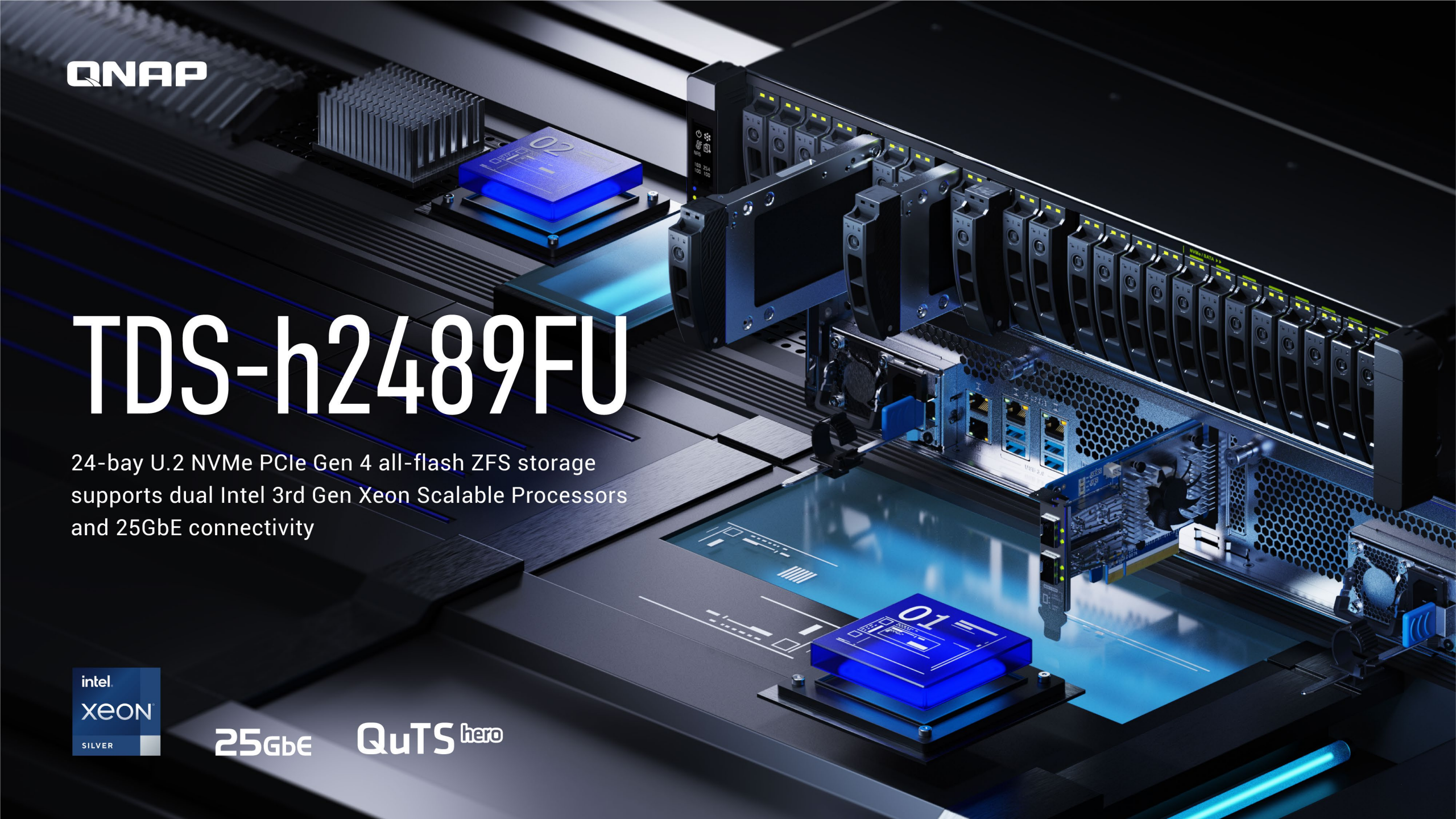
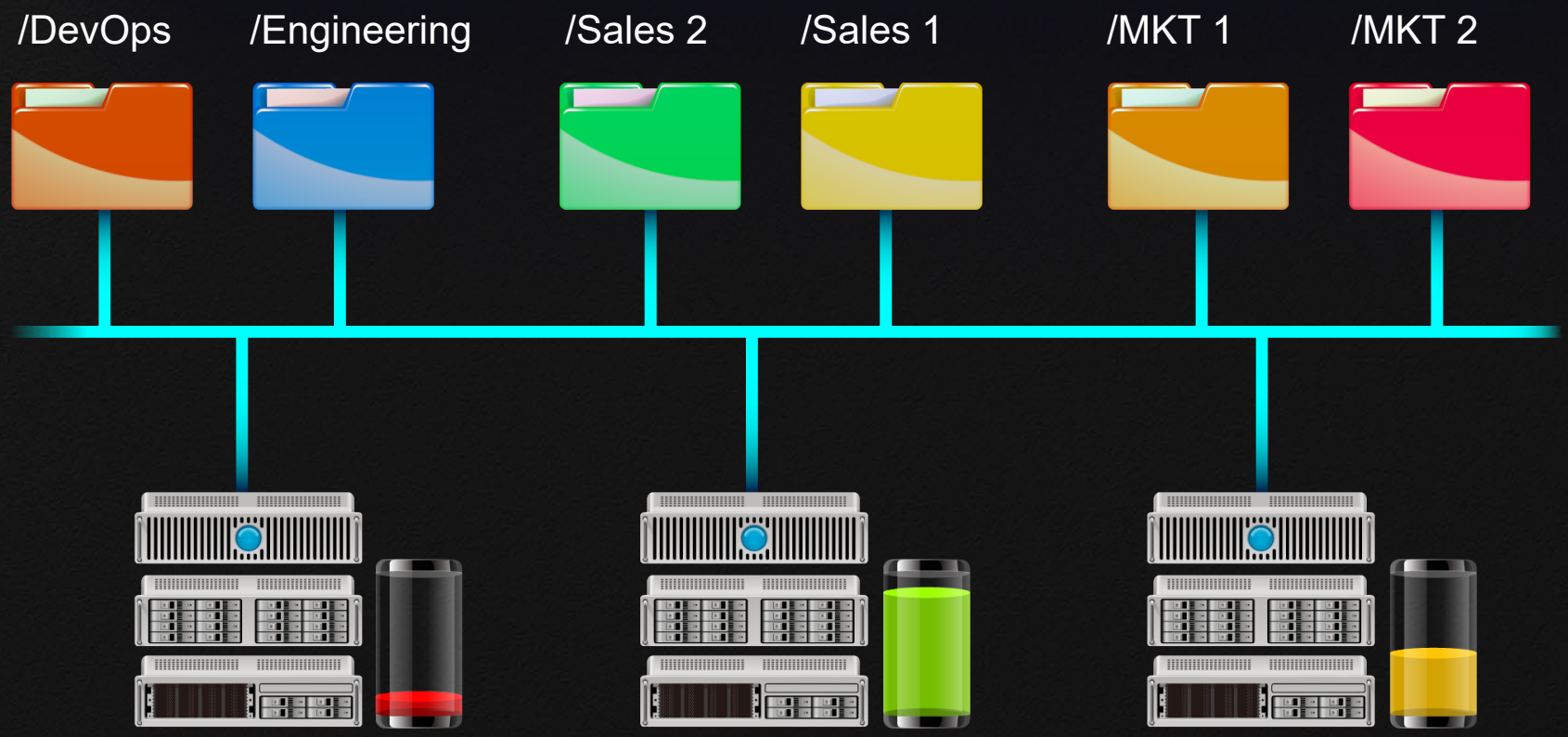

QNAP
TDS-h2489FU
24-bay U.2 NVMe PCIe Gen 4 all-flash ZFS storage
supports dual Intel 3rd Gen Xeon Scalable Processors
and 25GbE connectivity
intel
XEON
SILVER
25GbE
QuTS hero

Data growth leads to disruptive expansion in enterprise.

Where did that file go?



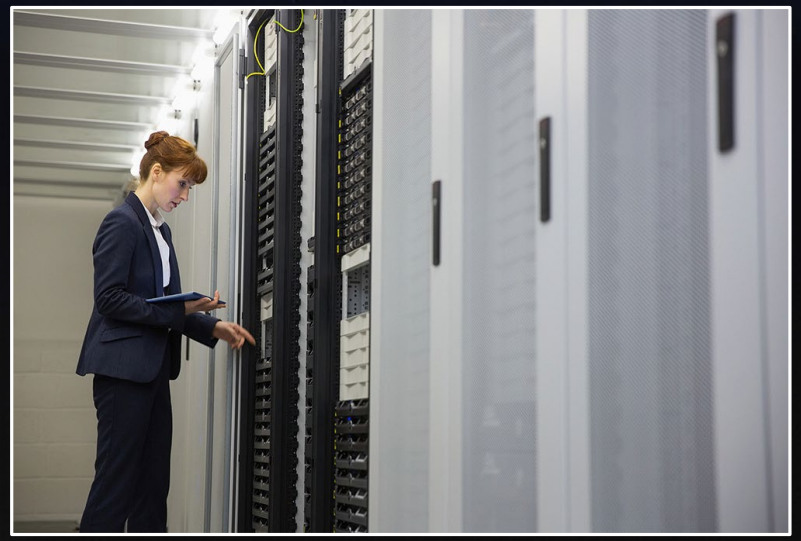
Uneven loading & capacity consumption

- Manually split shares between filers
- Copy files to new servers
- Redirect apps & users to new locations

How to tackle throughput- and IOPS-demanding applications with ease?

Virtualization

Eliminates storage bottlenecks for unstructured data and I/O intensive workloads; ideal for server virtualization and virtual desktop infrastructure (VDI).



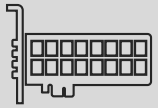
Data Centers

Delivers ultra-low latency and high IOPS performance, providing response times within microseconds for data centers that host significant business-critical systems and data.

Media & Entertainment

Satisfies smooth 4K/8K media streaming and post-production, empowering multimedia workflows with faster data transfer, access, and backup for boosted efficiency.

Must use SSD to get the highest performance. How to choose SSDs?

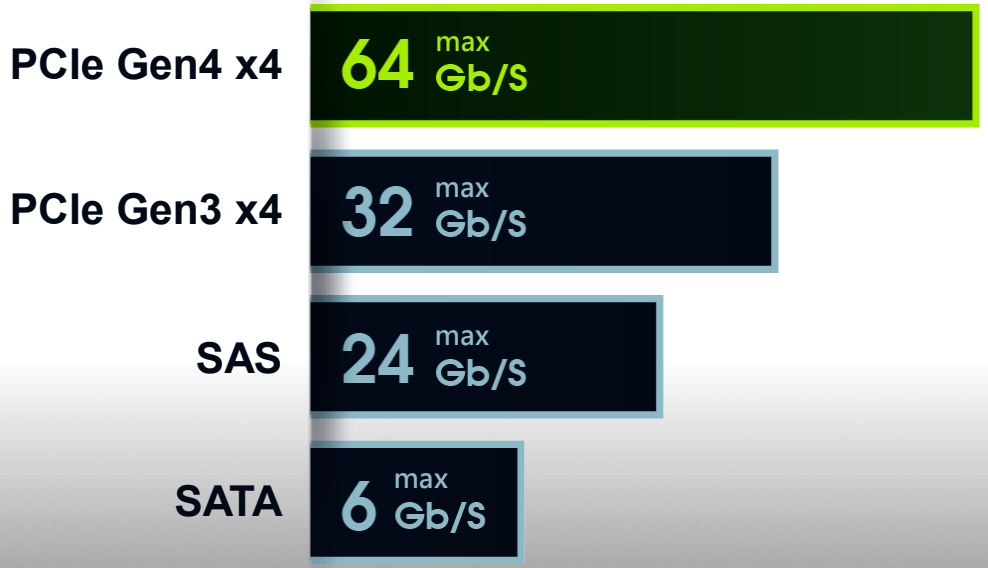
	Formfactor	Interface	Major dimension
	2.5 inch (hot swappable)	SATA	• Height 7~9.5 mm
		SAS	• Height 15 mm
		NVMe (U.2/U.3)	• Height 7 mm • Height 15 mm
	M.2	SATA	• 2230 (22 x 30 mm) • 2280 (22 x 80 mm) • 22110 (22 x 110 mm)
		NVMe	
	PCIe card (AIC)	NVMe	• Full height / half height • Full length / half length

Each SSD model has different sequential / random read/write performance, TBW, and DWPD life expectancy. Choose wisely depends on your applications.

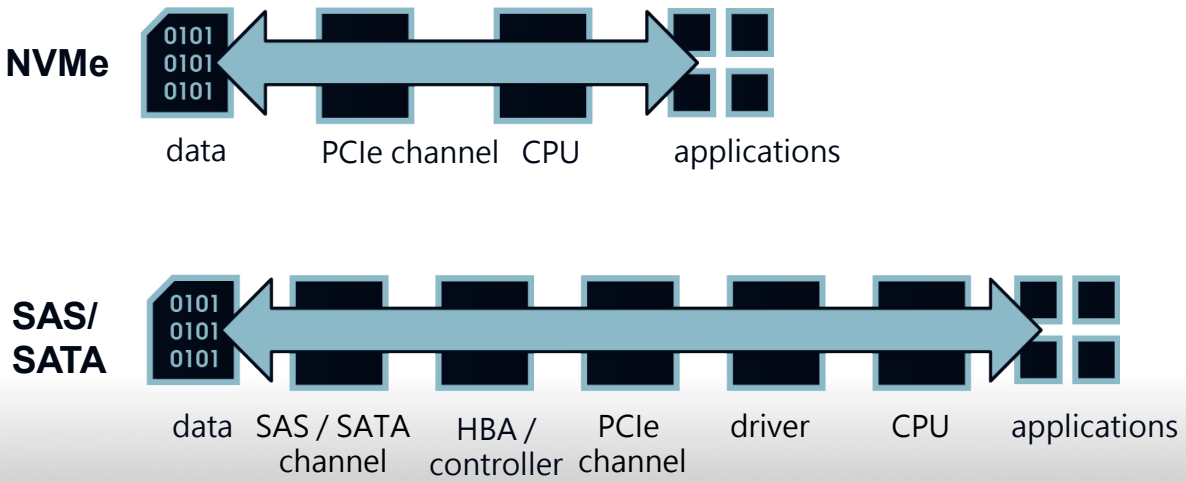
Source: http://Samsung.com

Why the future mainstream SSD market will be PCIe NVMe SSD and not be SAS or SATA SSD?

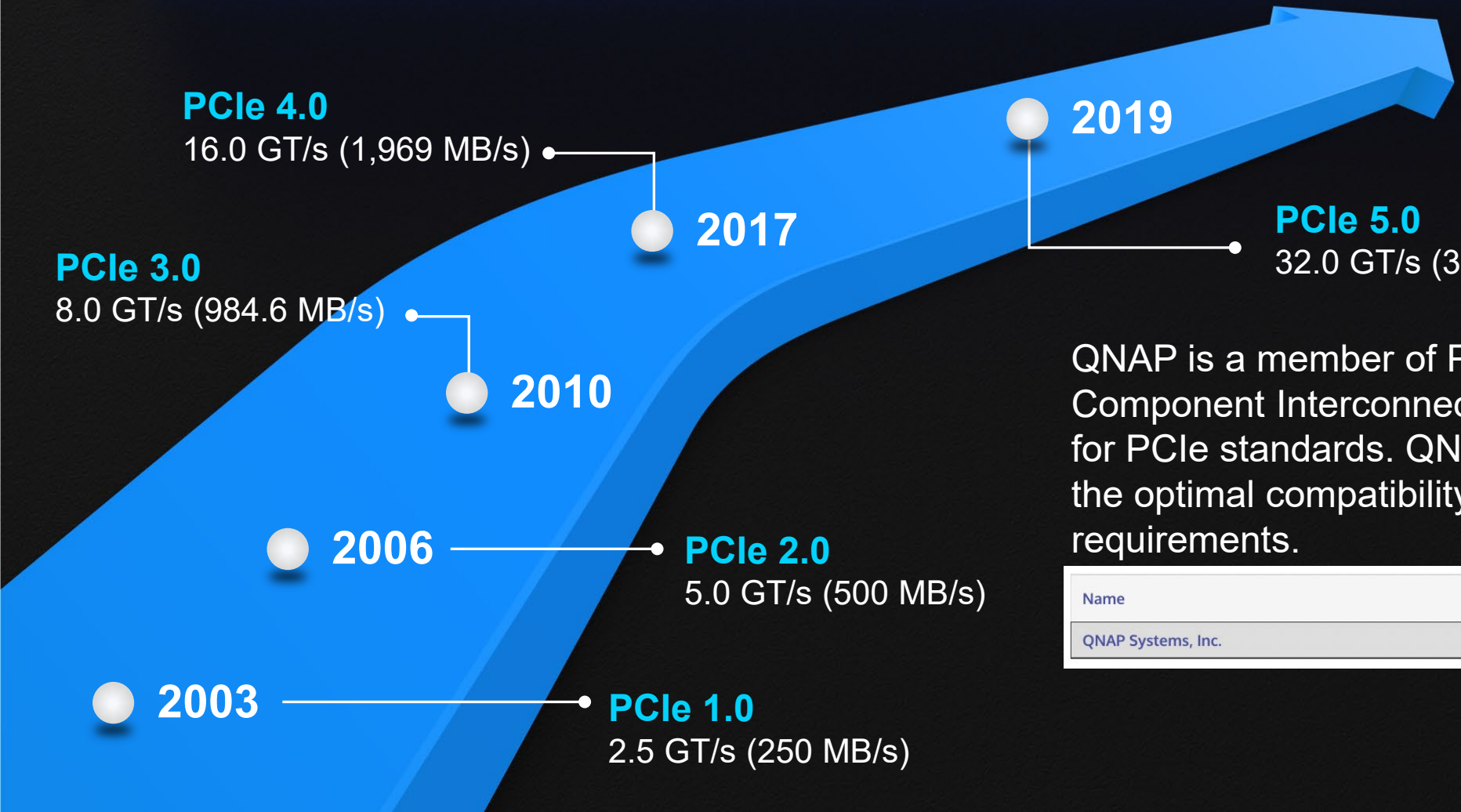
Maximum bandwidth 64 Gb/s (8GB/s)



Low latency, Super short data path



800+ members in PCI-SIG community for PCIe standards since 1992 establishment



QNAP is a member of PCI-SIG (Peripheral Component Interconnect Special Interest Group) for PCIe standards. QNAP follows the specs for the optimal compatibility and performance requirements.

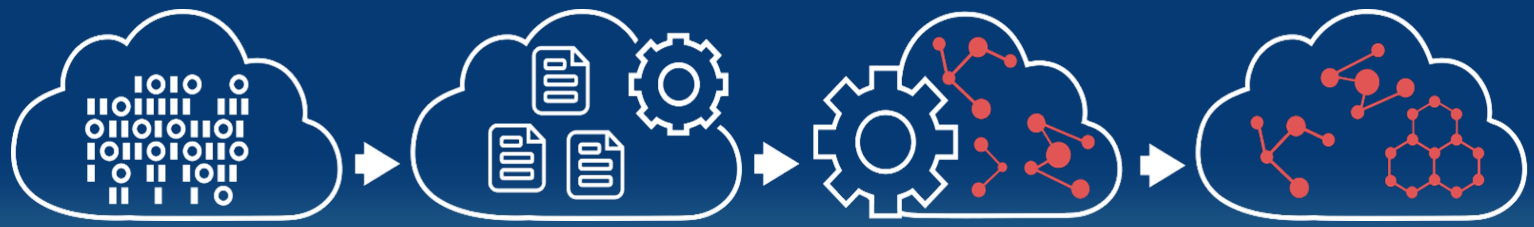
Name	Vendor ID
QNAP Systems, Inc.	7082 (1BAA Hex)

Source https://pcisig.com/specifications

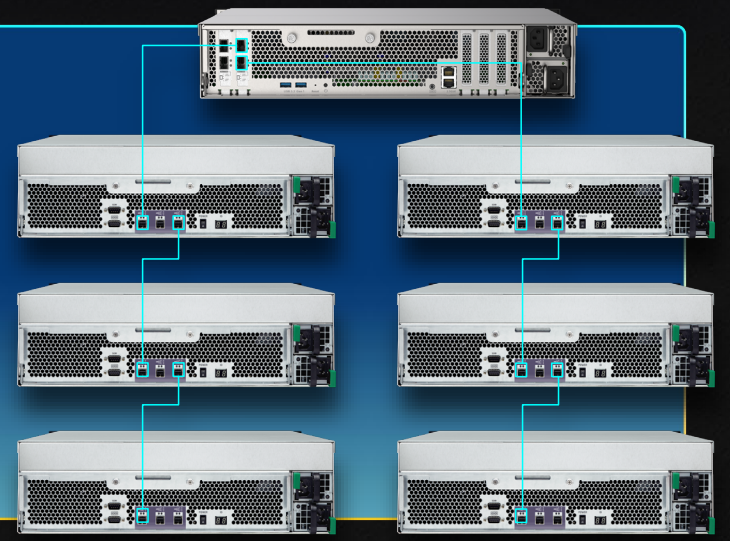
How to find the best data carrier of big data analysis / edge computing / AI inference?

200TB is not enough

Only PB-level shared folder is enough to store the huge data matrix



Deep Learning



Connect multiple JBOD to reach peta-bytes of storage capacity

The all-flash U.2 NVMe NAS with dual Intel Xeon processors, 25GbE, and optional 100GbE

TDS-h2489FU 32 & 16 cores dual CPU 25GbE NAS

- 24 x 2.5” U.2 NVMe PCIe Gen4 SSD bays
  + 2 x M.2 2280 PCIe / SATA SSD combo slots
- Dual Xeon processors up to 32 and 16 cores:
  2 x Intel Xeon Scalable Silver 4314 16-core / 4309Y 8-core
- 32 DDR4 RDIMM memory slots, up to 1TB total
- 2 x 25GbE and 2 x 2.5GbE, with an additional PCIe Gen4 slot for 100GbE NIC, Fibre Channel, or SAS HBA

vmware READY · Microsoft Hyper-v · CITRIX XenServer · VEEAM READY Repository

- ZFS file system for data security
- 65,536 snapshots for data protection
- Data reduction technology
  - ✓ Increase storage efficiency and maximize ROI
  - ✓ De-duplication, inline compression, data compaction
- Unified Storage: iSCSi/ FC/ NFS/ CIFS/ FTP / S3
- Container Station and Virtualization Station for virtualized applications

Dual server-grade 3rd gen Intel Xeon Silver scalable processors for the best efficiency

- 2 x Intel® Xeon® Silver 4314
  16 cores 32 threads, up to 3.4 GHz
- 2 x Intel® Xeon® Silver 4309Y
  8 cores 16 threads, up to 3.6 GHz

Ice Lake SP
CPU code name

8 CH ECC
RDIMM

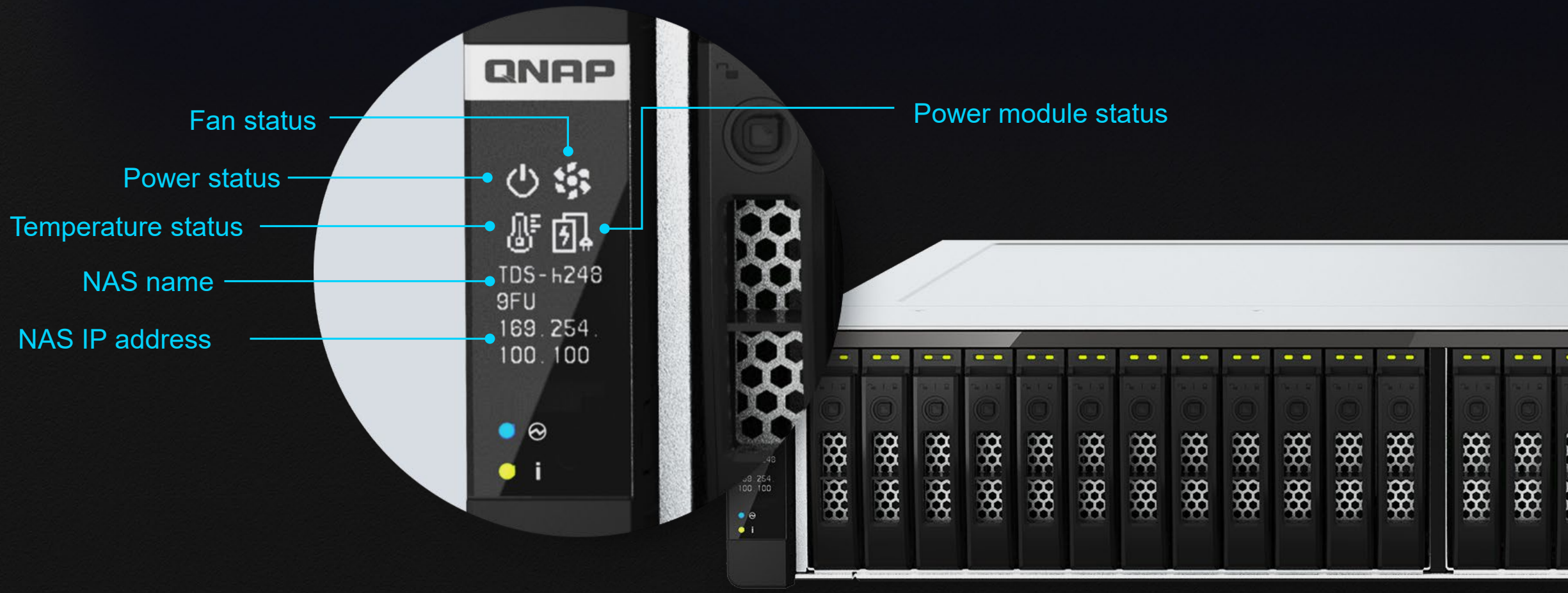
10nm
Lithography

PCIe 4.0
Ultra speed

The latest and newest!

