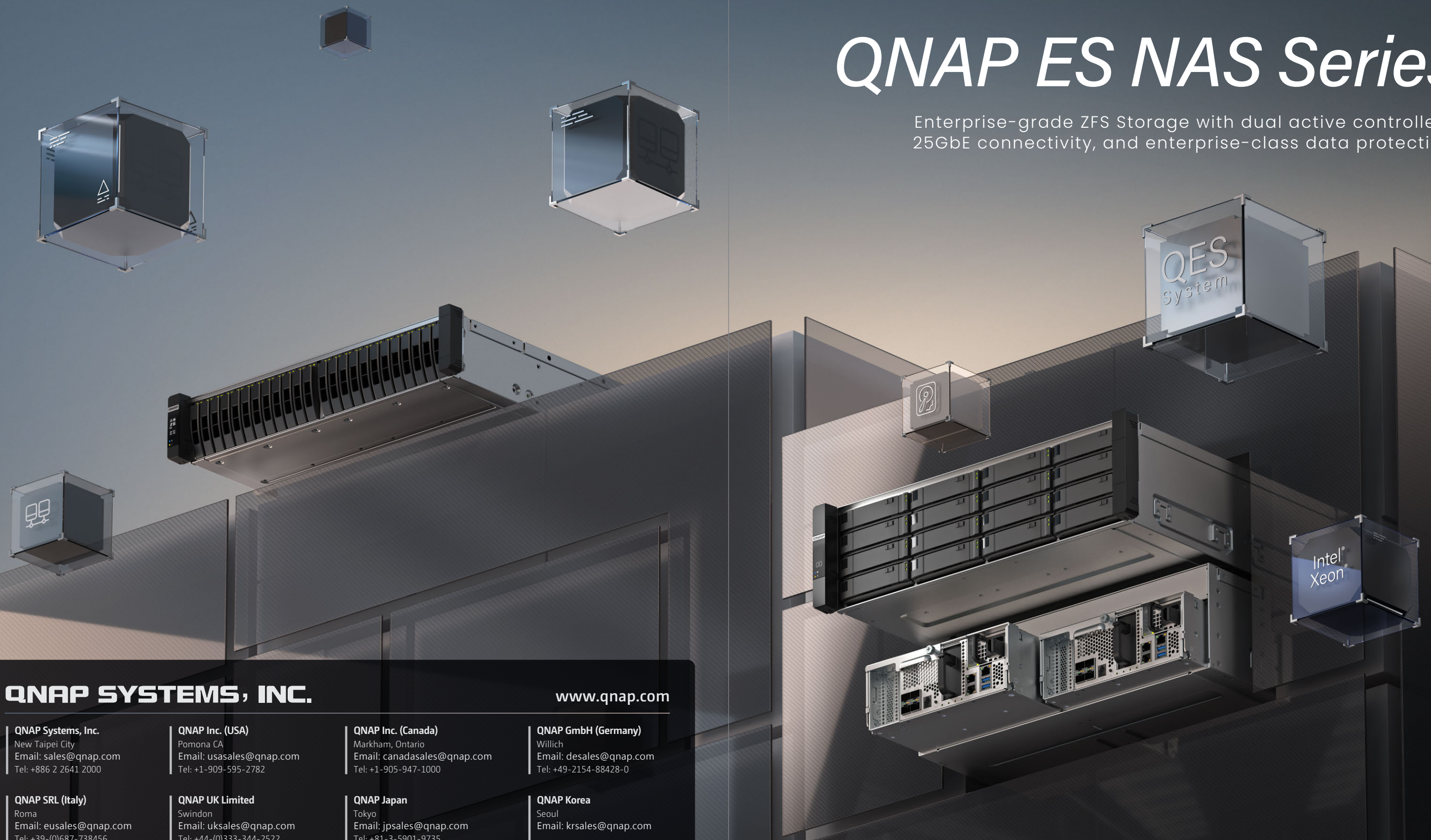


QNAP ES NAS Series

Enterprise-grade ZFS Storage with dual active controllers, 25GbE connectivity, and enterprise-class data protection.



