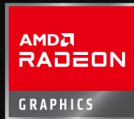


QNAP

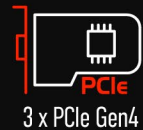
TS-h3077AFU

The ZFS Enterprise All-Flash NAS with an AMD Ryzen™
7000 series 6-Core/8-Core processor

Expand to PB-Class Storage,
Unleash the Potential of 100GbE



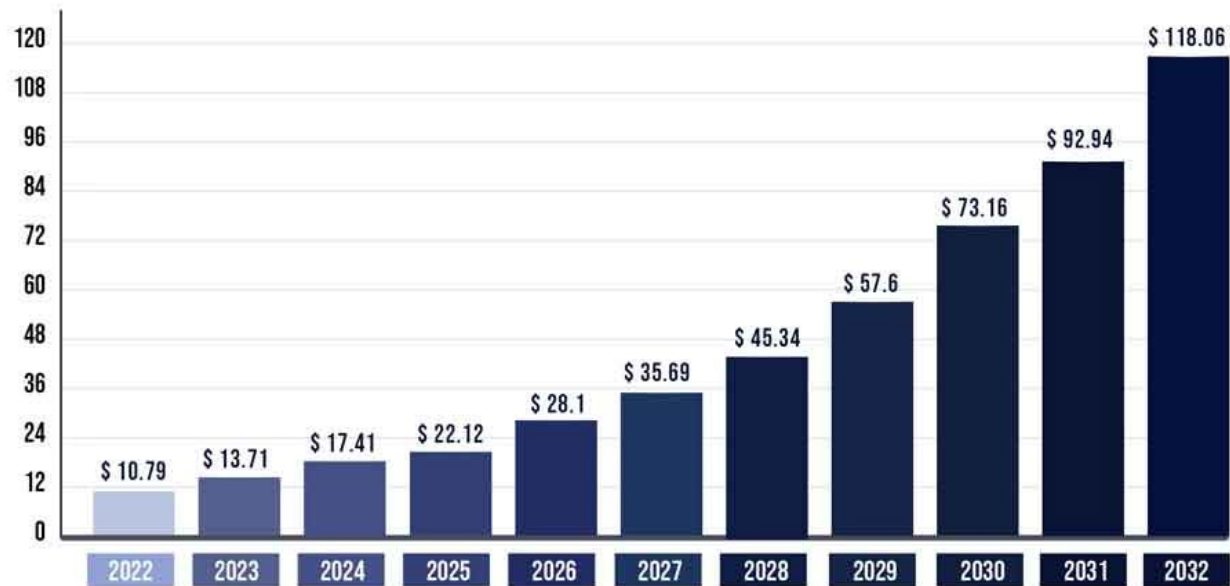
10GbE
2.5GbE



Unleashing the Power of AI: Why All-Flash Arrays are Essential ?

PRECEDENCE
RESEARCH

GENERATIVE AI MARKET SIZE, 2023 TO 2032 (USD BILLION)



Source: www.precedenceresearch.com

- Research Institution Data: The global generative AI market is expected to experience approximately **19%** annual growth.
- **Speed and Low Latency:** All-flash arrays offer significantly faster data access and lower latency compared to traditional storage solutions, ensuring quick retrieval and processing of AI workloads.
- **Optimized for Random Access Patterns:** AI algorithms often exhibit random access patterns rather than sequential.
- **Improved Reliability and Durability:** Flash storage is inherently more reliable and durable than traditional disk-based storage. This is crucial for AI applications that demand continuous and reliable access to data.
- **Parallel Processing and Scalability:** AI workloads often benefit from parallel processing. All-flash arrays support parallelism, enabling scalable performance for growing AI demands without compromising speed.

The Next-Gen Ryzen Enterprise All-Flash NAS

2 x 10G BASE-T + 2 x 2.5G RJ45

3 x PCIe Gen 4 expansion slot



**Designed for
Enterprise Applications**

TS-h3077AFU Takes Hardware Advancement to the Next Level



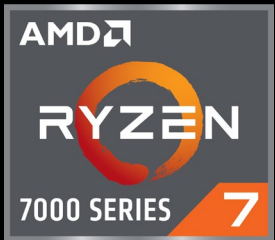
Ryzen™ 7 3700X

- # of CPU Cores: 8
- # of Threads: 16
- Max. Boost Clock: **4.4GHz**
- Base Clock: **3.6GHz**
- Memory Support: DDR4
- GPU: N/A



AMD Ryzen™ 7 7000 Series

- # of CPU Cores : 8
- # of Threads : 16
- Max Boost Clod: **5.3GHz**
- Base Clock: **3.8GHz**
- Memory Support: **DDR5**
- GPU: **AMD Radeon™ graphics iGPU**



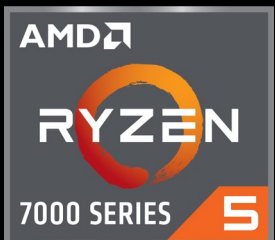
Ryzen™ 5 3600

- # of CPU cores: 6
- # of Threads: 12
- Max. Boost Clock: **4.2GHz**
- Base Clock: **3.6GHz**
- Memory Support: DDR4
- GPU: N/A



AMD Ryzen™ 5 7000 Series

- # of CPU Cores: 6
- # of Threads: 12
- Max. Boost CLock: 5.1GHz
- Base Clock: 3.8GHz
- Memory Support: **DDR5**
- GPU: **AMD Radeon™ graphics iGPU**