TDS-h2489FU front view

Advanced OLED display for system status



Ordering information and optional rail kit

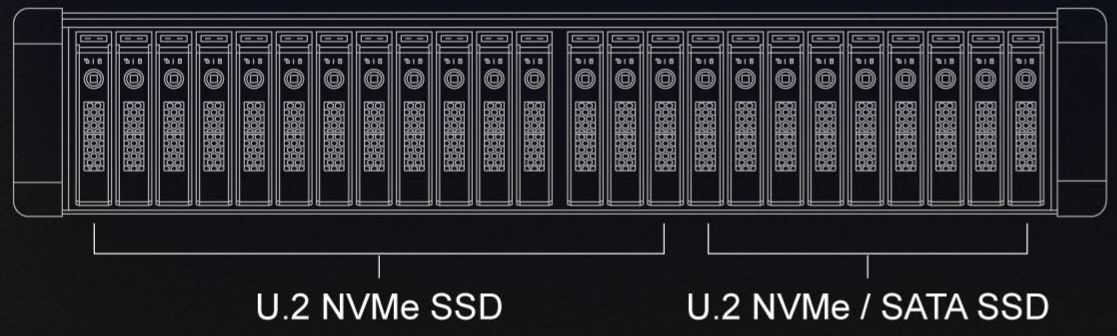
Ordering information

- TDS-h2489FU-4309Y-64G (8 x 8GB RDIMM)
- TDS-h2489FU-4314-128G (8 x 16GB RDIMM)
- TDS-h2489FU-4314-256G (8 x 32GB RDIMM)
- TDS-h2489FU-4314-512G (16 x 32GB RDIMM), by request
- TDS-h2489FU-4314-1TB (32 x 32GB RDIMM), by request

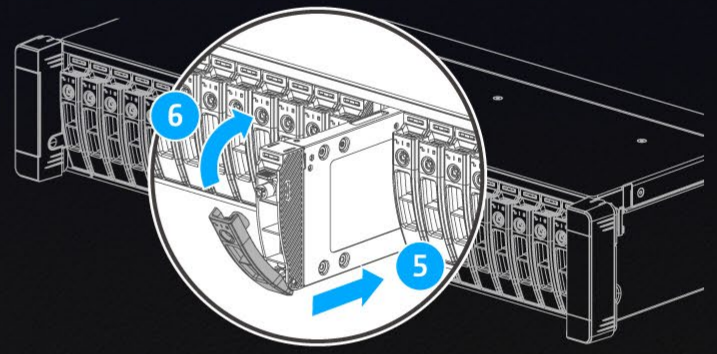
Optional rail kit

- RAIL-E03

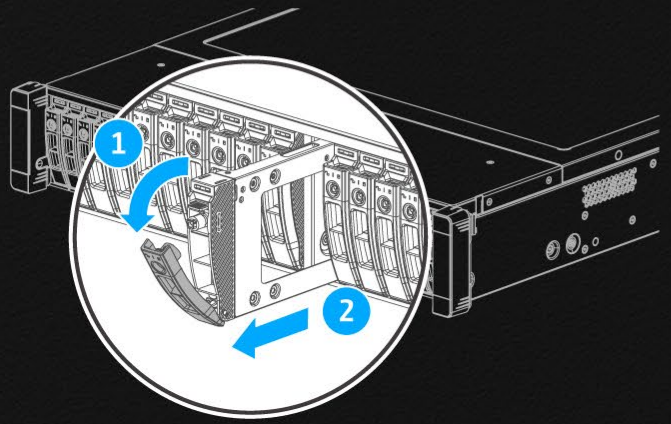
24 hot-swappable SSD trays and easy 2.5-inch SSD installation



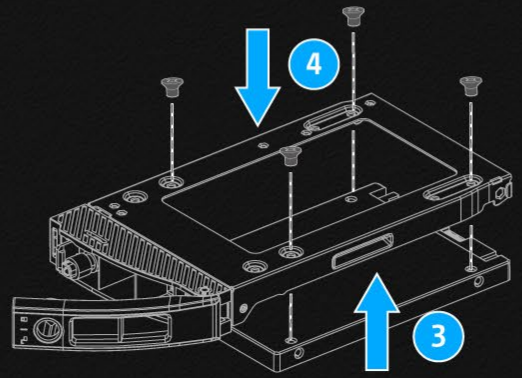
3. Insert the tray



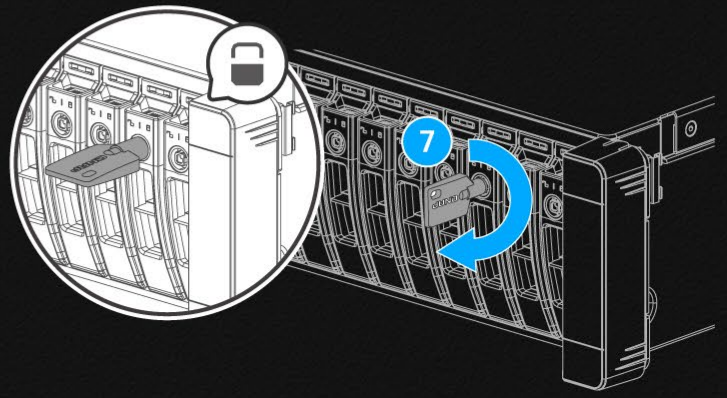
1. Remove the tray



2. Fasten the screws

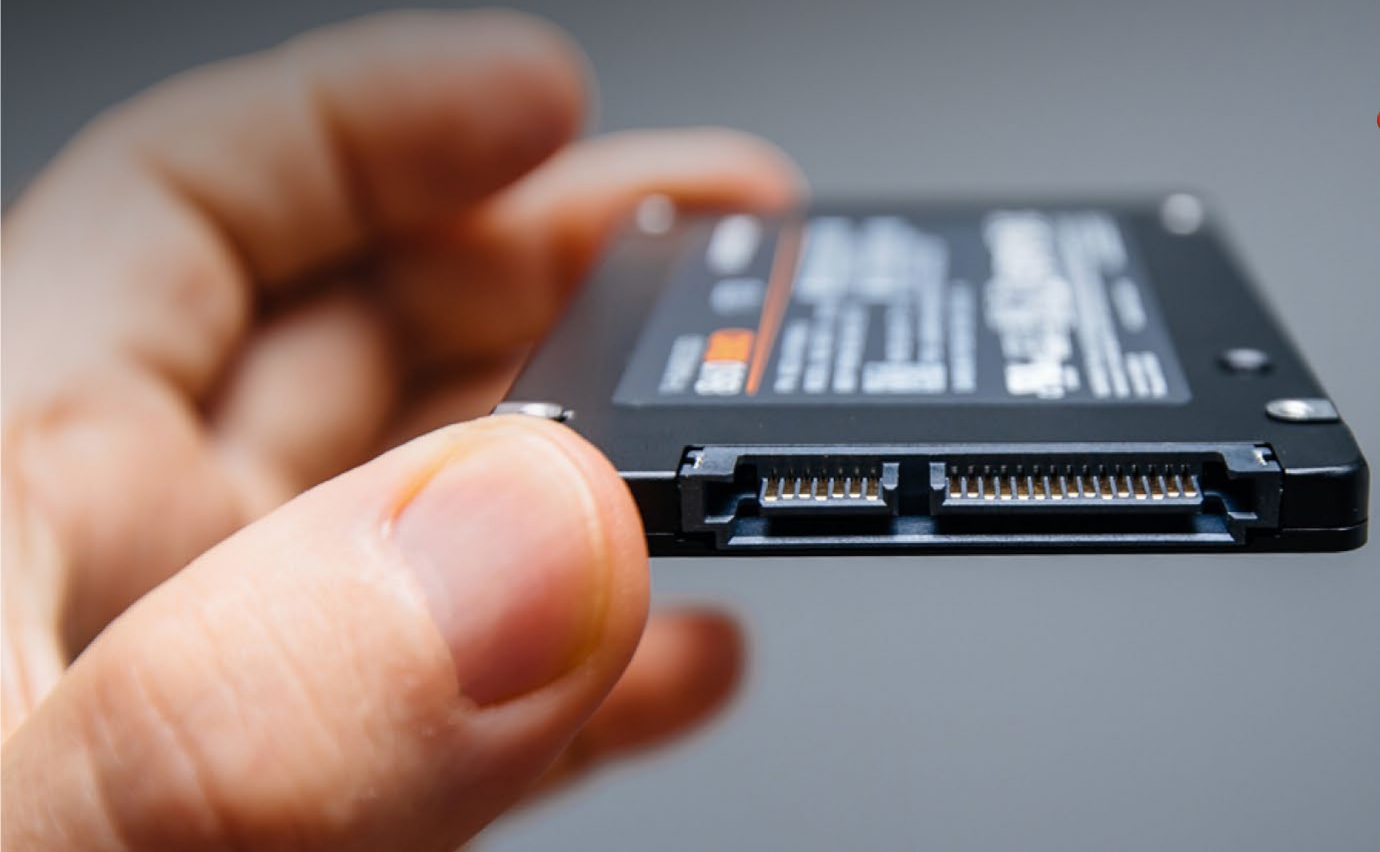


4. Lock the tray with a key (optional step)



What if U.2 NVMe SSDs are not available in your country or if the cost is over your IT budget?

24 x U.2 NVMe SSD in the All flash NAS TDS-h2489FU

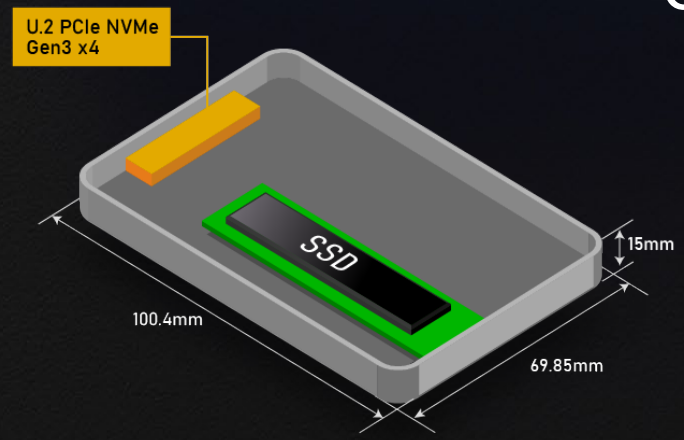


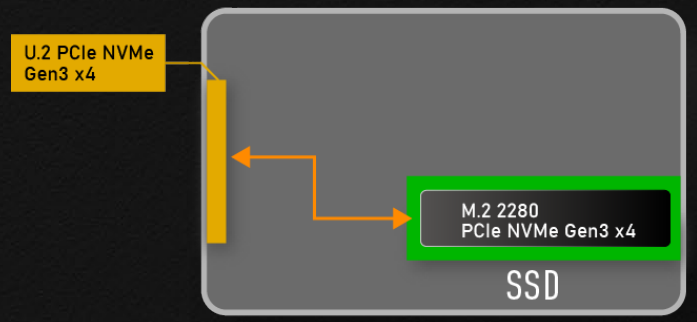
Not available for sale or long lead time?

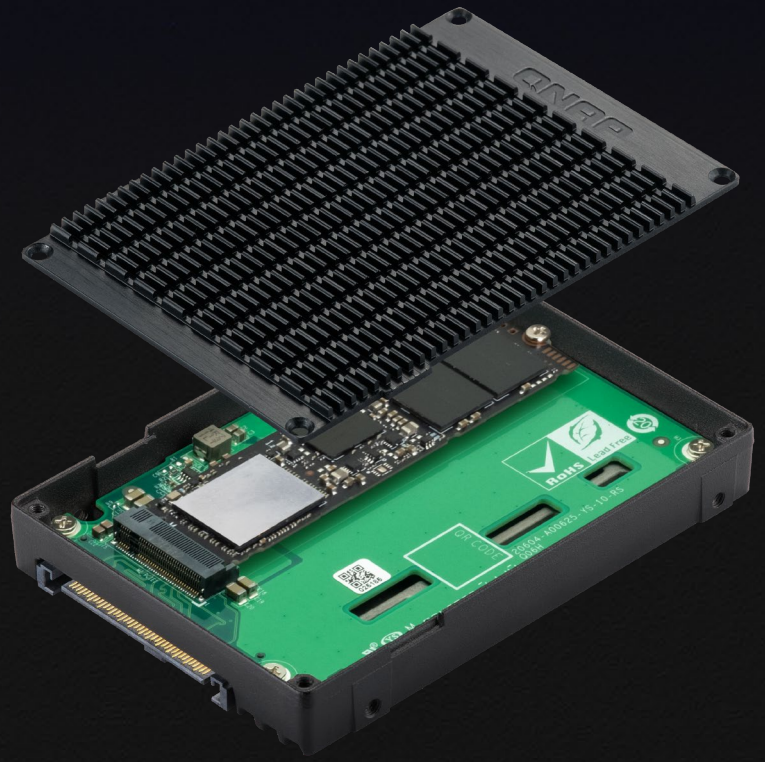
Too expensive and over your IT budget?

Economically use M.2 NVMe SSDs with QNAP QDA-UMP4 U.2 to M.2 SSD adapter

Order P/N: QDA-UMP4

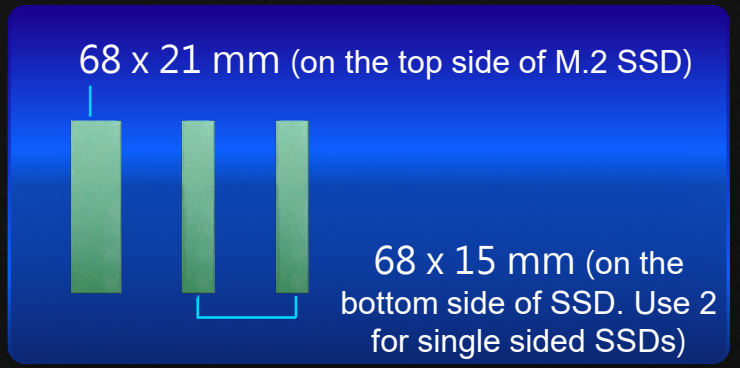






U.2 NVMe to M.2 NVMe PCIe adapter, supporting PCIe 4.0/3.0

- Use readily available and more affordable M.2 NVMe PCIe Gen4/Gen3 SSDs
- Excellent heat-conductive metal design with thermal pads so that M.2 SSDs do not overheat. Keep the optimal performance and prolong the life.



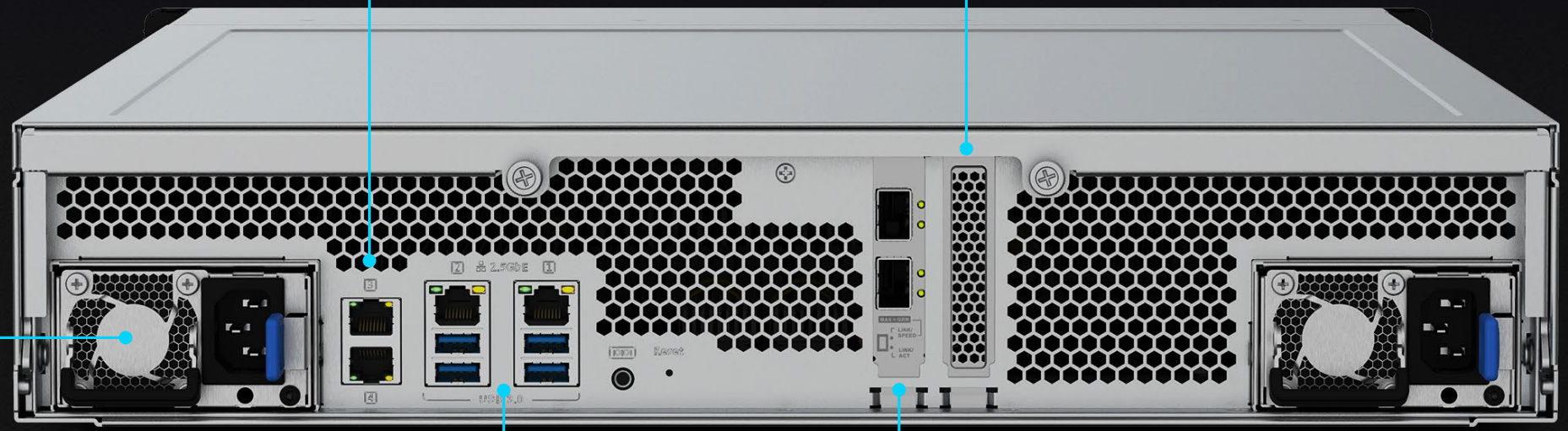
TDS-h2489FU rear view

4 x 2.5GbE
(2.5G/1G/100M)

PCIe slot 1: 1 x PCIe Gen4 x16 slot
(x8 if slot 2 is occupied)

2 x PCIe Gen4 slots

- Slot 1 provides the width of PCIe Gen4 x16 when Slot 2 is not in use, and provides the width of PCIe Gen4 x8 when Slot 2 is in use.

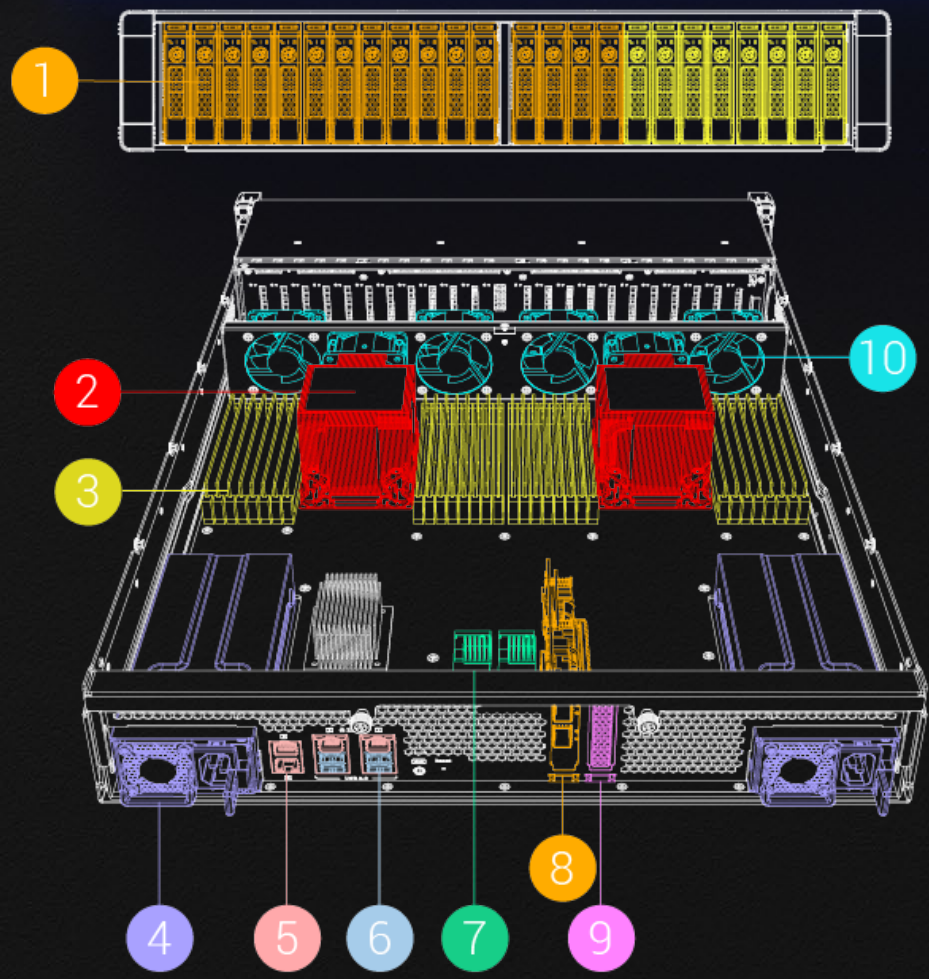


2 x 1200W
redundant
power
supplies

4 x USB 3.2 Gen1
Type-A

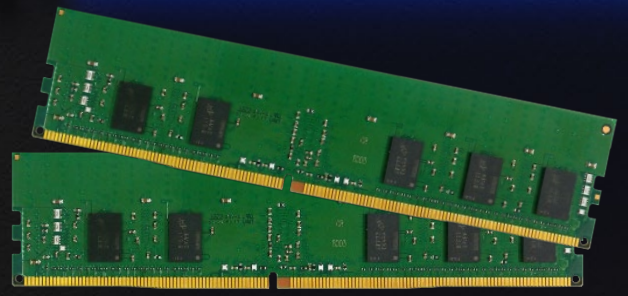
PCIe Slot 2: 2 x 25GbE SFP28
(pre-installed 2-port 25GbE NIC)

Powerful all-flash NVMe NAS specs to meet your business digital transformation requirements

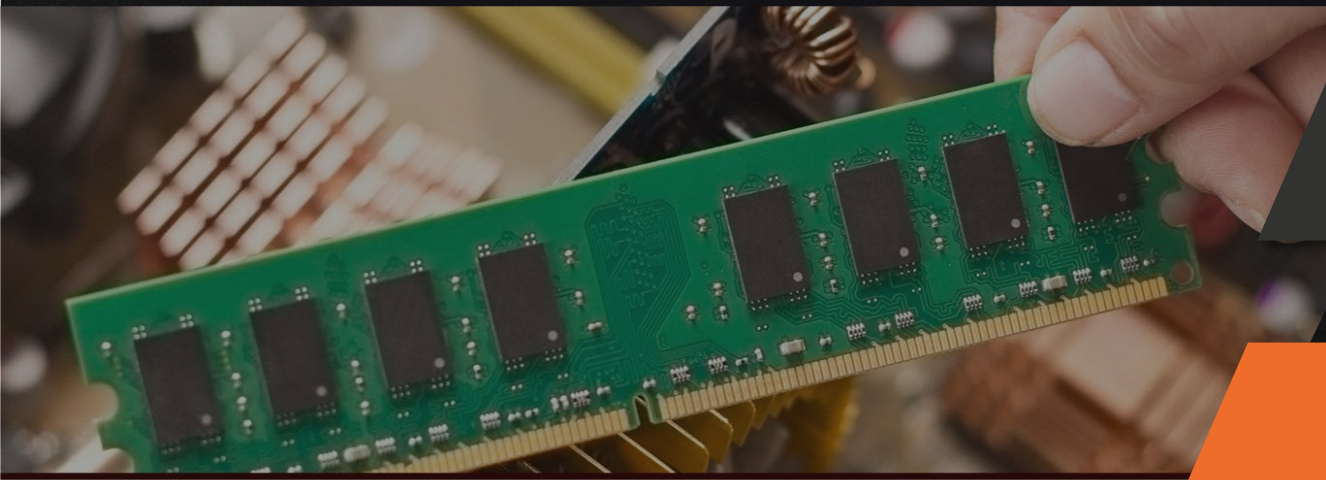


1. 24 x U.2 NVMe SSD bays (bay 17~24 also supports SATA 6Gb/s)
2. 2 x Intel® Xeon® Silver 4300 processors, up to 32 cores
3. 8 channel 32 x DDR4 RDIMM slots, up to 1TB
4. 2 x 1200W redundant PSU
5. 4 x 2.5GbE RJ45 ports
6. 4 x USB-A 3.2 Gen 1 ports
7. 2 x M.2 2280 PCIe Gen3 (x4 + x2) / SATA 6Gbps ports
8. 2 x 25GbE SFP28 ports (2-port 25GbE NIC)
9. 2 x PCIe Gen 4 slots (pre-installed 25GbE NIC)
10. System fan module

32 DDR4 ECC RDIMM RAM slots, 8-channel high-speed memory, up to 1TB RAM total



ECC Error correction & Optimal stability

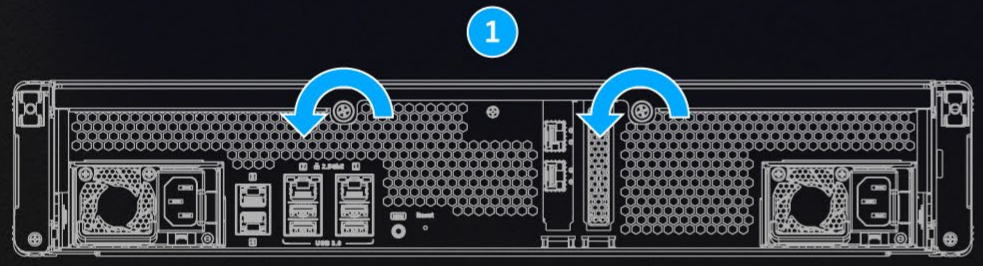


TDS-h2489FU supports
ECC Registered memory for automatic error detection and correction.

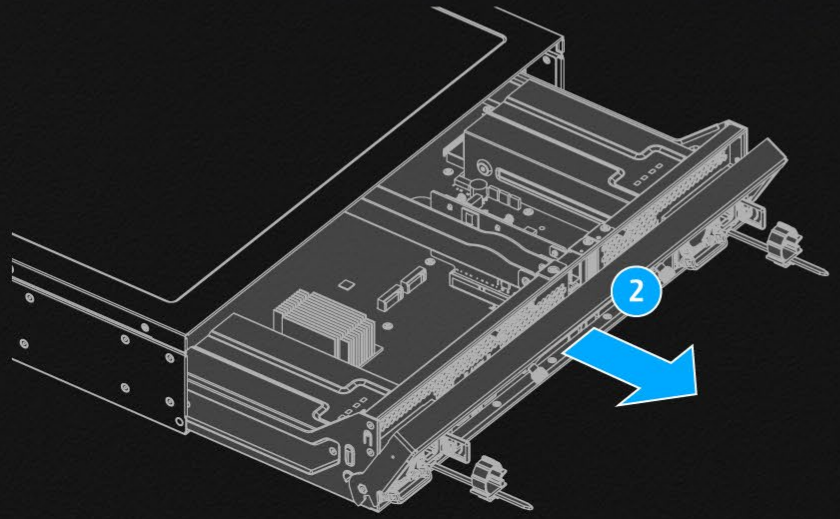
NAS tested with **1TB RAM!**

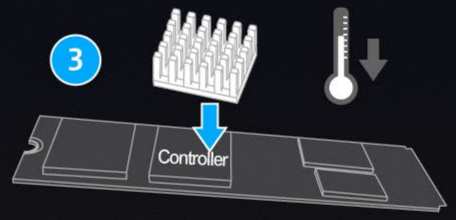
Easy maintenance design for quick M.2 2280 PCIe NVMe / SATA SSD or RAM upgrade

1. Loosen the screws



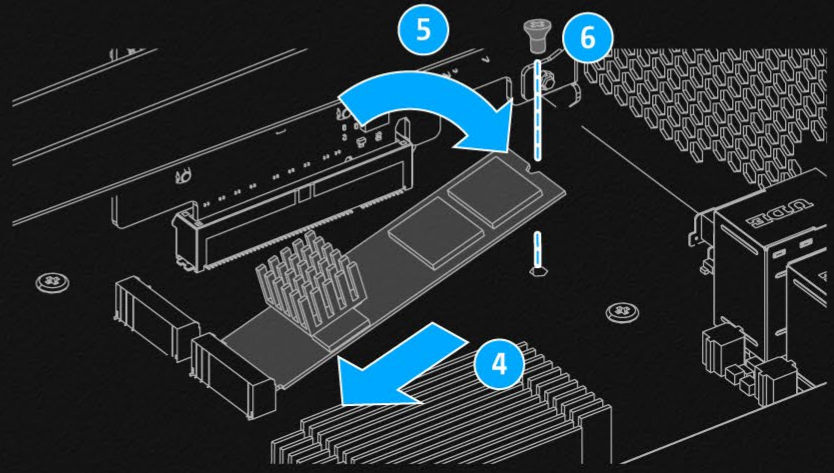
2. Pull out the system module





3. Optional M.2 SSD heatsink for purchase (8 pcs P/N: HS-M2SSD-01)

4~6. Install the SSD & fasten the screws



SAMSUNG

PM9A3 Introduction

Q4, 2021 | Samsung Electronics., Ltd.

