



Full-service MEGA Scale-out NAS

QNAP's full-service approach empowers your IT team to focus on business growth, while we take care of your infrastructure.

Introduction

The Storage Infrastructure Demanded in the Data Explosion Era

With the advancement of DX (Digital Transformation) and the utilization of AI and Big Data, enterprises are handling an unprecedented surge in data. Video content, AI training datasets, and IoT sensor data are driving organizations to plan for petabyte-level storage and utilization.

Despite this trend, many companies still rely on traditional **scale-up NAS** configurations, which depend on single-chassis expansion and face several challenges:

- Costly hardware replacements with each capacity expansion.
- Risk concentration due to hardware failures.
- Lack of flexibility to meet high-capacity and high-throughput demands.

In response, **scale-out NAS** solutions are attracting significant attention. This document introduces the full capabilities of QNAP's MEGA Scale-out NAS, a next-generation storage platform combining scalability, flexibility, and high availability.

Scale-out NAS



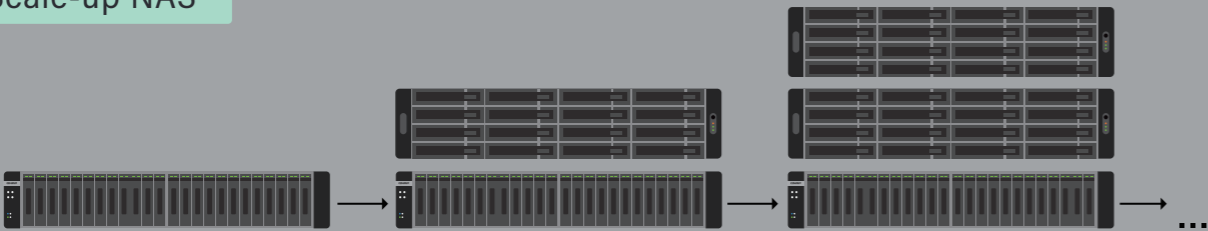
How it works

- Expands processing power by adding more nodes, enabling distributed processing across multiple NAS.
- Known as horizontal scaling, where capacity and performance grow linearly with each added node.
- Facilitates seamless capacity expansion and improved fault tolerance.

Ideal for...

Large-scale, data-intensive environments requiring flexibility, scalability, and zero downtime.

Scale-up NAS



How it works

- Enhances performance and capacity by upgrading or adding resources (CPU, memory, storage drives) within a single NAS system.
- Also known as vertical scaling, where improvements are limited by the maximum capacity of the existing hardware chassis.

Ideal for...

Small to medium-sized deployments with predictable workloads.

QNAP MEGA Scale-out NAS

Overview

Comprehensive Full-Service Experience

QNAP's MEGA Scale-out NAS is backed by robust full-service models designed to remove complexity from every stage of your storage journey. From tailored consulting to post-deployment care, we go beyond hardware to ensure your business gets a complete, worry-free experience.

Expert Consultation

Receive professional insights and customized planning to ensure an optimal system architecture tailored to your workload and future scalability needs.

Hassle-Free Deployment

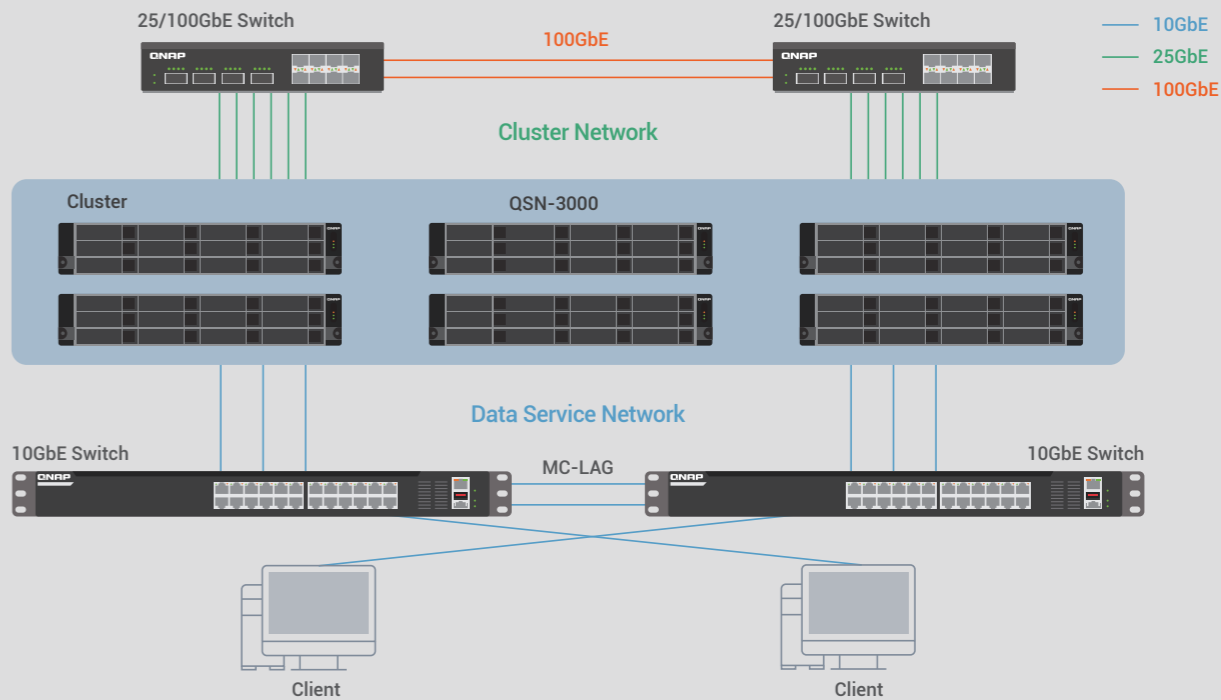
Our on-site deployment services ensure your system is configured and optimized according to best practices, so you can start operating smoothly from day one.

