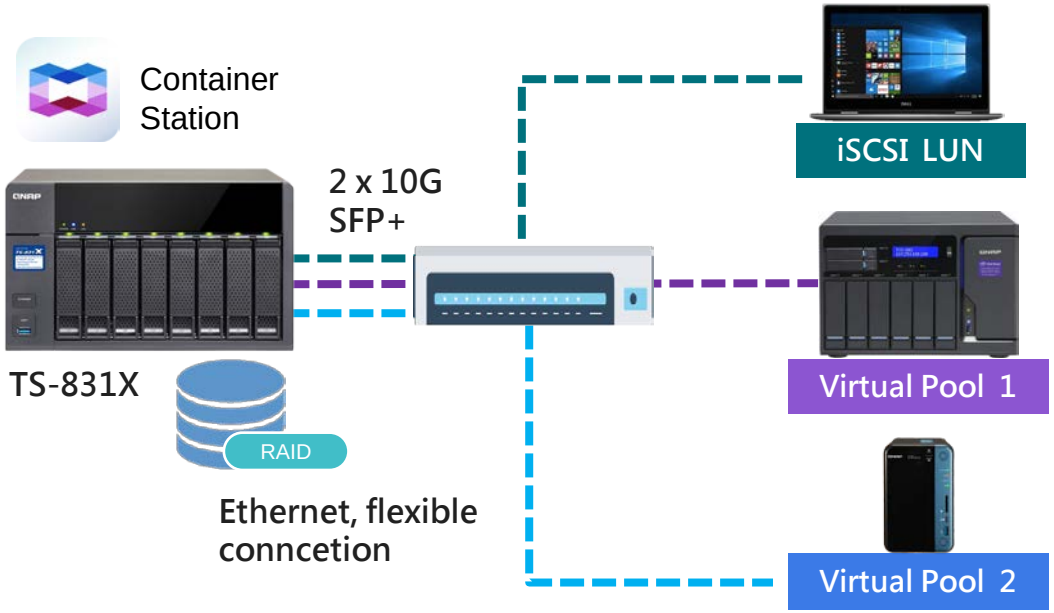
Use iSCSI / JBOD to Expand NAS

- **NAS + iSCSI Target** ：Limited functions without knowing target storage condition
- **NAS + JBOD**： Limited ports with RAID protection on the host



Replacing JBOD with iSCSI VJBOD

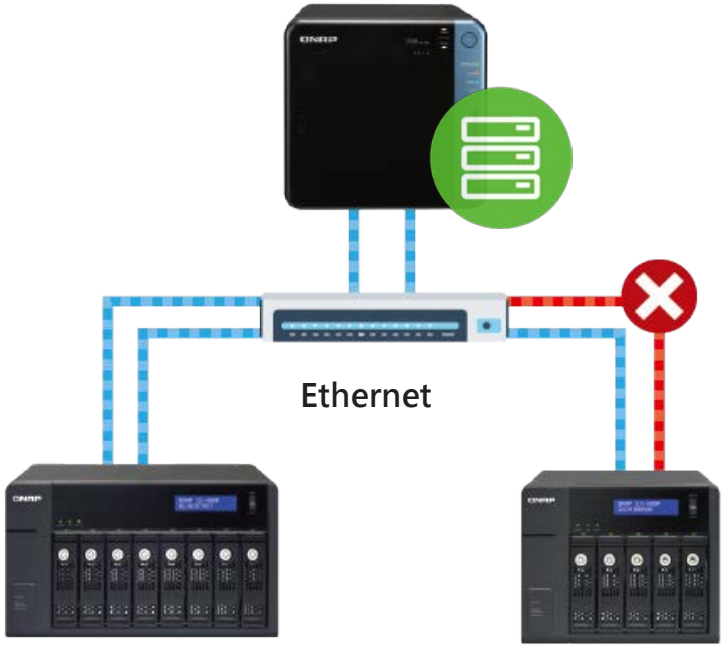
- Uses VJBOD to mount a LUN as a local disk
- Create Storage Pool, take snapshot, use media library, Qsirch indexing
- Fully utilize storage space of NAS



Backup Connection For Data Security

Combining QNAP NAS Port Trunking (Multiple connections, same IP):

- Create Backup Connection
- Achieve Load Balance with supported switch
- Use with 1GbE, 10GbE and 40GbE