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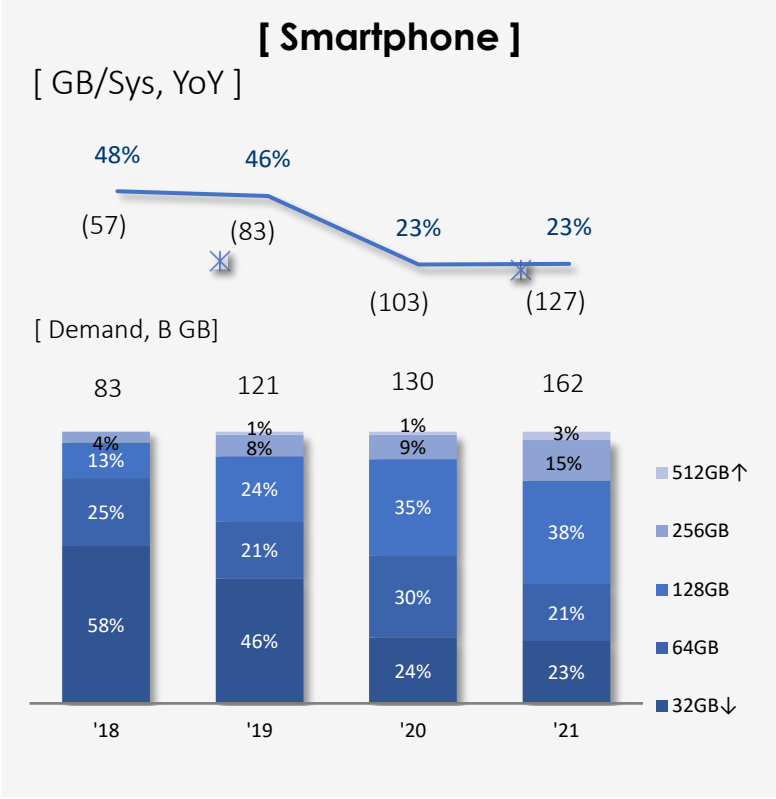
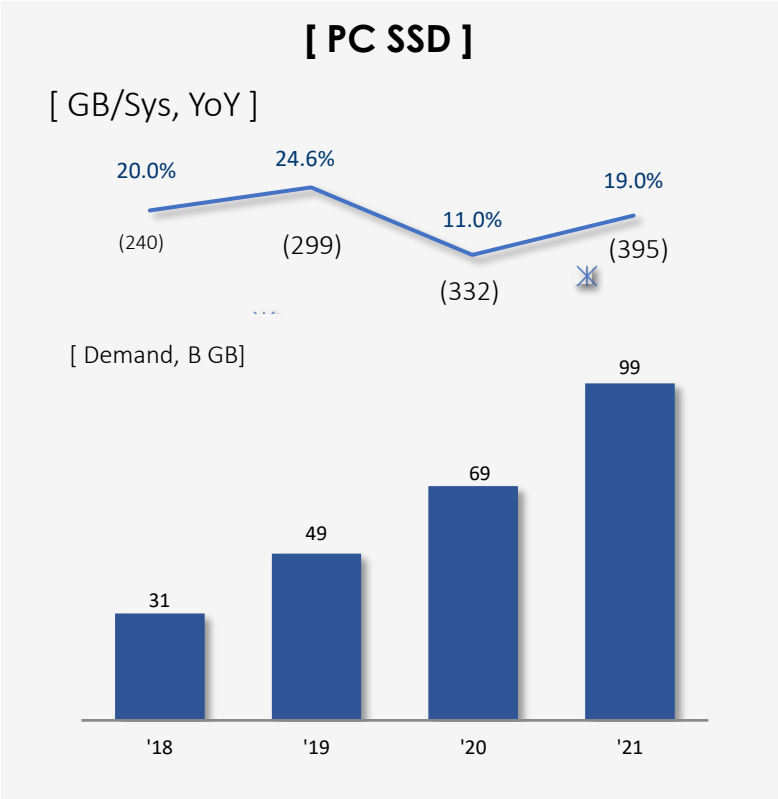
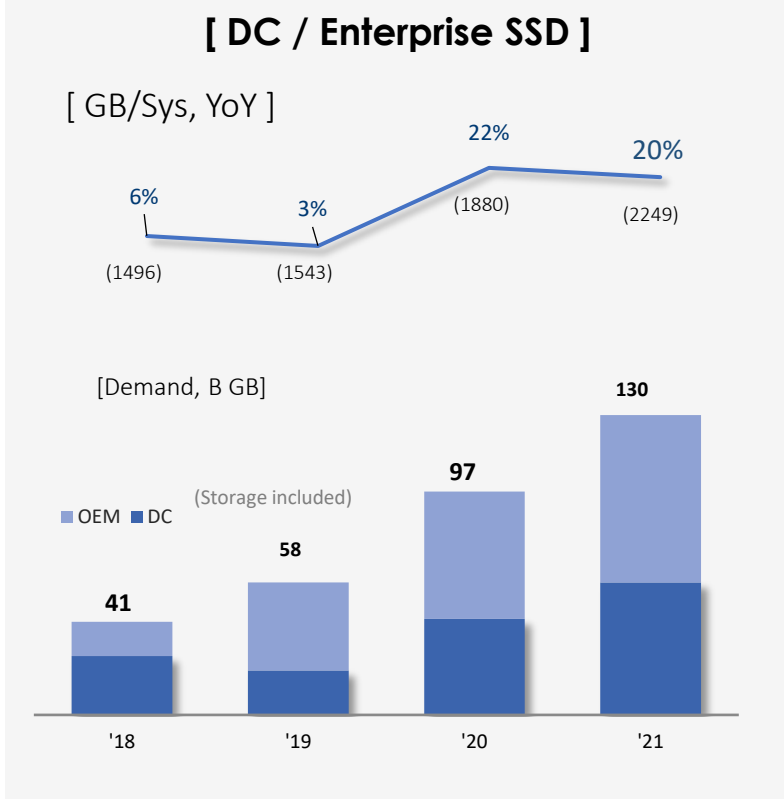
Proprietary

NAND Solution Market outlook

1. Enterprise SSD market to see continuing growth due to data explosion





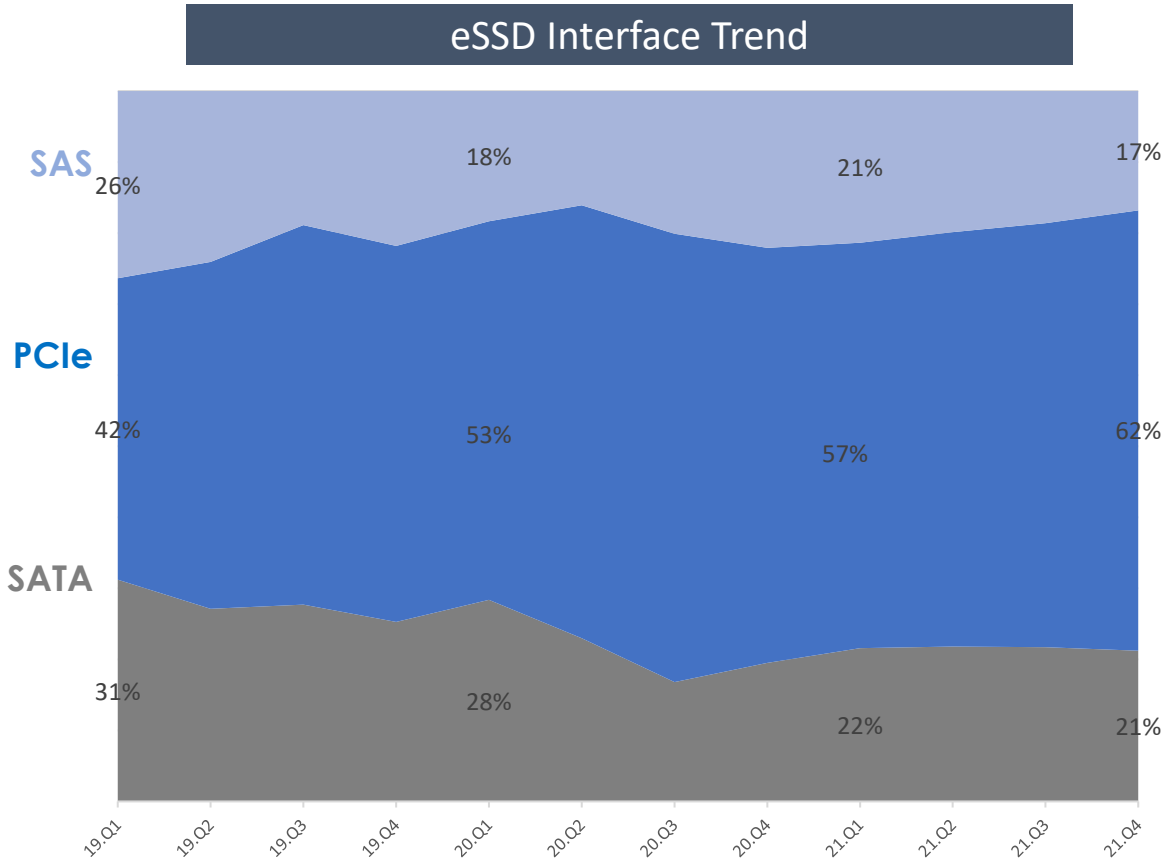


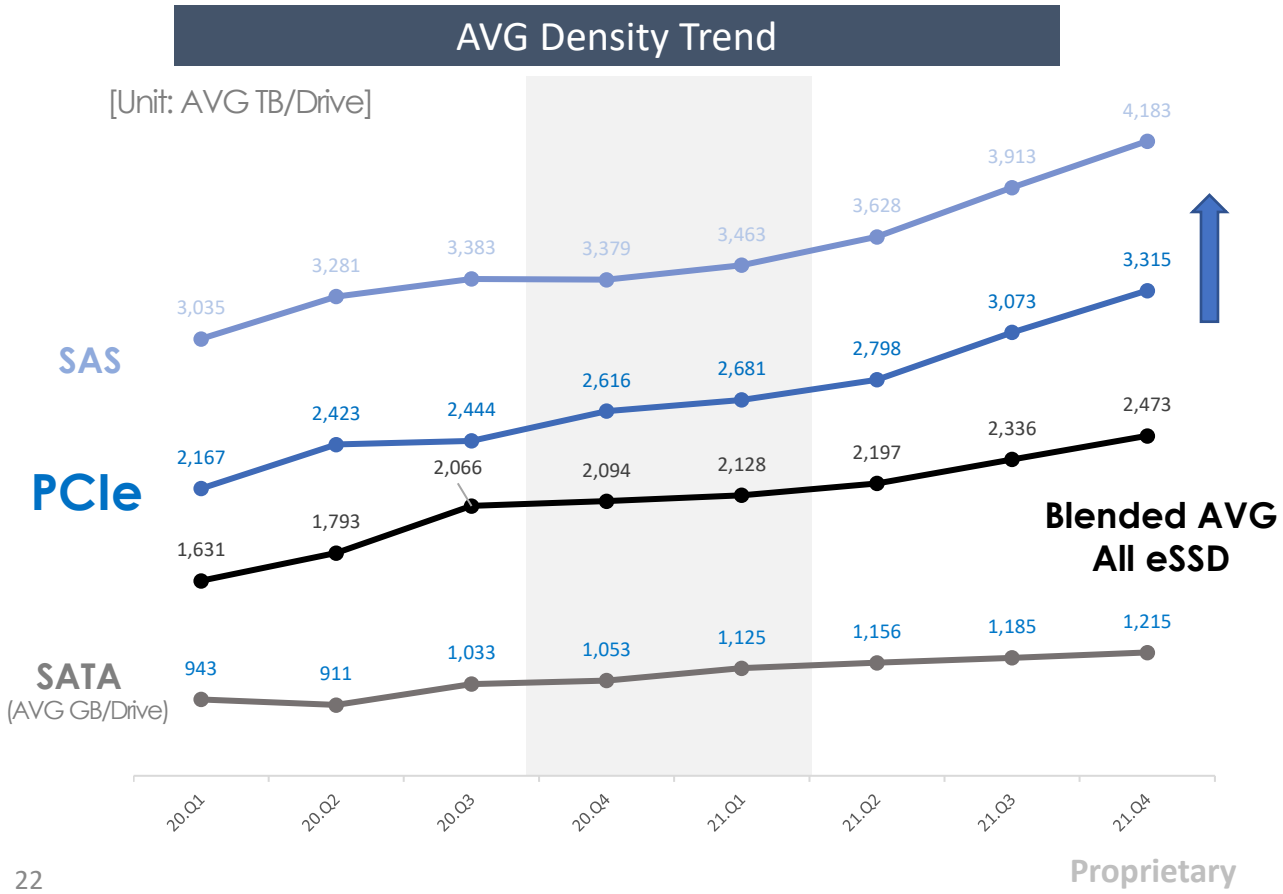
Source: Samsung, Forward Insights

Proprietary

Industry Interface Trend: NVMe Drives eSSD Growth

1. PCIe performance benefits drive interface conversion and higher density SSD – More than 8/16TB



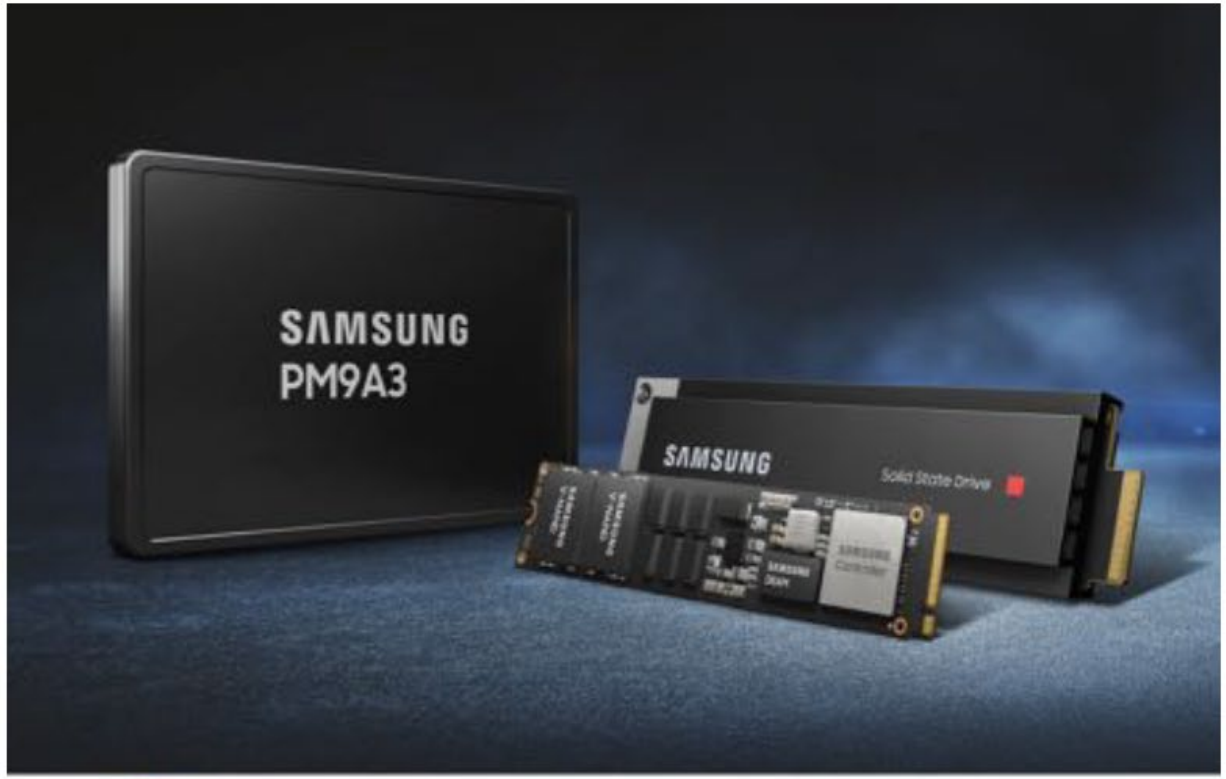


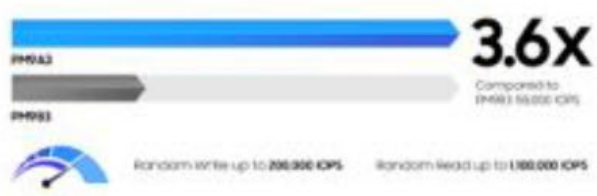
Source: Samsung, Forward Insights

Proprietary

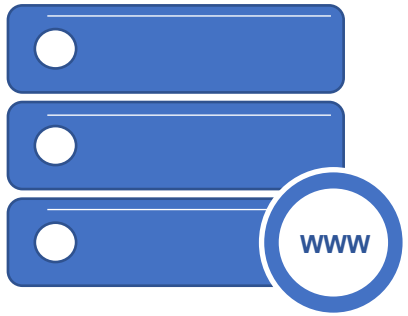
Technical trend of DC NVMe SSDs

1. **From 2020, PCIe Gen4 based DC NVMe SSDs have been introduced continuously**
   1) SSD's own performances are getting higher and various types of new form-factors are being adopted to meet host level requirements.
2. **Samsung is the leading company to support best in class performances and all kinds of form-factor**

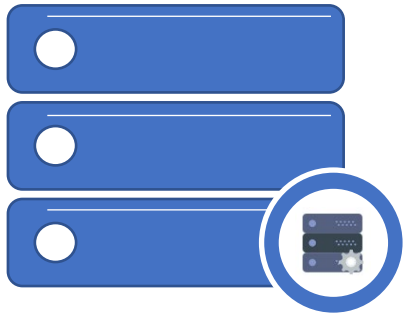




Target Applications



① Multi-Thread & More functions
(Compute, Web servers, Mainstream servers)



② Mixed workload Service with PCIe Gen.4 speed
(Application servers, File servers)

Proprietary

PM9A3 Value Proposition

PM9A3

Samsung NVMe™ SSD PM9A3 provides the best in class PCIe Gen. 4 performances, various platform efficiencies, highly scalable design capability such as multiple form-factors and enhanced reliability with advanced V-NAND technology

Performance

- PCIe Gen.4 based performances for mainstream(Computing & Storage) servers with NVMe interface.
- Best in class QoS for various workload

Efficiency

- Improved energy efficiency, up to 80% power consumption per unit performance
- Faster emergency responsibility.

Design Capability

- Enhanced design scalability under host level constraints such as 1U server – providing multiple F/F for users' demands
- Leading technical priority of OCP and providing new reference design based on OCP specs

Proprietary

Performance: PCIe Gen.4 Generic version

1. **PM9A3 provides best-in class PCIe Gen.4 performance for all kinds of form-factor**
   1) Random write performance is the key performance of PM9A3 → Refer to competitiveness of PM9A3.
2. **Even though high performance, PM9A3 consumes small amount of power for datacenters' power efficiency**
   ※ Refer to appendix for power budget of SSD form-factor, PM9A3 achieves high performance with enough margin.

Form Factor		U.2 (7mmT)				E1.S (9.5mmT)		M.2 (22x110mm)		
Capacity		7.68TB	3.84TB	1.92TB	960GB	3.84TB	1.92TB	3.84TB	1.92TB	960GB
Sequential (128KB, MB/s)	Read	6,700	6,900	6,800	6,500	6,800	6,800	5,500	5,500	5,000
	Write	4,000	4,100	2,700	1,500	4,000	2,700	2,000	2,000	1,400
Random (4KB, KIOPS)	Read	1,100	1,000	740	580	1000	850	800	800	550
	Write	200	190	130	70	190	130	85	85	60
Power (Watt)	Active (R/W)	11/13.5	11/13.5	10/12.5	9.5/8	11/13.5	10/12.5	8.2/8.2	8/8.2	7.5/6.5
	Idle	3.5	3.5	3.5	3.5	3.5	3.5	2.5	2.5	2.5

Proprietary

Performance: Best in class Latency and QoS

1. Latency

Form Factor		U.2 (2.5”mm 7mmT)				E1.S (9.5mmT)*		M.2 (22x110mm)		
Capacity		7.68TB	3.84TB	1.92TB	960GB	3.84TB	1.92TB	3.84TB	1.92TB	960GB
Sequential (128KB, us)	Read	20	20	20	20	20	20	20	20	20
	Write	20	20	20	20	20	20	20	20	20
Random (4KB,QD1, us)	Read	80	80	80	80	80	80	75	75	75
	Write	30	30	30	35	30	30	30	30	30
Drive Ready Time (sec)		8	8	8	8	8	8	5	5	5

* U.3 is under development for contracted server OEM companies first.

2.

Form Factor		U.2 (2.5”mm 7mmT)				M.2 (22x110mm)		
Capacity		7.68TB	3.84TB	1.92TB	960GB	3.84TB	1.92TB	960GB
Read (us)	QD1	0.1/0.15	0.1/0.15	0.1/0.15	0.1/0.15	0.1/0.15	0.1/0.15	0.1/0.15
	QD32	0.25/0.5	0.25/0.5	0.25/0.5	0.5/0.6	0.25/0.5	0.25/0.5	0.5/0.6
Write (us)	QD1	0.03/0.04	0.03/0.04	0.03/0.04	0.06/0.06	0.03/0.04	0.03/0.04	0.06/0.06
	QD32	0.35/0.5	0.35/0.5	0.35/0.6	0.6/0.6	0.7/0.7	0.7/0.7	0.8/0.8

Proprietary

Efficiency: Power consumption

1. **Regardless PCIe version, PM9A3 provides the lowest power consumption with the fastest performances.**
2. **Lower power consumption is the key factor of TCO for datacenters**
   1) Lower power means lower heat generation and it directly affects cooling cost of systems and datacenters

※ Refer excel spread sheet for competitors power consumption level,

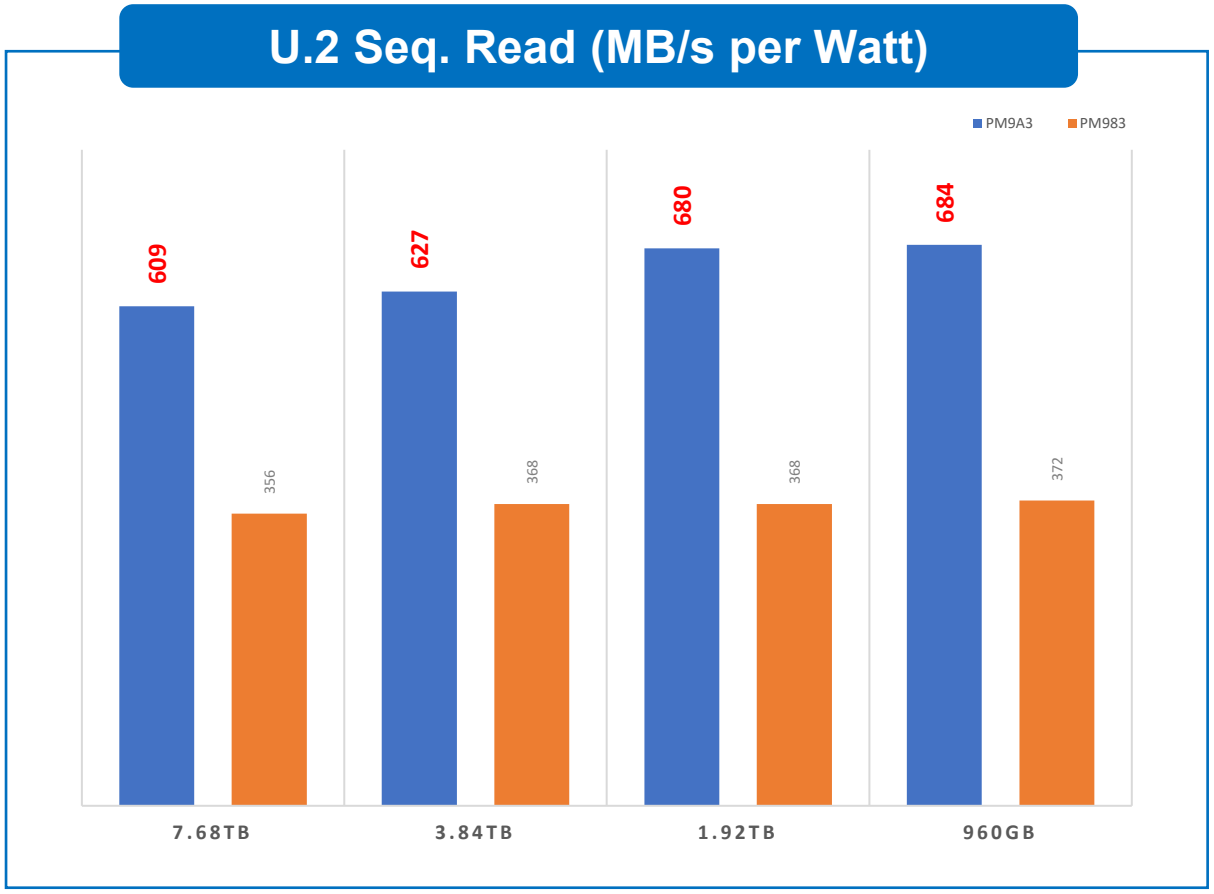
12V supply cond.		U.2 (2.5”mm 7mmT)				M.2 (22x110mm)		
Capacity		7.68TB	3.84TB	1.92TB	960GB	3.84TB	1.92TB	960GB
Active (Watt)	Read	11	11	10	9.5	8.2	8	7.5
	Write	13.5	13.5	12.5	8	8.2	8.2	6.5
Idle (Watt)		3.5	3.5	3.5	3.5	2.5	2.5	2.5
F/F Max Power		25W				8.25W		

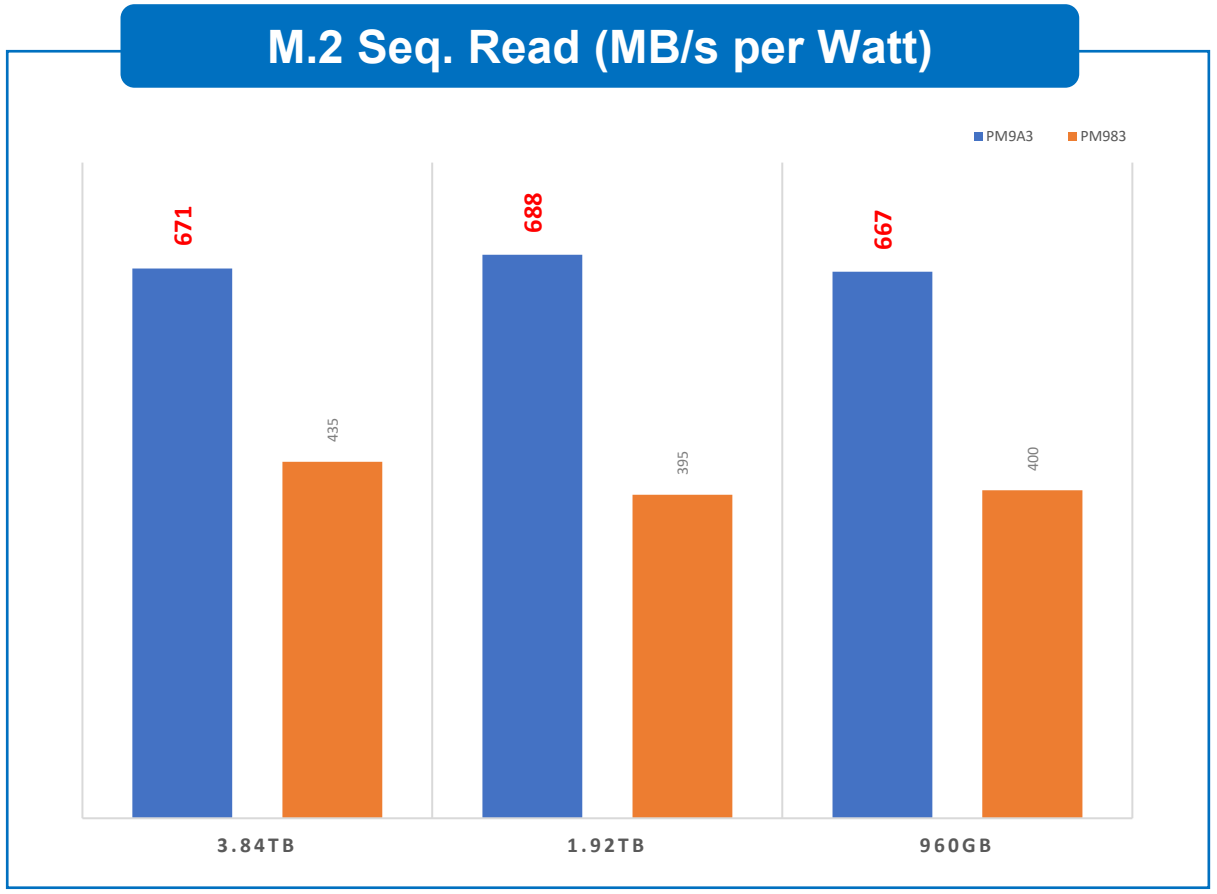
1) Power consumption was measured in the 12V power pins of the connector plug in SSD. The active and idle power is defined as the highest averaged power value, which is the maximum RMS average value over 100 ms duration.
2) The measurement condition for active power is assumed for Maximum power between sequential or random performance in PCIe Gen4.
3) The idle state is defined as the state that the host system can issue any commands into SSD at any time

Proprietary

Efficiency: Efficient Power management (Seq. Read)

1. **PM9A3 provides up to 1.8x times better power efficiency than previous generation, PM983**
   1) Even though PM9A3 is PCIe Gen.4 based SSD, less power consumption with higher performance