Complete Package

- ✓ Shipped with: Enterprise-grade NAS, certified drives, high-speed network switches, and essential accessories.
- ✓ Standard 5-year hardware warranty.
- ✓ RMA and replacement support included.
- ✓ Perpetual software license—no recurring fees.

Dedicated After-Sales Support

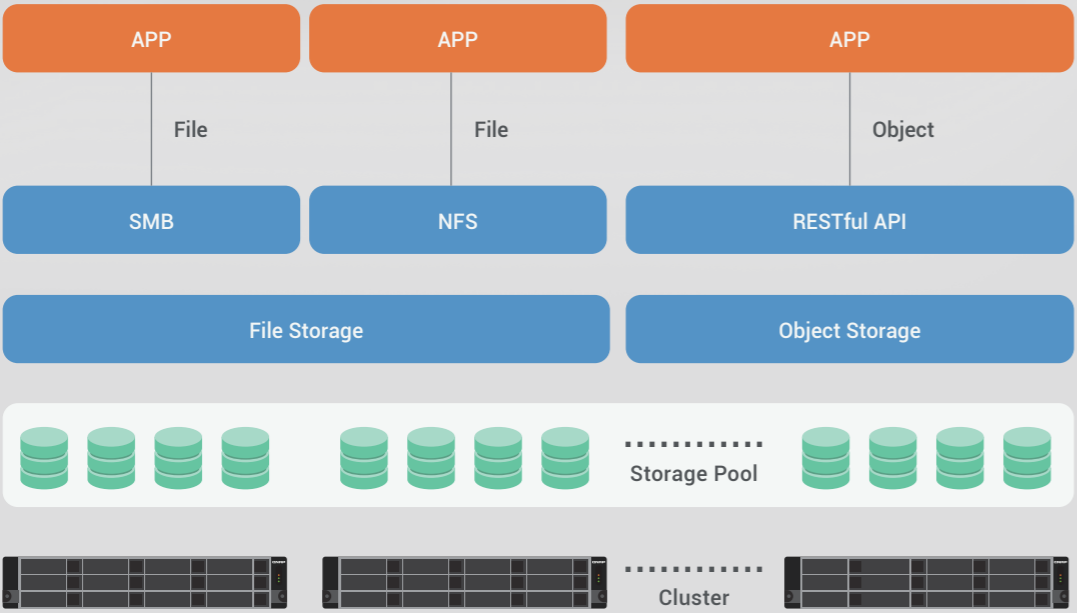
- ✓ 8x5 Next Business Day technical support.
- ✓ Remote diagnostics and root cause analysis.
- ✓ Optional on-site support with next business day response.



Infrastructure

QNAP's MEGA Scale-out NAS allows you to flexibly scale from 3 nodes up to 96 nodes in line with your business growth. Each node can be seamlessly added without downtime, enabling linear scalability in both capacity and performance. The cluster operates as a unified storage pool with a single namespace, providing centralized management while allowing flexibility to meet various business needs.

QNAP's solution supports both file protocols (SMB/NFS) and object protocols (S3 API) building a comprehensive storage platform from data centers to cloud services.



Storage types	Protocols	Scalable architecture
✓ File storage ✓ Object storage	✓ SMB ✓ S3 API ✓ NFS	✓ From 3 nodes to up to 96 nodes.

Storage Efficiency

QNAP's Scale-out NAS supports data compression technology that reduces the size of stored data, lowering I/O workloads and improving overall system performance—ideal for handling large-scale datasets efficiently.

