

QNAP

TVS-x72XU

**25GbE &
Fibre Channel**

Ready

intel CORE i
8th Gen



- Built-in Mellanox ConnectX[®]-4 Lx 10GbE Controller
- iSER supported



8th Gen Intel Core CPU 10GbE NAS

TVS-x72XU NAS Series



TVS-972XU-I3-4G
TVS-972XU-RP-I3-4G

Core i3
4-core



TVS-1272XU-RP-I3-4G

Core i3
4-core



TVS-2472XU-RP-I5-8G

Core i5
6-core



TVS-872XU-I3-4G
TVS-872XU-RP-I3-4G

Core i3
4-core



TVS-1672XU-RP-I3-8G

Core i3
4-core



Revamped QNAP Extended Warranty

3 year standard + 2 year extended warranty =
Up to 5-year warranty

<https://www.qnap.com/service/product-warranty/>



QNAP Warranty Service

Standard Warranty Extended Warranty Advanced Replacement Check NAS Warranty

Product Registration and Extended Warranty

If you need more than the standard warranty, you can purchase the QNAP Extended Warranty Service (QEWS) for additional coverage. Register your QNAP NAS within 60 days of purchase, and automatically be eligible to purchase a warranty extension that stretches your coverage to up to 5 years.

» View the QNAP product warranty extension terms and conditions

[Sign in QID](#) [Check Available Warranty Extension Plans](#)

Note: A QNAP ID is required to purchase extended warranty.

A blue shield-shaped badge with a yellow border. At the top is the QNAP logo. In the center is a large yellow number '5' with two small white stars on either side. Below the '5' is the word 'YEARS' in yellow. At the bottom of the shield is a white banner with the word 'WARRANTY' in blue. The shield is decorated with yellow floral patterns on the sides and a single white star at the bottom center.

- ✓ Sign in
- ✓ Product registration
- ✓ Purchase extended warranty

8th Gen Intel Core Processors

AMAZING
PERFORMANCE &
RESPONSIVENESS

33% faster

IMMERSIVE
ENTERTAINMENT
Stream Premium

4K

More Cores!



FAST CONTENT
CREATION

Up to

32%

Faster 4K video editing

FLUID GAMING

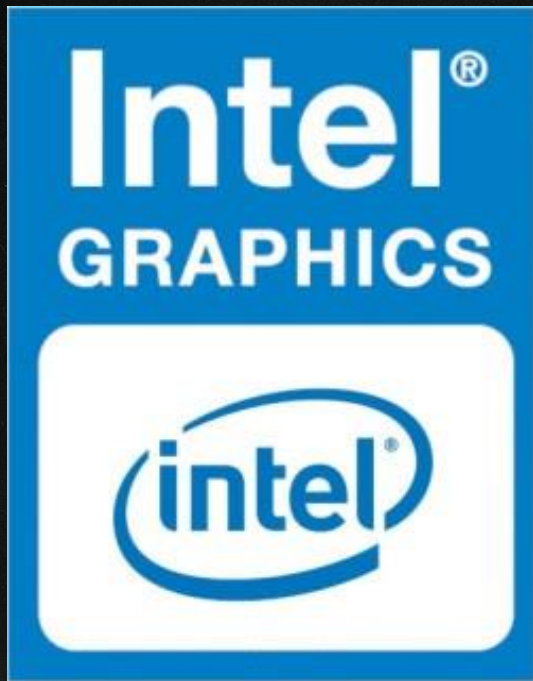
Up to

25%

More FPS

Intel® Turbo Boost
Technology

Smooth 4K playback & transcoding



Intel UHD Graphic 630

4K UHD

1 x HDMI v2.0a
3840 x 2160, 60 Hz

1.10 GHz

Intel UHD
Graphics 630



The supported video and audio may vary depending on the software, hardware, and the environments.

HW transcoding for business multimedia needs



Video Station

PLEX



Realtime Transcoding and Streaming

- Product ad videos
- Employee training videos
- Product training videos
- Company event recording
- Video tutorials

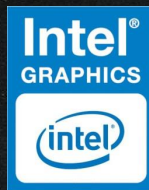
Smooth Surveillance Monitoring



Live video output via
built-in HDMI port

Applications and Storage in a Box

Virtualization
Station
Windows VM



NAS Storage



TVS-972XU

Complete Product Lines-1U 9-bay



TVS-972XU-RP-i3-4G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 4GB DDR4 RAM (1x 4GB)

TVS-972XU-i3-4G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 4GB DDR4 RAM (1x 4GB)

9-bay



5 x 2.5-in ports (inside)
4 x 3.5-in ports



Complete Product Lines-2U 8-bay



TVS-872XU-RP-i3-4G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 4GB DDR4 RAM (1x 4GB)

TVS-872XU-i3-4G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 4GB DDR4 RAM (1x 4GB)

8-bay



Complete Product Lines-2U 12-bay



TVS-1272XU-RP-i3-4G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 4GB DDR4 RAM (1x 4GB)

12-bay



Complete Product Lines-3U 16-bay

Redundant PSU
2x500W



TVS-1672XU-RP-i3-8G

- Intel® Core™ i3-8100 4-core 3.6 GHz Processor
- 8GB DDR4 RAM (2x 4GB)

16-bay



Complete Product Lines-4U 24-bay

Redundant PSU
2x800W



TVS-2472XU-RP-i5-8G

- Intel® Core™ i5-8500 6-core 3.0 GHz Processor, Max turbo to 4.0 GHz
- 8GB DDR4 RAM (2x 4GB)

24-bay



QNAP

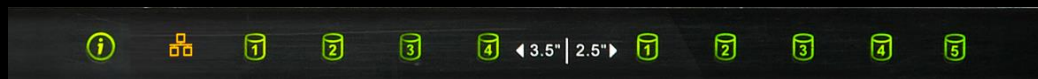
TVS-x72XU

Hardware
Introduction



Enjoy Qtier and SSD cache in a 1U NAS

LED indicators:
System status, network, disks



**5 x 2.5\"
SATA 6Gb/s SSD port**



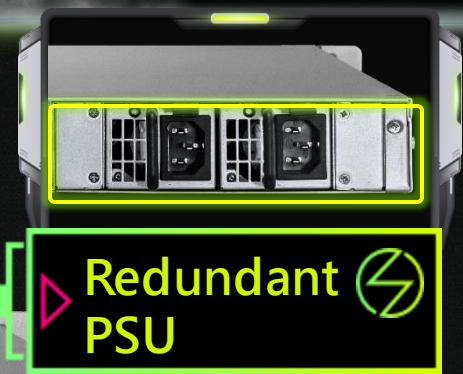
4 x 3.5\"SATA 6Gb/s HDD/SSD port

TVS-972XU/TVS-972XU-RP Rear View

2 x 10GbE SFP+ port

2 x GbE RJ45 port

1 x low profile PCIe slot



2 x USB 3.0 (5G) ports

1 x HDMI 2.0a

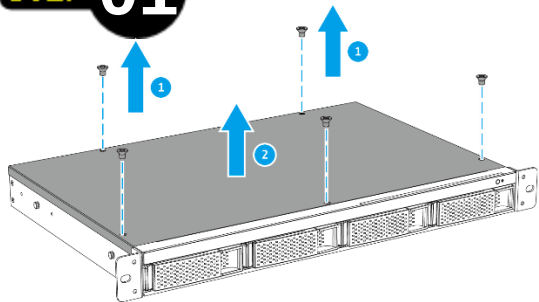
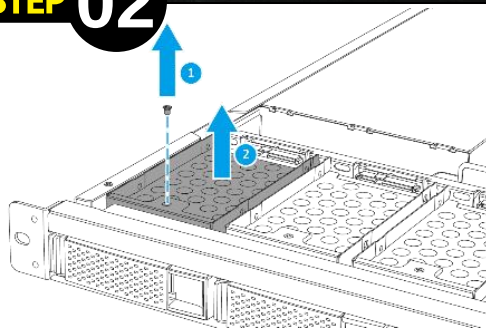
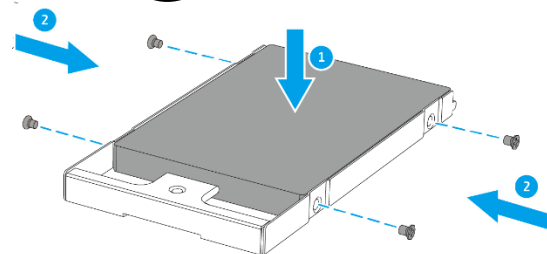
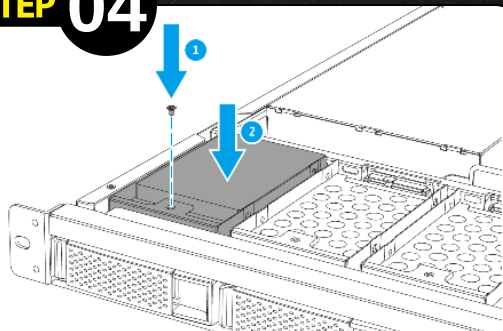
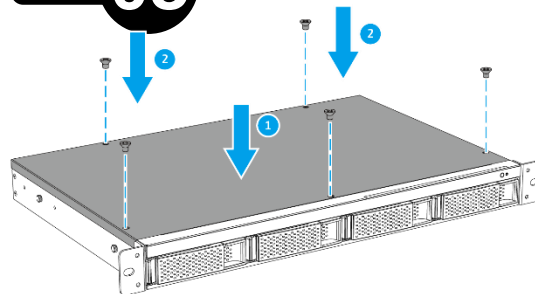
250W
2 x 250W

Single PSU

4 x USB 3.1 Gen2 (10G) port



TVS-972XU SSD Installation

STEP 01**STEP 02****STEP 03****STEP 04****STEP 05**

2U/3U TVS-x72XU Front View

24/ 16/ 12/ 8 x 3.5" SATA 6Gb/s HDD/SSD port

TVS-1272XU-RP



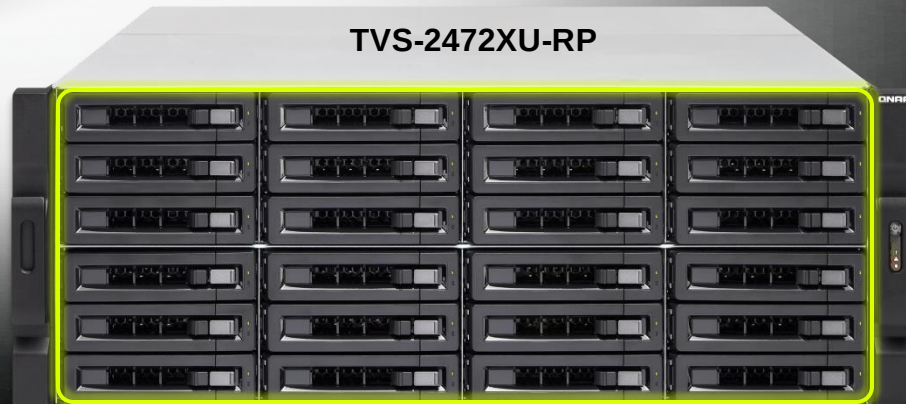
TVS-872XU / TVS-872XU-RP



TVS-1672XU-RP



TVS-2472XU-RP



2U/3U/4U TVS-x72XU Front View

2U**4U****3U**

Power switch
LED indicators: system
status, network, external
expansion enclosures,
disks

2U/3U/4U TVS-x72XU Rear View

4 x 1GbE
ports

1 x HDMI 2.0a

2 x 10Gb SFP+
SmartNIC port

Single
PSU



Redundant
PSU



USB 3.1 Gen2 (10G) Type-A & Type-C port



PSU

24-bay
Redundant
PSU

8-bay
12-bay
Single
PSU



Industry-leading PCIe expansion options

QM2 provides 10GBASE-T port and/or M.2 SSD slots for SSD cache or Qtier tiered storage for optimized storage performance.