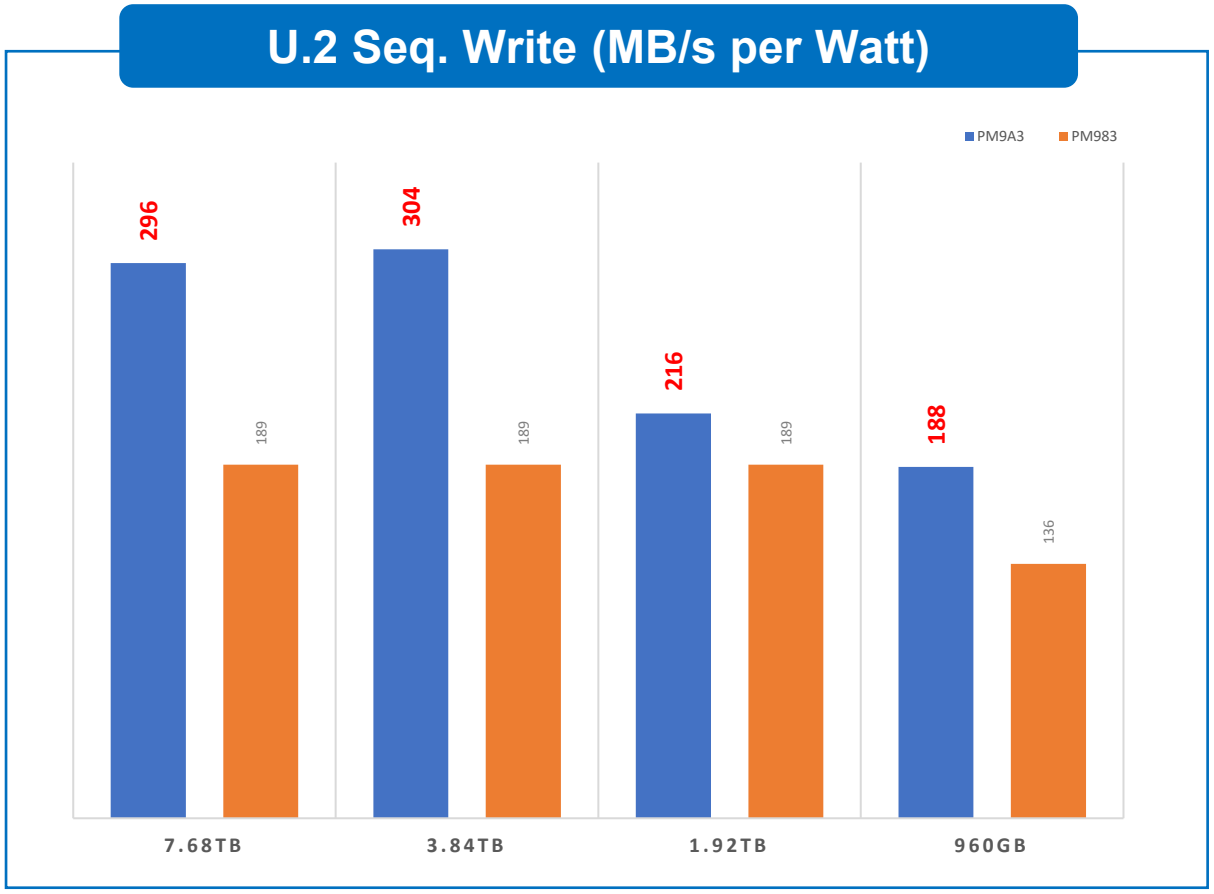


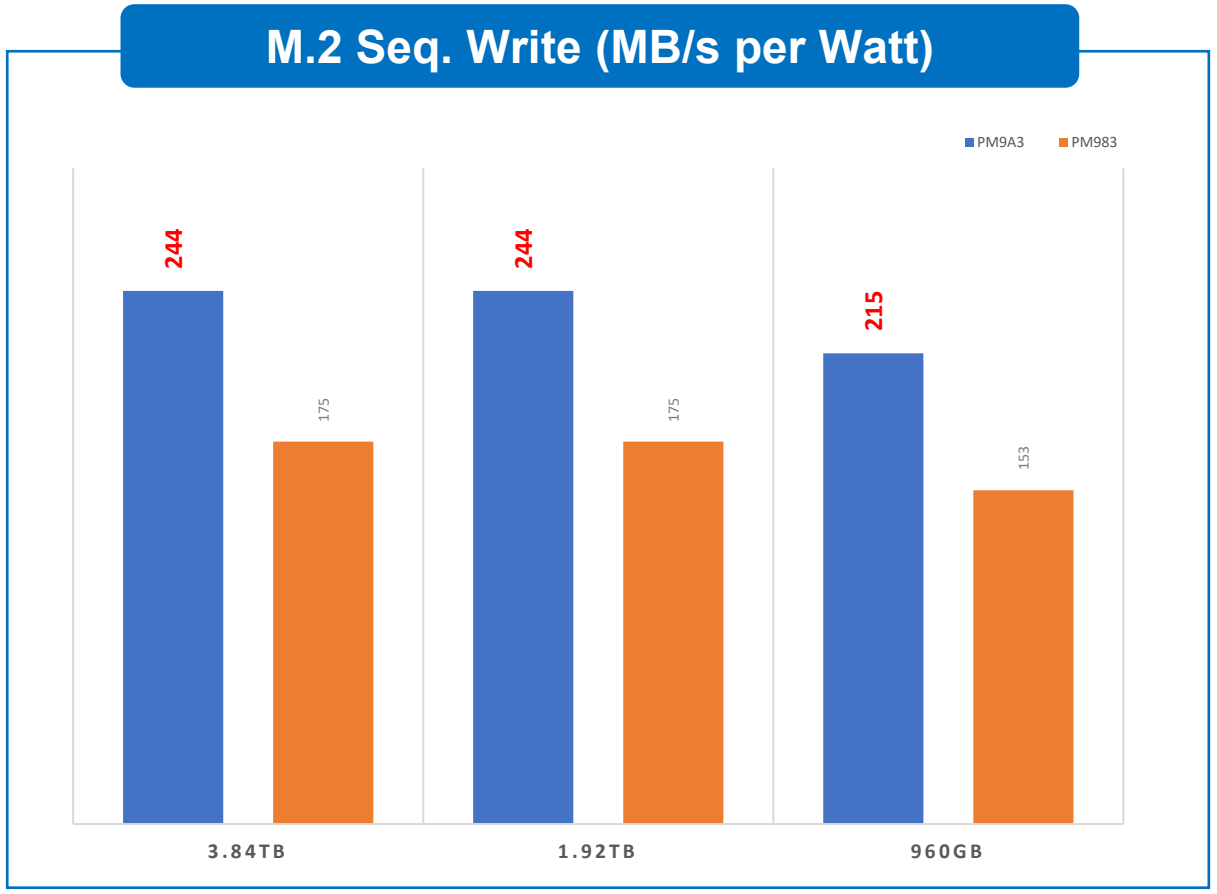


Proprietary

Efficiency: Efficient Power management (Seq. Write)

1. **PM9A3 provides up to 1.6x times better power efficiency than previous generation**





Proprietary

Design Capability: Multiple Form Factor

1. **Samsung can meet various form-factor needs from server manufacturers and DC architecture designers – M.2, U.2, E1.S, E1.L and U.3**

PM9A3 Overview

		PM9A3	PM983
Interface		**PCIe Gen4x4**	PCIe Gen3
Port configuration		Single port	Single port
CTRL		Elpis (8ch)	Phoenix (8ch)
NAND		**V6(128L)** TLC	V4(64L) TLC
Form-Factor		U.2, **U.3**, M.2, **E1.S, E1.L**	M.2, U.2
Capacity		**15.36TB**/7.68TB/3.84TB/1.92TB/960GB	7.68TB/3.84TB/1.92TB/960GB
Logical Block Address		512B(Default), 4KB	512B(Default), 4KB
NVMe.	NVMe Ver	1.4(Mandatory Only)	1.3c
	Sanitize	NVMe 1.3 Compliance (Block Erase, Crypto Erase)	Not Support
	Device Self test	Support	Not Support
SED		TCG/Opal	TCG/Opal
DWPD		1@5yr	1.3@3yr
Warranty		3	3

Proprietary

Security

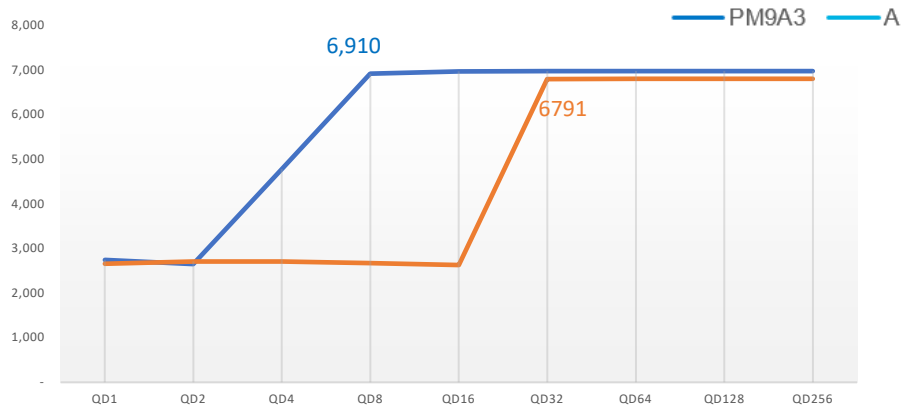
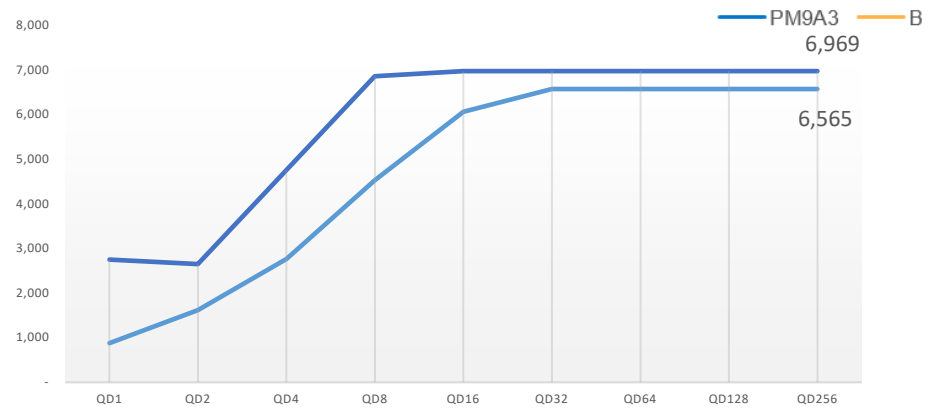
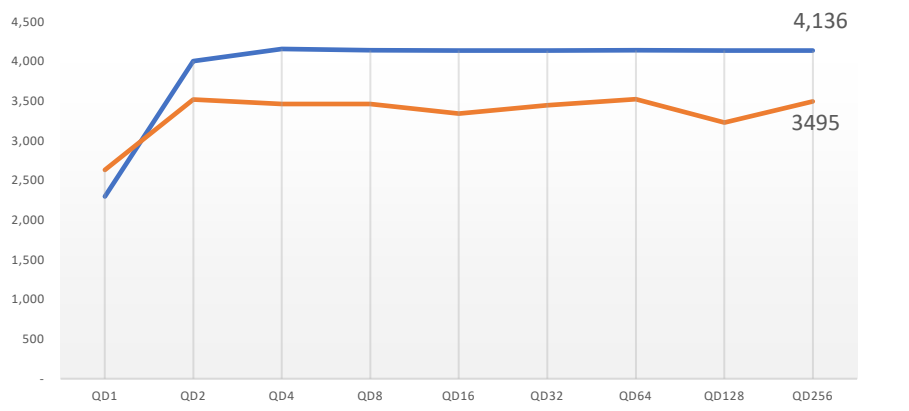
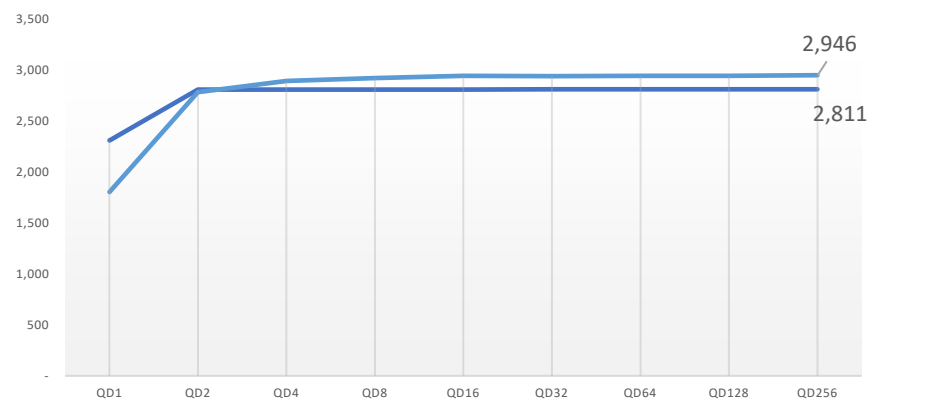
1. **AES 256-bit hardware-accelerated encryption with optional TCG Opal 2.0 feature to protect data at rest**
   1) SED(Self-encrypting Drive) feature with no performance degradation
   2) Advanced key management scheme guarantees no access to the encrypted data without knowing users' credentials
   3) PUF(Physically Un-clonable Function) technology to provide an additional layer of security by encrypting sensitive information with a unique, random and unpredictable key

2. **Secure FW boot and update to prevent the firmware from illegal modification**
   1) Hardware based immutable firmware verification at every power-on
   2) Digital signature to protect firmware integrity based on RSA-3072
   3) Key Revocation feature to revoke the firmware verification key in case of compromised signing key

Proprietary

128KB Sequential performance(MB/s)

1. PM9A3 provides best-in class sequential read and write performance

U.2	3.84TB	1.92TB
Seq. Read (MB/s)		
Seq. Write (MB/s)		

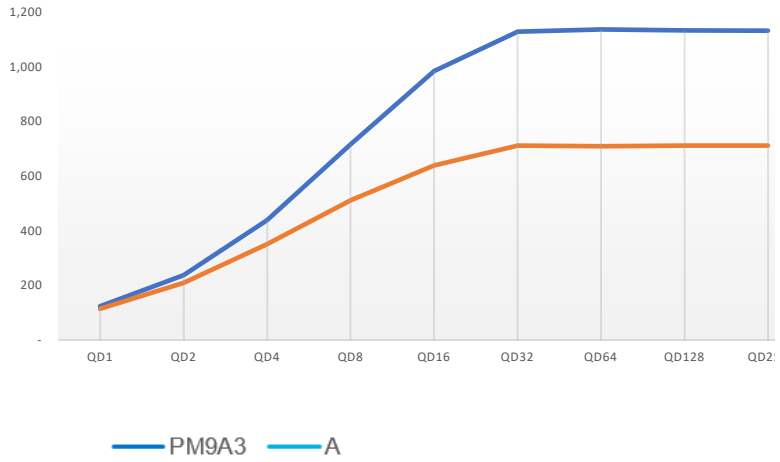
Proprietary

4KB Random Performance(KIOPS): 3.84TB

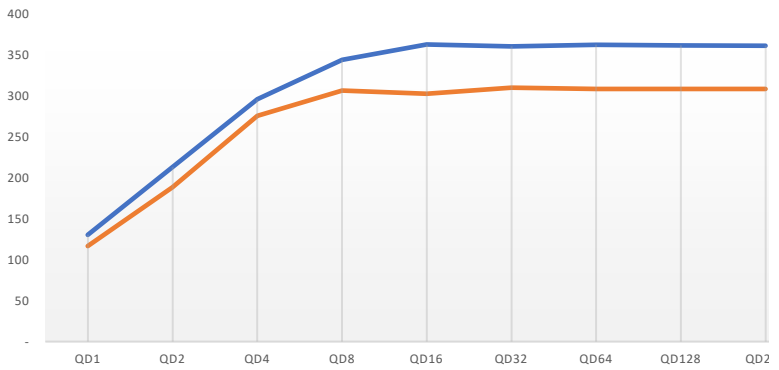
1. PM9A3 provides robust 4KB ran performance in various types of mixed workload pattern

1) Datacenter customers are usually focusing on 70% Read case(mixed workload 7:3), PM9A3 shows up to 20% higher IOPs.

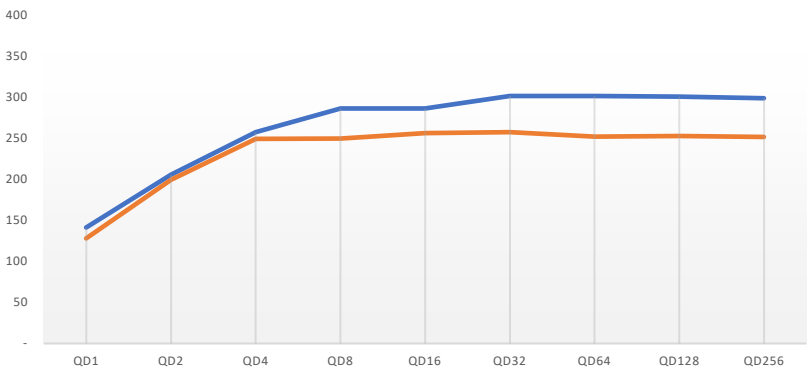
Read 100%



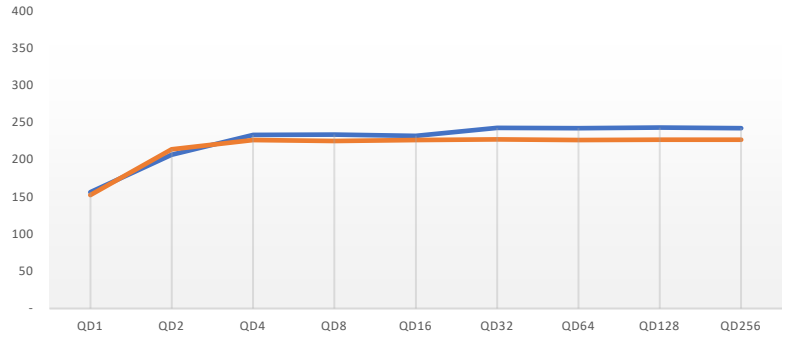
R/W 70%:30%



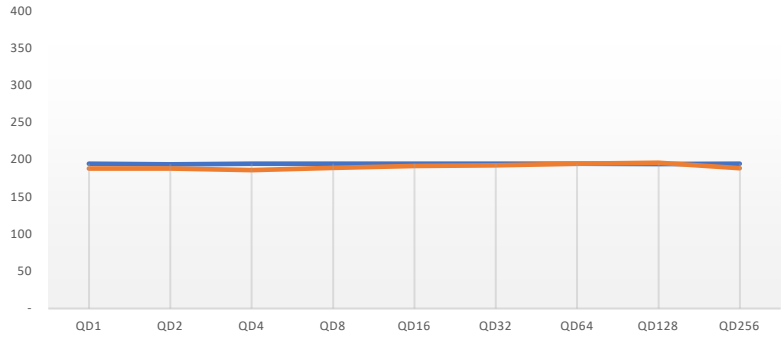
R/W 50%:50%



R/W 30%:70%



Write 100%

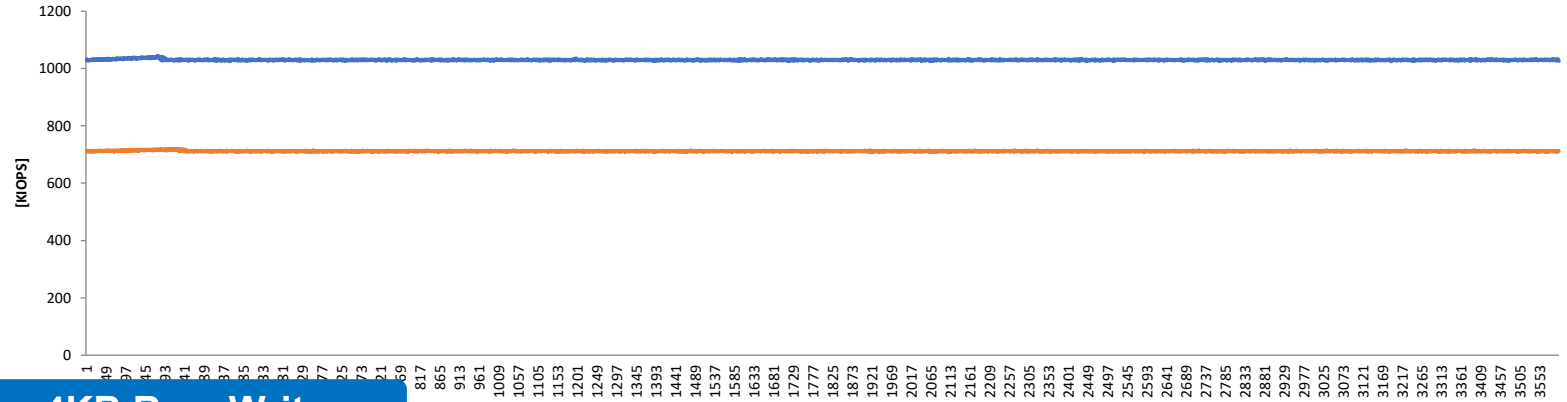


Proprietary

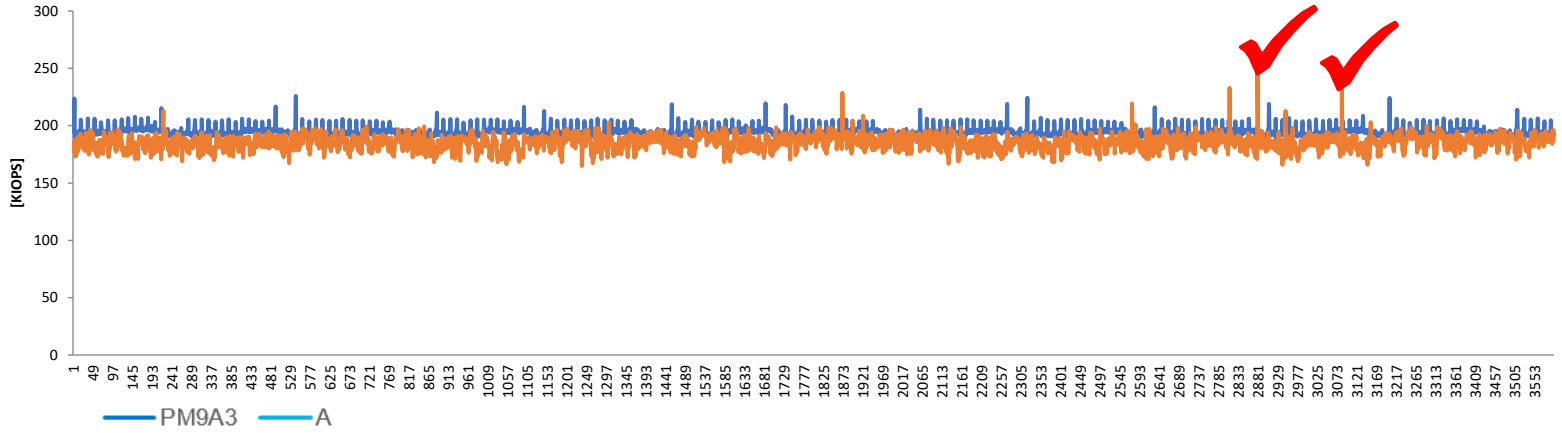
IOPS consistency: 3.84TB

1. PM9A3 shows stable IOPS consistency with Gen.4 performance compared to 16x based SSD

4KB Ran. Read



4KB Ran. Write

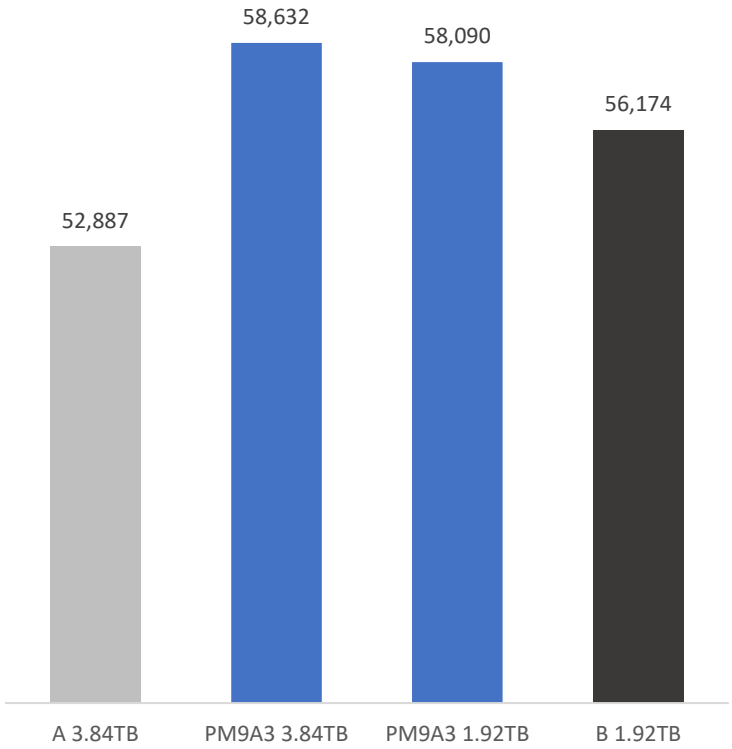


	PM9A3	A
Read	100%	99%
Write	97%	90%

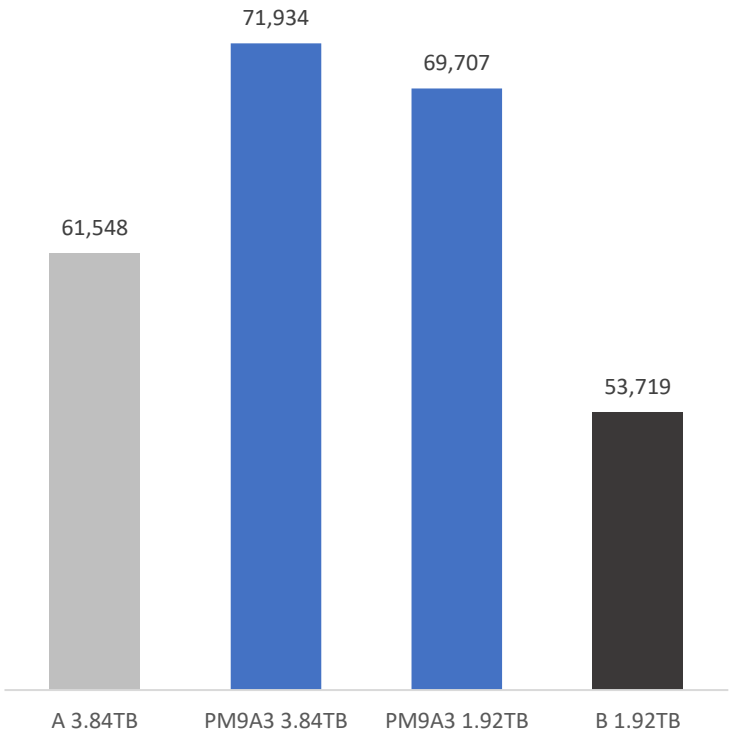
Proprietary

User-environment simulation test (script base)

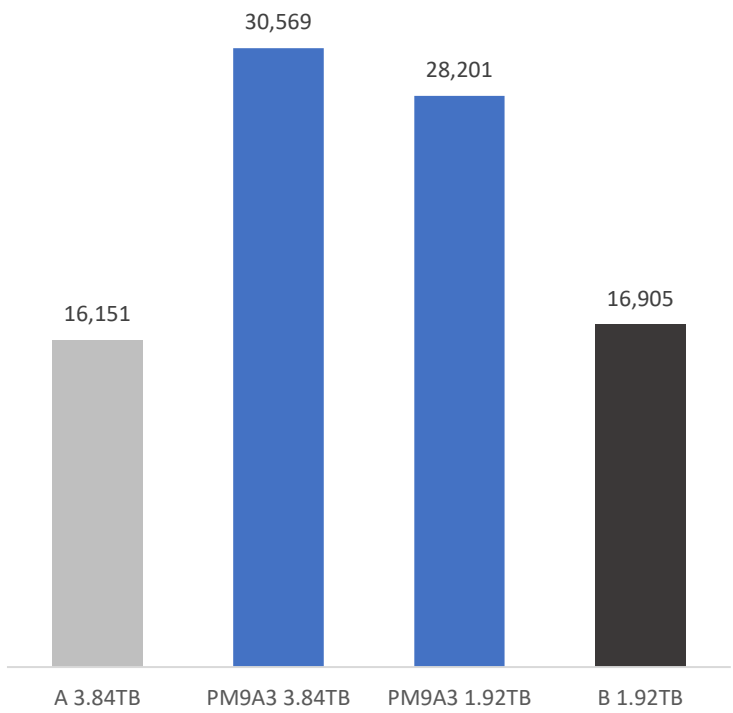
※ Higher score is better



4KB	Web Server
Seq. read	25%
Seq. Write	75%
Ran. Read	95%
Ran. Write	5%



4KB	Exchange email
Seq. Read	0%
Seq. Write	100%
Ran. Read	67%
Ran. Write	33%

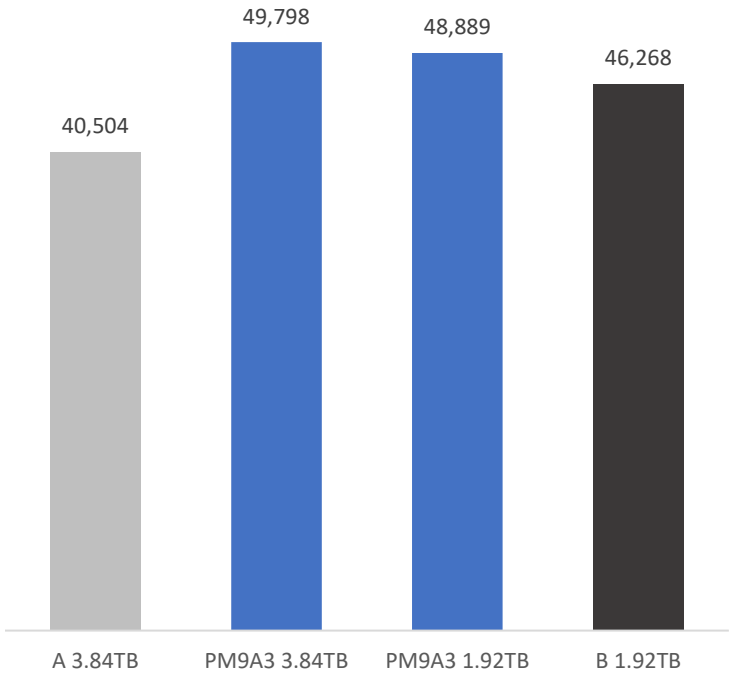


64KB	Media streaming
Seq. Read	100%
Seq. Write	0%
Ran. Read	98%
Ran. Write	2%

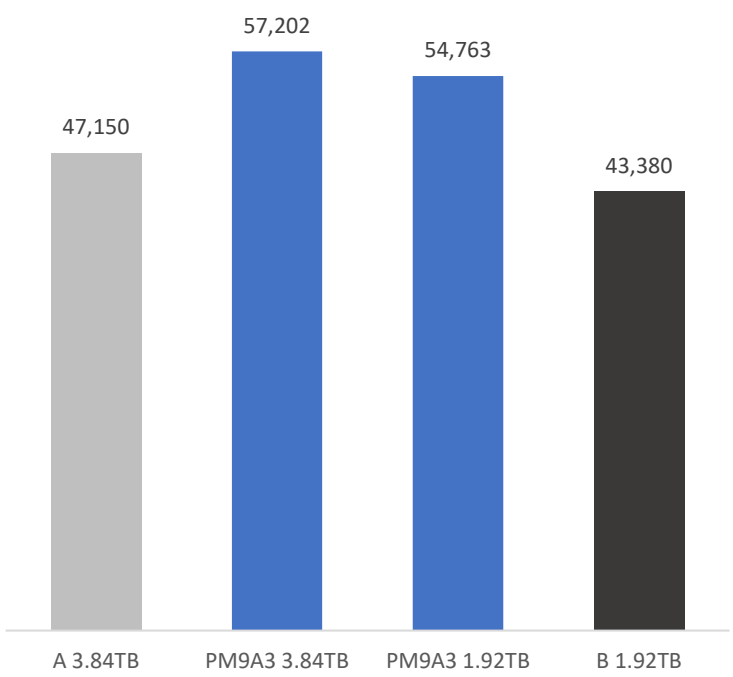
Proprietary

User-environment simulation test (script base)