2U 30-bay

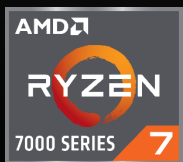
30-bay



TS-h3077AFU-R5-32G

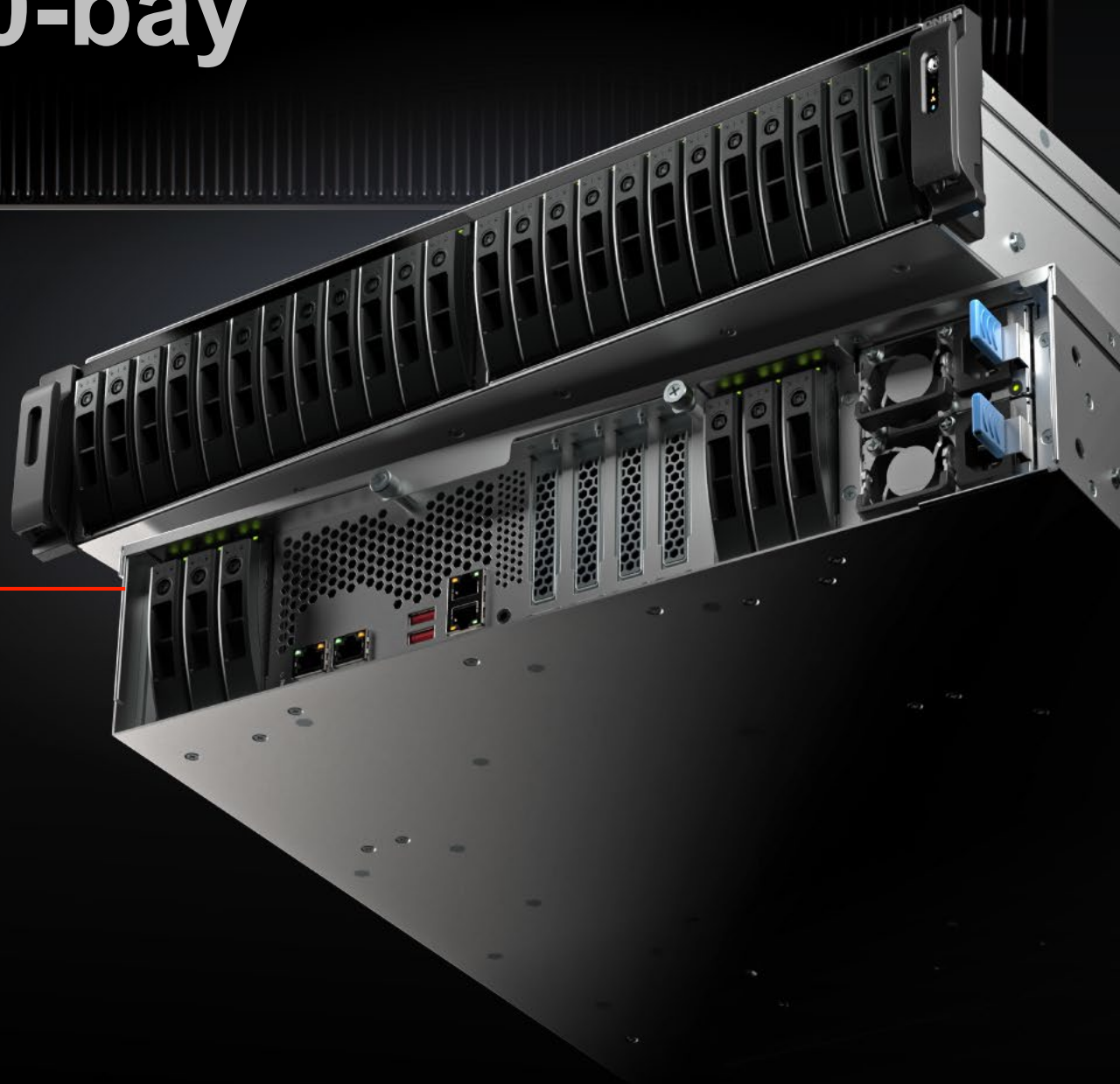
Ryzen 5 7600 / Pro 7645,
32GB RAM (1 x 32GB)

30-bay



TS-h3077AFU-R7-64G

Ryzen 7 7700 / Pro 7745,
64GB RAM (2 x 32GB)



TS-h3077AFU

Gain a competitive advantage by deploying an AMD Ryzen™ 7000 series-powered SATA SSD all-flash storage with 30 drive bays. The TS-h3077AFU is ideal for AI training, media production companies, enterprises, and science research institutions that require high-performance large capacity storage for storing recordings, business assets, Big Data, and virtual machines.



TS-h3077AFU

Front / Rear View

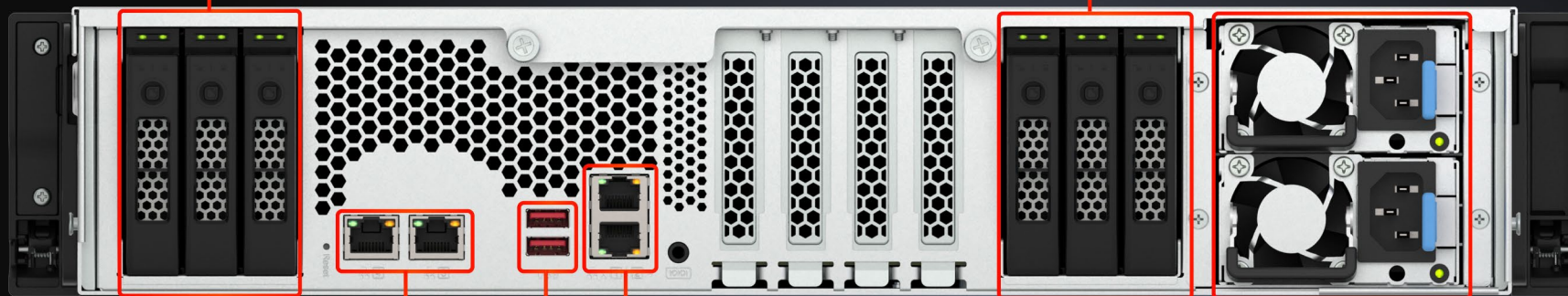
Front



Power button &
LED indicators:
System status, network, external
expansion enclosures, disks

30 x 2.5" SATA 6Gb/s SSD slot, support
diverse configurations

Back



2 x 2.5GbE
RJ45

2 x USB 3.2 Gen2
Type-A

2 x 10 GBASE-T

Redundant PSU

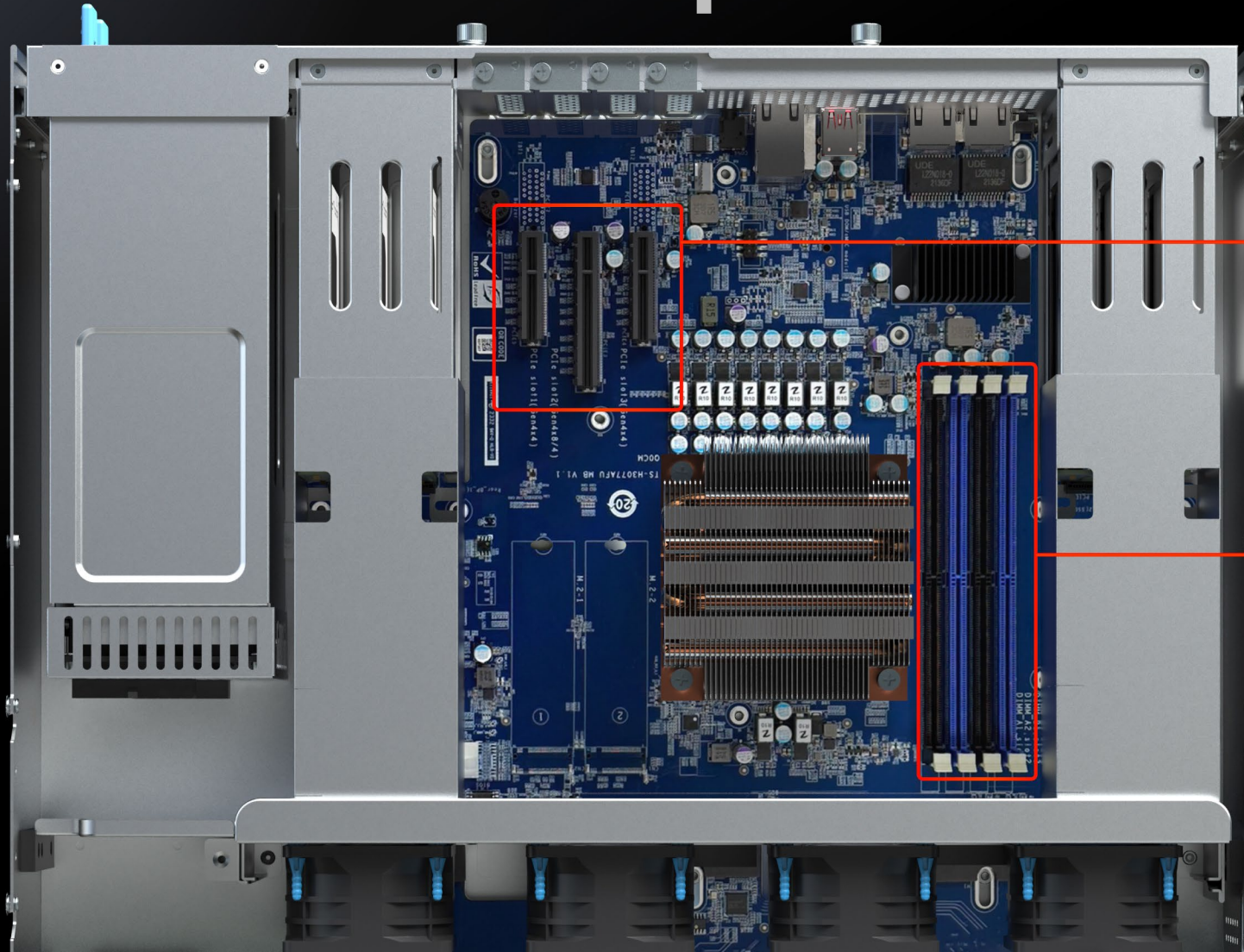
Performance

- **1.6 Million IOPS** ran. read (4K block size)
- **17,327 MB/S** seq. read (1M block size)