40GbE/10GbE and wireless network expansion cards provide high bandwidth, low latency, or wireless AP functionality.



USB 3.1 Gen 2 expansion cards provide 10Gb/s for external USB devices. Type-A port is also backward compatible with USB 3.0/2.0 devices.



SAS expansion card is for adding support of REXP expansion units for up to 40 additional SAS/SATA drives.



TVS-x72XU PCIe Slots

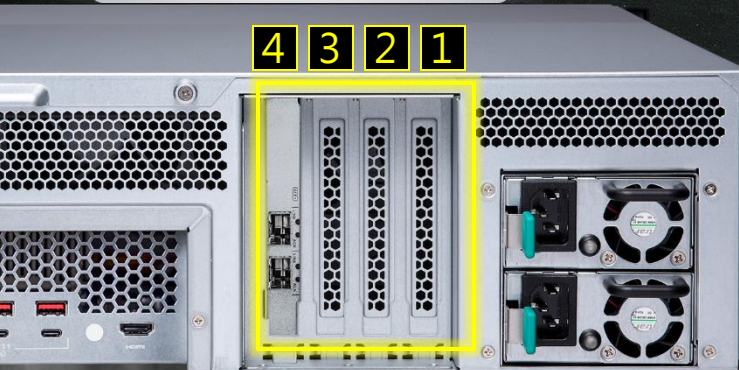
1U/2U: low profile

1

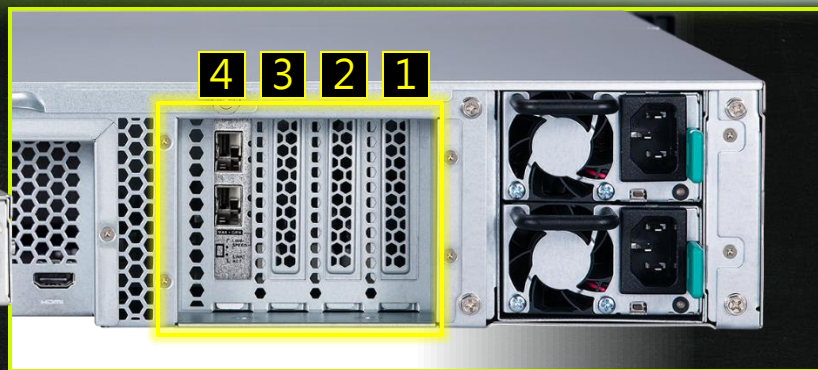


3U/4U: full height

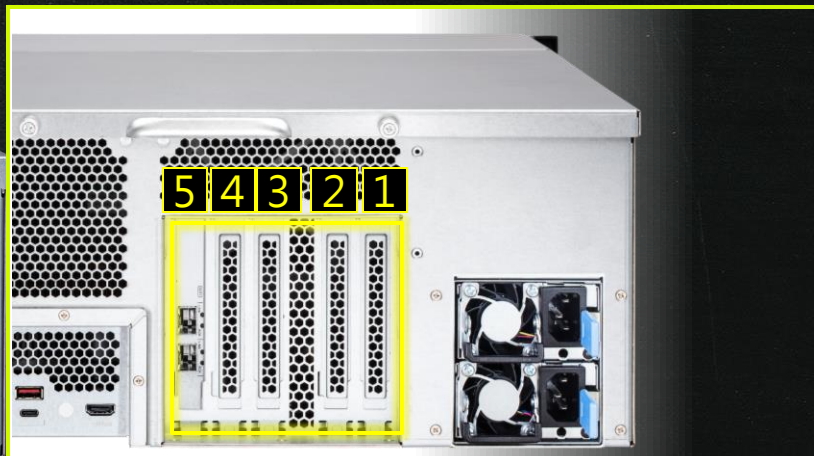
4 3 2 1



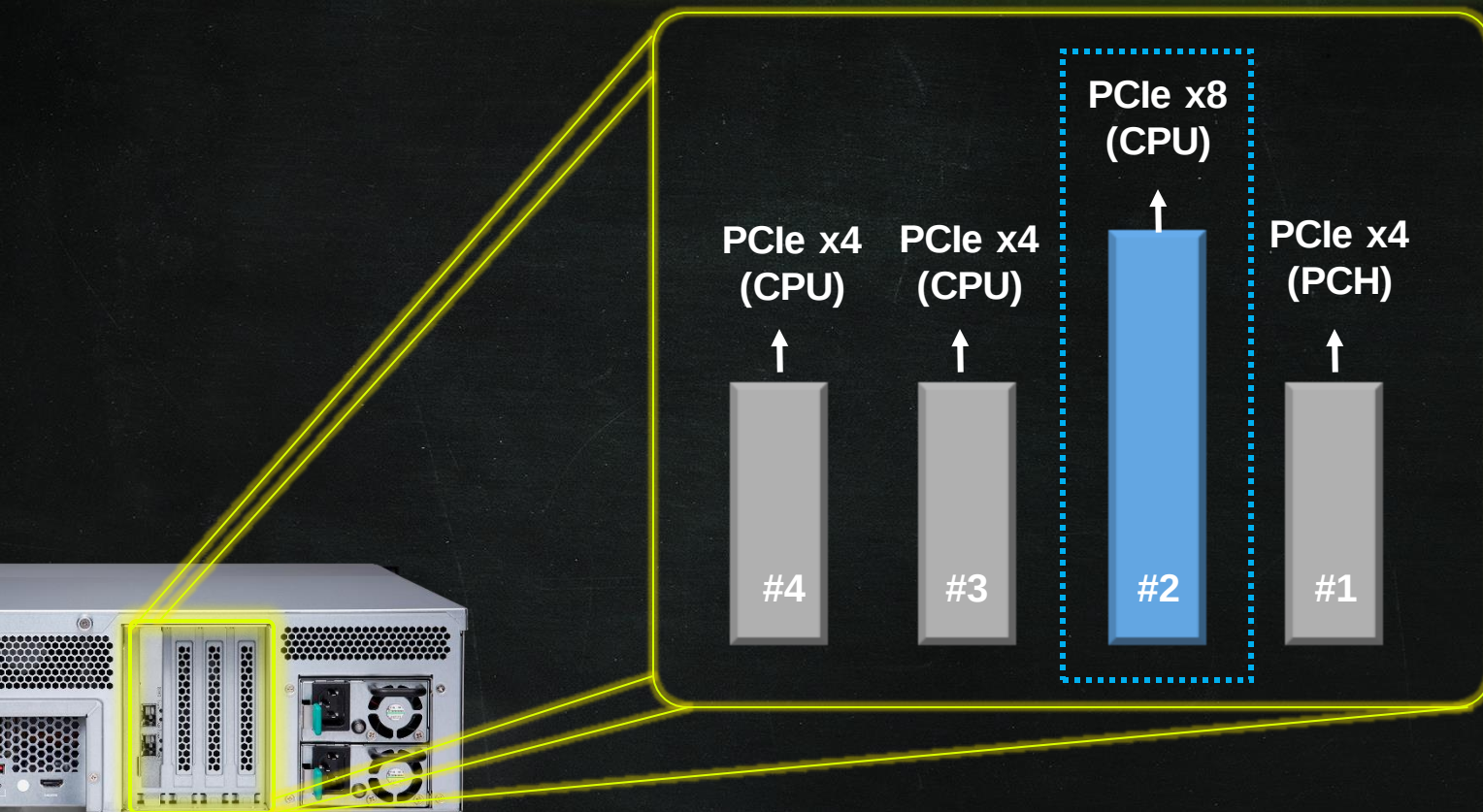
4 3 2 1



5 4 3 2 1

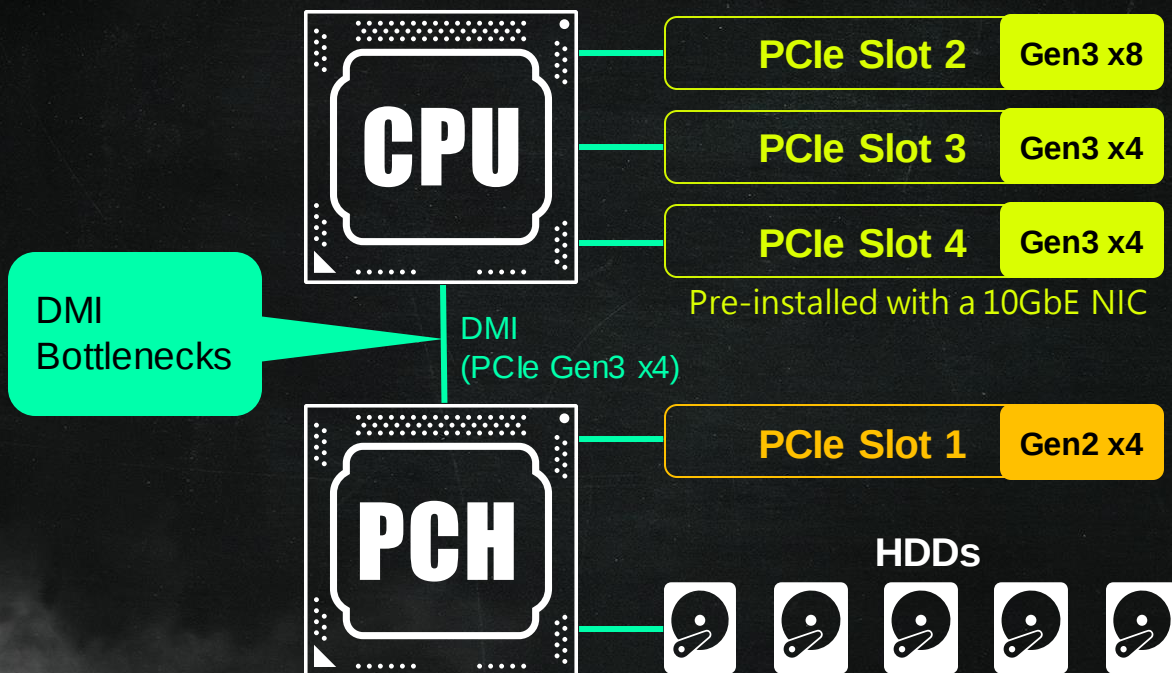


PCIe Slot Specifications(2U/3U)