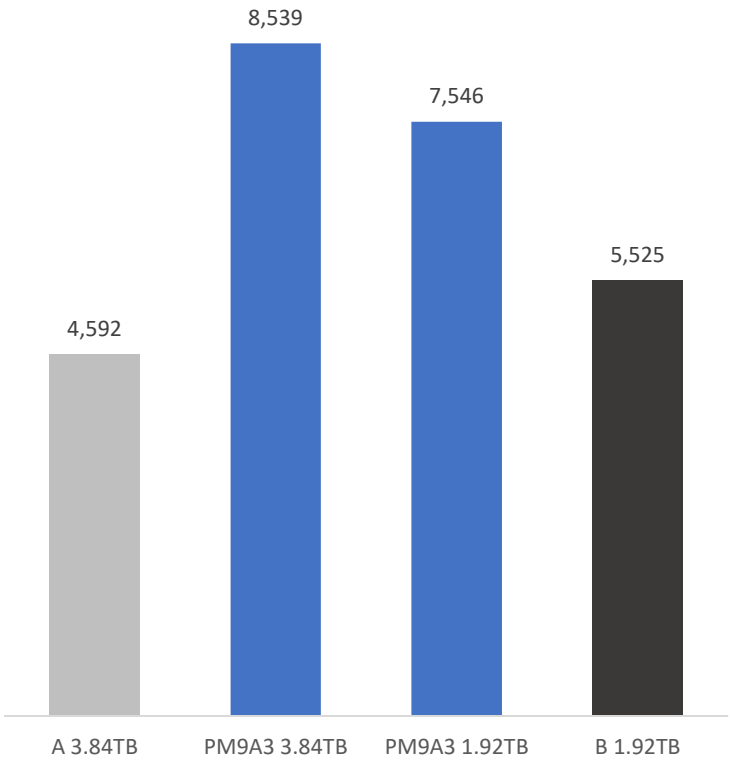
※ Higher score is better



4KB	File Server
Seq. read	25%
Seq. Write	75%
Ran. Read	90%
Ran. Write	10%



8KB	Database OLTP
Seq. Read	0%
Seq. Write	100%
Ran. Read	70%
Ran. Write	30%



512KB	Video on demand
Seq. Read	100%
Seq. Write	0%
Ran. Read	100%
Ran. Write	0%

Proprietary

QNAP All Flash NAS

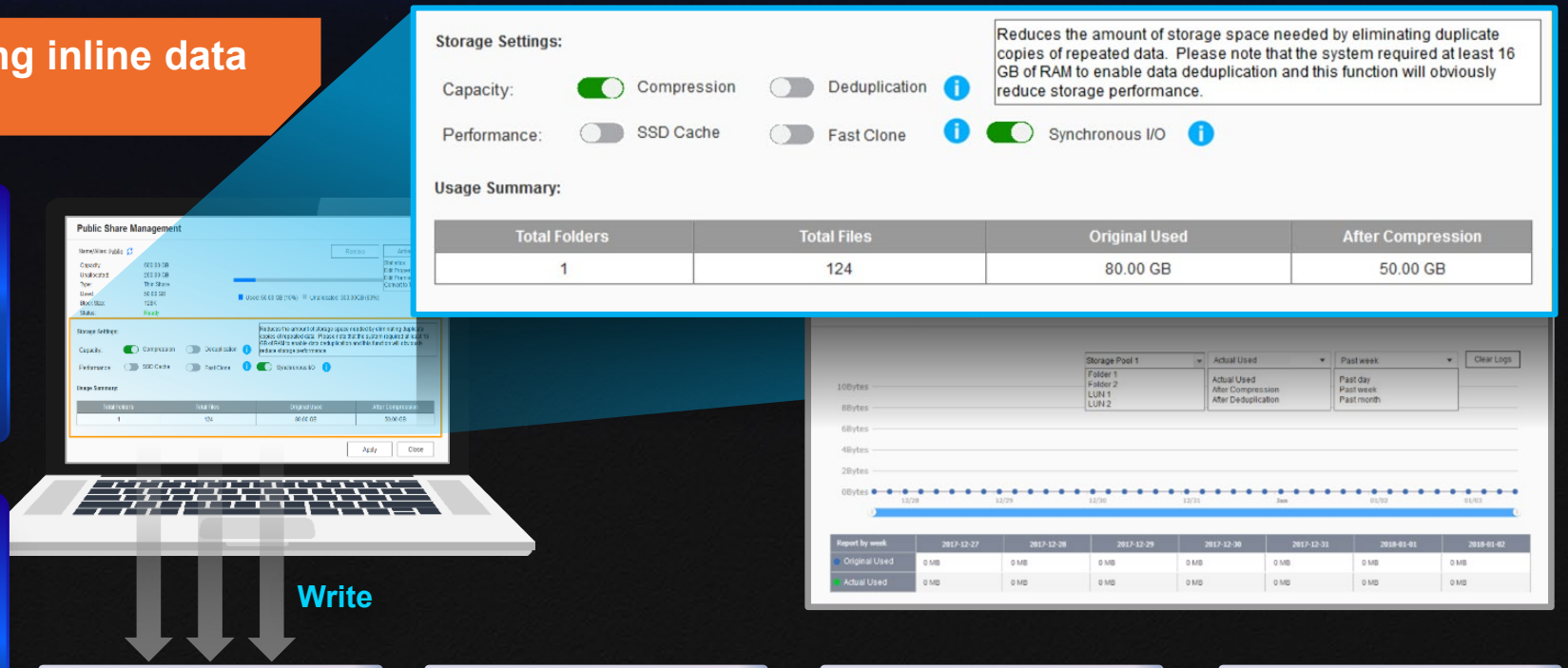
Fast and furious with expandability

TDS-h2489FU with powerful data reduction to extend SSD endurance

Only available when during inline data process before writing

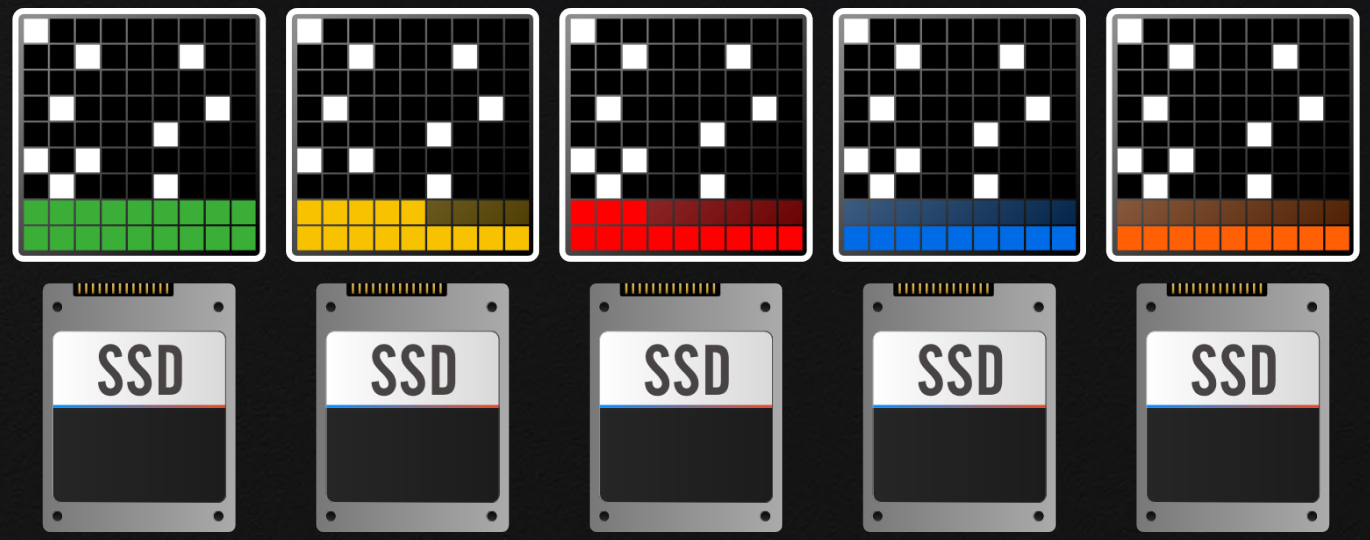
ZFS file system with inline deduplications and compresstion feature

It's the best choice to pair with the all-flash and SSD storage because it reduces the data size and pattern that need to be written to the SSD directly.



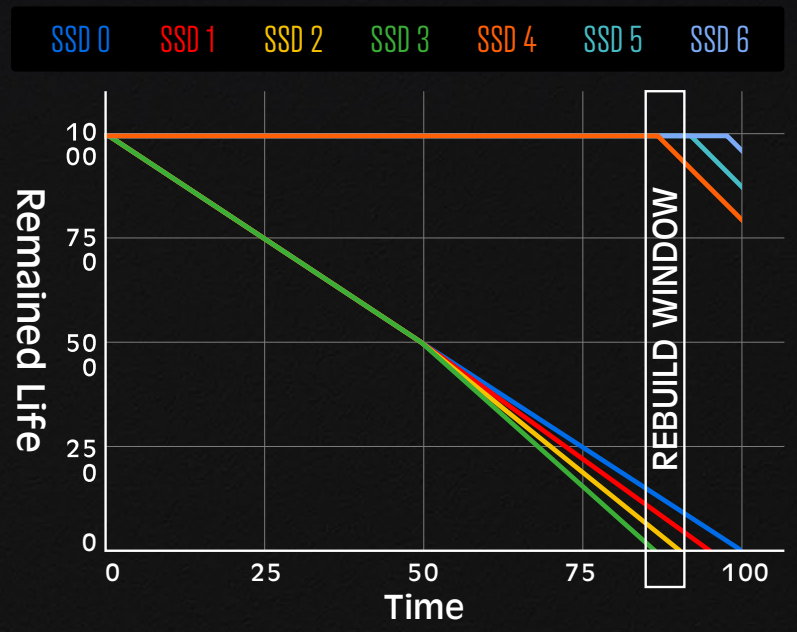
Patented QSAL technology: preventing multiple SSD malfunctioning at the same time

QSAL
Dynamic
Distribution



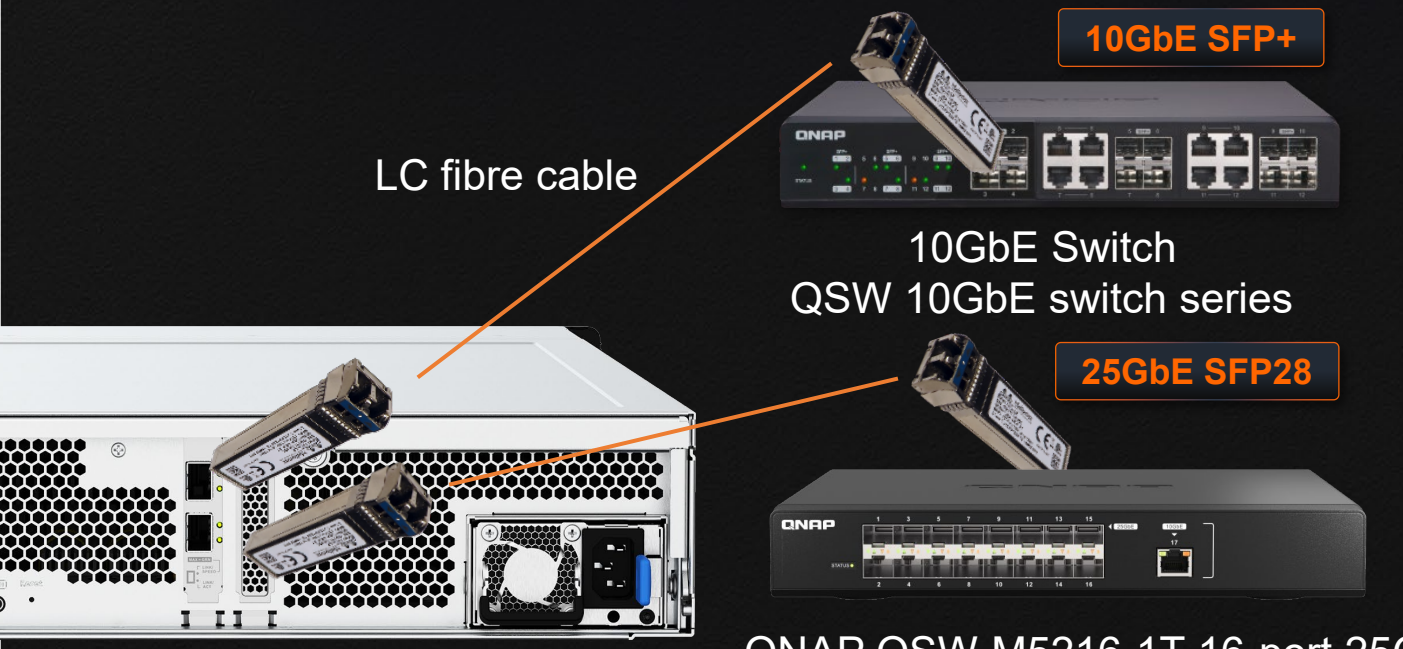
For SSD RAID 5 / 6 / 50 / 60 / TP(Triple Parity).

Note: QSAL can be activated at any time and is compatible with SSD Parity RAID that has not been configured before. It is recommended to enable QSAL before the SSD lifespan reaches 50% to prevent the risk of damage to the SSD RAID due to insufficient rebuild time.



Support 25GbE/10GbE/1GbE transceivers for various network environments

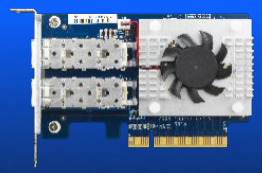
- Built-in 2 x 25GbE ports for SFP28 transceivers
- Backward compatible with 10GbE and 1GbE networks with compatible SFP+/SFP transceivers
- Auto-negotiation for auto speed detection



Abundant high-speed network cards with plug and use support

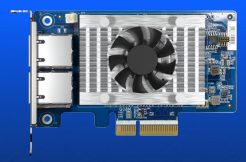
10GbE NIC

2 x SFP+



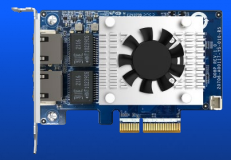
QXG-10G2SF-CX4

2 x RJ45



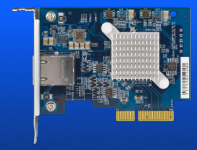
LAN-10G2T-X710

2 x RJ45



QXG-10G2TB

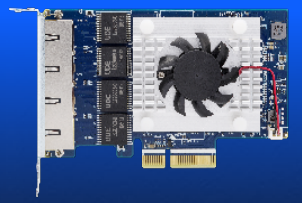
1 x RJ45



QXG-10G1T

5GbE NIC

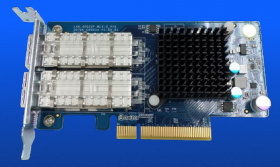
1/2/4 x RJ45



QXG-5G1T-111C
QXG-5G2T-111C
QXG-5G4T-111C

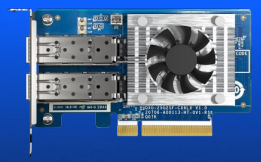
40/25GbE NIC

2 x QSFP+ 40Gb/s



LAN-40G2SF-MLX

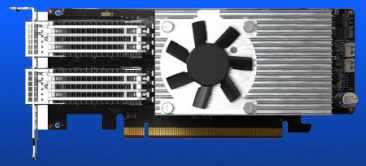
2 x SFP28 25Gb/s



QXG-25G2SF-CX6

100GbE NIC

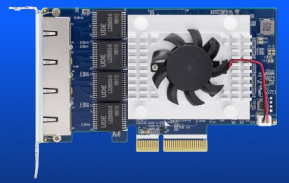
2 x QSFP28



QXG-100G2SF-E810

2.5GbE NIC

1/2/4 x RJ45



QXG-2G1T-I225
QXG-2G2T-I225
QXG-2G4T-I225

PCIe Gen4 slots for 100GbE Ethernet

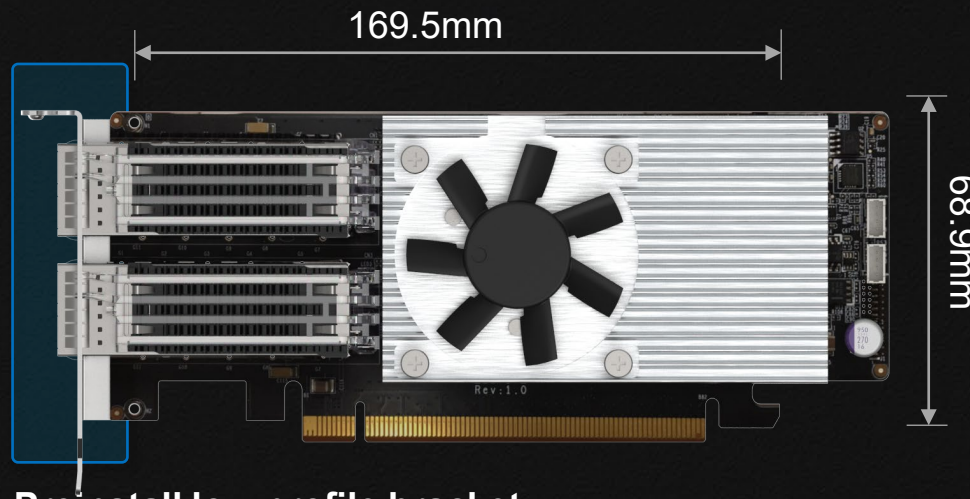
- Install the QNAP **QXG-100G2SF-E810** network card with a 100GbE switch for 100GbE network adaptation and future proof your storage investment.
- Support port-configuration mode to connect to 4 x 25GbE port.
- Connect your 100GbE server to **4 x 25GbE or 8 x 10GbE** end devices with native port-configure mode

Mellanox 25 / 100 GbE Switch (SN2010)

Full-height bracket include inside package

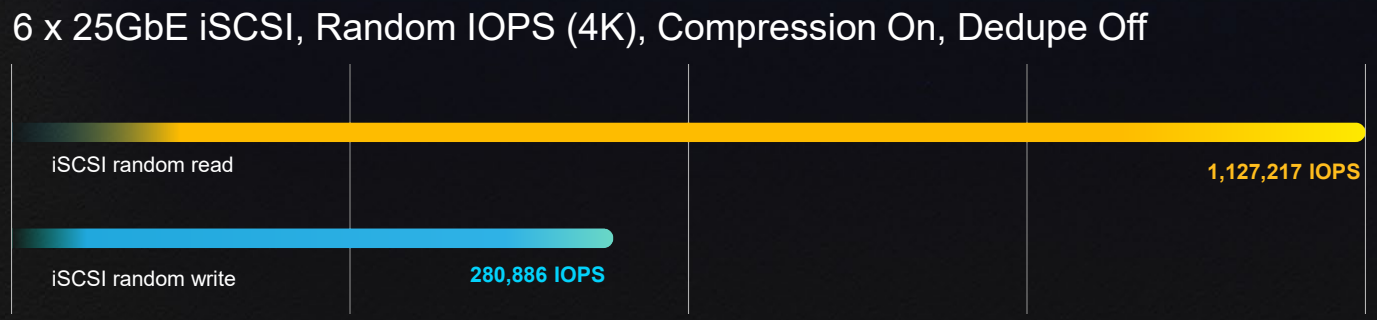
CAB-DAC15M-Q28B4

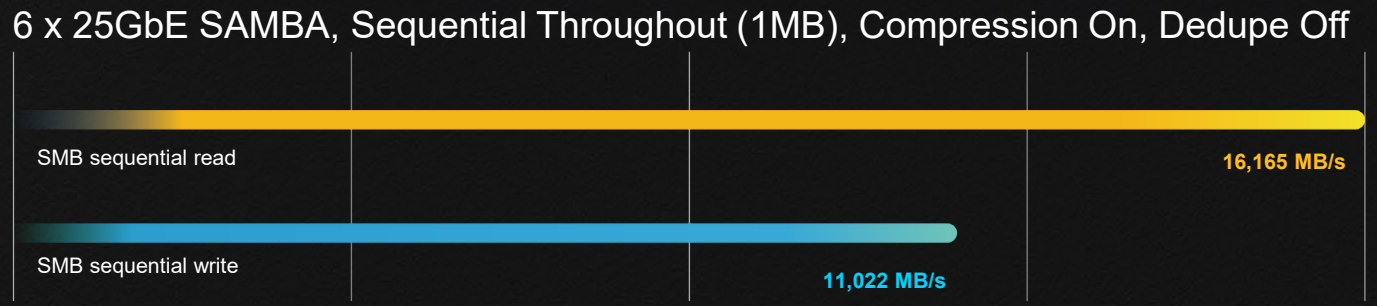
CAB-DAC15M-Q28



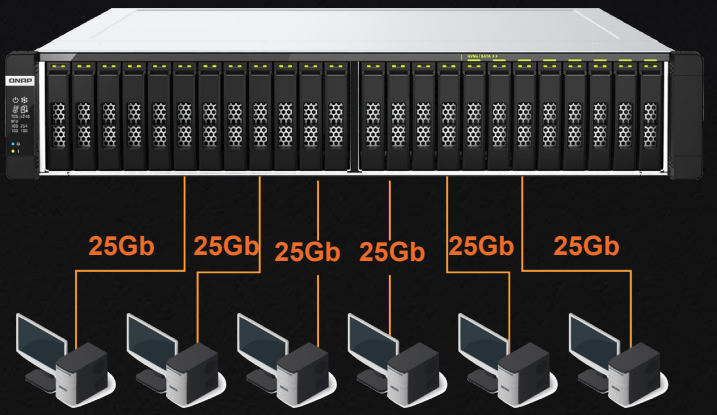
Preinstall low profile bracket

Performance of 32-core TDS-h2489FU-4314-128G with 6 x 25GbE clients





- **Up to 1.1 million iSCSI random read IOPS!**
- **16,165MB/s SMB seq. read and 11,022 MB/s SMB seq. write!**



6 x 25GbE clients concurrent access

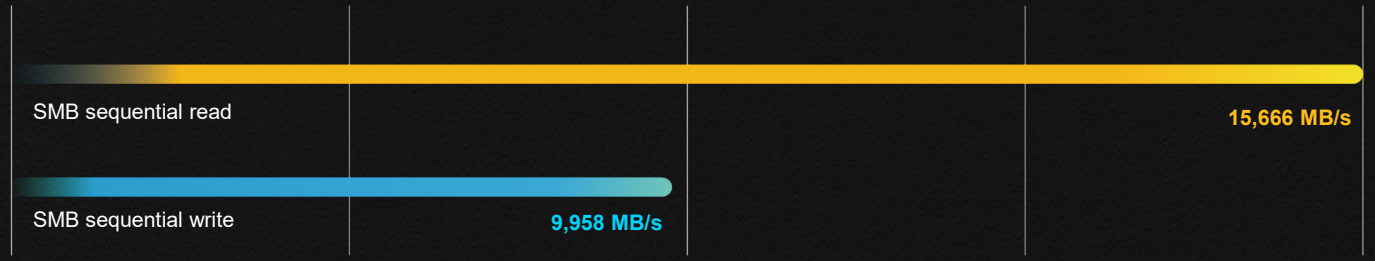
Tested in QNAP Labs. Figures may vary by environment.

Test Environment:
NAS: TDS-h2489FU-4314-128G with QuTS hero 5.0.0
Volume type: Samsung PM9A3 960G Gen4 U.2 NVMe SSD x24 (RAID 50); Intel QXG-100G2SF-E810; QXG-25G2SF-CX4
Client PC:
6* Client PC simultaneously read and write 16GB file (= 96GB totally)
Intel Core™ i7-7700 4.20GHz CPU, 32GB DDR4 RAM, QXG-25G2SF-CX4, Windows® Server 2016, and Intel Core™ i3-8100 3.60GHz CPU, 4GB DDR4 RAM, QXG-25G2SF-CX4, Windows® Server 2016

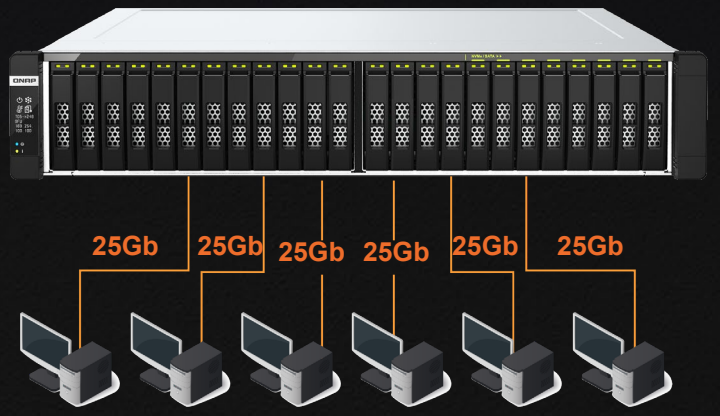
Performance of 16-core TDS-h2489FU-4309Y-64G with 6 x 25GbE clients

6 x 25GbE iSCSI, Random IOPS (4K), Compression On, Dedupe Off

6 x 25GbE SAMBA, Sequential Throughout (1MB), Compression On, Dedupe Off



- **Up to 745,479 iSCSI random read IOPS!**
- **15,666 MB/s SMB seq. read and 9,958 MB/s SMB seq. write!**

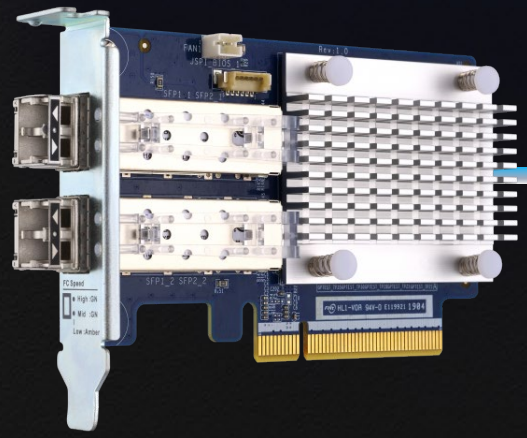


6 x 25GbE clients concurrent access

Tested in QNAP Labs. Figures may vary by environment.

Test Environment:
NAS: TDS-h2489FU-4309Y-64G with QuTS hero 5.0.0
Volume type: Samsung PM9A3 960G Gen4 U.2 NVMe SSD x24 (RAID 50); Intel QXG-100G2SF-E810; QXG-25G2SF-CX4
Client PC:
6* Client PC simultaneously read and write 16GB file (= 96GB totally)
Intel Core™ i7-7700 4.20GHz CPU, 32GB DDR4 RAM, QXG-25G2SF-CX4, Windows® Server 2016, and Intel Core™ i3-8100 3.60GHz CPU, 4GB DDR4 RAM, QXG-25G2SF-CX4, Windows® Server 2016

Fibre Channel SAN
32Gb & 16Gb storage solution



QXP-32G2FC

2-port 32Gbps FC card

QXP-16G2FC

2-port 16Gbps FC card

Designed for NAS, high-performance and efficient QNAP FC expansion cards*

* Installation on Windows/Linux hosts is not supported

Includes optical FC transceivers. Additional ones available for purchase:

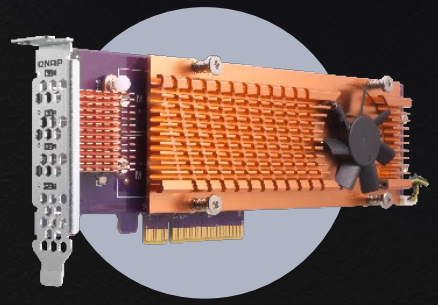
- TRX-32GFCSFP-SR
  32Gb/16Gb/8Gb
- TRX-16GFCSFP-SR
  16Gb/8Gb/4Gb

Note: cables are not included.