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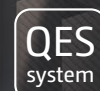
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QES Operating System
Advanced Data Protection
& Storage Efficiency



Dual active-active controllers
High Availability
& Performance



Dual-controller SAS Storage Expansion
Gain petabyte-scale storage capacity

QNAP ES NAS

Enterprise-grade ZFS Storage with dual active controllers, 25GbE connectivity, and enterprise-class data protection, featuring high availability and optimal storage efficiency

Nearly 13 years ago, QNAP launched the ES NAS enterprise-class storage system development project. The first product, ES1640dc, was launched at the end of 2015, and the upgraded version ES1642dc v2 supporting 12Gb SAS specifications was launched the following year. Since the birth of ES1640dc, QNAP ES NAS has been developed for 10 years. During this period, it has also spawned models with different densities such as ES1686dc R2 (3U 16-Bay 3.5" SAS) and ES2486dc (2U 24-Bay 2.5" SAS/SATA). The latter is positioned as QNAP's first enterprise-level high-availability NAS with all-flash memory and dual-active control architecture. QNAP's emphasis on "dual active controller" is not only a technical specification, but also symbolizes the reliability design at the architectural level. Through the active-active architecture, two controllers can handle data access, load balancing and service delivery simultaneously, thereby improving performance and truly implementing uninterrupted operations.



The History of QNAP ES NAS: An Standing Witness As Time Gone By

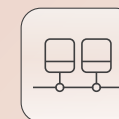
	ES1640dc	ES1640dc v2	ES1686dc	ES2486dc	ES1686dc R2
Operating System	QES (QNAP Enterprise Storage)				
High Availability	Dual Active-Active Controller				
Launch	2015 Q4	2016 Q4	2019 Q2	2020 Q1	2025 Q2
RAM, PCIe	3 DDR3, Gen2 x4 (Mini-SAS)		8 DDR4, 2 Gen3 x 8 (Mini-SAS, 25GbE)		
Form Factor	3U 16 Bay	3U 16 Bay	3U 16 Bay	2U 24 Bay	3U 16 Bay
Interface	3.5" SAS	3.5" SAS	3.5" SAS	2.5" SAS SATA	3.5" SAS
SAS	6G	12G	12G	12G	12G
10GbE LAN	RJ45 x 2	SFP+ x 4 RJ-45 x 2 (PCIe)	SFP+ x 4	SFP+ x 4	SFP+ x 4
PSU	770W	770W	770W	700W	700W

ES1686dc R2

High Availability Enterprise NAS with Dual Active Controllers



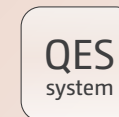
Ensure uninterrupted mission-critical business operations with the high-availability ES1686dc R2 NAS. With redundant controllers and power supplies, it minimizes downtime, allowing seamless component replacement without disruption, ensuring reliability and continuity for enterprises.



Dual active-active controllers
Dual active-active controllers provide supreme uptime and redundancy to ensure high availability.



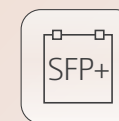
NVRAM module
NVRAM reduces the risk of losing write cache data if unexpected power failure occurs.



QES operating system
Supports ZFS near-limitless snapshots, SnapSync, block-level data deduplication, and inline data compression.



Storage for virtualization
Supports VMware® vSphere®, Windows Server® and Citrix® XenServer® for storage virtualization.



10GbE SFP+ ports
Four 10GbE SFP+ ports (per controller) accelerate virtualization, large file sharing, and intensive data transfer.



PCIe Gen 3 slots
Two PCIe slots (per controller) allow for adding 10GbE/25GbE networking cards to increase application performance.

Available Models

- **ES1686dc-R2-2123IT-64G**
Intel® Xeon® D-2123IT 4-core 2.20 GHz processor (burst up to 3.0 GHz) per controller, 32 GB RDIMM DDR4 ECC (4x 8 GB) per controller
- **ES1686dc-R2-2142IT-96G**
Intel® Xeon® D-2142IT 8-core 1.90 GHz processor (burst up to 3.0 GHz) per controller, 48 GB RDIMM DDR4 ECC (4 x 4 GB+4 x 8GB) per controller
- **ES1686dc-R2-2142IT-128G**
Intel® Xeon® D-2142IT 8-core 1.90 GHz processor (burst up to 3.0 GHz) per controller, 64 GB RDIMM DDR4 ECC (4 x 16 GB) per controller