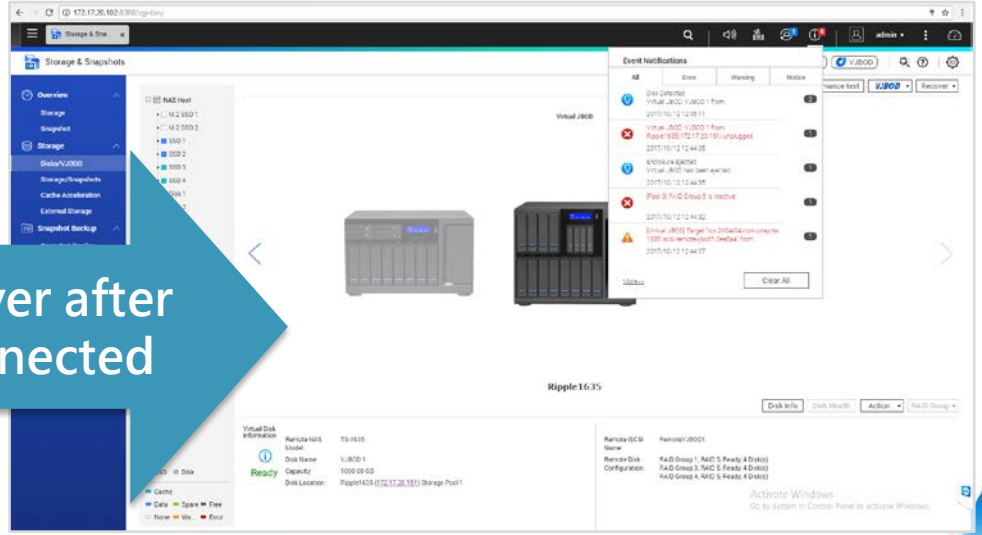


Auto Recovering for Building a Safer Connection

- Enhanced iSCSI stability and security, quickly disconnect an abnormal connection to avoid misjudgment from application
- Doesn't need manual recovery when network is temporarily blocked

Use Mac address to search NAS

Recover after reconnected

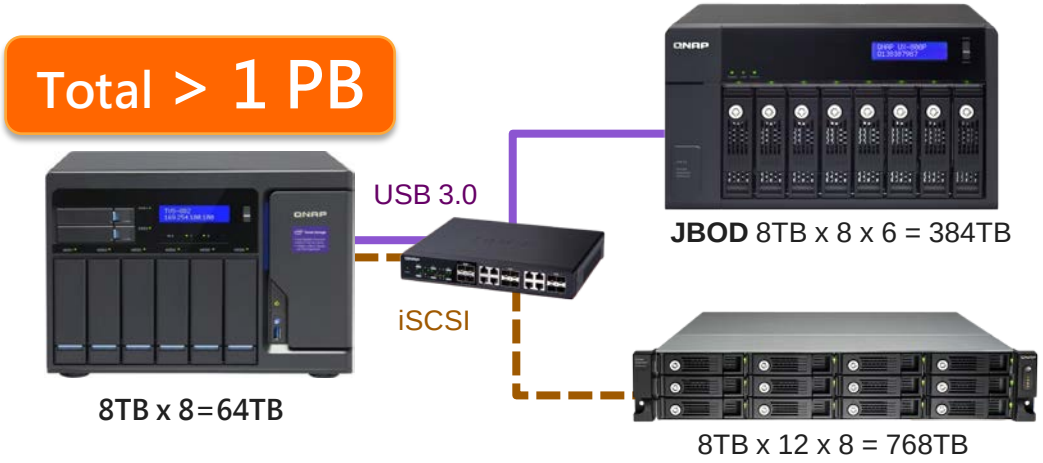


Combining JBOD and VJBOD for Max. Capacity

- With a 8-bays NAS and 4 UX-800P，Maximum 300TB* (8TB per disk)

- Add Virtual JBOD:

  Over 1 PB total raw storage space



Using VJBOD to Run Backup

Traditional JBOD :

Use host device's resource for backup

JBOD

Application

Remote Side

LUN backup to remote

VJBOD

VJBOD :

Run LUN backup from expansion unit directly

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3 Leading Technologies for Maximizing ROI

1 Qtier 2.0

Hybrid Storage Pool

3 iSCSI VJBOD

Storage Space Expansion

2 RAID 50 & 60

for Advanced Data Protection

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THANK YOU