Expand M.2 NVMe SSD slots with QM2

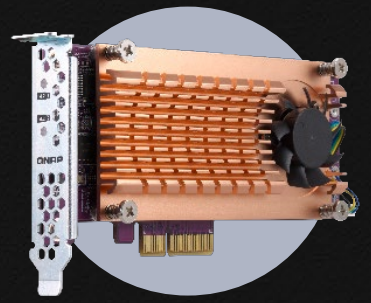
QM2 helps you to expand more M.2 NVMe SSD slots via PCIe

Keep your original storage aarchitecture



QM2-4P-384 (Gen 3 x8)

4 x M.2 2280 PCIe Gen 3 x4 NVMe SSD slots



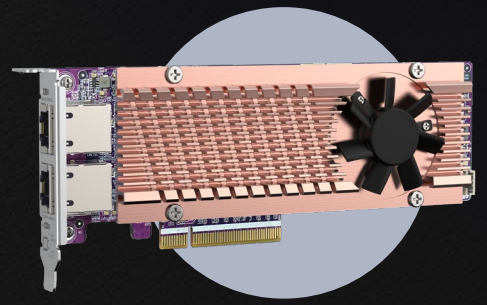
QM2-2P-384 (Gen 3 x8)

2 x M.2 22110/2280 PCIe Gen 3 x4 NVMe SSD slots

Expand 10GbE and M.2 SSD slots with QM2

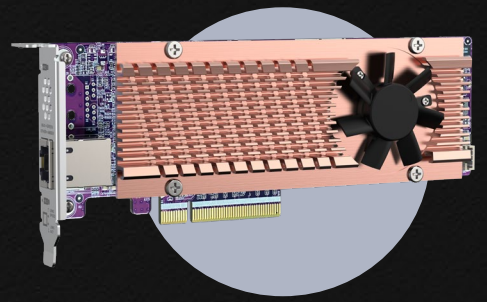
Expand both Ethernet and M.2 NVMe SSD slots with new PCIe 4.0 QM2 series

PCIe 4.0 high speed expansion



QM2-2P410G2T (Gen 4 x8)

4 x M.2 2280 PCIe Gen 4 x4 NVMe SSD slots
+ 2 x 10GbE RJ45 ports



QM2-2P410G1T (Gen 4 x8)

2 x M.2 2280 PCIe Gen 4 x4 NVMe SSD slots
+ 1 x 10GbE RJ45 port

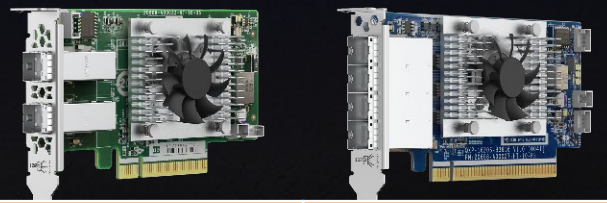
Reach PB storage capacity with QNAP SAS 12Gb/s 12-bay & 16-bay JBOD units

TL-R1620Sep-RP TL-R1620Sep-RP

NAS supports up to **16** QNAP SAS JBOD enclosures

- 12-bay TL-R1220Sep-RP or 16-bay TL-R1620Sep-RP
- Each NAS with **hundreds of HDDs**，**1~3PB** raw HDD capacity
- SAS JBOD can expand NAS existing storage pools

SAS HBA (optional purchase)



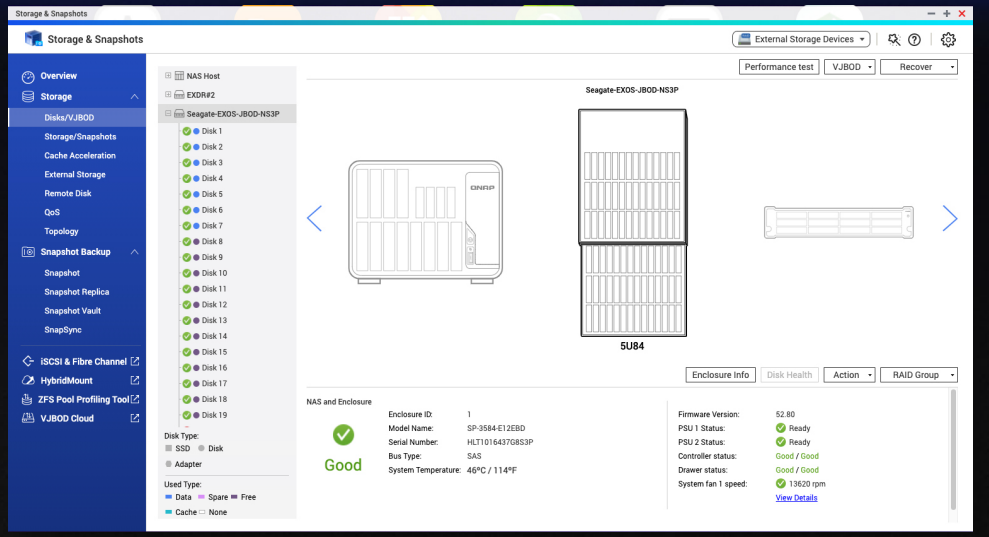
	QXP-820S-B3408	QXP-1620S-B3616W
SAS IC	Broadcom SAS3408	Broadcom SAS3616W
PCIe bus	PCIe3 x8	PCIe3 x16
IOPS	1.2X	1.8X
Bandwidth	6,850 MBs	13,700 MBs
Ports	External 8 ports	External 16 ports
Connectors	2 x SFF8644	4 x SFF8644

*The above data is for reference only based on IC vendor's data sheets.
Actual performance could be different due to host, expansion unit or drives.

QNAP NAS x Seagate JBOD partnership for massive storage capacity in agile business transformation

QNAP TDS-h2489FU
NAS

Seagate JBOD



Huge Capacity

Tackle the massive storage requirements of 4K/8K multimedia, big data storage, critical backups, and more.

High Density

Seagate Exos E 5U84, the 5U rackmount enclosure, can house 84 drives for storing up to 1.1 PB.

Management

QNAP ***Storage*** & ***Snapshots*** Manager simplifies NAS and JBOD management, effectively minimizing IT operational workloads.

- **QNAP NAS supports Seagate Exos E SAS JBOD units and 100+ drives to provide petabytes (PBs) of raw capacity.**

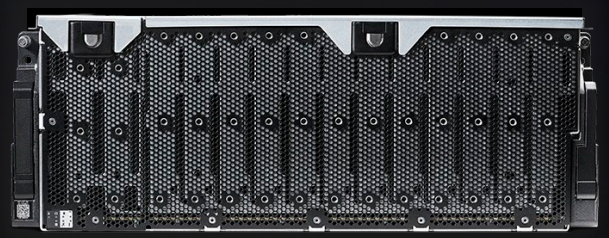
Note:
1. Optional purchase of SAS HBA is required for the NAS.
2. Seagate's JBODs can only be used as an individual storage pool or volume. Its storage pool/volume cannot be combined into the connected NAS. NAS applications cannot be installed on Seagate's JBODs.

SEAGATE

Scale up NAS capacity with optimized cost by using Seagate Exos E JBOD enclosures

Exos E 2U12

- Max 216 TB
- 12 x 18 TB 3.5” SAS HDD



Exos E 4U106

- Max 1.9 PB
- 106 x 18 TB 3.5” SAS HDD

Exos E 2U24

- Max 57.6 TB
- 24 x 2.4 TB 2.5” SAS SSD

Exos E 5U84

- Max 1.5 PB
- 84 x 18 TB 3.5” SAS HDD

Note:
New JBOD models and the maximum connected numbers will be tested and added throughout 2022 H1. Refer to the latest compatibility table before purchase.
https://www.qnap.com/en/compatibility-expansion?model=tds-h2489fu

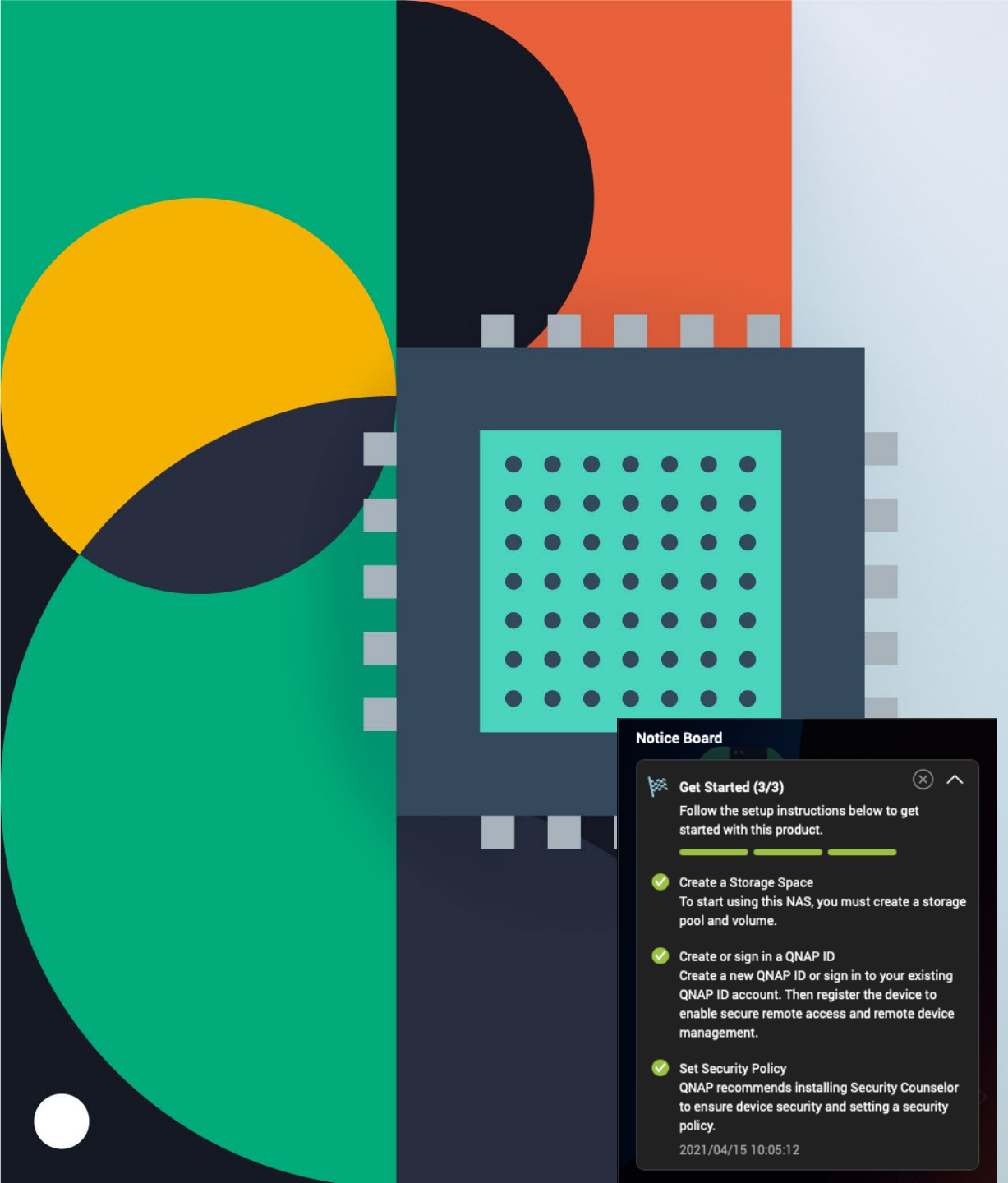
LIVE DEMO

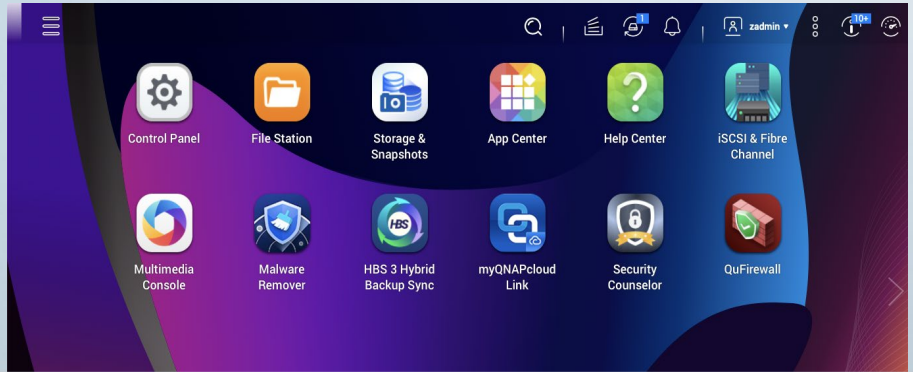
Kernel 5.10 LTS

ZFS-based QuTS hero ensures performance, security, and data integrity

Fast, smooth, and easy-to-use!

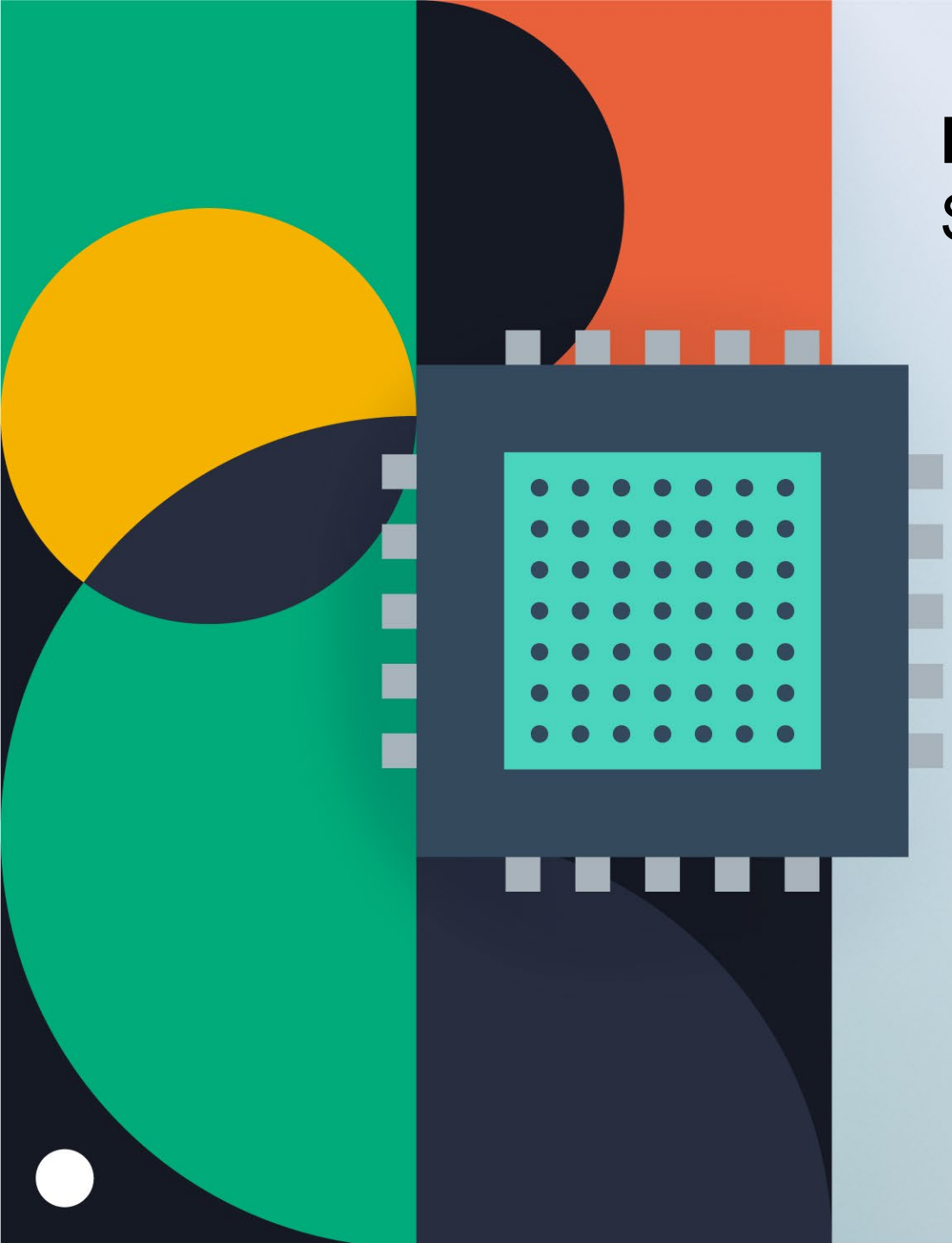
Whether clicking buttons, switching between apps, expanding/collapsing windows – every action is much smoother. The search bar in the main menu also assists in quickly finding desired apps.





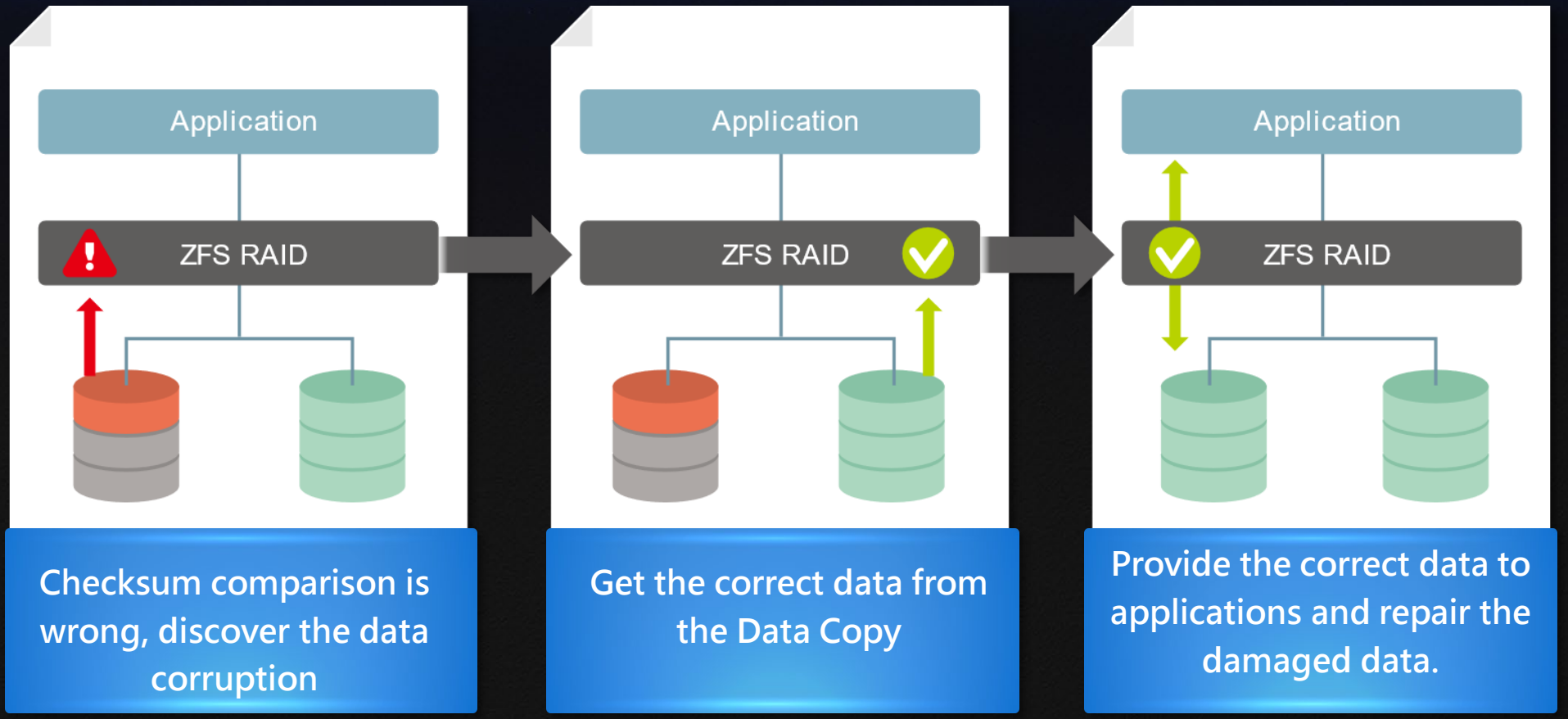
Big Data Storage

Security and performance are priority



- Supports TLS 1.3 to improve security and performance.
- You can also use SSH keys for authentication to secure access to your NAS, preventing password breaches or similar potential attacks.
- The new kernel improves PCIe performance, which enhances NVMe SSD performance and utilization.

Silent data corruption & self-healing with QuTS hero NAS O.S.



Checksum comparison is wrong, discover the data corruption

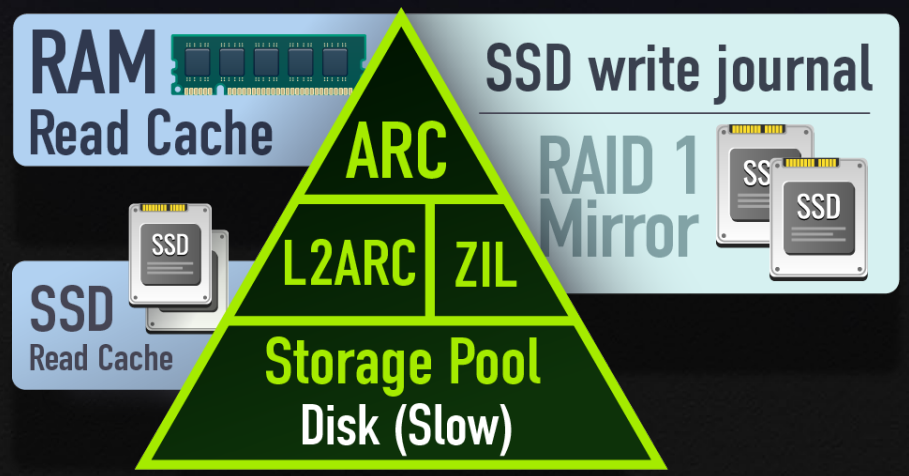
Get the correct data from the Data Copy

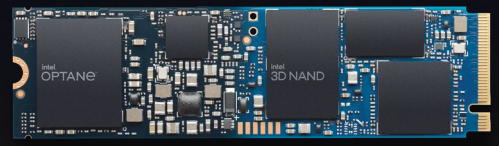
Provide the correct data to applications and repair the damaged data.

Avoid silent data corruption that occurred on the running system.

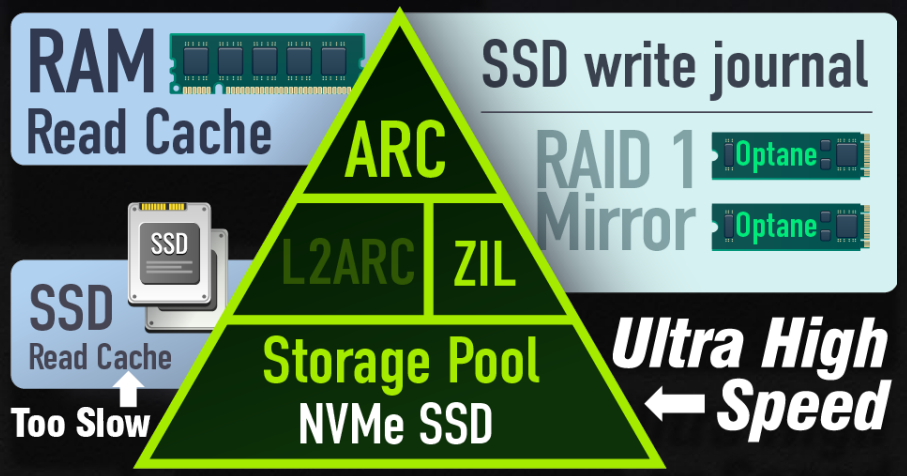
Dedicated ZIL - SLOG

Read cache is not needed in AFA because it can slow down the pool performance. However, the ZIL for data protection is still need. Therefore, the smaller capacity and high endurance Intel Optane SSDs are the perfect candidate.





intel OPTANE SSD



License-free backup solutions to provide the most complete data backup protection

RPO : daily / scheduled

HBS 3 (Hybrid Backup Sync 3):
File level, multi-version management: RTRR, Rsync, FTP, WebDAV, and CIFS/SMB protocols.

RPO : hourly / daily / yearly

Snapshot & Replica:
File level, multi-version management.
Lightweight snapshot w/o performance impact.

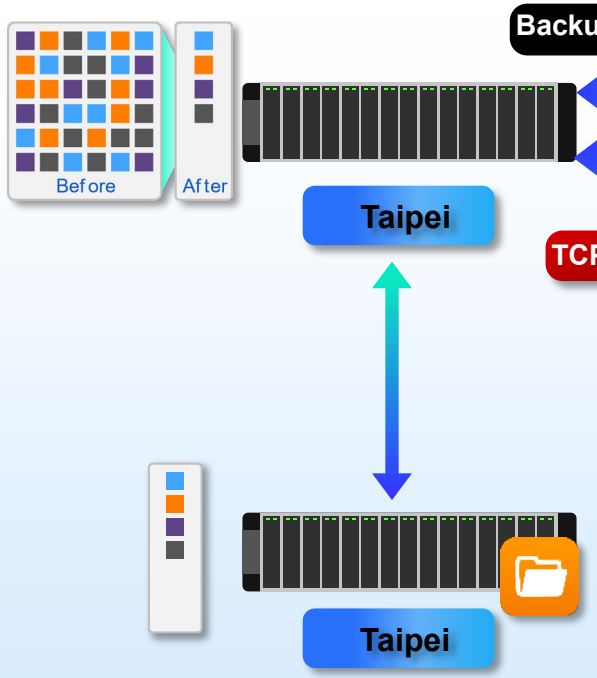
RPO : real-time

SnapSync:
Block level, Mirror the data copy and always kept up to date.