2U/3U NAS PCIe Slot Suggestion

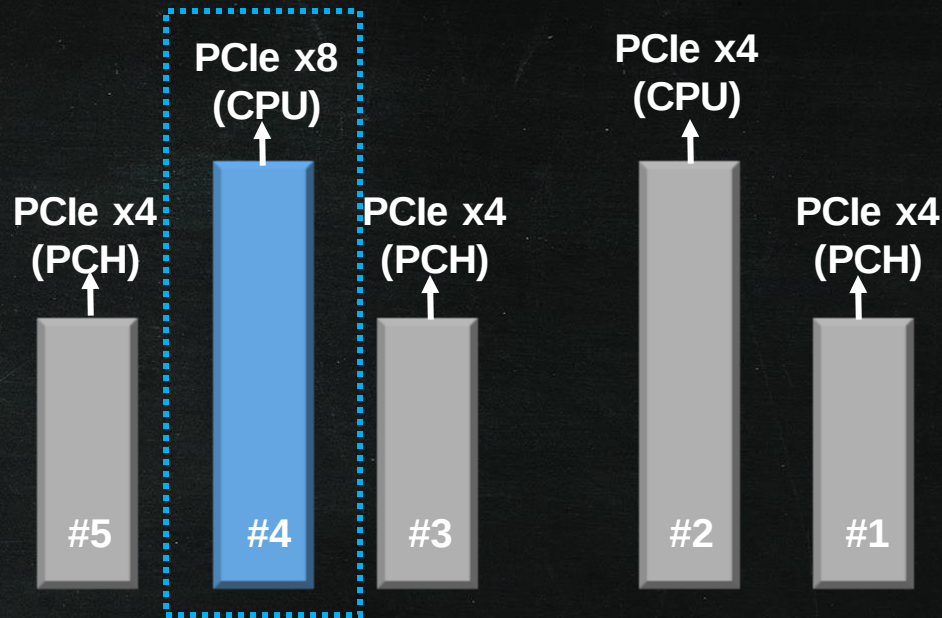
To ensure that the SATA drives have sufficient bandwidth, **slot #1** is PCIe Gen2 x4



High-speed expansion card (such as 10/40GbE NIC, SAS expansion card & GPU card)

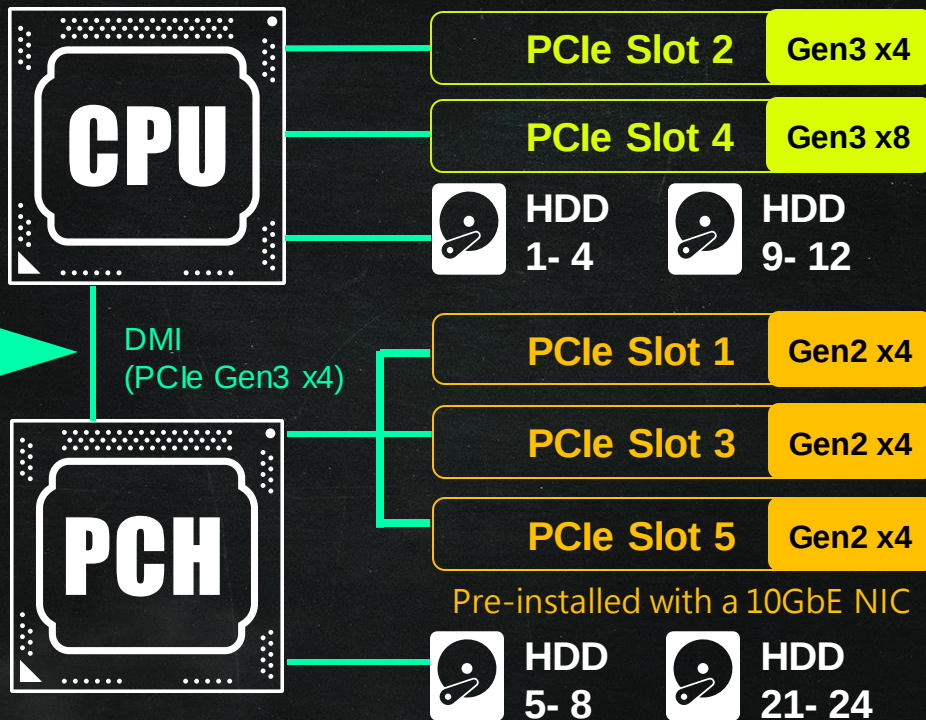
Low-speed card (such as a 1GbE NIC, USB adapter)

PCIe Slot Specifications(4U)



4U NAS PCIe Slot

To ensure that the SATA drives have sufficient bandwidth,
Slot #1, #3 & #5 is PCIe Gen2 x4

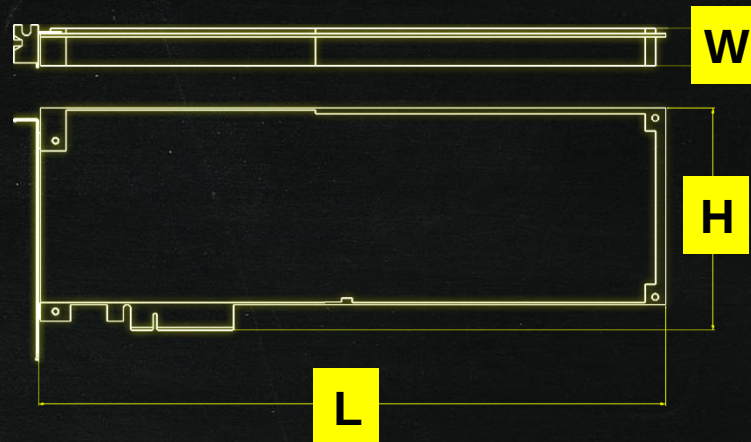


High-speed expansion card (such as 10/40GbE NIC, SAS expansion card, GPU card)

Low-speed card (such as a 1GbE NIC, USB adapter)

GPU card slots and supported dimensions

NAS	Slot	Dimension W x H x L (mm)
TVS-972XU TVS-972XU-RP	Slot 1	19 x 68.9 x 257
TVS-872XU TVS-872XU-RP	Slot 2	37 x 68.9 x 214
	Slot 4	37 x 68.9 x 214
TVS-1272XU-RP	Slot 2	37 x 68.9 x 214
	Slot 4	37 x 68.9 x 214
TVS-1672XU-RP	Slot 2	38.5 x 111 x 214
	Slot 4	38.5 x 111 x 214
TVS-2472XU-RP	Slot 2	55 x 138 x 312
	Slot 4	55 x 138 x 312

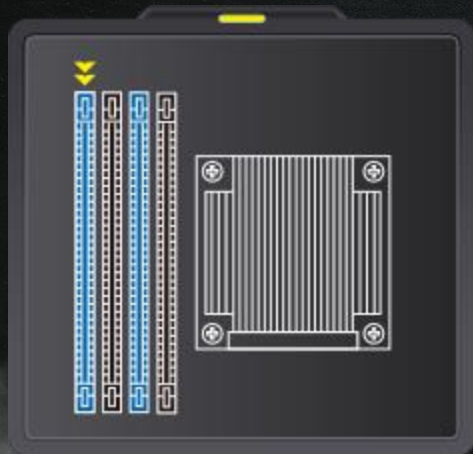


Supports up to 64 GB Memory

- Supports Dual-channel and Long-DIMM x4
- Installing memory in pair to take advantage of dual-channel

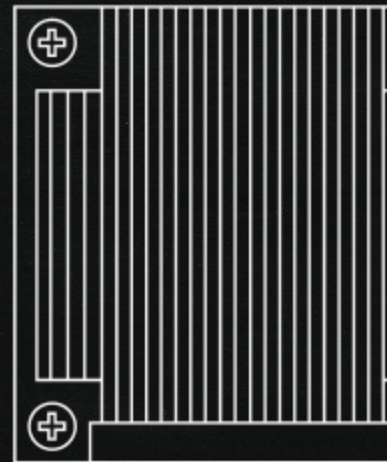
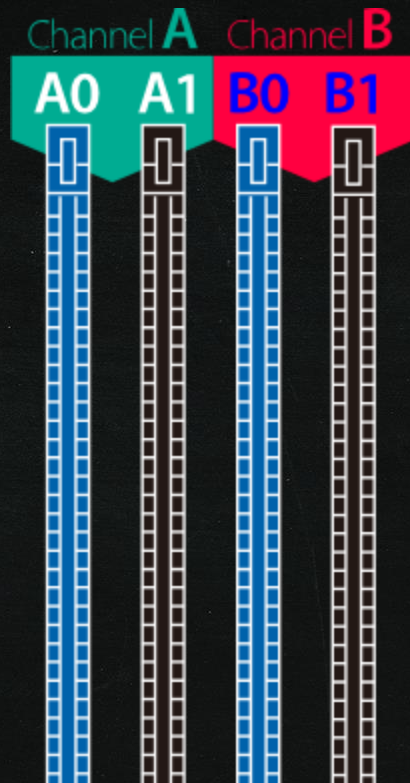
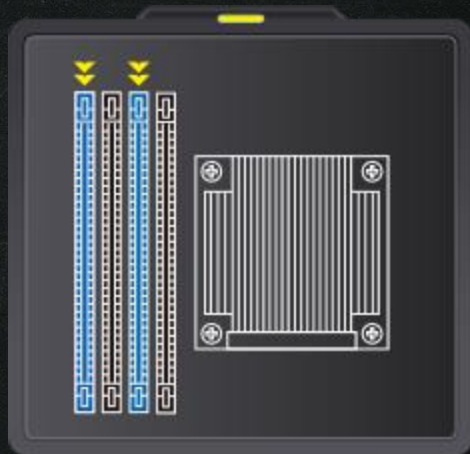
One module

Install in A0 slot



Two module

Install in A0 and B0 slots



TVS-x72XU Memory Accessories

Ordering P/N	Specification
RAM-4GDR4A1-UD-2400	DDR type: DDR4(288PIN) Capacity: 4 GB Manufacturer: ADATA Frequency: DDR4-2400 Manufacturer P/N: AD4U2400W4G17-BSSZ
RAM-8GDR4A1-UD-2400	DDR type: DDR4(288PIN) Capacity: 8 GB Manufacturer: ADATA Frequency: DDR4-2400 Manufacturer P/N: AD4U240038G17-BSSZ
RAM-16GDR4A1-UD-2400	DDR type: DDR4(288PIN) Capacity: 16 GB Manufacturer: ADATA Frequency: DDR4-2400 Manufacturer P/N: AD4U2400316G17-BSSZ