Tested by Iometer with 5 clients
with 6 x 25GbE

TS-h3077AFU

Easily remove the top cover for upgrades



3x **PCIe Gen4** expansion Slots (2x PCIe Gen4 x4, 1x PCIe Gen4 x8 or Gen4 x4) Balancing performance and expandability, offering the flexibility to expand with **100GbE/25GbE Smart NIC**, Fibre Channel, or JBOD.

4 x **DDR5** UDIMM RAM Slots, delivering immense bandwidth and expandable up to a maximum of 128GB. Shipped with non-ECC memory, with the option to upgrade to ECC memory. Note: ECC and non-ECC memory cannot be mixed.

TS-h3077AFU Dimensions



**Optional Rail Kit
Accessory:RAIL-
A03-57**



**Support Model :
TS-h3077AFU
Max. Load Capacity :**

Handles up to **57 kg when fully
extended**

Powerful 6-core/12-thread & 8-core/16-thread High Frequency 5nm Processors

Multicore Efficiency with Low Power Consumption

- AMD Ryzen™ 7 7000 series 8 Cores / 16 Threads
- AMD Ryzen™ 5 7000 series 6 Cores / 12 Threads

The all-new AMD AM5 high-performance processors deliver robust capabilities with up to 32MB cache, reaching a maximum frequency of 5.3 GHz. Equipped with integrated AMD Radeon™ Graphics, they support 4K video transcoding and accelerate various AI applications.

Max. Overclocking

5.3 GHz

Thumbnail Performance Compared to the Previous Generation x77XU

Boosted by **6.73X**

8-Cores / 16-Threads

3.8 GHz

CPU Benchmark Compared to the Previous Generation x77XU

Boosted by **1.55X**

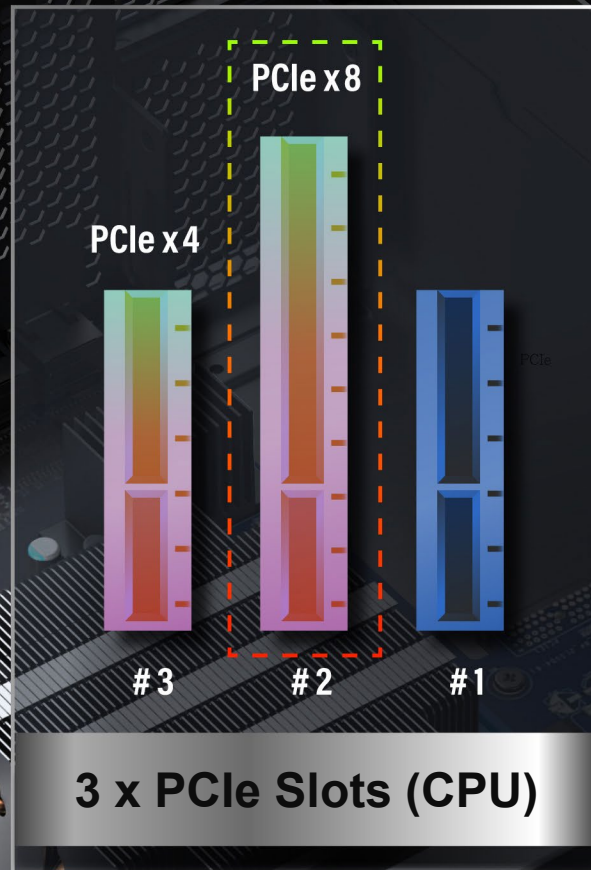
Note: Specifications on this page are based on the AMD Ryzen™ 7 7700 as an example. Detailed specifications may vary depending on the chosen CPU SKU.

For more information, visit: [CPU Comparison \(Ryzen7 7700 vs. Ryzen7 3700X\)](#)



3 x PCIe Gen4 Slots, Faster and Beyond!

When slot 1 is unoccupied by a PCIe expansion card:

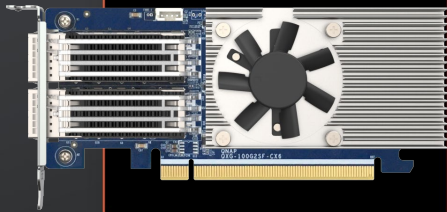


When installing a PCIe expansion card in slot 1:

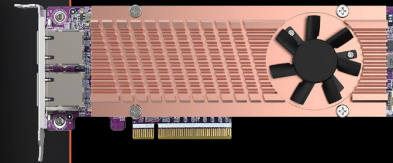


Slot 2 provides the width of PCIe Gen4 x8 when Slot 1 is not in use, and provides the width of PCIe Gen4 x4 when Slot 1 is in use.

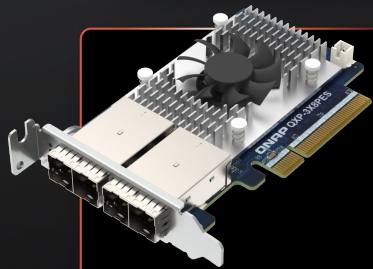
Leading the Industry: Diverse Range of QNAP PCIe Expansion Cards



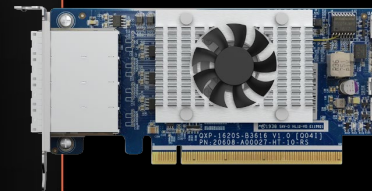
The 100GbE / 25GbE Network Expansion Cards (e.g., QXG-100G2SF-CX6 or QXG-25G2SF-E810) offer high throughput and low latency, enabling enterprises to swiftly accomplish tasks.



The QM2 card (e.g., QM2-2P410G2T) features 10GBASE-T Ethernet ports and/or M.2 NVMe SSD slots, instantly adding more SSD cache for accelerated storage.



The QXP-3X4PES or QXP-3X8PES expansion card is designed specifically for NAS in conjunction with the QNAP TL-Rx00PES-RP JBOD series storage expansion devices. It can connect up to 192 additional SATA hard drives, expanding storage capacity to over 1PB.



The SAS expansion card (QXP-820S-B3408) is specifically designed for NAS in conjunction with the QNAP TL SAS JBOD series storage expansion devices. It can connect up to 16 units of the 16-bay TL-R1620Sep-RP SAS JBOD, providing versatile storage solutions.

Choose The Large Capacity SATA SSDs for TS-h3077AFU

In today's data-driven landscape, All Flash NAS systems play a crucial role in providing high-performance storage solutions. Large capacity SSDs further elevate the capabilities of these systems by delivering enhanced performance, increased storage efficiency, and improved reliability.