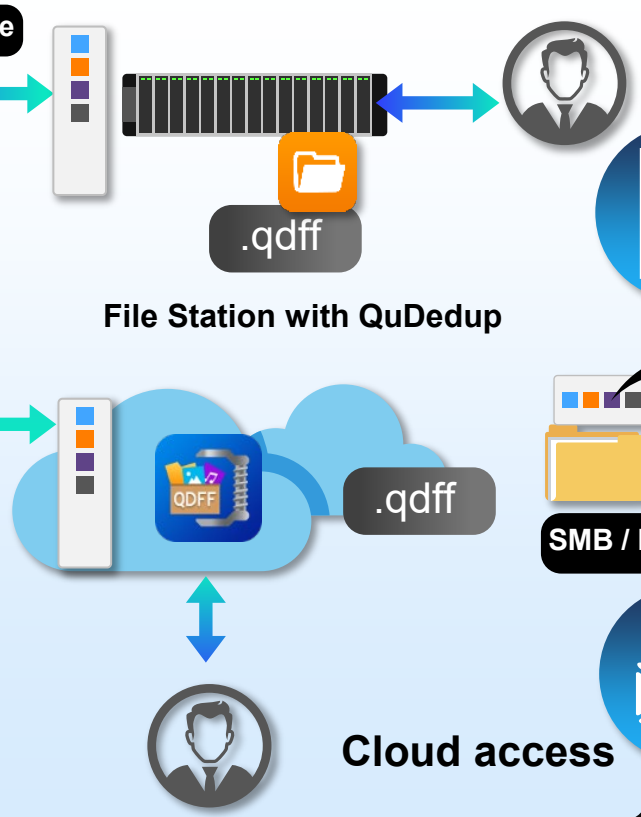
Easy to use HBS 3.0 app fulfilling backup 3-2-1 practice with deduplication

HBS 3 (Hybrid Backup Sync 3)

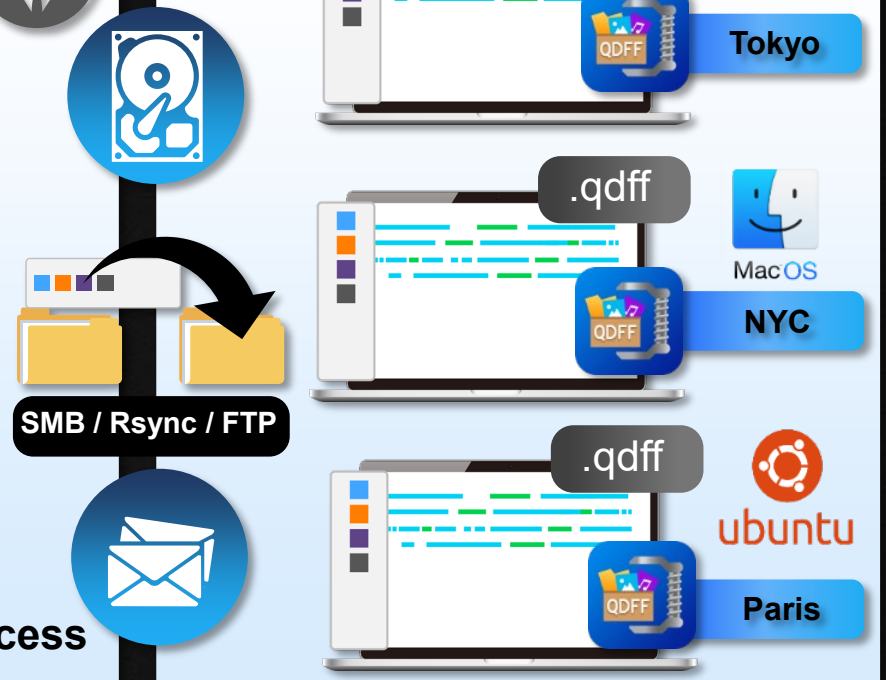
Local NAS access (via HBS 3)



Remote NAS access (via File Station)

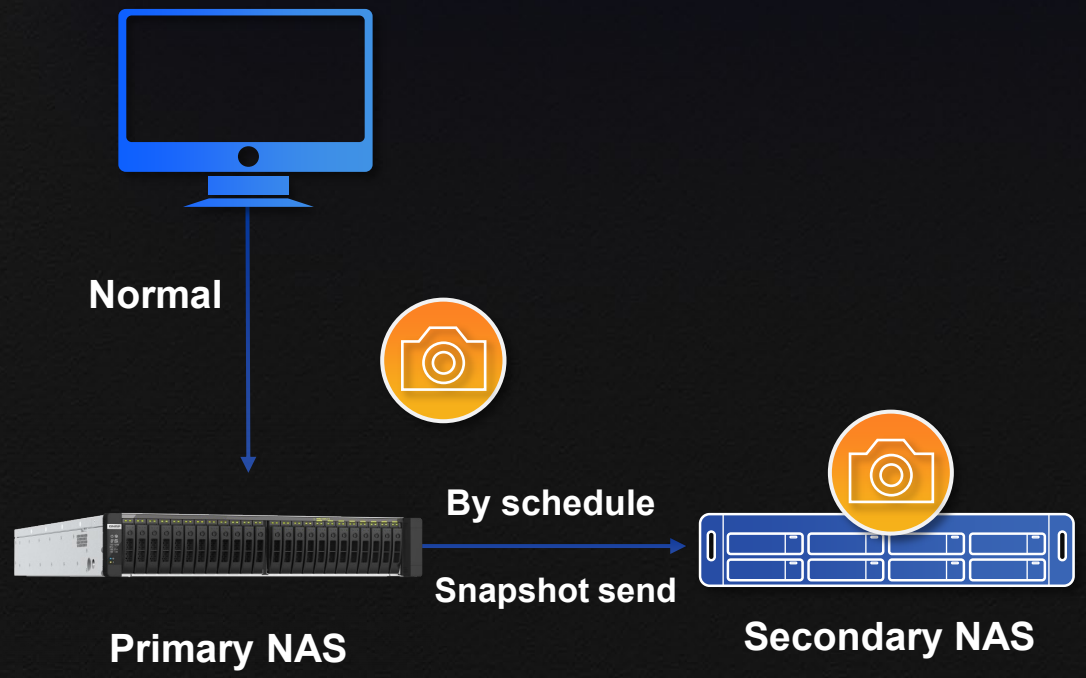


Portable use (QuDedup Extract Tool)

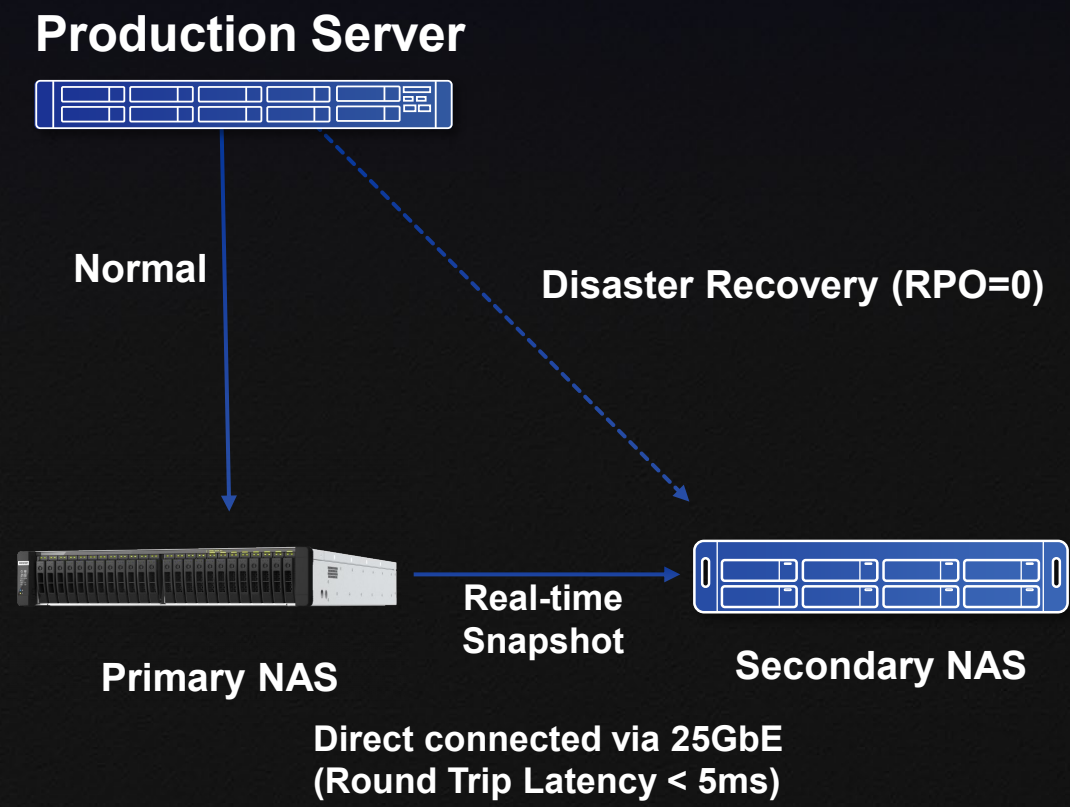


Real-time SnapSync ensures minimal RPO with real-time disaster recovery

Schedule SnapSync: 5min~60min

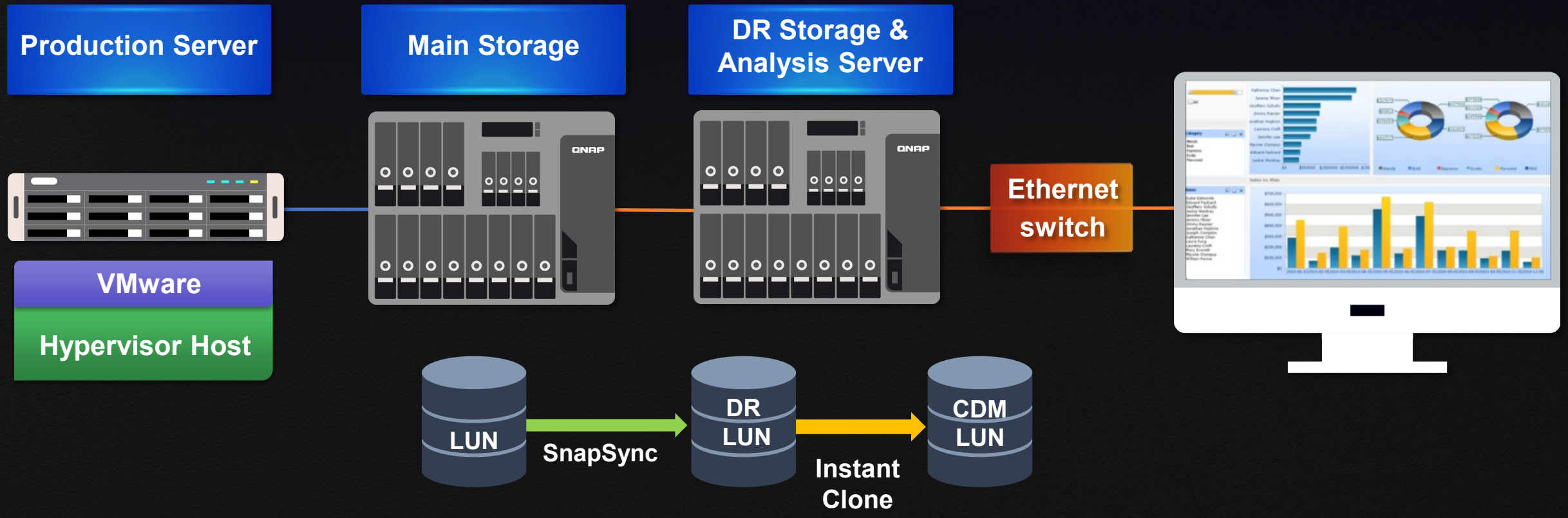


Realtime SnapSync: RPO=0



SnapSync + Instant Clone

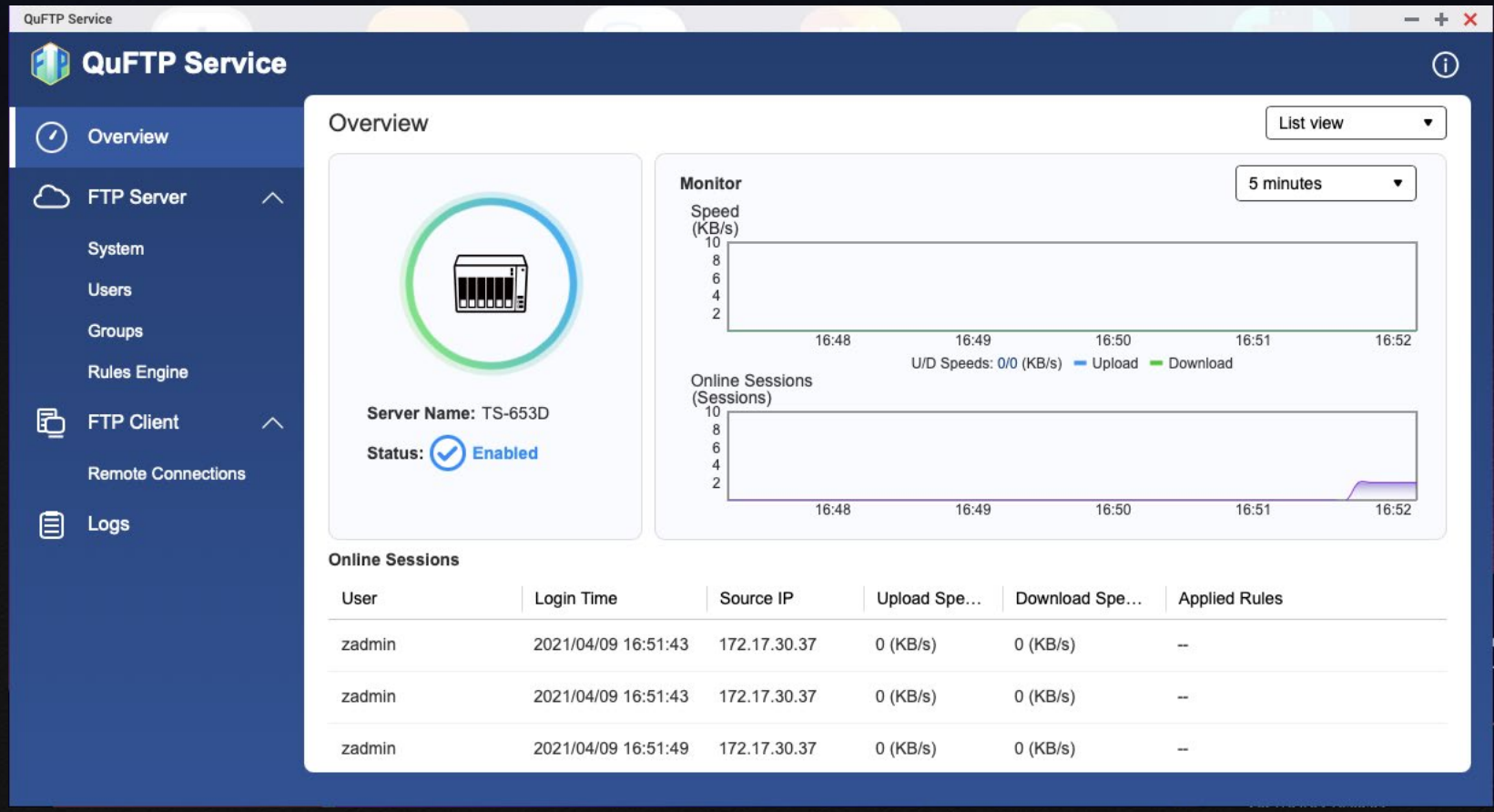
Economical & efficient CDM (Copy Data Management) solution



QNAP QuFTP: set up a secure FTP server for file sharing and exchange

QuFTP Service consolidates all FTP related activities into a single App. With its user-friendly interface and detailed permissions settings, QuFTP Service leverages FTP's efficiency with high security and easy management.

- Folder-level permissions
- QoS (Quality of Service) settings
- Instant event notifications
- Access time restrictions
- Limit access to only the FTP root folder
- Watermark for images & videos
- Detailed logs
- Remotely connect to other NAS



QVPN Service with WireGuard: easier VPN tunnels for remote workers

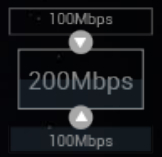
- WireGuard is an open-source VPN protocol that uses User Datagram Protocol (UDP) for network communication. The protocol uses several cryptography tools to implement secure VPN tunneling.
- The built-in WireGuard® provides faster and stable VPN connections. With a user-friendly interface, non-IT professional remote workers can easily set up VPN tunnels to access office-based QNAP devices with simplified connection methods.

QuWAN

SD-WAN Solution for Resilient IT Infrastructure

QNAP's QuWAN SD-WAN solution features Auto Mesh VPN, IPsec encryption, cloud-centric management and QVPN Service for multi-site network. Compatible with a wide range of QNAP products and Hypervisor Platforms such as VMware ESXi, QuWAN enables SMBs to efficiently build a dependable network at a cost-effective price, and to facilitate digital transformation, multi-site expansion and remote working.

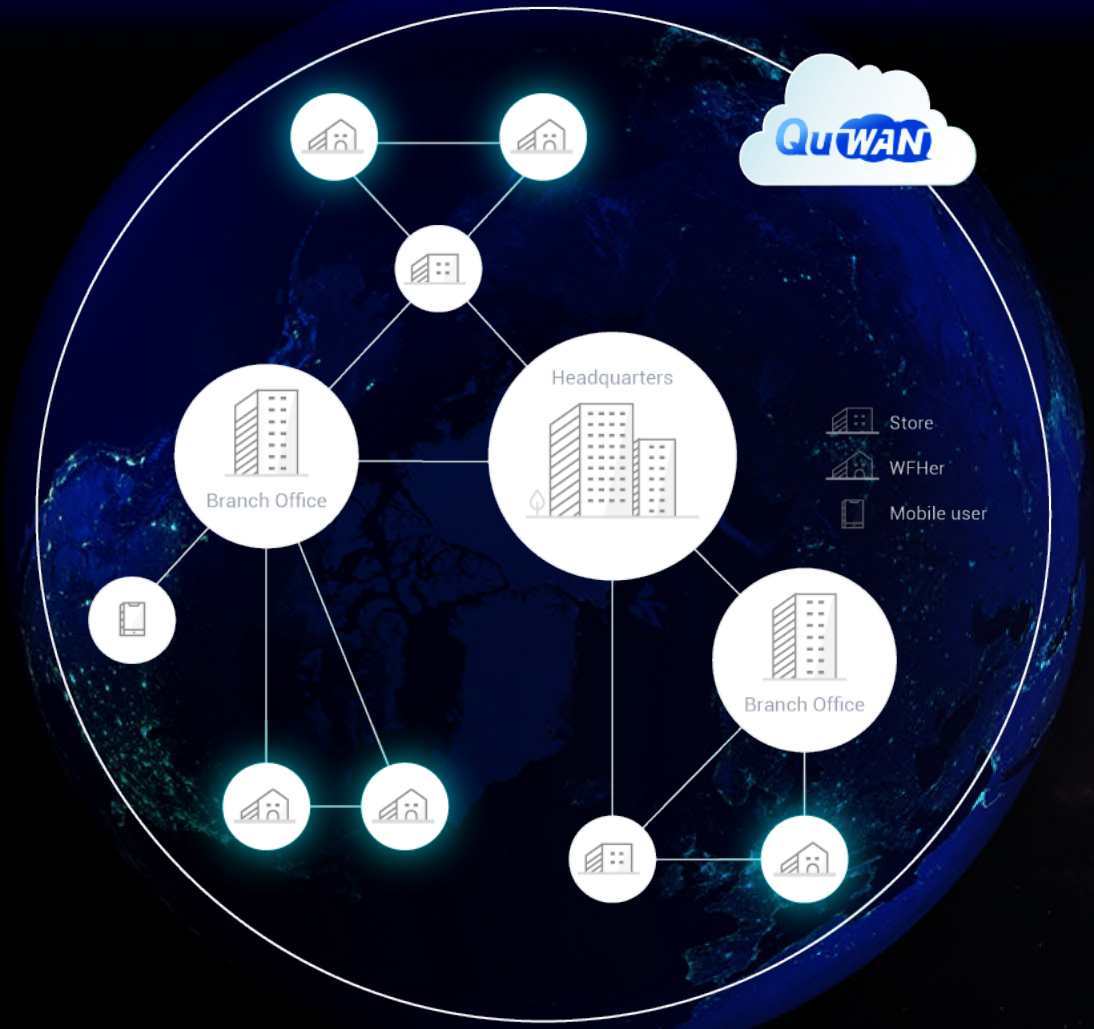
Automated VPN Deployment



Smart Bandwidth Prioritization

Centralized Cloud Management

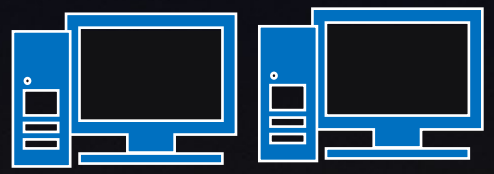
Secure Network Protection



Hyper Data Protector is a license-free VMware® and Hyper-V backup appliance

With only one QNAP NAS required and with no license fees to pay, you can backup unlimited VMware® and Hyper-V environments. Hyper Data Protector provides you with a cost-effective and reliable disaster recovery plan, ensuring 24/7 operation of your services.

Win10 / Server2016/ Server2019



COMING SOON

vmware®

Hyper Data Protector

Microsoft Hyper-V

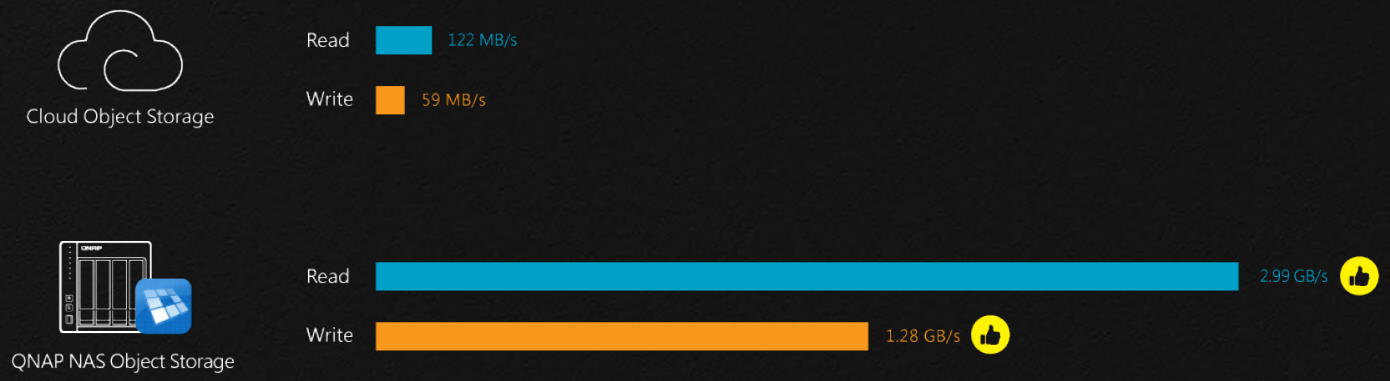
Easy VM backup with multi-version retention

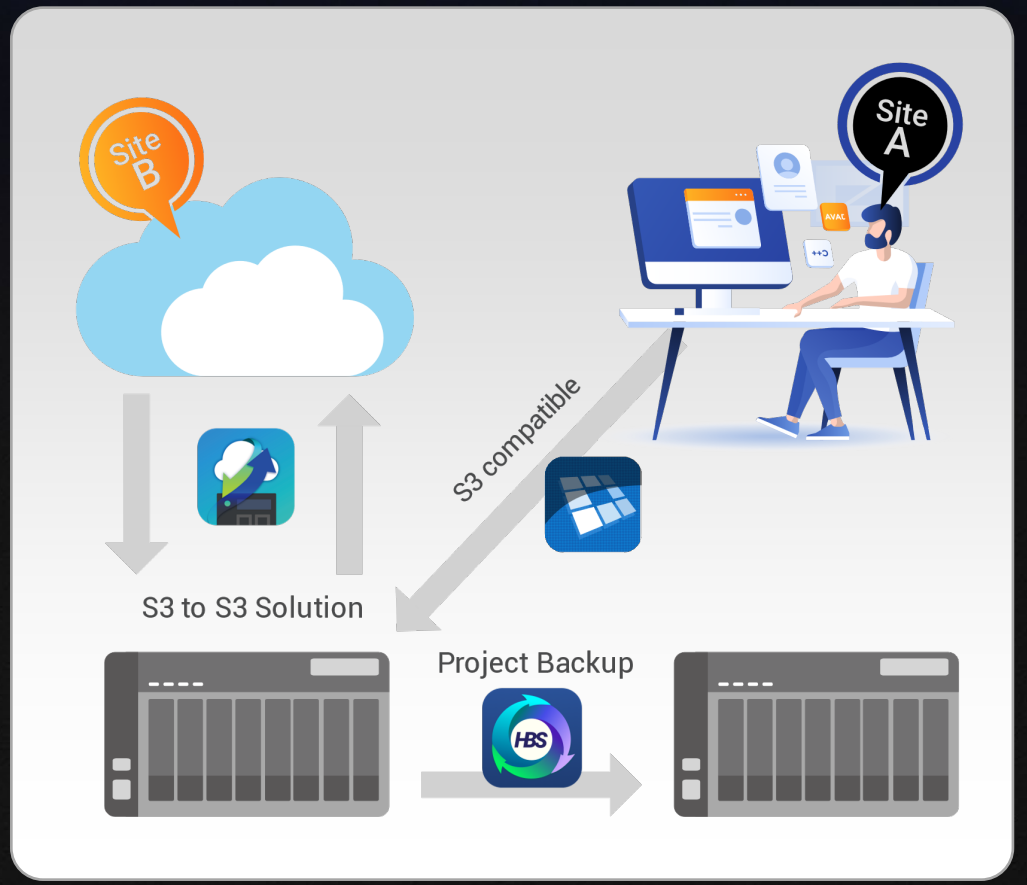
QuObjects is perfect for object storage development & testing, and backing up cold data from the cloud

Object example

https://alvin1.s3.ap-east-1.amazonaws.com/test1/292557.jpg

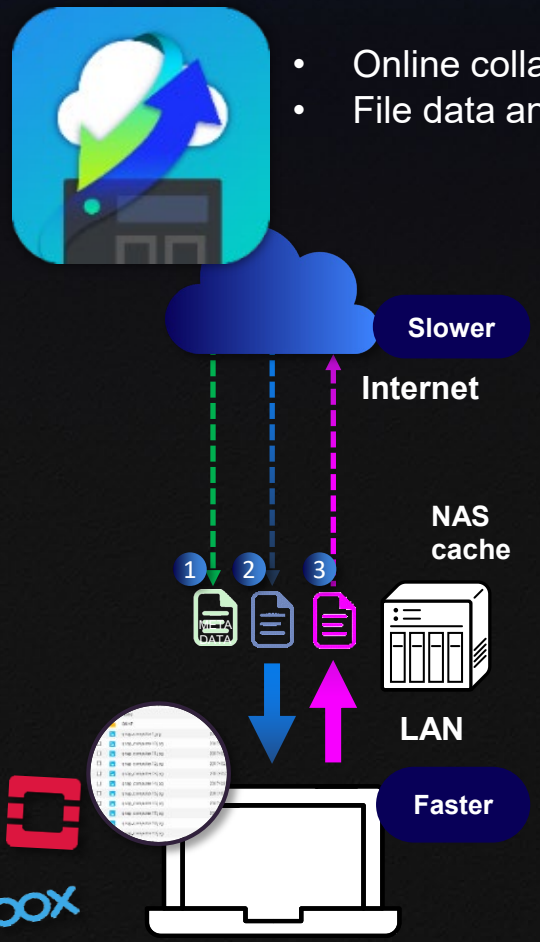
bucket **cloud provider** **folder** **file name**





HybridMount provides two modes for file-based cloud storage gateway

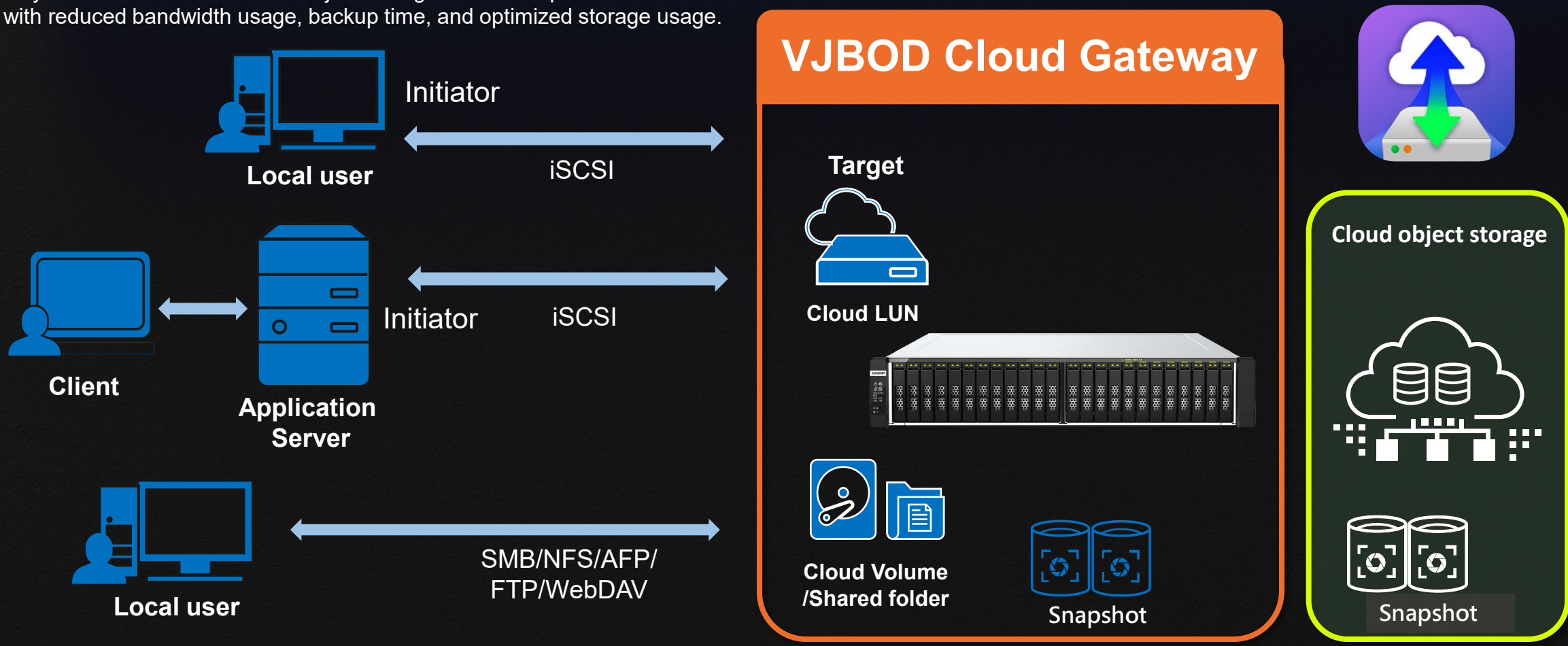
	Network Drive Mount	File Cloud Gateway
Setup Method	Mount cloud drives	Select “File Cloud Gateway” mode and create a dedicated cache space
Connections	No limit	2 free and perpetual connections. Purchase license for more connections
Access Performance	Depends on network speed	High performance thanks to caching
Access in File Station	Supported	Supported
Access through SMB / NFS / AFP	Not supported	Supported
Sync with the cloud	Sync only when browsing	Sync constantly for quick access
Integration with QTS Apps	Not supported	Supported



- Online collaboration
- File data analysis

Back up business data to the cloud. Flexible, economical, and safe with VJBOD Cloud

Connect your QNAP NAS with cloud object storage and back up business data to the cloud with reduced bandwidth usage, backup time, and optimized storage usage.



Boxafe

Google™ Workspace and Microsoft 365® total backup solution

With Boxafe, you do not need to worry about data loss. You can backup files, emails, calendars and contacts from Google™ Workspace and Microsoft 365® into the QNAP NAS.