Tool-less Rail Kit

RAIL-B02



Supported NAS:
TVS-872XU/1272XU

Max. Load: **20** kg

RAIL-A03-57



Supported NAS:
TVS-1672XU

Max. Load: **57** kg

RAIL-A02-90



Supported NAS:
TVS-2472XU

Max. Load: **90** kg

Hardware upgrade made easy

Pull it out and lift
up the cover



QNAP

TVS-x72XU

**Versatile
Applications**



More Efficient Backup with USB 3.1 Gen 2

2X USB 3.1
SPEED UP

10Gb/s

5Gb/s

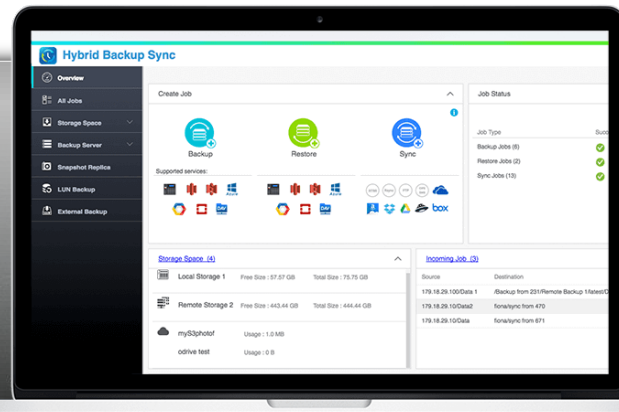
USB 3.0

USB 3.1

TYPE-C

COPY

TYPE-A



Do more with graphics cards

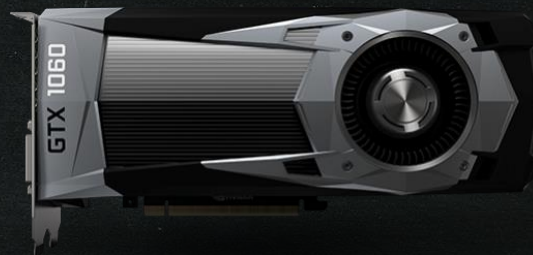
3U/4U NAS 500W+ power supply»

Support full-high GPU card which required external power



TVS-1672XU-RP

HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE



QuAI

2U NAS 350W/300W power supply »

Support half-height GPU card and required no external power: NVIDIA GT1030, etc.

Add-on GPU Card Applications

TVS-x72XU

DESIGN

▶ A002

▶ A001

▶ A003



AI
Computing
Acceleration



QTS
Transcoding
Acceleration



**Virtualization
Station**
GPU Passthrough

Ride the AI wave with "QuAI"

QNAP QuAI

▶▶ AI Developer Package



QuAI is intended for data scientists and developers to quickly build, train, and optimize their AI models on QNAP NAS.



AI



QNAP NAS



GPU accelerated
computing



QuAI



Smooth Video Experience

- Virtualization Station
- HybridDesk Station, Linux Station
- QVR Pro Client (HD Station)
- Video Station
- Plex Media Server



QVR Pro

A Professional NVR on NAS



QNAP®



Video Station



QTS & virtualization increase productivity

NEW

QTS 4.3.5**Storage & Snapshot Manager, and new virtualization network functions**

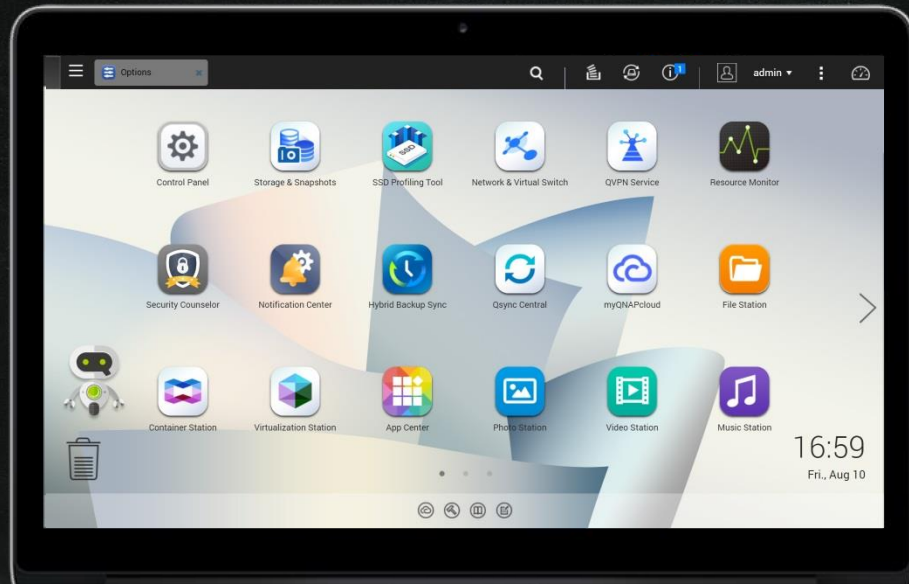
Supports Windows/Linux VMs and containers



Virtualization Station

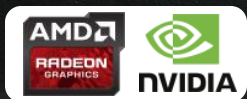
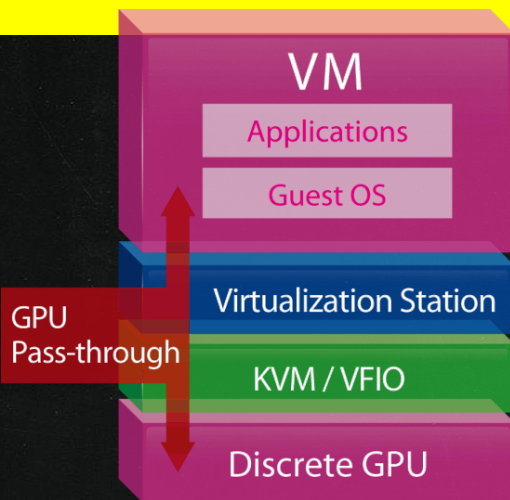


Container Station

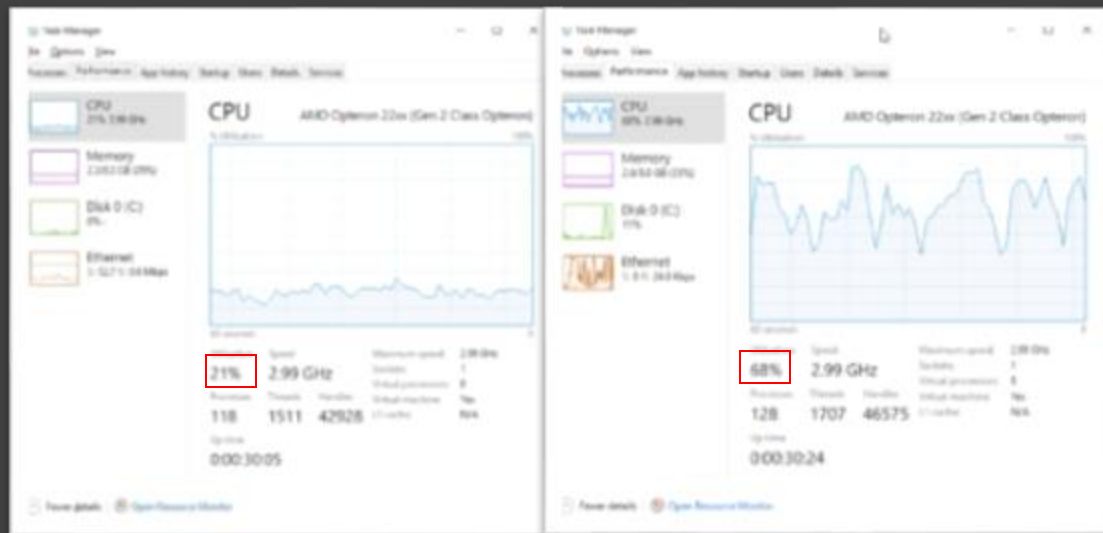


GPU boosts image/video processing

For OpenGL & DirectX applications



H/W accelerated with GPU to lower CPU usage.



w/ GPU



w/o GPU

Super high capacity surveillance



Surveillance Station 5.1

Default: **8 free channels**
Max: 80 CH (optional license)



QVR Pro

Default: **8 free channels**
Max: 128 CH (optional license)



QUSBCam2

Up to 1080p USB Webcam
recording



QNAP

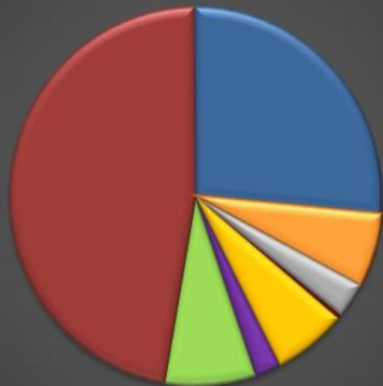
TVS-x72XU

**Network
Interface**



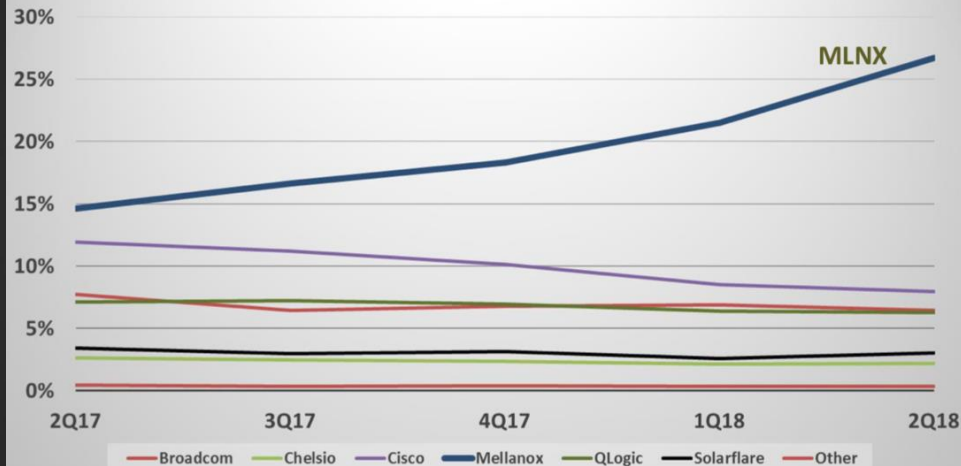
High-Speed Connectivity Supported by Mellanox

2Q'18 Ethernet 10G+ Adapter Market Share



■ Broadcom ■ Chelsio ■ Cisco ■ Intel ■ Mellanox ■ QLogic ■ Solarflare ■ Other

10G & Above Ethernet Adapter Share of Market (x Intel)