Miron 5400 Pro 7.68TB
MTFDDAK7T6TGA-1BC1ZABYY



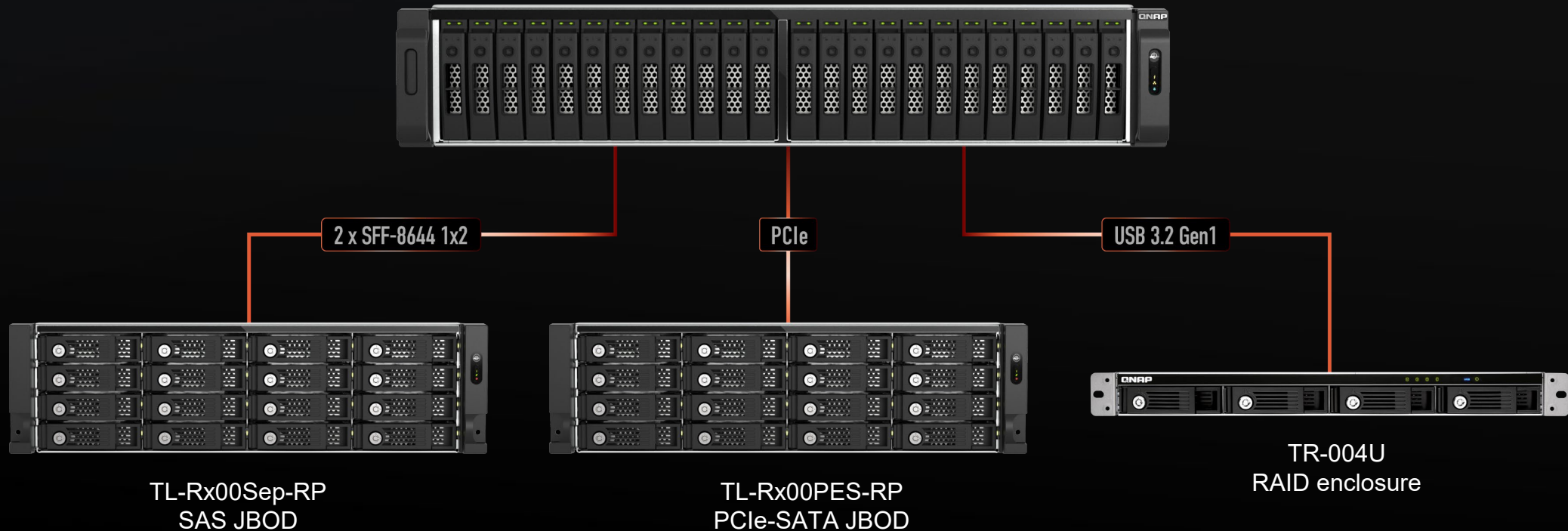
Samsung PM893 7.68TB
MZ7L37T6HBLA



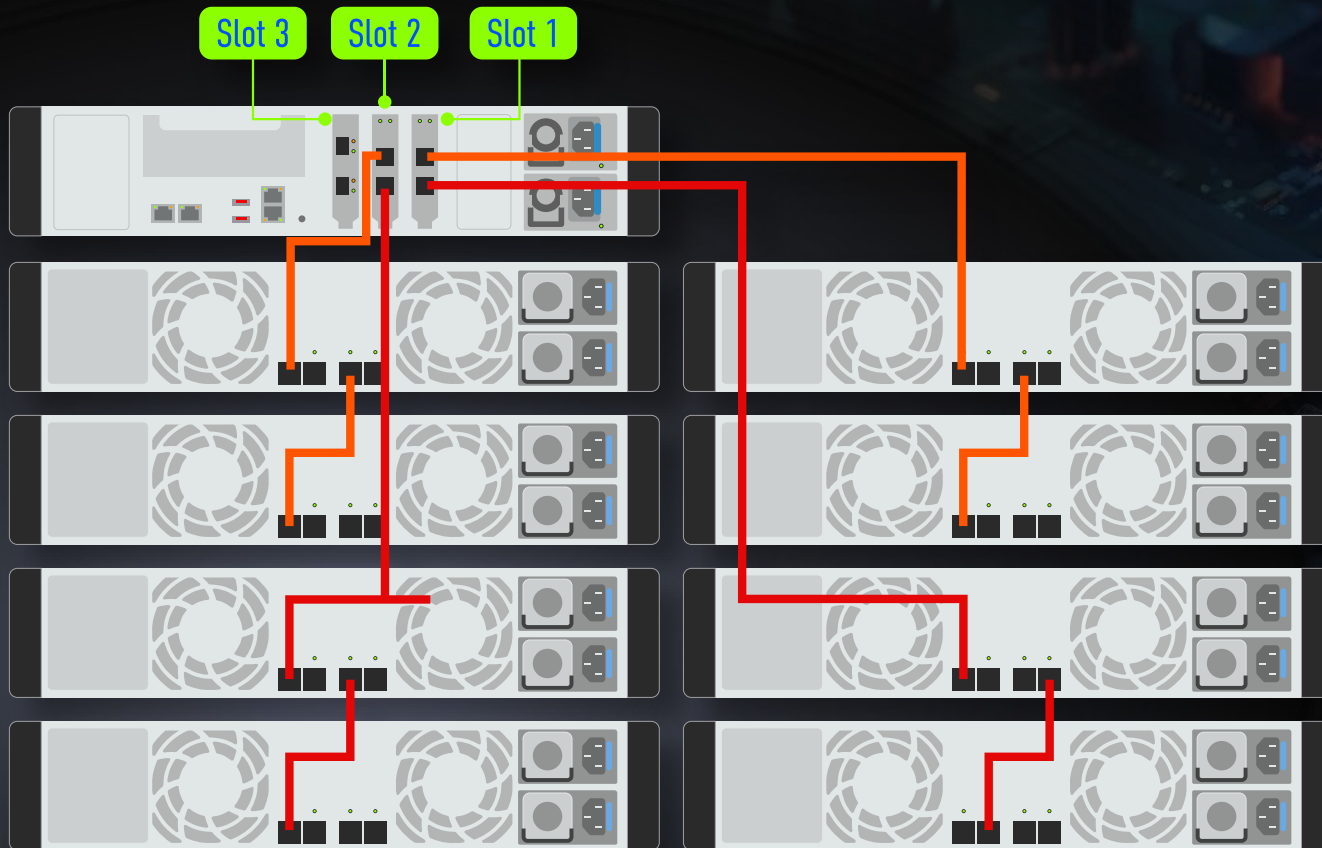
Kingston DC450R 7.68TB
SEDC450R/7680G

Versatile Storage Expansion Choices

The TS-h3077AFU offer flexible capacity expansion options, catering to various devices and scenarios through different interfaces. Options include VJBOD, USB JBOD, SAS JBOD, SATA JBOD, and TL-Rx00PES-RP PCIe SATA JBOD, providing adaptability based on specific equipment and requirements.



Petabyte-Grade Value Solution: Balancing Performance and Capacity



The TS-h3077AFU can **support up to 8 TL-Rx00PES PCIe SATA JBODs**, providing a total space for up to 208 disks (total capacity reaching 4PB, with over 3PB of usable space). Simultaneously, they ensure optimal network performance with dual 25GbE ports, catering to the diverse capacity and performance expansion needs of enterprises in various scenarios.

TL-Rx00PES JBOD comes in 3 SKUs: TS-R1200PES-RP (12-bay, now available), TL-R1600PES-RP (16-bay, now available), and TL-R2400PES-RP (24-bay, launching in Feb 2024).