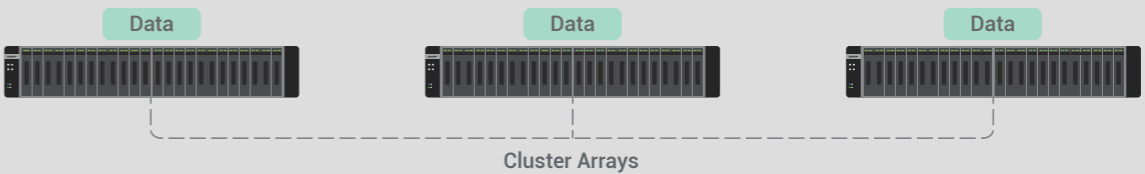
Technical Architecture

This section explains how QNAP's Scale-out NAS architecture achieves high availability through the following technologies and features.

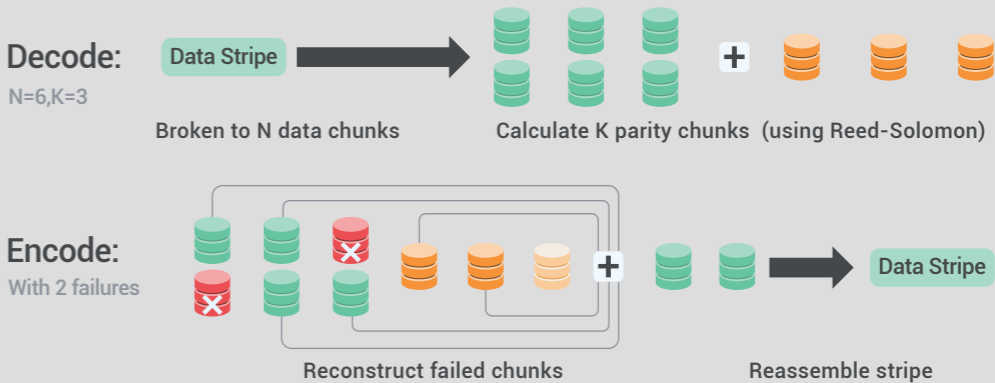
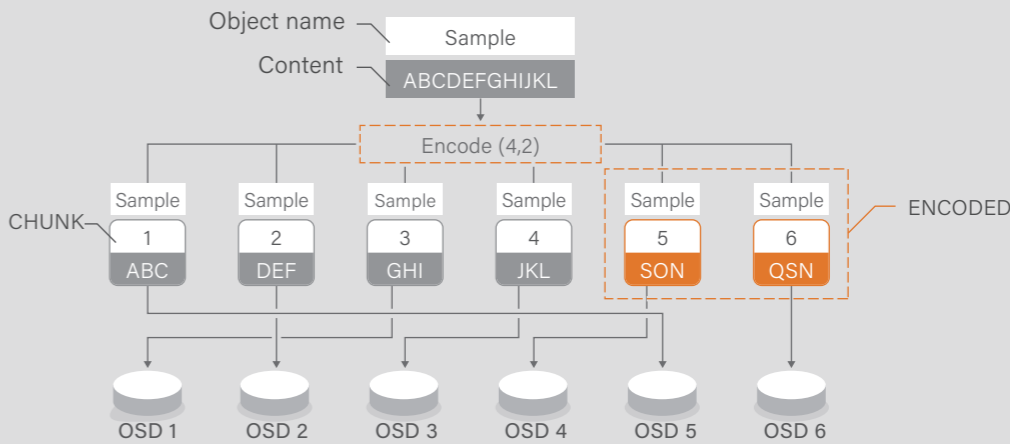
Data Redundancy

Scale-out NAS comes with the following technologies to ensure data redundancy over a cluster.

- **Data replication:** Each copy of the data is stored on a different node/disk in a distributed manner (typically 2-3 copies). If a node/disk fails, other copies remain available to ensure data integrity.



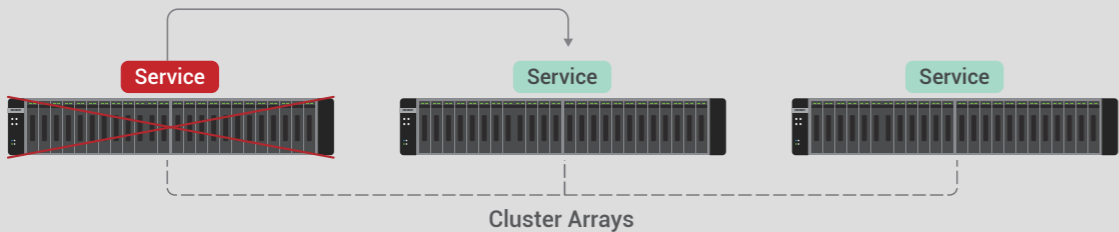
- **Erasur coding:** Increases data reliability by dividing data into multiple parts and making them redundant. This improves storage efficiency while maintaining high fault tolerance. This mechanism is ideal for long-term storage and infrequently accessed data such as backups or archival content, offering higher space efficiency compared to traditional replication.