Storage



Machine Learning



Big Data



Efficient Data Transport



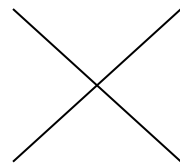
SDN/Security



10/25/40 GbE SmartNIC with offload function

QNAP

QNAP®

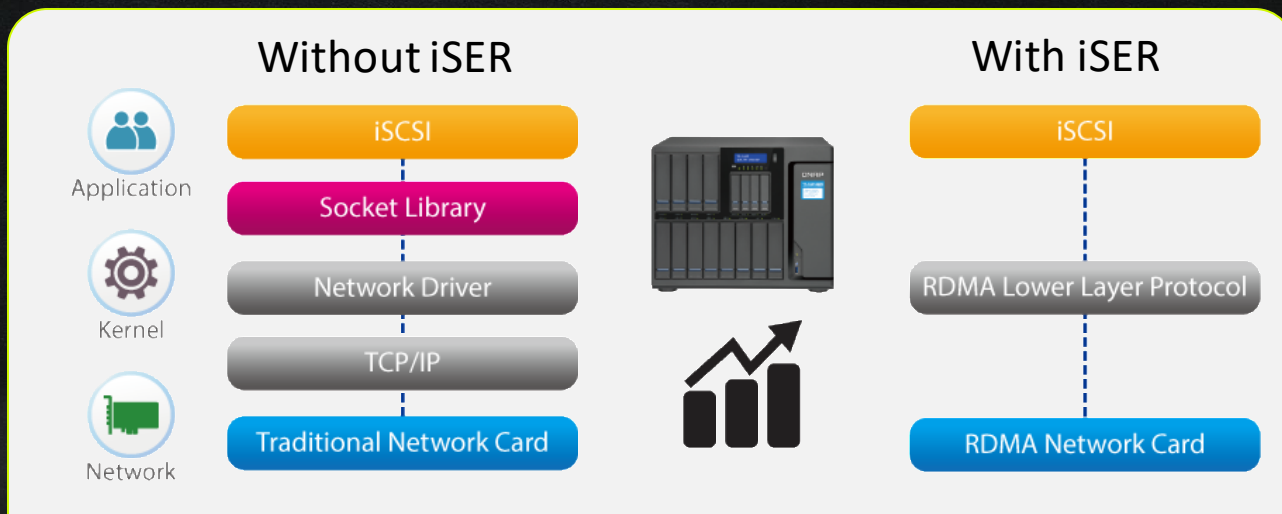


- Built-in Mellanox ConnectX-4 Lx 10GbE SmartNIC
- Supports 25/40GbE expansion
- Supports iSER



Offload tasks from CPU with iSER

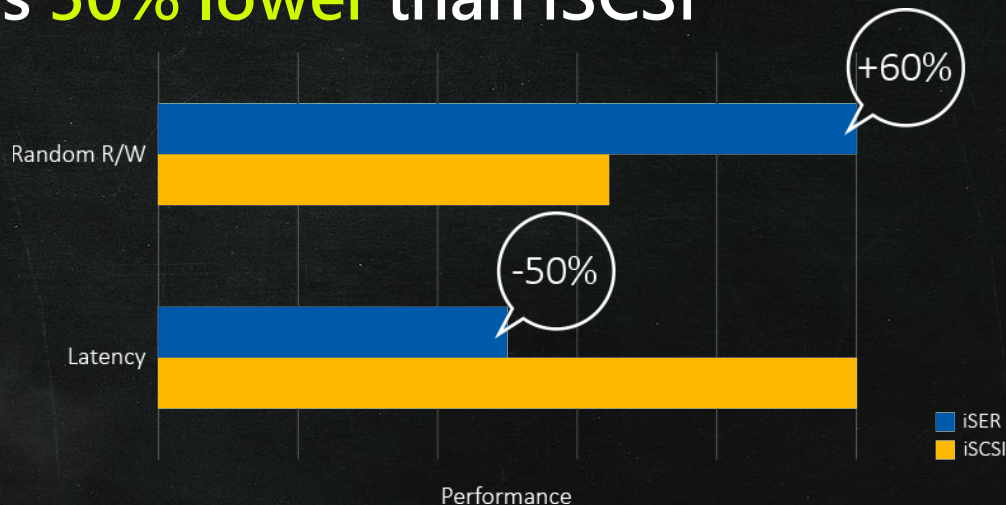
- iSER allows data to **bypass general network drivers, the socket layer**, and to directly enter memory buffers of the server and storage.
- Increasing performance, lower CPU loading



iSER makes VMware Faster

When VMware Server and NAS with iSER :

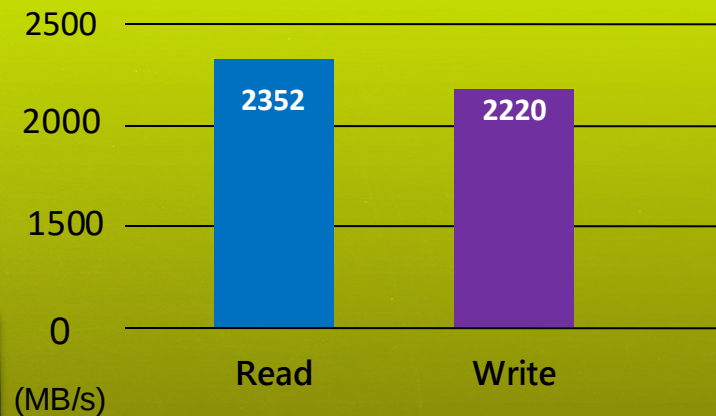
- Random read/write performance is **60% higher** than iSCSI
- Latency is **50% lower** than iSCSI



Built-in dual 10GbE SFP+ ports



10GbE x 2 (Throughput)



Tested in QNAP Labs. Figures may vary by environments.

Test environment:

NAS: TVS-1272XU-RP-i3-4G with QTS 4.3.5

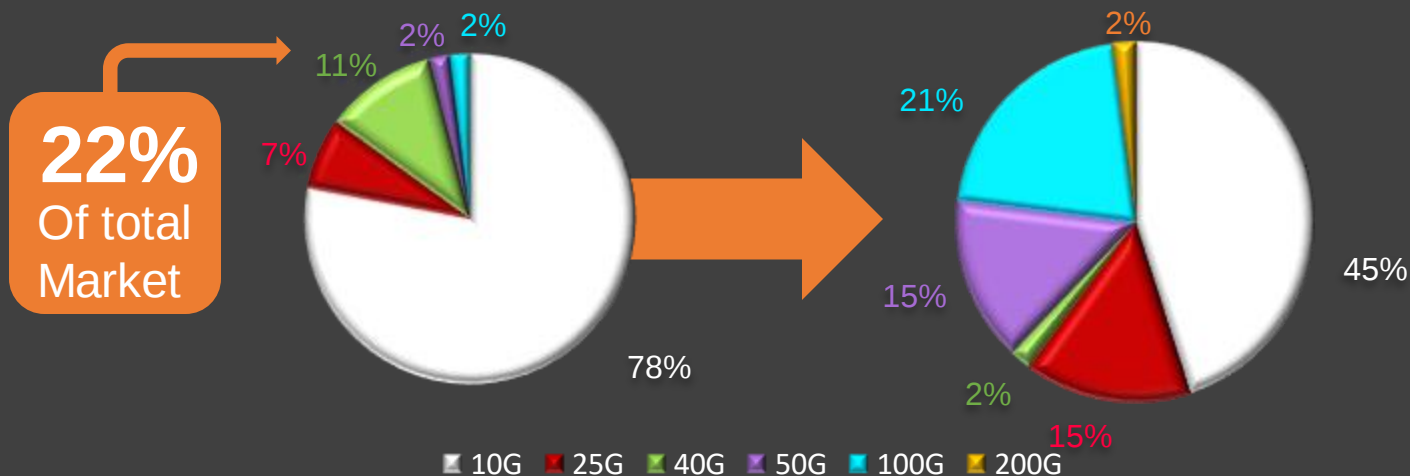
Volume type: RAID 5; 16 x Intel S3500 240GB SSDs (SSDSC2BB240G4)

>25GbE Market Moves Faster Than Ever

- The estimated market share of >25GbE will be doubled to nearly 55% (after 2018) from 22% (2017)
- High speed adapters are expected to grow rapidly in Cloud, Big Data, High speed storage, Virtualization and A.I. segments.

High Speed Adapters 2017 (\$1.3B)

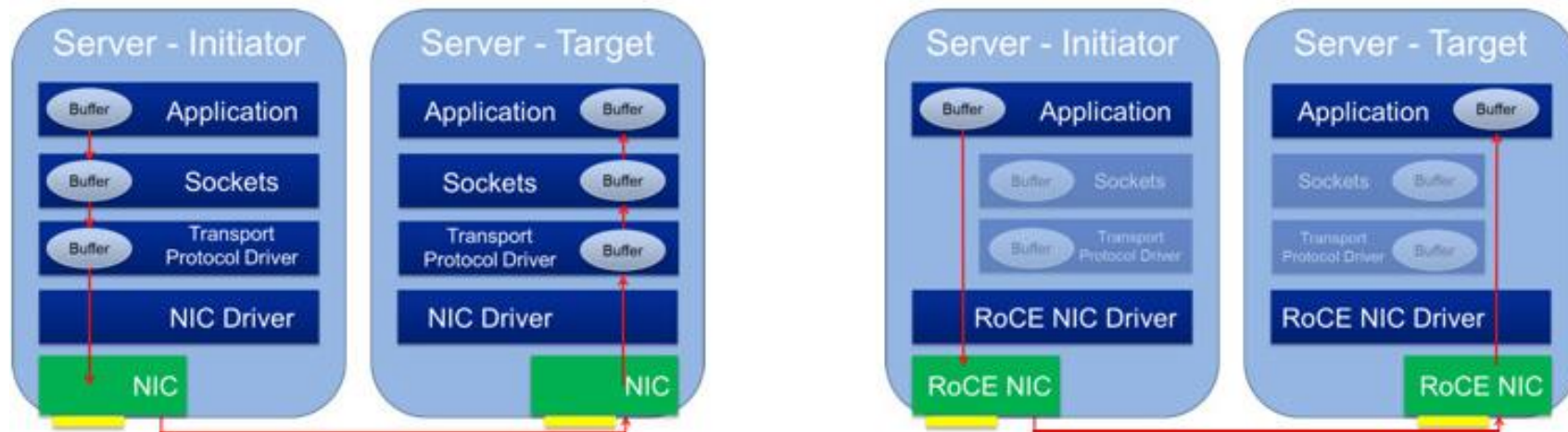
25G+ Segment Growing at 38% CAGR



Mellanox ConnectX®-4 Lx NIC

Supports RDMA Over Converged Ethernet (RoCE)

RoCE (L2) and RoCEv2 (L3) hardware offload
Ideal for low latency and high speed big data transferring