Note: For NAS compatibility details, refer to the compatibility list at <https://www.qnap.com/go/compatibility-expansion/pcie>

Unleashing 1.9x CPU Power with the Next-Gen Model

TS-h3077AFU, equipped with the AMD Ryzen™ 7000 Series processors, not only deliver high clock speeds but also provide increased bandwidth, ensuring robust performance for enterprise applications.

Protocol	Unit	IO Access	TS-h3077AFU-R7 (32Gx4,8C16T)
			5 host 25GbEx6
iSCSI	Throughput (MB/s)	SW-1M	6,073
		SR-1M	10,740
	IOPS	RW-4K	1,202,262
		RR-4K	1,669,854
SMB	Throughput (MB/s)	SW-1M	9,559
		SR-1M	17,327
	IOPS	RW-4K	635,797
		RR-4K	1,428,002

CPU Benchmark single thread Compares with the Previous Generation TS-h3088XU-RP

Up to

1.34X

CPU Benchmark multi-core Compares with the Previous Generation TS-h3088XU-RP

Up to

1.96X

PASSMARK
SOFTWARE

	AMD Ryzen 7 7700	Intel Xeon W-1270 @ 3.40GHz
Single Thread Rating	4058	3026
CPU Mark	34647	17641

These test results were conducted in the QNAP laboratory, and actual performance may vary based on real-world environments.

NAS: TS-h1677AXU-RP-R7-32G, with QXG-25G2SF-CX6*1, QXG-25G2SF-E810*2, OS: QTS h5.1.4, Volume type : Samsung 870 EVO 1TB x30 (RAID 50)

Client PC : 5* Client PC simultaneously read and write 16GB file (= 80GB 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

Next-Gen Memory Performance: Max 128GB DDR5 RAM and Optional ECC

More Powerful, Faster, and More Stable Than Ever!

- 4 x DDR5 UDIMM slots, supporting expansion up to a total of 128 GB, with an option to upgrade to ECC RAM.
- Clock speeds starting from 4800MT/s, delivering at least 50% higher performance compared to DDR4.
- Reduced power consumption, cost-effectiveness, and environmental consciousness. Approximately 20% lower power consumption compared to DDR4.

Clock Speed Comparison
with the Previous
Generation DDR4

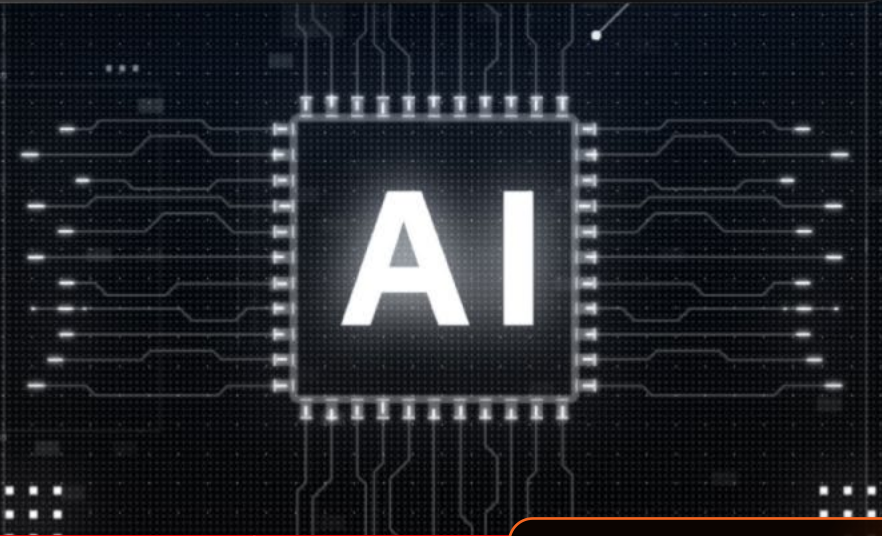
Boosted by **1.5X** up

RAM Order P/N

Ordering P/N	Memory
RAM-16GDR5T0-UD-4800	16G DDR5 UDIMM 4800MHz
RAM-32GDR5T0-UD-4800	32G DDR5 UDIMM 4800MHz
RAM-16GDR5ECT0-UD-4800	16G DDR5 ECC UDIMM 4800MHz
RAM-32GDR5ECT0-UD-4800	32G DDR5 ECC UDIMM 4800MHz

Built-in GPU: Elevating AI Image Recognition and Video Transcoding Efficiency

The TS-h3077AFU come equipped with an integrated AMD Radeon™ Graphics GPU. Not only does it accelerate facial recognition efficiency, but it also enhances video transcoding, ensuring smoother streaming transmissions and improving compatibility across various platforms. Transcoding into H.264/265 further optimizes storage efficiency.



	TS-h1677AXU	TS-h1887XU	TS-h1677XU	TS-464eU	TS-453E
Thumbnail/Hour	91009	50055	11917	12834	11917
Facial Recog./Hour	66740	55616	37077	10215	10215
1080p Video FPS	712	w/o igpu	w/o igpu	171	167

Comparison with the Previous Generation 77XU Series

Boosted by

7.63X

SPEC: TS-h3077AFU

SKU	TS-h3077AFU-RP-R5-32G	TS-h3077AFU-RP-R7-64G
CPU	Ryzen™ 5 7000 series 6C12T 3.8 ~ 5.1 GHz	Ryzen™ 7 7000 series 8C16T 3.8~5.3 GHz
Memory (default)	32GB (32GB x1) DDR5 none-ECC UDIMM	32GB (32GB x2) DDR5 none-ECC UDIMM
Max. Memory	128GB (4 x 32GB)	
Memory Slots	4 x DDR5 UDIMM, ECC supported	
O.S	QuTS hero (default) / QTS (optional)	
Disk Slots	30x 2.5" SATA SSD slots	
I/O Port	2 x 2.5GbE + 2 x 10G Base-T	
PCIe Slots	3 x PCIe Gen4 expansion slots (Slot 1: Gen4 x4, Slot 2: Gen4 x8 or Gen 4 x4, Slot 3: Gen4 x4) Support 10GbE, 25GbE x 2 NIC **Slot 2 provides the width of PCIe Gen4 x8 when Slot 1 is not in use, and provides the width of PCIe Gen4 x4 when Slot 1 is in use.	
USB	2 x USB 3.2 Gen2 Type-A	
GPU	AMD Radeon™ Graphics iGPU	
PSU	Redundant PSU	
System Fan	3 x 60mm	

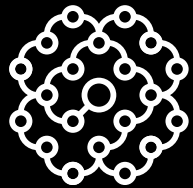
QNAP

Enterprise-Grade Operating System

Powered by QuTS hero with Enterprise
ZFS Technology



QuTS hero h5.1.x Highlights



Data Integrity

- QuTS hero no longer needs file system checks (FSCK), with ZFS Mirror layer, COW (copy on Write) could keep the data integrity.