Google™ Workspace

Gmail
Backup all your emails and attachments in Gmail

Google Drive
Backup all your file versions in Google Drive and supports My Drive and Shared Drive

Contacts
Backup all your contacts in Google Contacts

Calendar
Backup all your events and attachments in Google Calendar

Microsoft 365®

Outlook
Backup all your emails and attachments in Outlook

Contacts (People)
Backup all your contacts in Outlook People

Calendar
Backup all your events and attachments in Outlook Calendar

SharePoint & OneDrive
Backup your SharePoint and OneDrive files including OneNote

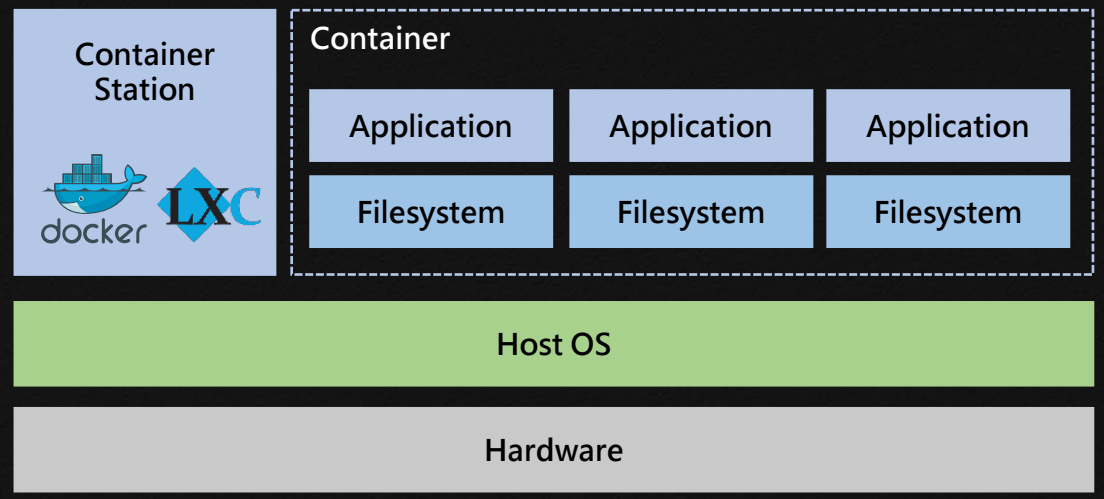
All-in-one solution for hosting virtual machines and containers

Virtualization Station

Virtualization Station allows you to create virtual machines (VM) on Turbo NAS, supporting Windows、Linux®、UNIX®、Android、QuTScloud operating systems.

Container Station

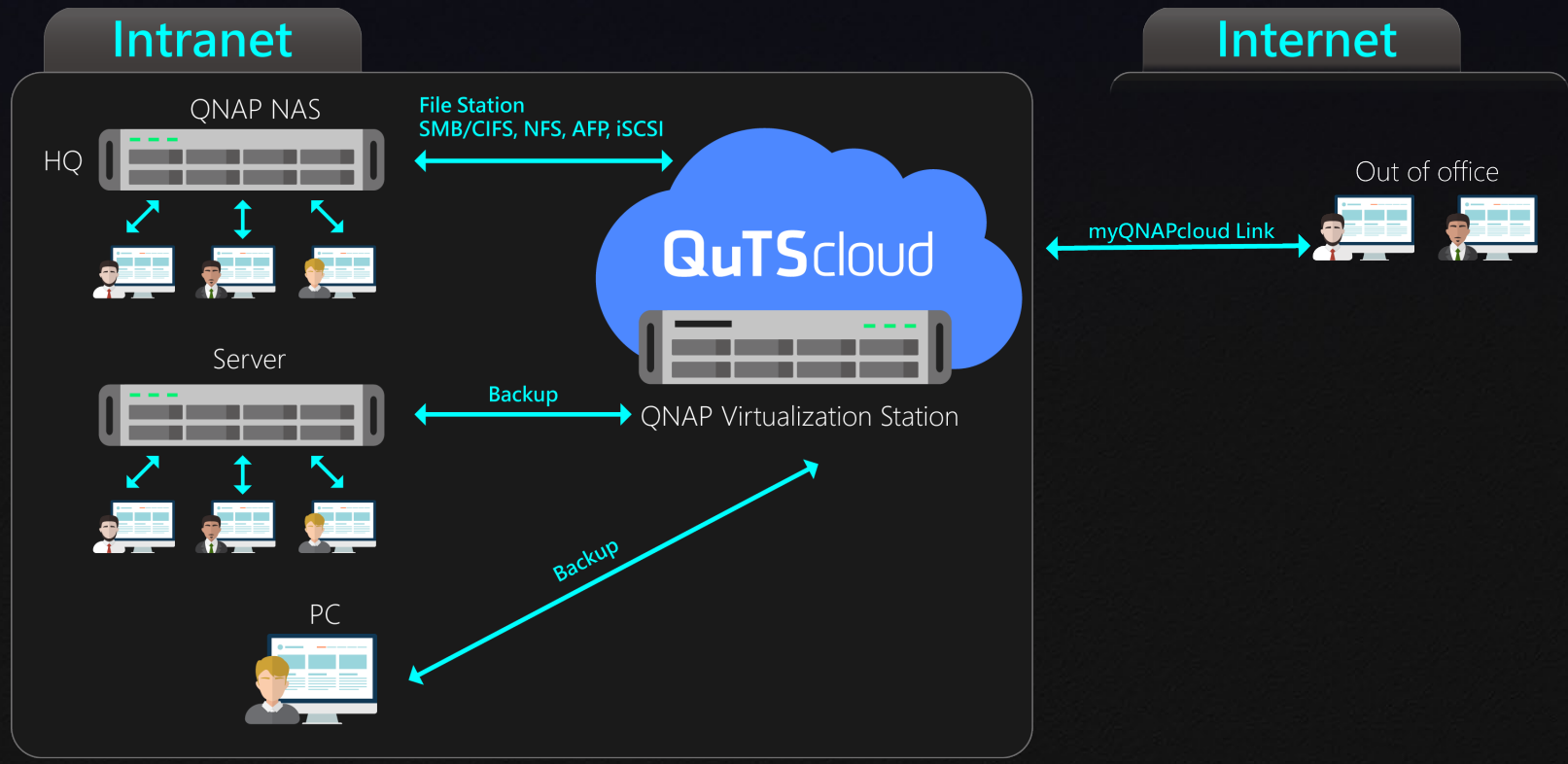
Experience LXD and Docker® lightweight virtualization technologies, download apps from the Docker Hub Registry®, import/export containers, and create abundant microservices.



A virtual NAS solution suited for Enterprises and Workgroups

QuTScloud is a virtual appliance based on QNAP's QTS Operating system, can be quickly launched on QNAP Virtualization Station.

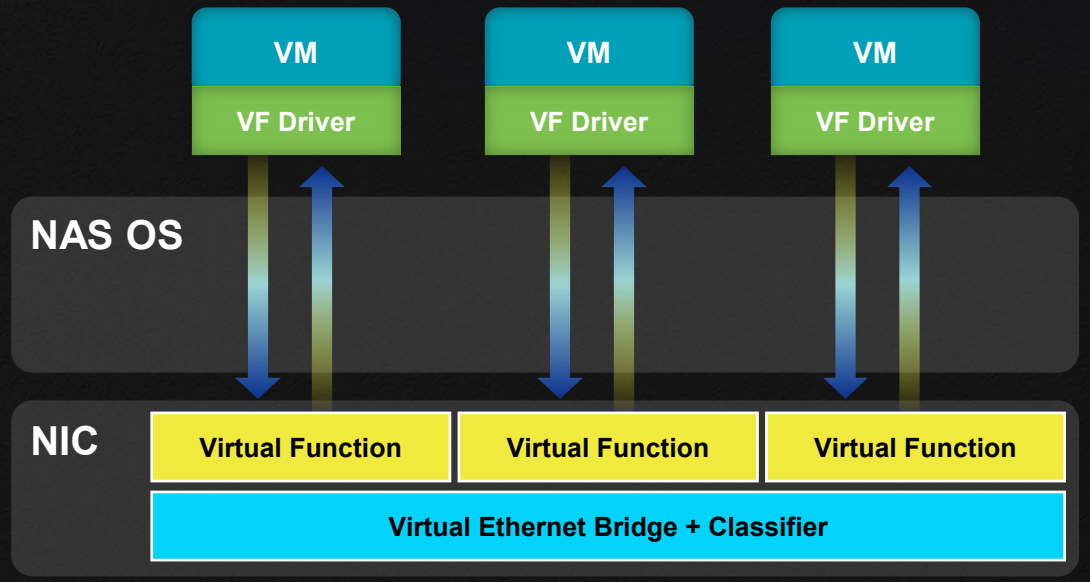
Organizations can increase their budget flexibility by using existing virtual environments, saving hardware space and additional maintenance efforts, and by leveraging the application advantages of the app-ware QuTScloud operating system.

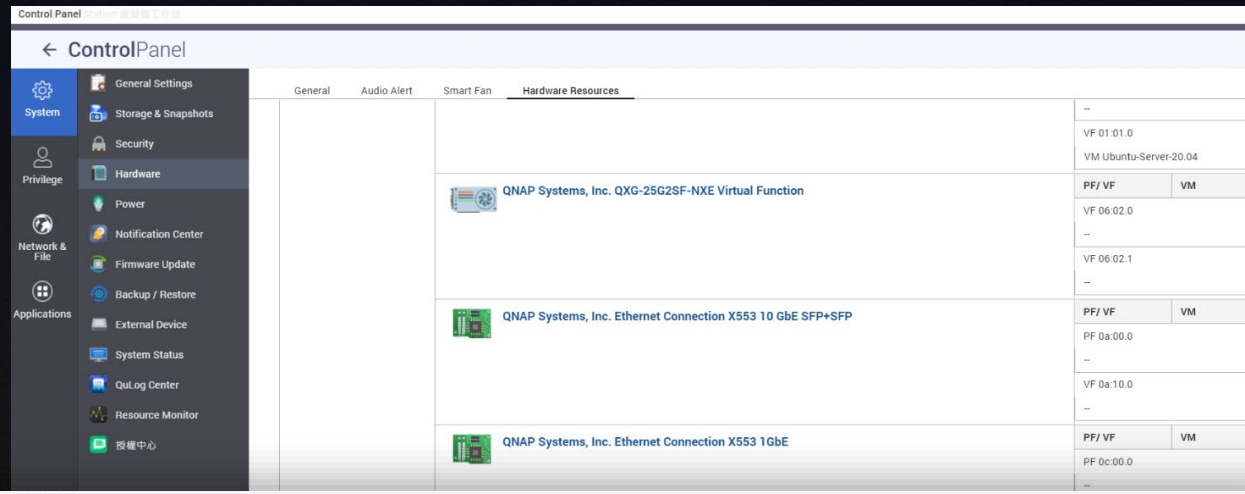


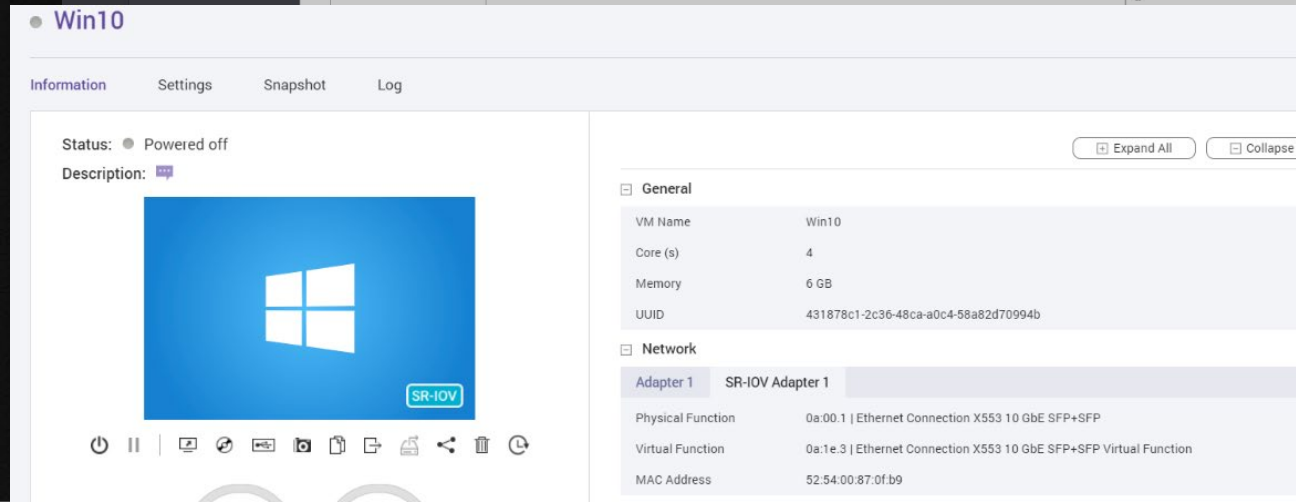
SR-IOV improves the network performance of virtual machines by 20% with HW acceleration

SR-IOV (Single-Root Input/Output Virtualization) let the services on your virtual machine enjoy the physical network speed.

- If you need real-time service needs, such as ticket booking service, cash flow service, audio-visual service, you can directly enjoy the speed of the hardware network card, reducing network delay.
- Reduce the usage of the host's CPU.
- Increase network efficiency by at least 20%







Build a comprehensive surveillance system with a QNAP NAS, QVR Elite, and IP cameras

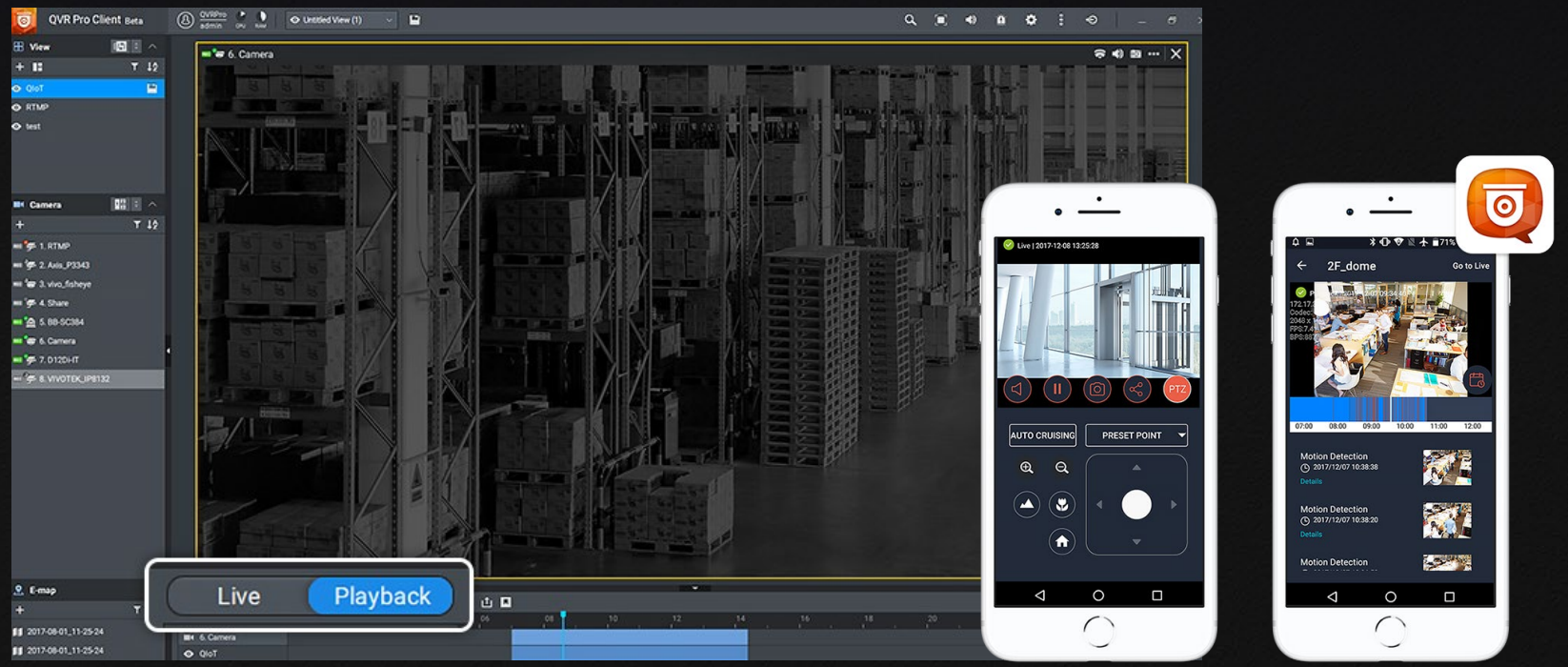
NAP QVR Elite is a subscription-based smart surveillance solution, allowing you to easily build a surveillance system with lower TCO (subscriptions starting from only US $1.99 per month) and higher scalability. It also integrates multiple QNAP AI-based video analytics solutions to build smart facial recognition for retail and door access systems with QNAP NAS.

Real-time Monitoring

Expandable Capacity

Value-added AI Applications

- Windows / macOS/ iOS / Android QVR Pro client

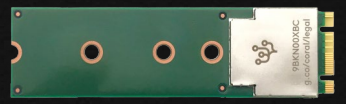


Support Coral Edge M.2 PCIe and USB TPU for AI enhanced image recognition

- Official certification by Google to support Coral M.2 & USB TPU devices
- Up to 4 TPU devices per NAS

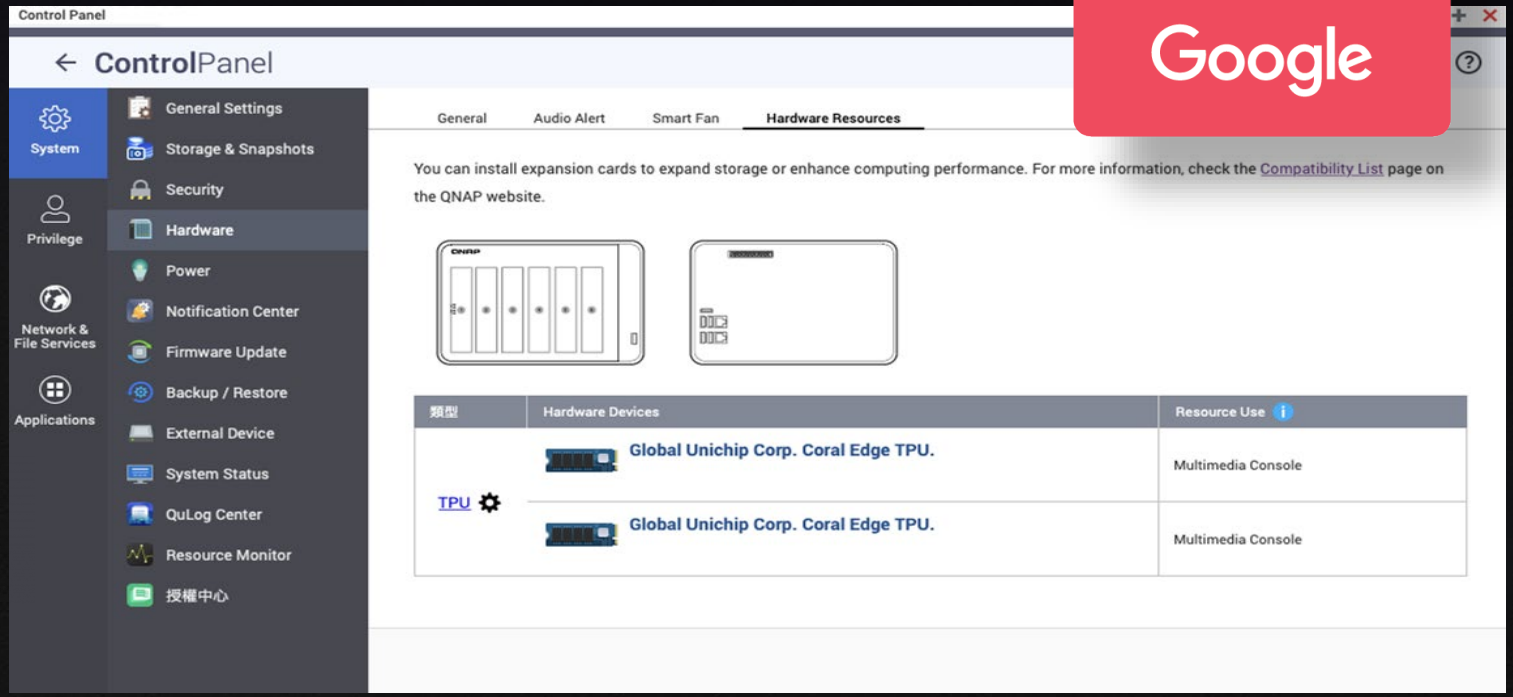
https://coral.ai/products/

Works with Coral



With Coral intelligence

Google



Works with Coral

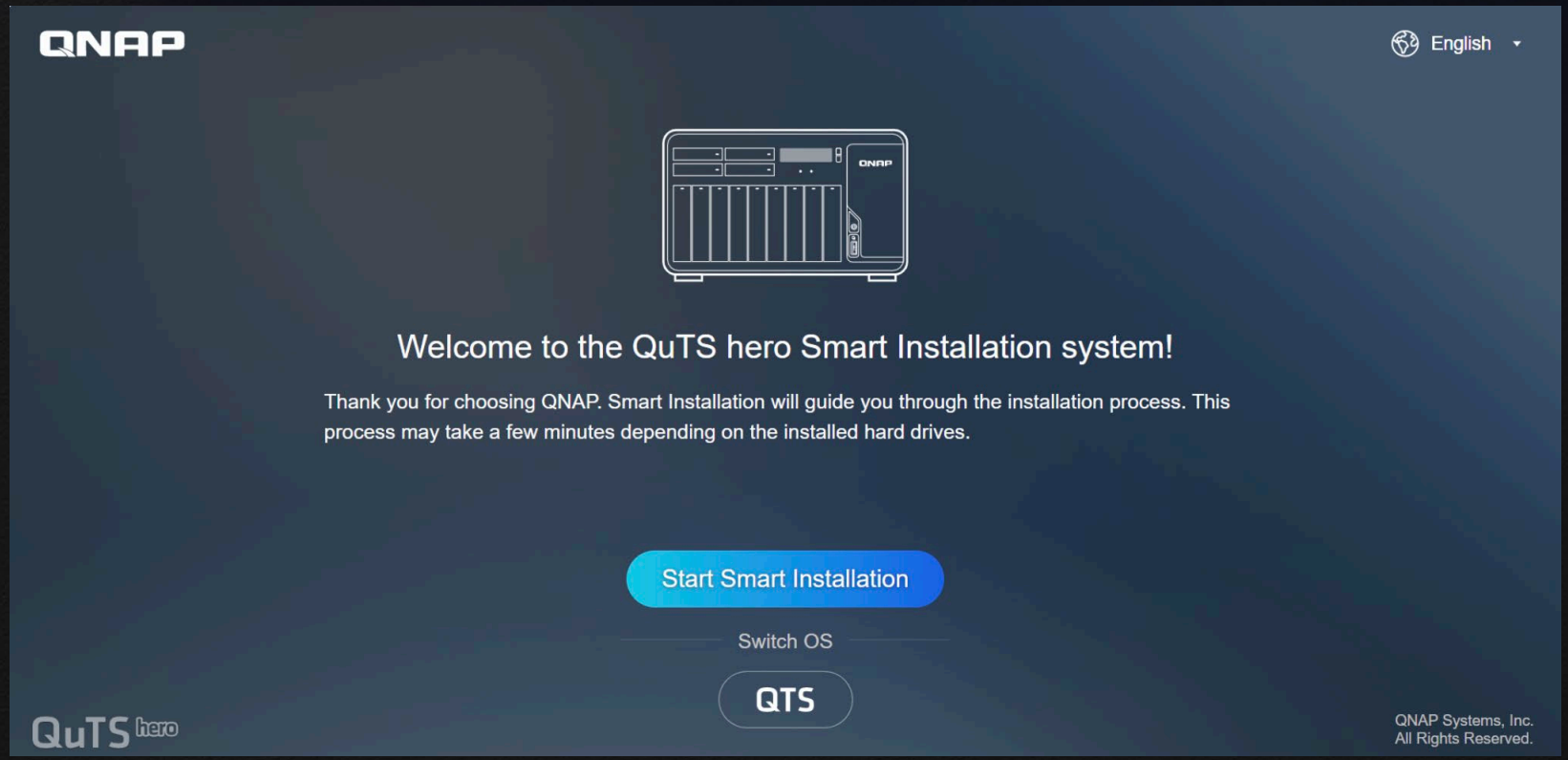
QVR Face Insight

Smart Facial Recognition Solution

A facial recognition solution for small offices and residential communities that enables instant and accurate facial recognition with live AI-powered video analytics that is even capable of recognizing masked people.

- Real-Time Facial Recognition and Analytics
- Mask detection and facial recognition in one solution
- Build A Smart Facial Recognition System with One NAS
- Identity Authentication Made Easy with Profile Database
- Enhance your face recognition speed with an Edge TPU
- Empowered surveillance feeds with QVR Pro integration

Switch operating systems for higher everyday performance

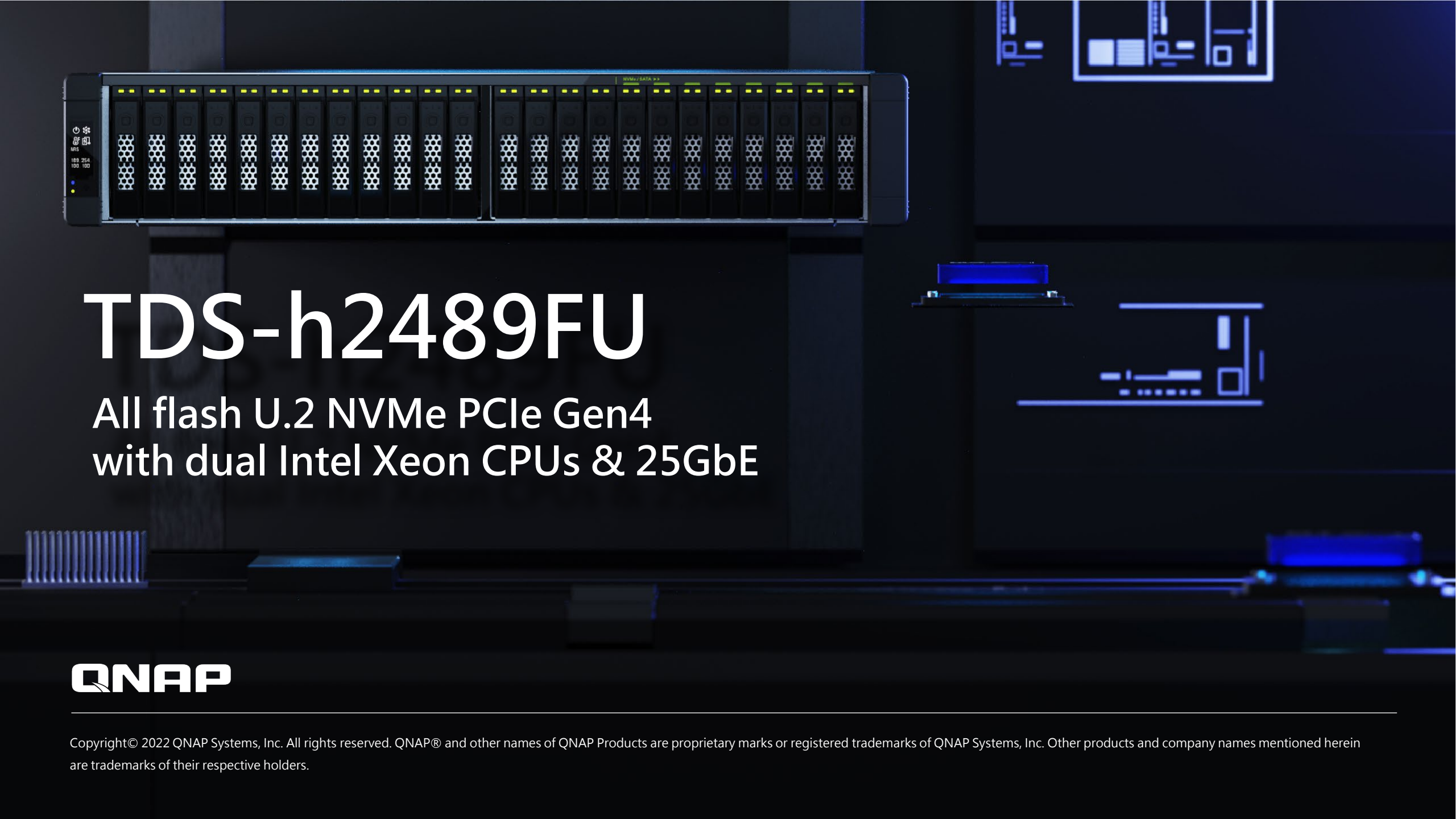


The TDS-h2489FU also supports QTS - QNAP's standard NAS operating system – that provides greater everyday performance, efficient memory utilization, and the advantage of Qtier auto-tiering. You can also migrate drives from your current QTS-based NAS to the TDS-h2489FU.

Note:
•QTS and QuTS hero use different file systems. You must remove all the drives from the TDS-h2489FU before switching from QuTS hero to QTS.

5-year hardware warranty and technical support as standard

The TDS-h2489FU is backed by a 5-year warranty at no extra cost. This premier warranty demonstrates QNAP's dedication to your essential business needs for continuous operations and non-interrupted services.



TDS-h2489FU

All flash U.2 NVMe PCIe Gen4 with dual Intel Xeon CPUs & 25GbE

QNAP

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