ES2486dc

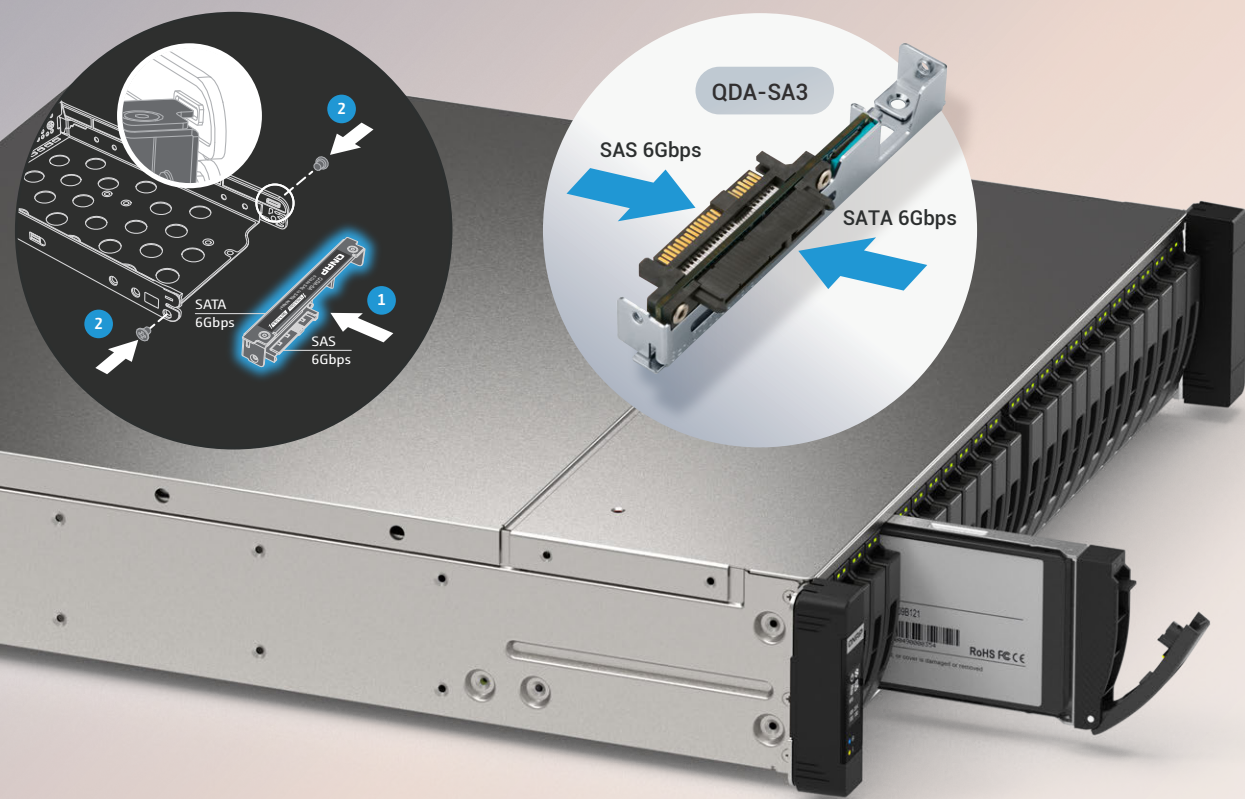
Powerful and cost-efficient Intel® Xeon® D based Enterprise ZFS NAS, optimized for inline deduplication and all-flash applications



The ES2486dc Enterprise ZFS NAS is QNAP's first high-availability NAS with all-flash arrays and dual active controllers. Powered by an Intel® Xeon® D-2142IT 8 cores/16 threads processor, the ES2486dc supports up to 24 x 2.5-inch SAS 12Gbps SSDs and provides excellent I/O throughputs. Random write performance for all-flash arrays is further driven by the flash-optimized QES operating system that comes pre-installed on the ES2486dc.

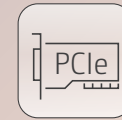
Use SAS or SATA SSDs flexibly within your IT budget

Although SATA 6Gbps SSDs provide high-performance affordable storage, this type of drive is unsuitable for dual-controller environments because it lacks dual-port support. By using a QDA-SA3 adapter specially designed for QNAP all-flash Enterprise ZFS NAS, a SATA 6Gbps drive can be used in the 2.5-inch SAS drive bay of the ES2486dc— allowing storage capacity expansions with cost-effective SATA drives. By installing a SATA SSD with the QDA-SA3 into the dual-controller ES2486dc, the SATA SSD can share SAS dual-port advantages to ensure a high-availability and fault-tolerant enterprise storage environment.



Dual active-active controllers

Intel® Xeon® D dual active-active controllers provide superb uptime and redundancy to ensure high availability (HA).