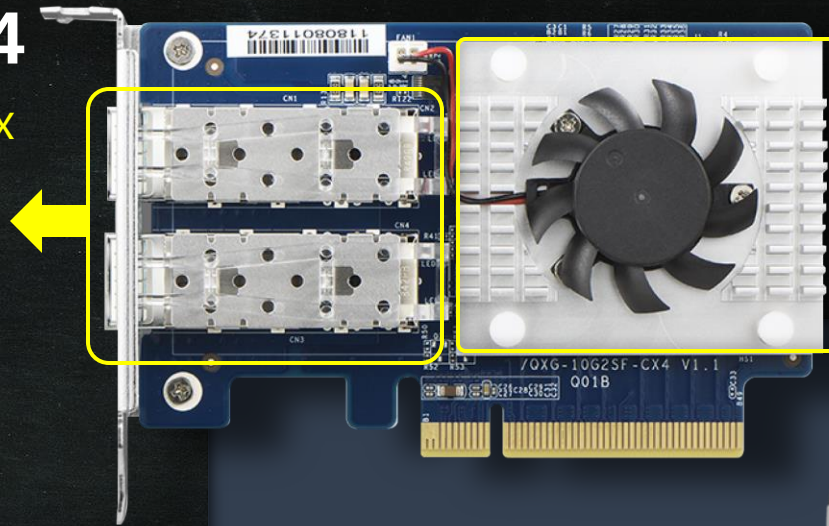
QNAP Dual-port 25GbE NIC

QNAP

2019
January
on the
market

QXG-25G2SF-CX4

- Mellanox ConnectX®-4 Lx NIC
- 2 x SFP28 ports
- Supports 25GbE/10GbE
- Supports iSER/RoCE hardware offload



Cooling system



Compatible cable
SFP28 25/10GbE
DAC cable



Mellanox SN2010 10/25GbE and 40/100GbE switch

QNAP

- Build 25GbE Ready high speed ethernet
- 18 x 10/25GbE SFP28 port
- 4 x 40/100GbE QSFP28 port

QNAP® X

Mellanox
TECHNOLOGIES

18x 10/25GbE
SFP+/28 ports

4x 40/100GbE
QSFP/28 ports

Management
ports



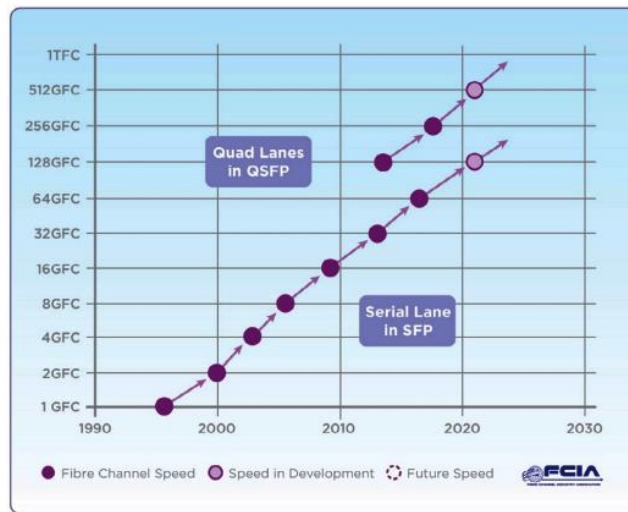
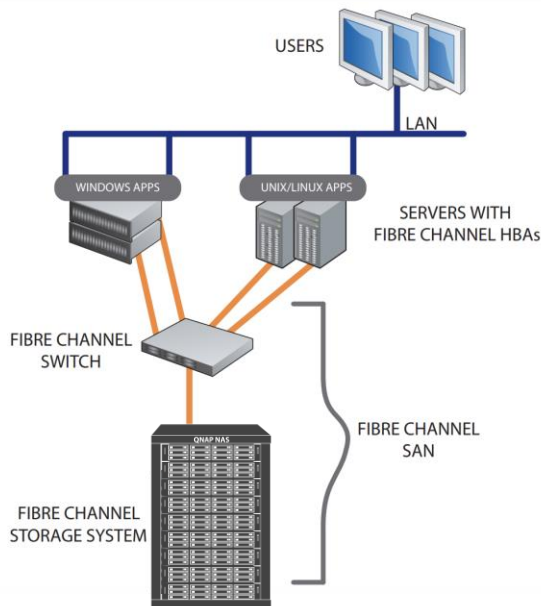
Spectrum™

SN2010

← 1½ 19" →

Fibre Channel SAN

- Use Fibre channel protocol with SCSI command to transmit block-level data
- 32Gbps FC is now commercial and moving to a faster speed. Its **speed** and **lower latency** are suitable for high density computing and storage



Fibre Channel applications

Bank transactions

- Need low-latency storage
- Higher security for data segregation between FC and Ethernet



Databases

- Small in size but huge in numbers data packets transfers
- FC SAN provides high IOPS and lower latency



4K & 8K media storage & editing

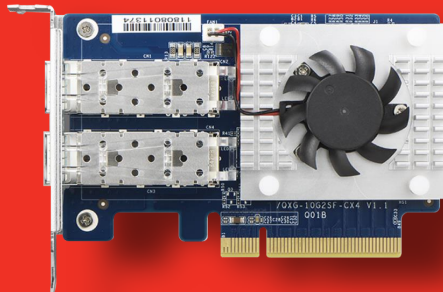
- Huge storage space demand for TV programs and footage
- FC environment for longer distance video access and real-time editing



Integrating Fibre Channel SAN services

Soon to
market

- **QTS 4.4.1** will support FC SAN: single NAS to provide SAN, NAS and cloud storage for unified storage solution
- Partnering with FC card vendor Marvell & ATTO for the most economical FC SAN storage solution



Support Marvell
Qlogic 32Gb/16Gb/8Gb FC card



Support ATTO
Celerity 32Gb/16Gb/8Gb FC card

QNAP

TVS-x72XU

Double the ROI of
purchasing SSDs

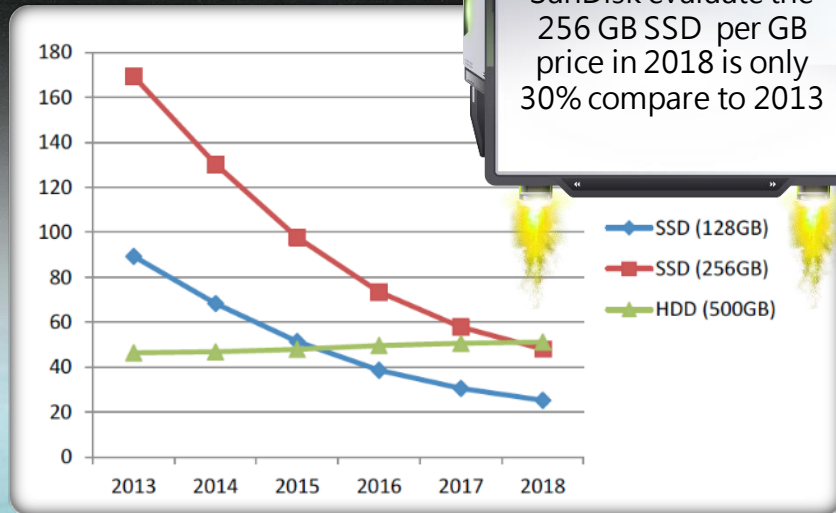
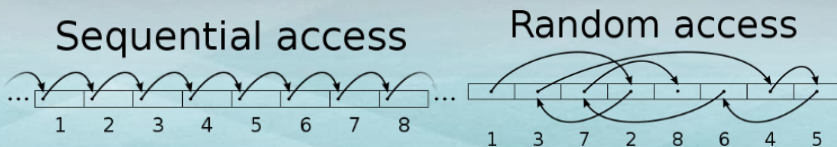
SSD Over-provisioning,
Snapshot Remote Restore



SSD Usage In Network Attach Storage

- SSD can provide high random IOPS for multi-clients sync and business applications that can not be achieved by HDD.
- In 2018, SSD price also comes close to the sweet spot.
- Besides choosing the right SSD, you should also choose right NAS!

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

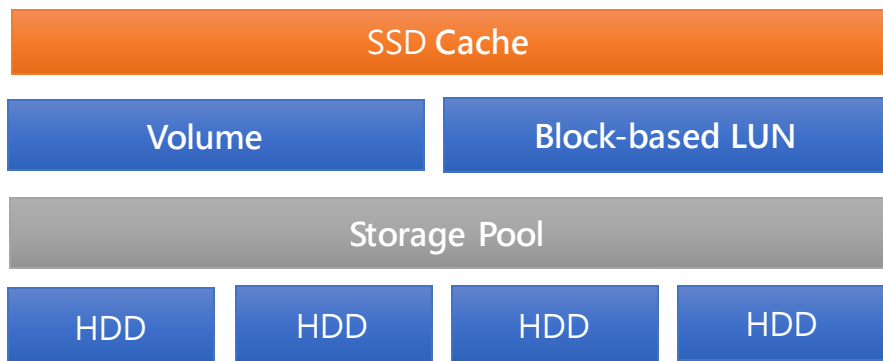


QNAP SSD Global Cache and Qtier

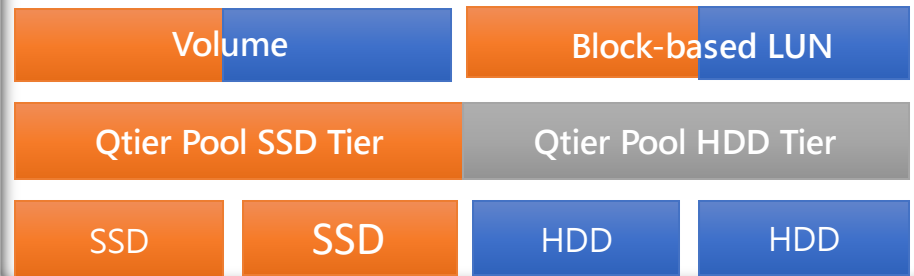
IT manager can have different SSD configurations with TS-x77XU

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

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



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

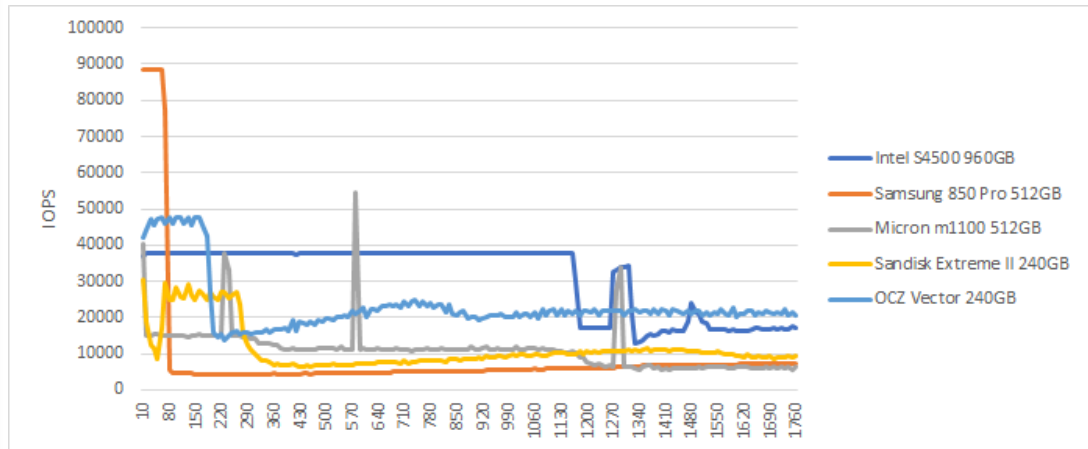


Different SSD has Different Performance!