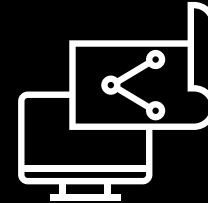
Data Protection

- The native ZFS snapshot feature allows max 65,536 snapshots (supports folder/LUN)
- SnapSync
- More RAID types available
- WORM (write once read many)
- SMB signing and Encryption AES-NI Acceleration
- **SMB Signing with GMAC**
- Authenticator and Passwordless



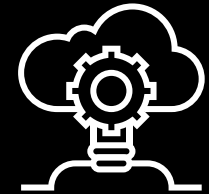
Data Efficiency

- Offers inline compression, inline compacting & inline deduplication for better storage utilization
- ZIL & L2ARC
- Write Coalescing
- Pool over provisioning
- **SMB Multichannel**
- iSCSI Read Zero Copy
- Enhanced performance on encrypted LUN/folder



Stability & Scalability

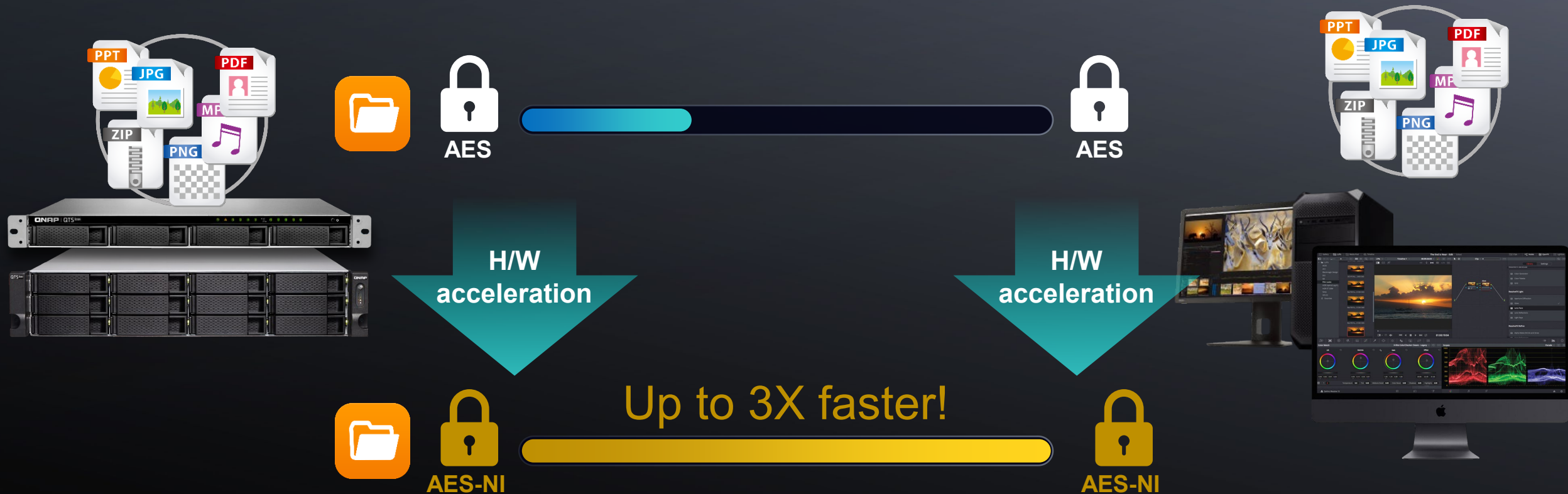
- Easily expanded to PB-level storage space.
- Provide ECC RAM supported model to reach the enterprise level stability
- **Expand/Upgrade ZFS RAID**
- Provide the service of SSD/HDD life prediction
- Predictive Migration



Management & Application

- Detailed ACL
- Protocols & Connection
- Delegated Administration
- AMIZ cloud
- NFS Fixed Ports

AES-NI Acceleration for SMB3 Signing and Encryption



AES-NI accelerated SMB3 Signing and Encryption

Supports AES-128-GMAC for SMB signing acceleration

In 10Gb/s network, **AES-NI enabled CPU**, **new GMAC** algorithm outperforms the former **CMAC** algorithm significantly.

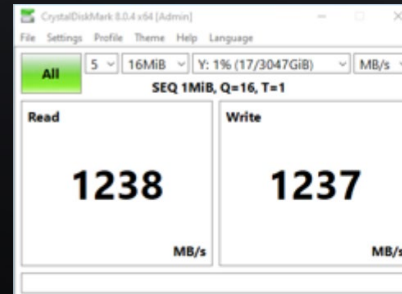
QuTS hero h5.1 supports AES-128-GMAC signing acceleration (only in Windows Server 2022 and Windows 11 clients) that not only greatly increases data signing efficiency over SMB 3.1.1 but also enhances the CPU utilization of the NAS system - providing the best balance of security and performance.

CMAC



x86

GMAC

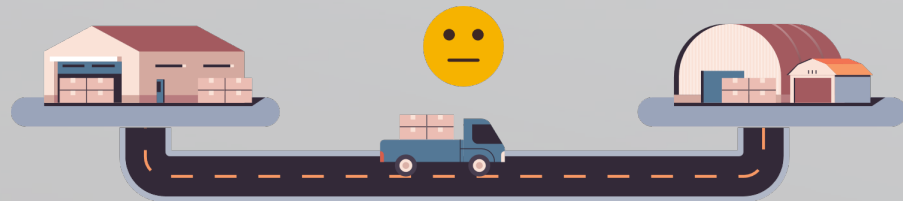


2X Faster

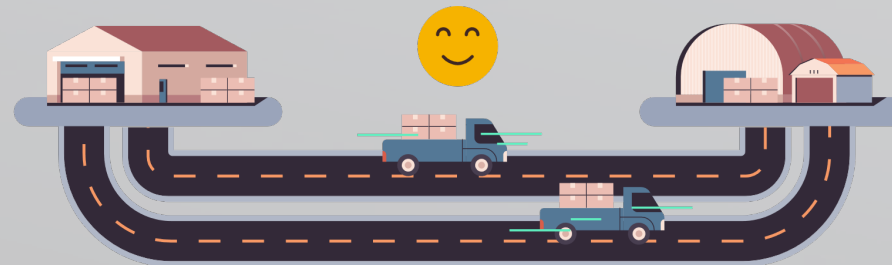
SMB Multichannel for Multiplied Network Performance and Fault-tolerant Connections

A SMB 3 client automatically establishes multiple connections to the SMB server for a single SMB session, and with the multiple connections achieves bandwidth aggregation and network fault tolerance.

Without Multichannel



With Multichannel



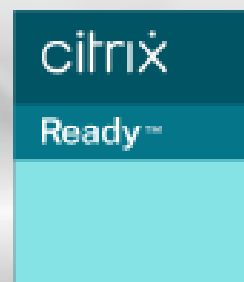
Faster!



Network fault tolerance!

Virtualization Storage Solutions

Virtualization applications significantly enhance the management efficiency and resource availability of enterprise IT. QNAP NAS provides a reliable, high-performance, and cost-effective storage solution for diverse virtualization platforms.



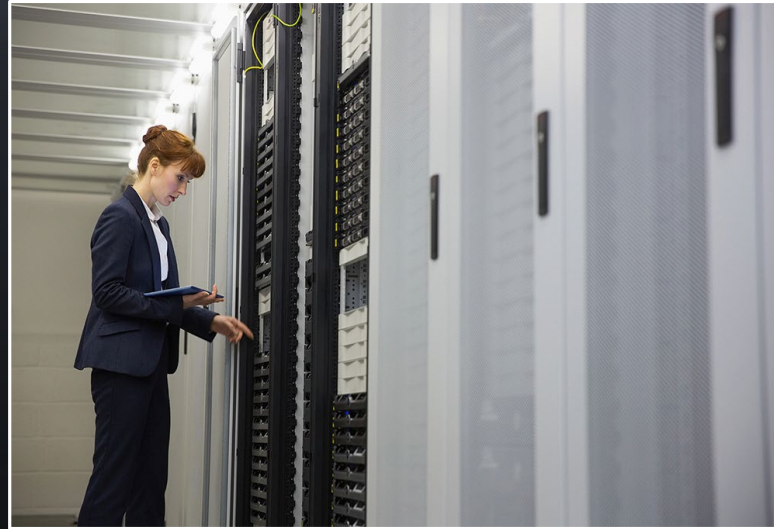
Note: Virtualization certifications are still in progress. The NAS models are expected to be certified by the end of Q1, 2024.