Flexible PCIe expansion

PCIe expandability allows for 10GbE/25GbE adapters to increase application performance.



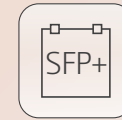
Data protection & recovery

Near-limitless snapshots and SnapSync for snapshot remote backup assist businesses to resume essential services in the shortest time.



Reliable & High-performance

Battery-protected DRAM write to cache data protection and flash read acceleration provides industry-leading random access performance.



10GbE connectivity

Four 10GbE SFP+ ports accelerate large file sharing and intensive data transfer from virtualization or datacenter.



Virtualization applications

Supports VMware® vSphere®, Windows Server® and Citrix® XenServer® for storage virtualization. Compatible with OpenStack® cloud environments.

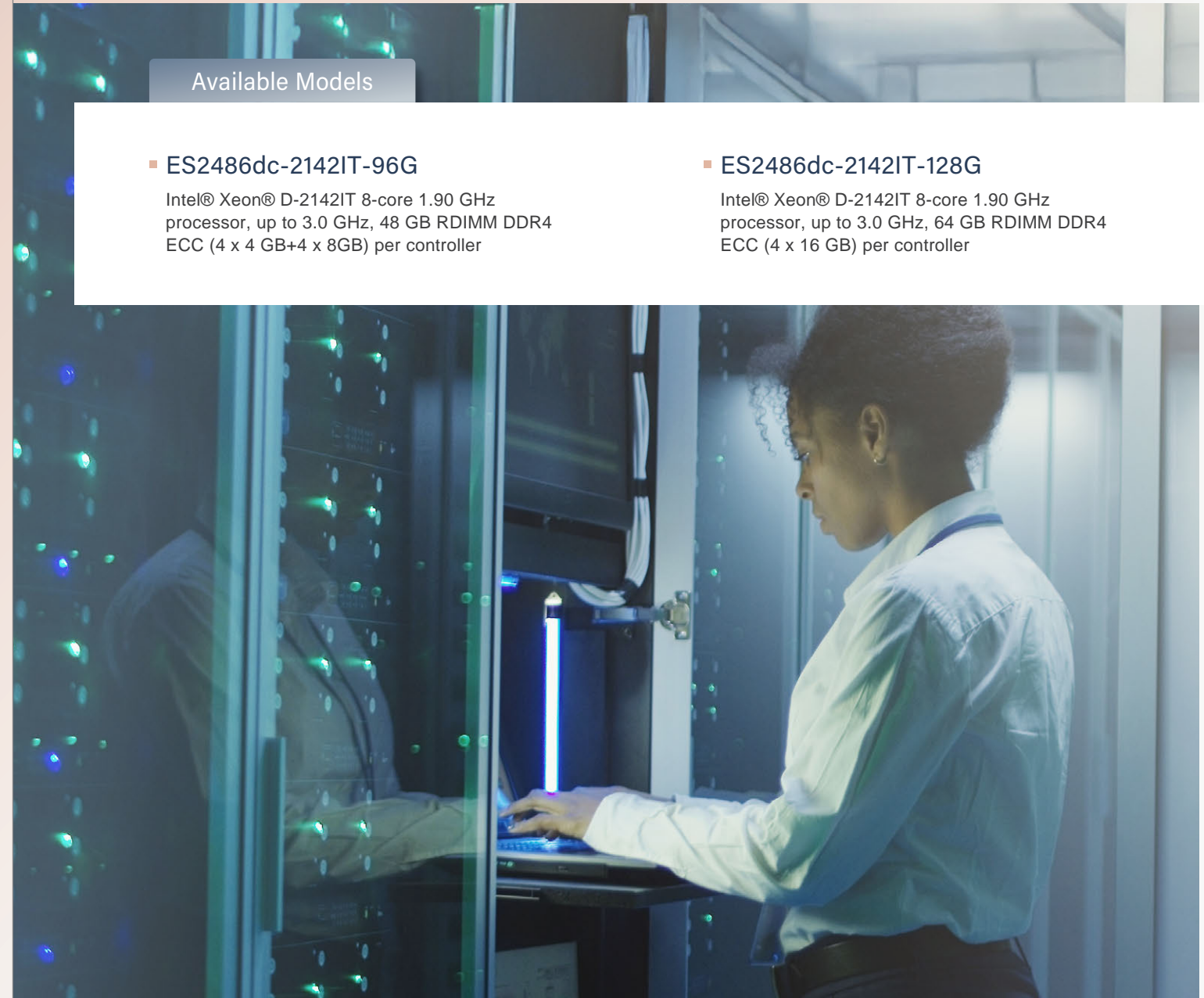
Available Models

■ ES2486dc-2142IT-96G

Intel® Xeon® D-2142IT 8-core 1.90 GHz processor, up to 3.0 GHz, 48 GB RDIMM DDR4 ECC (4 x 4 GB+4 x 8GB) per controller