- SSD Write amplification cause performance degradation
- In QNAP Lab, engineer use FIO to test different SSD, and all SSD have showed consisted write performance degrade.
- Different SSD's controller and Garbage Collection Algorithm will effect the long term performance

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

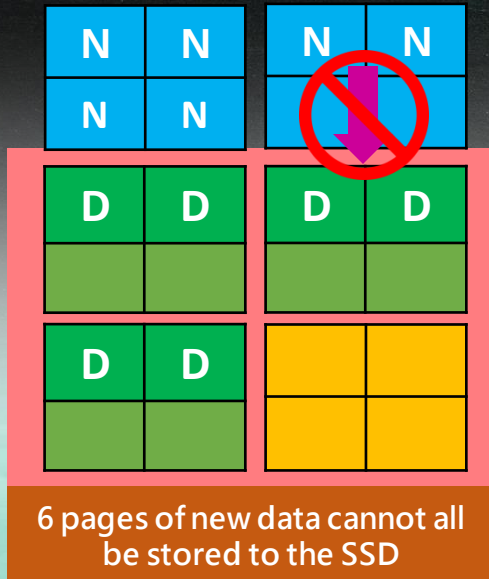
Different SSD in QNAP NAS's FIO consisted performance (IOpattern: RW-4K):



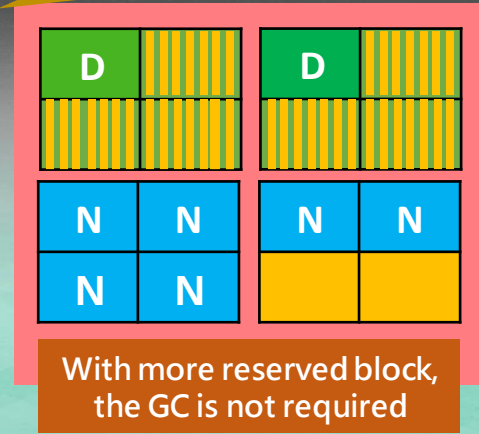
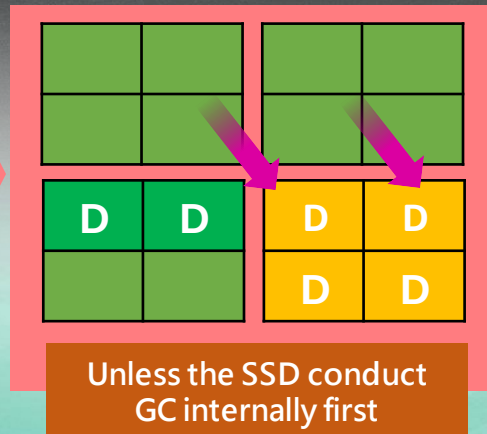
What is SSD Over-provisioning

- SSD Over-provisioning reserves space in the SSD to decrease write amplification & increase consistent performance and endurance.
- Reason: to avoid Garbage Collection in any giving point of time

N	New D
D	Valid D
	Invalid D
OP	OP
	OP

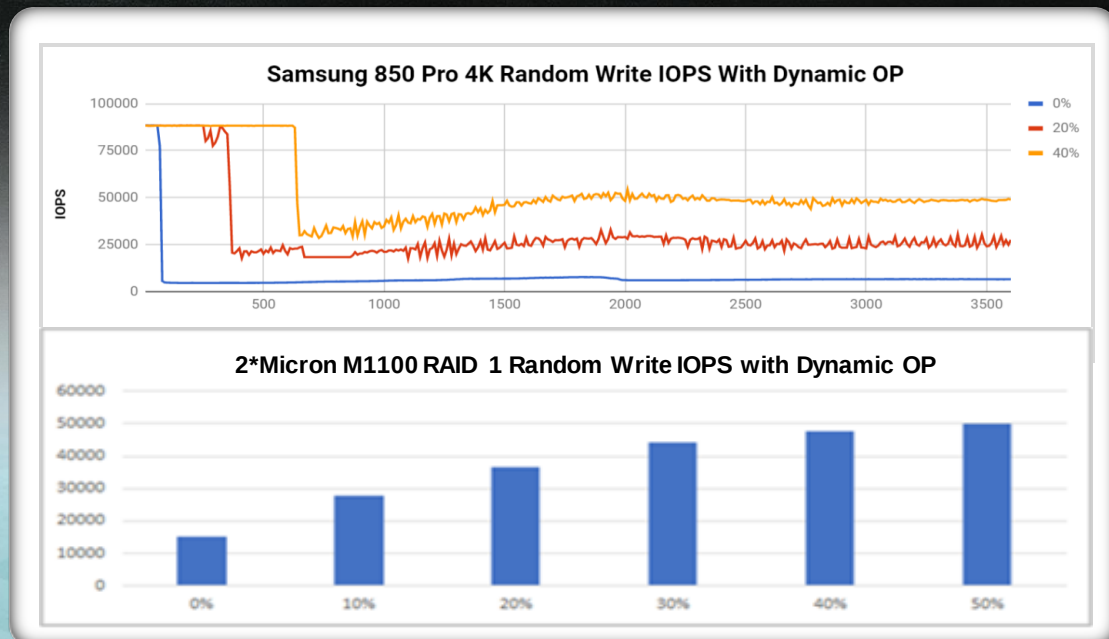
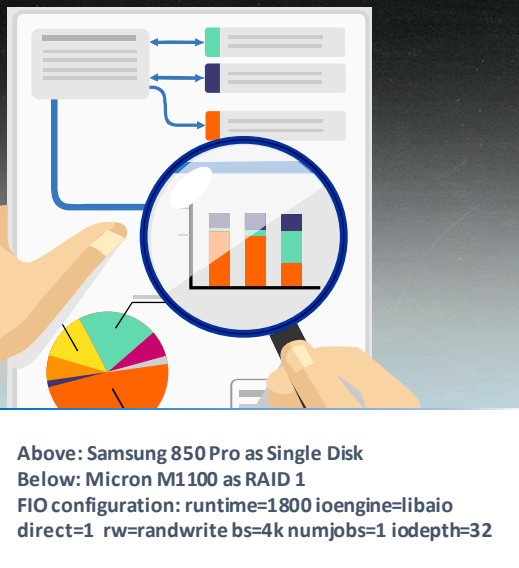


With limited OP, 4 additional write is needed. With more OP the movement is not required.



The Advantage of Software-defined SSD Extra Over-provisioning

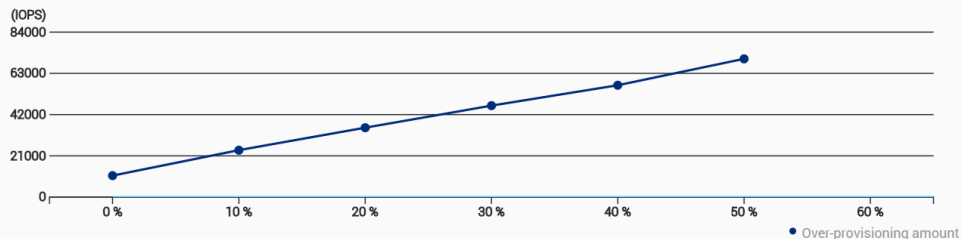
- With QTS, user can assign more OP to the SSD RAID.
- At QNAP Lab, the effect of over-provisioning can not only be observed on single consumer-level Samsung 850 Pro to gain the performance same as data center SSD, but also be seen on SSDs as a RAID.



Choose SSD is Hard, Choose QNAP is Simple

- IT managers' biggest challenges in deploying SSD is to measure the SSD performance and how it can solve storage bottleneck.
- With QNAP SSD Profiling Tool, users can not only set OP, but further test SSD RAID performance with different OP amount.

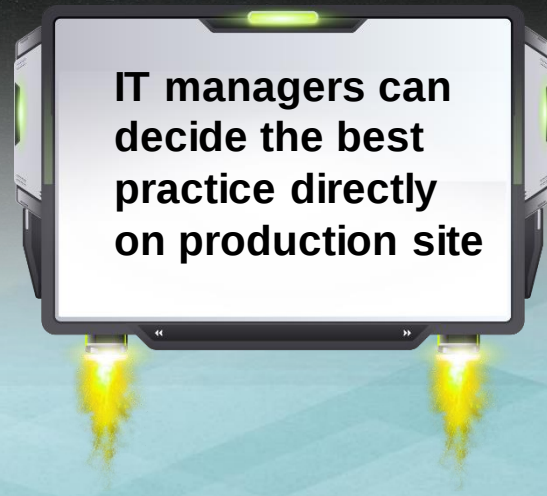
SSD over-provisioning test 20180810_1938



Test RAID group

Alias	RAID Type/ Disk Model	Capacity	Initial Sequential		Initial Random	
			Read	Write	Read	Write
RAID Grou...	Single	944.37 GB				
Host Disk 14	Samsung SSD 860 PRO 1TB	953.87 GB	541.55 MB/sec	239.05 MB/sec	99381 IOPS	53770 IOPS

IT managers can
decide the best
practice directly
on production site



QNAP Global SSD Cache

The QNAP SSD Cache can be applied to multiple volume / LUN

Cache Type

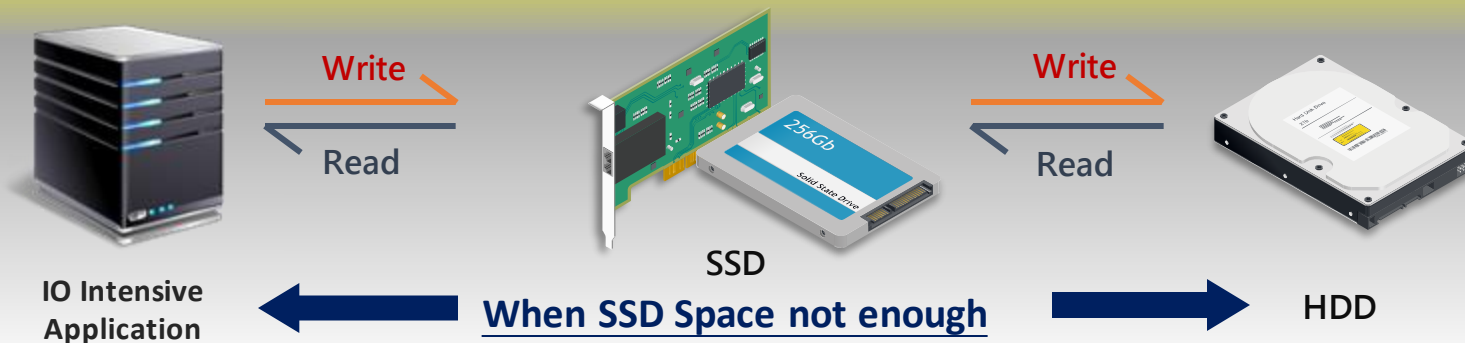
Read-Only → Copy frequently used data to SSD