Performance-demanding NAS Applications



Virtualization

In the realm of non-structured data processing, breaking through the performance bottlenecks of I/O-intensive applications, ideal for extensive virtualization environments and Desktop Virtualization (VDI) applications.



Data Centers

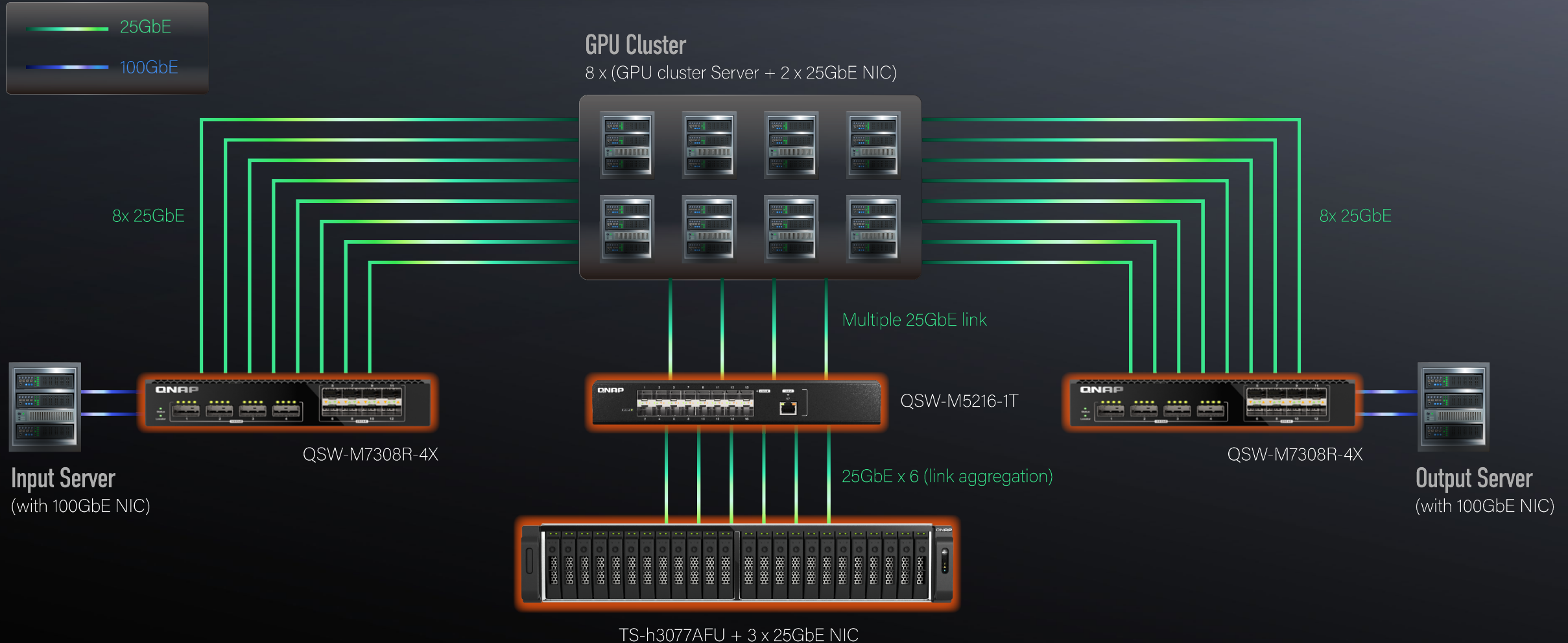
Delivering ultra-low latency and high IOPS performance, providing data centers hosting critical business systems and data with microsecond-level response times.



Media & Entertainment

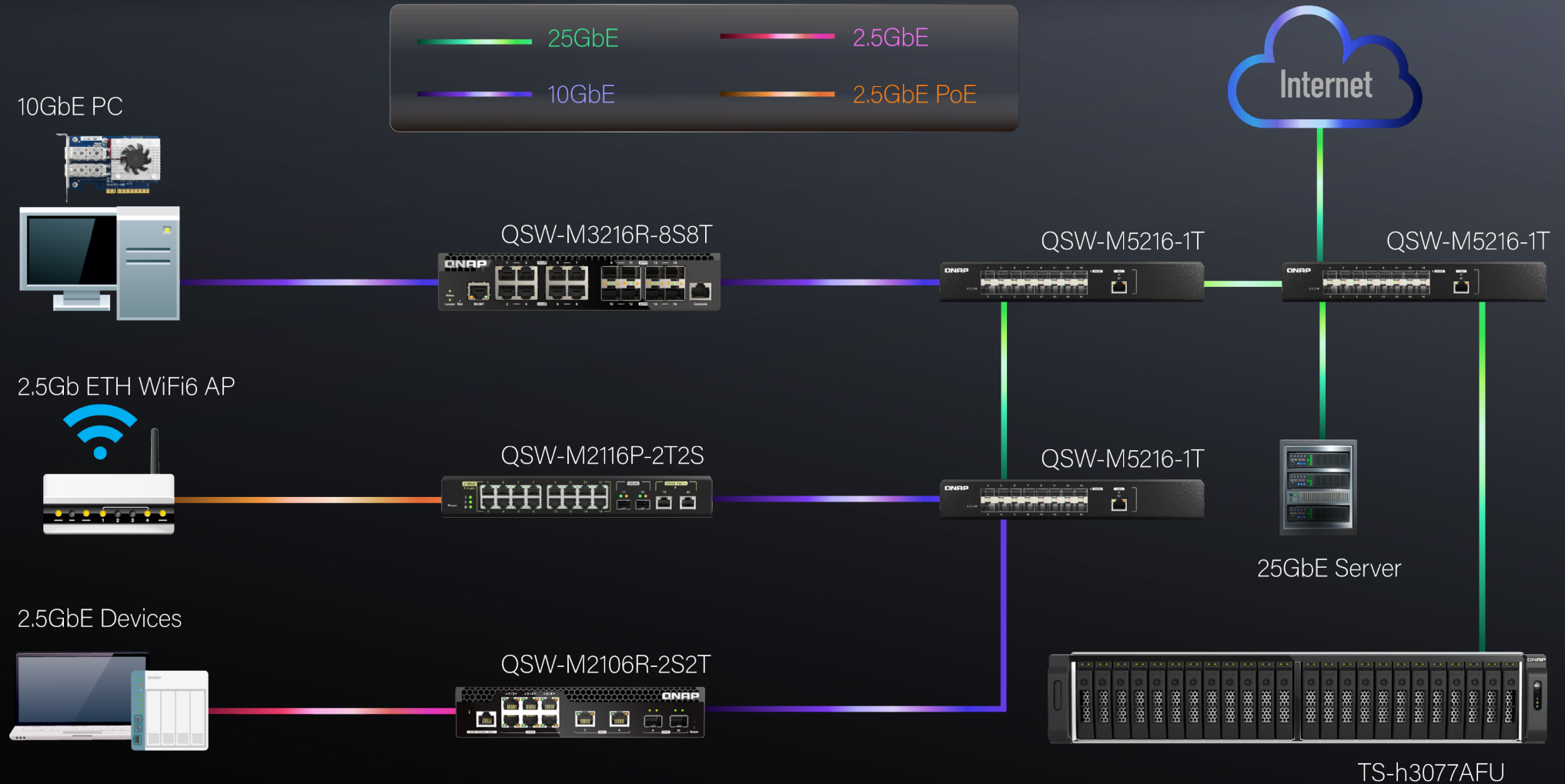
Meeting the demands of seamless 4K/8K media streaming and post-production needs, enhancing efficiency in multimedia workflows through faster data transfer, access, and backup.