■ ES2486dc-2142IT-128G

Intel® Xeon® D-2142IT 8-core 1.90 GHz processor, up to 3.0 GHz, 64 GB RDIMM DDR4 ECC (4 x 16 GB) per controller

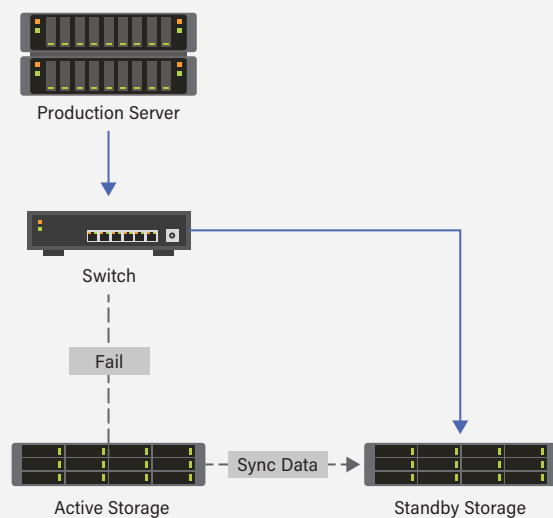


Active-Active high availability with optimal storage efficiency

In Active-Active storage system architecture, both controllers can provide a comprehensive range of services, which is different from the Active-Standby architecture of single-controller systems. An advantage of Active-Active architecture is the lack of idle computing resources. To leverage the strengths of the Active-Active controller architecture, QNAP recommends creating multiple storage pools and distributing ownership between both controllers to enable simultaneous output from both controllers for improved load balancing.



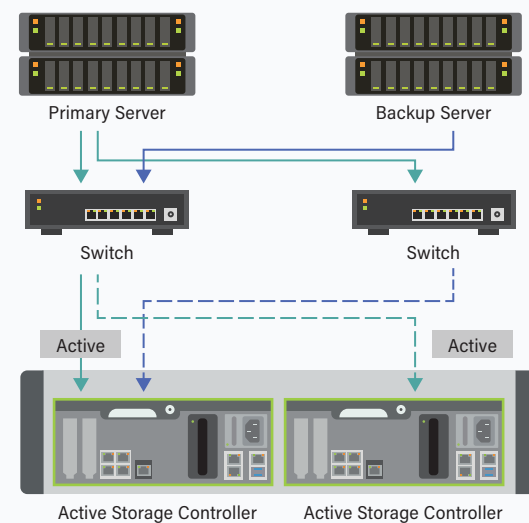
Active-Standby single-controller system



If the active system fails, the standby system starts up and takes over processing.

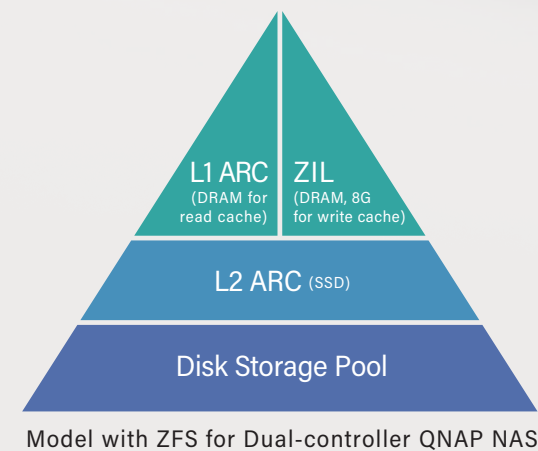
- Requires purchasing two systems for HA, doubling the cost.
- Causes load imbalance as only the active system processes workloads.
- A power outage may lead to data loss.
- Network disconnection invalidates the HA architecture, rendering it ineffective.

Active-Active dual-controller system



Both systems are active simultaneously.