Read-Write → Not only copy data, new data can also be temporarily stored in SSD

(New) Write-Only → Only new data will be written into the cache

How Read-write Cache work:

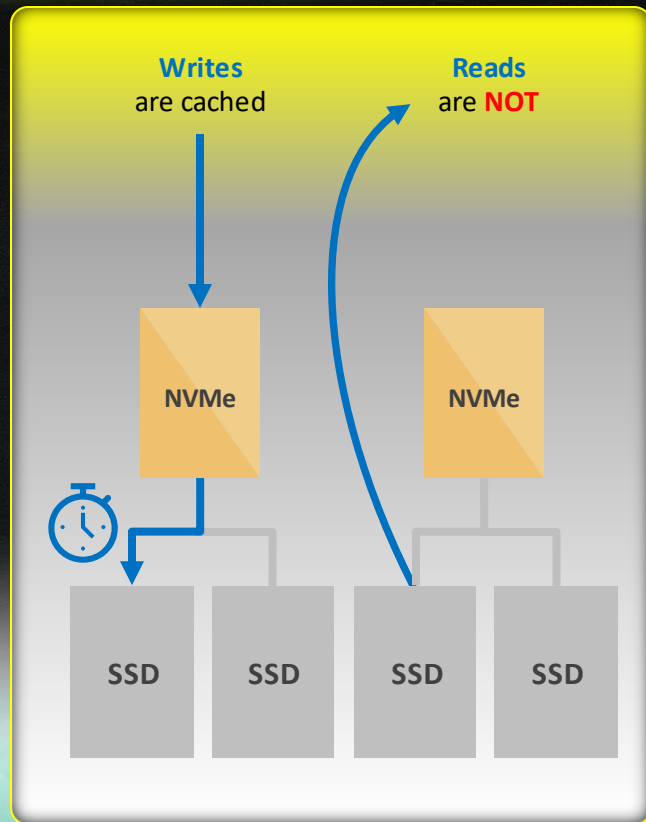
Data from clients and storage will both be cached



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

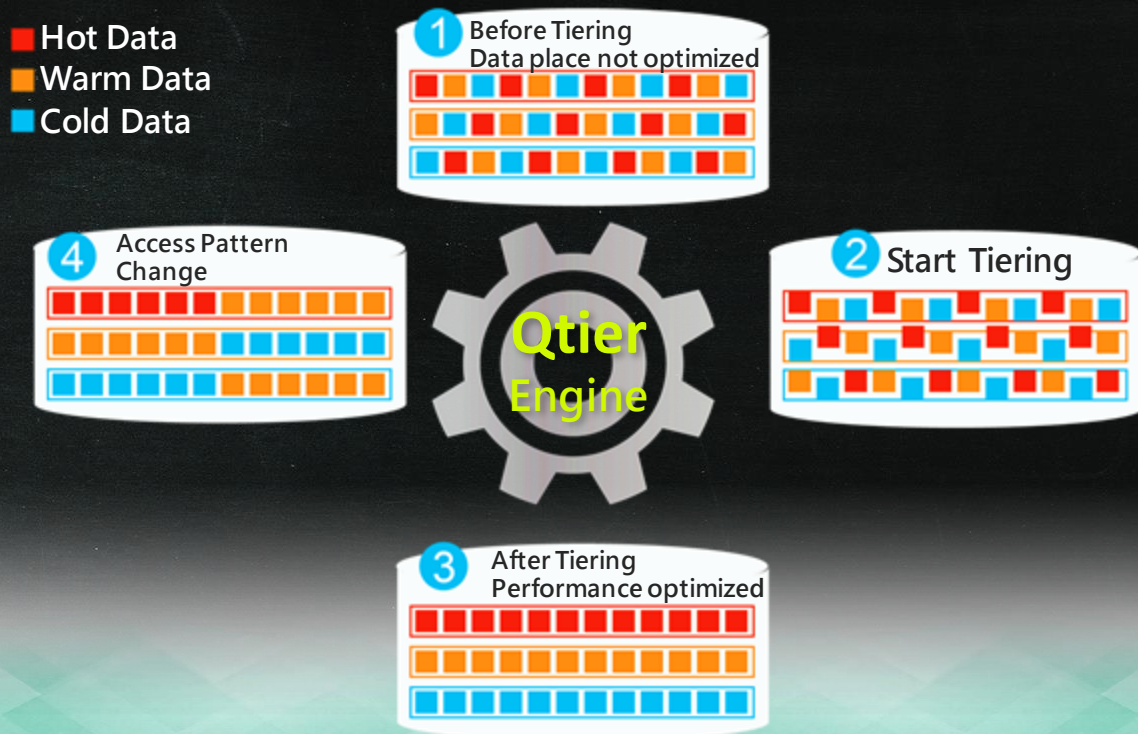
<https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/understand-the-cache>



Qtier (Auto-Tiering) Increase Capacity and Performance at the Same Time

Beside SSD Cache,
Qtier™ can migrate
data between SSD and
HDD directly

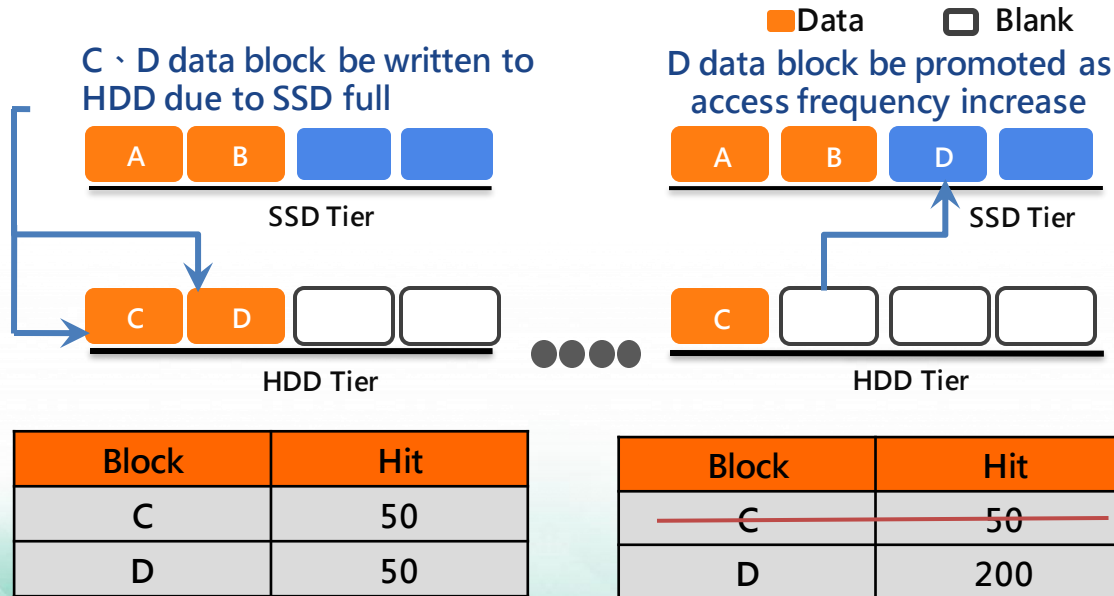
SSD capacity can be
utilized with limited
memory requirement.



Qtier 2.0 IO Aware tiering for real time performance boost

Beside tiering on schedule, Qtier now can simulate SSD Cache behavior

It can utilize SSD capacity while boost performance in real Time thus increase SSD ROI



TVS-x72XU SSD Multiple Configurations

In addition to acting as a backup server, SSD Over-provisioning, Global Cache and Qtier let TVS-x72XU be deployed as production server

Scenario	File Server	Web, Application, Virtualization Server	Synchroni- zation, Vi- deo Editing	Surveillance, Backup, Log Server	Business- Critical Database
SSD Config	Qtier™	Qtier™	Read- Write Cache	Write-Only Cache	SSD RAID
SSD RAID	RAID 6	RAID 10	RAID 5	RAID 10	RAID 10
SSD OP	10%	20%	20%	30%	30%



With 5 x 2.5"
SATA 6Gb/s SSD
1U Rackmount can
use SSD too!

Businesses need lower RTO

In the survey of 300 Enterprises and SMBs at Taiwan:

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

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

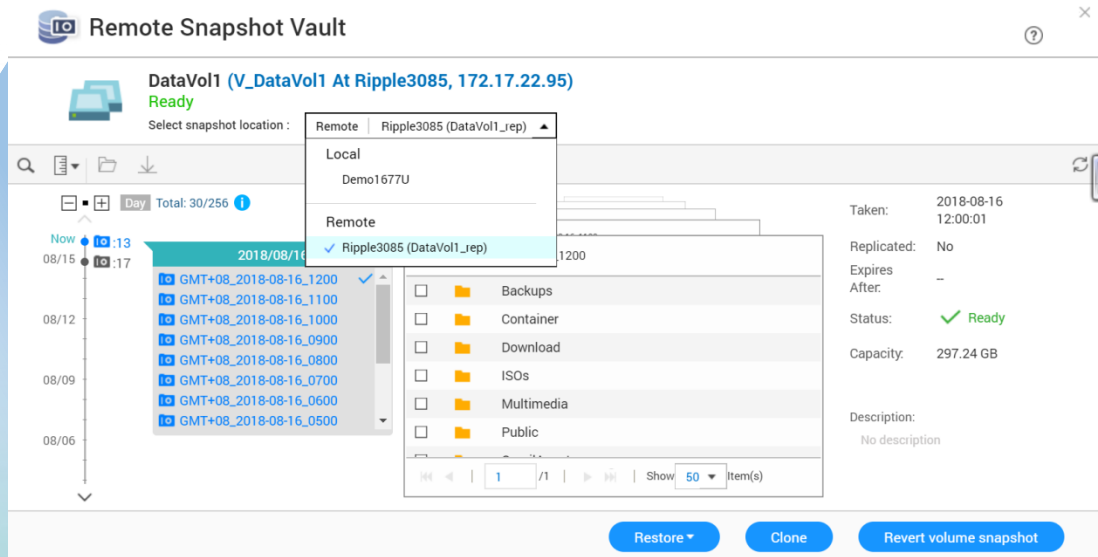


Restore From Remote Snapshot Vault

- The Snapshot Manager is now actively connected to Snapshot Vault
- Support monitor and restore selected folders and files **from the source NAS directly!**



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



Drastically Reduce Recover Time With 10GbE Network

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



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



With QTS 4.4.0 Power Of Storage:

01

Software-defined SSD Extra OP

Measure & set unique over-provisioning amount on the NAS

02

SSD Global Cache & Qtier™

Using Cache or Auto Tiering to maximum SSD ROI

03

Remote Snapshot Restore

Using 10GbE network to reduce RTO





QNAP

TVS-x72XU

is your best choice!

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