Use Case Example AI Model Training



Use Case Example

Office File Server



Use Case Example

Data Center Remote Redundancy

Local Data Center Facility

VM SQL VM ERP VDI VM Win server



Primary ESXi server
with 25GbE NIC

QNAP QSW-M5216-1T
25GbE switch



Multiprotocol Label
Switching

Remote Data Center Facility



Secondary ESXi
server with
25GbE NIC

QNAP QSW-M5216-1T
25GbE switch



Local-site Primary NAS
TS-h3077AFU
With 25GbE NIC

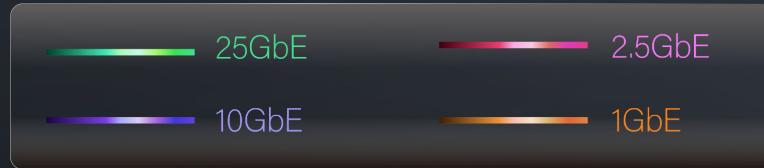


Secondary NAS
TS-h1277AXU-RP / TS-h1677AXU-RP
With 25GbE NIC

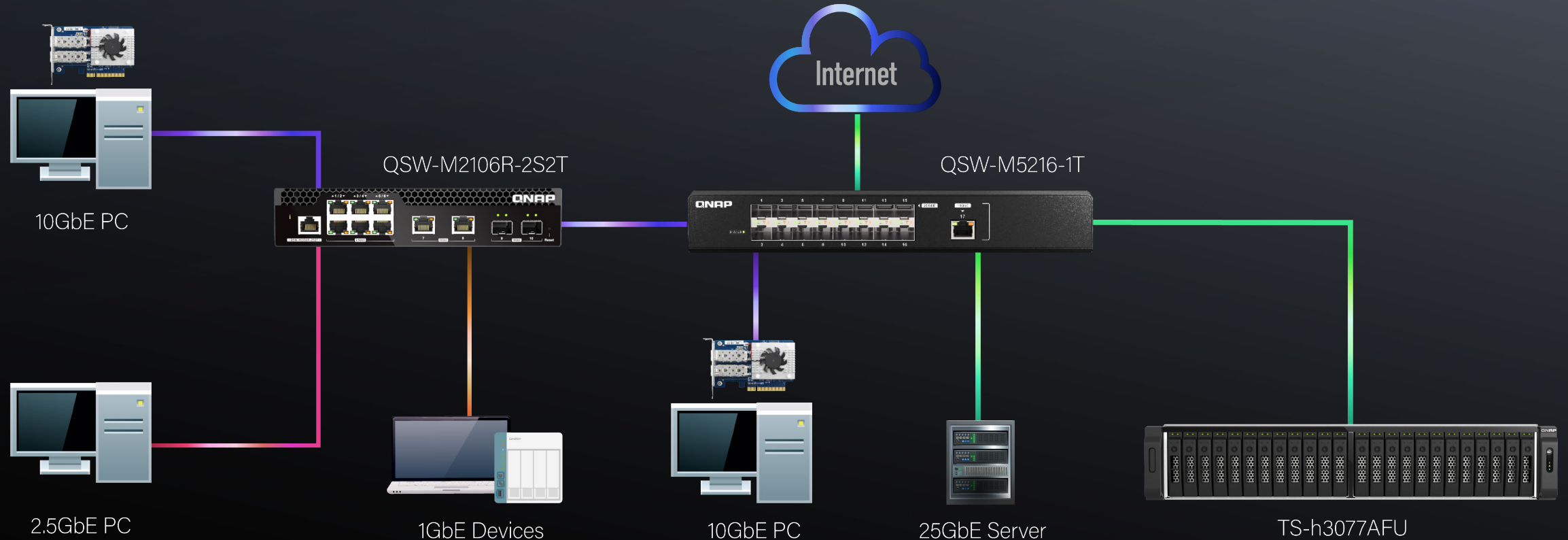


DR-site Primary NAS
TS-h3077AFU
With 25GbE NIC

Use Case Example Multimedia Studio



In the cutting-edge Multimedia Studio, our network thrives with a core 10GbE switch, distributed 10GbE switch, and accessible 2.5GbE switch. Storage prowess is embodied in the TS-h3077AFU, while clients boast a 25GbE server, 10GbE workstation, and a versatile 2.5GbE PC. Elevate your multimedia experience!

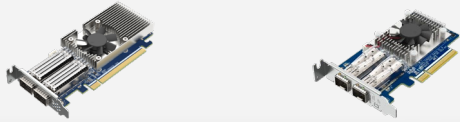


Standard 5-Year Warranty and Support Services

TS-h3077AFU enterprise NAS models come with an exclusive **5-year** hardware warranty, covering both hardware repairs and support services. QNAP offers this prestigious warranty service to ensure the continuous operation of your business organization and provide uninterrupted services to your customers.



100 / 25GbE NIC support



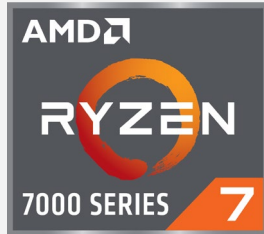
3 x PCIe Gen4 expansion slots for Ethernet, FC, storage, and more



Support dual OS
(Default is QuTS hero)

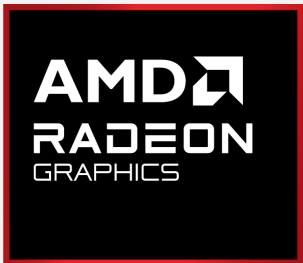


Expand your storage capacity to **3PB+** with additional **JBOD**



Up to **8 Cores**
AMD Ryzen™
7000 series
Processors

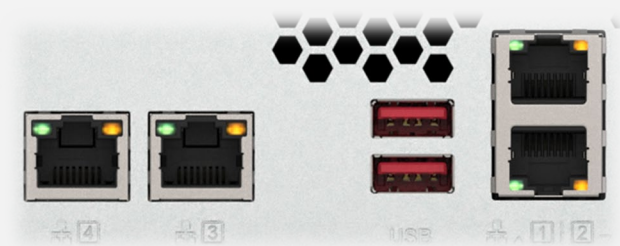
Integrated graphics



TS-h3077AFU Enterprise All-Flash NAS



2 x 10GBASE-T +
2 x 2.5GbE +
2 x USB-A 3.2 Gen 2 10Gbps



Empower your enterprise with an efficient virtualization environment

32GB RAM Up to Total
64GB RAM **128GB**

3PB up Storage capacity
(TS-h1677AXU-RP support up to 8x TL-R2400PES-RP installed with 22 TB HDD)

Faster!
DDR5
Unleash performance with over 4800MT/s UDIMM, optional ECC support

Standard 5-year Warranty



QNAP

TS-h3077AFU

The Next Generation Enterprise
All-Flash NAS with AMD Ryzen™
7000 series Processor



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