- Both controllers handle traffic, optimizing workload distribution.
- Copy-To-Flash protection safeguards data against power failure.
- Dual-path SAS interface ensures seamless connectivity.
- Efficient resource utilization, reducing computational waste.
- High-speed, uninterrupted, and high-availability storage service.
- Supports multiple communication protocols: SMB, NFS, and iSCSI.



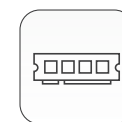
Multi-level cache technology with read and write support boosts storage performance

The ES NAS simultaneously supports read caches including primary cache (L1 ARC), SSD cache as a secondary cache (L2 ARC), and write cache ZFS Intent Log (ZIL) for synchronous transactions to meet performance demands for various enterprise applications.



Multi-tier caching

The ES1686dc R2 simultaneously supports main memory read cache (L1 ARC), SSD secondary read cache (L2 ARC), and memory write cache (ZFS Intent Log) to meet performance demands of various enterprise applications.



Expand main memory up to 512GB

Both controllers have eight RDIMM slots, allowing for up to 512GB memory.

The main memory will retain 8GB for use by the write cache.



NVRAM

In the event of power failure, the system can write cache data from the battery-protected DRAM to M.2 SSD through Copy To Flash (C2F) to ensure that data is not lost.

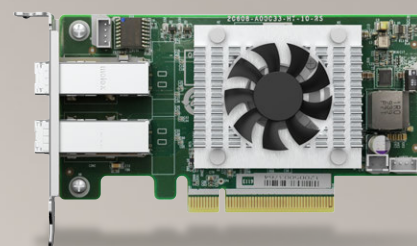


PCIe expansion for 25GbE high-speed networks

The ES2486dc provides two PCIe Gen 3.0 x8 slots connected to the CPU, allowing you to install lightning-fast 10GbE/25GbE network cards to boost virtualization, media streaming, and other bandwidth-demanding applications. Installing a Smart NIC that supports iSER can improve VMware virtualization performance. You can also install a SAS expansion card (QXP-820S-B3408) for connecting up to sixteen 16-bay TL-R1620Sdc expansion enclosures to seamlessly expand potential storage capacity to over 1PB, with unprecedented performance of up to 48 Gbps per host connection.

SAS Storage Expansion Card

With the SAS storage expansion card, you can scale up the ES1686dc R2 with QNAP's TL SAS expansion enclosures.



Build an affordable Fibre Channel SAN environment

Common Fibre Channel Storage Area Networks (SAN) devices are often costly. By installing QNAP dual-port 16Gb/32Gb Fibre Channel expansion cards in the ES NAS, you have more budget-friendly options to add a NAS to a SAN environment. You can set a Fibre Channel Target using the iSCSI & Fibre Channel app. Moreover, the LUN Masking and Port Binding features provide an additional layer of data security.

iSCSI & Fibre Channel

FC Port Groups

FC Port Groups	WWPN	Port	Action
Default	All FC ports		
16gport1	21:00:00:24:5e:be:00:06 (jauss882c16p1)	FC Adapter 2 Port 1	[Edit] [Delete]
My16gSAN	21:00:00:24:5e:be:00:06 (jauss882c16p1)	FC Adapter 2 Port 1	[Edit] [Delete]
	21:00:00:24:5e:be:00:07 (jauss882c16p2)	FC Adapter 2 Port 2	
My32gSAN	21:00:24:5e:be:00:00:06 (jauss882c32p1)	FC Adapter 1 Port 1	[Edit] [Delete]
	21:00:24:5e:be:00:00:07 (jauss882c32p2)	FC Adapter 1 Port 2	

FC Ports

Adapter	Manufa...	Status	Speed	WWPN	Alias	Initiators
FC Adapter 1 Port 1	QNAP	Disconnect...	0 Gbps	21:00:24:5e:be:00:00...	jauss882c...	0
FC Adapter 1 Port 2	QNAP	Disconnect...	0 Gbps	21:00:24:5e:be:00:00...	jauss882c...	0
FC Adapter 2 Port 1	QNAP	Connected	16 Gbps	21:00:00:24:5e:be:00...	jauss882c...	1
FC Adapter 2 Port 2	QNAP	Disconnect...	0 Gbps	21:00:00:24:5e:be:00...	jauss882c...	0

Petabyte-scale, dual-controller SAS storage expansion

Gain petabyte-scale storage capacity using the QNAP's expansion enclosure. Dual-channel (dual-path) connections allow service continuity even if one node fails.