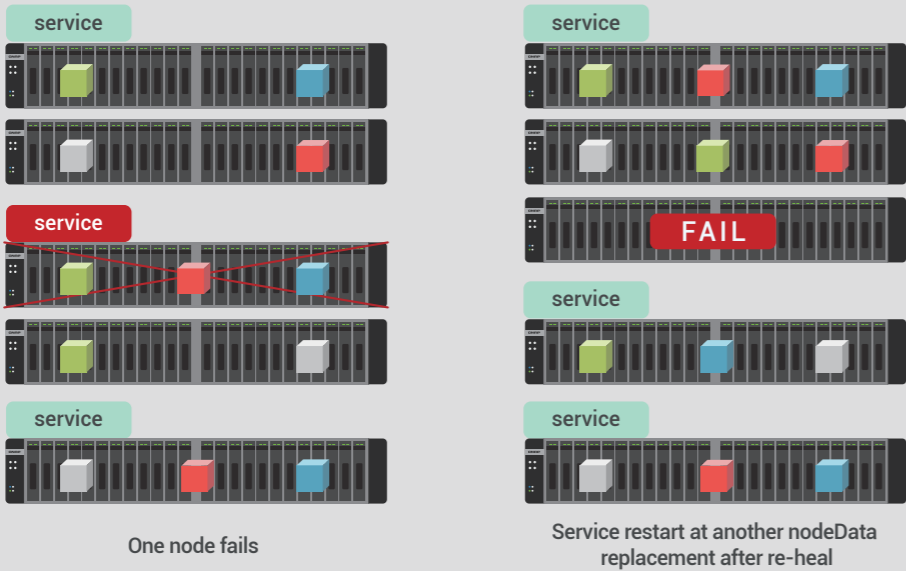
- **CRUSH (Controlled Replication Under Scalable Hashing) algorithm:** Intelligently distributes data across the cluster:
 - Ensures even data distribution to prevent overloading a specific node.
 - Supports automatic reallocation of data when nodes are added or removed.
 - Optimizes both performance and data durability through balanced placement.

Service-level High Availability (HA)

Fault tolerance is key for service-level HA. The system ensures no single point of failure by distributing both data and services across nodes.



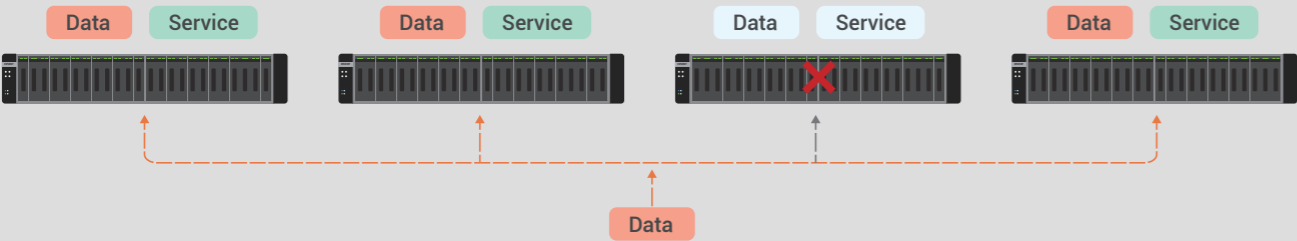
- **Automatic failover:** Services automatically migrate to healthy nodes.
- **Self-healing:** Rebuilds missing data using available replicas or parity chunks and redistributes it across the cluster.



Dynamic Rebalancing

Dynamic rebalancing automatically redistributes data when nodes are added or removed. This ensures optimal storage utilization and prevents any single node from becoming overloaded, keeping the system efficient and scalable.

You can adjust resource usage during periods of peak activity (such as e-commerce traffic spikes during promotional periods) to avoid over-provisioning.



Specifications

Recommended Solutions	QSN-3000 Cluster-6	QSN-3050 Cluster-6
Storage node	6 x QSN-3000	6 x QSN-3050
Expansion cards	<ul style="list-style-type: none">6 x (Dual M.2 PCIe SSD expansion card with 2 x 2.5" 960G B M.2 PCIe SSD)6 x 25GbE network expansion card	<ul style="list-style-type: none">6 x (Dual M.2 PCIe SSD expansion card with 2 x 2.5" 960GB M.2 PCIe SSD)6 x 25GbE network expansion card
Network switches	<ul style="list-style-type: none">2 x 25GbE Switch (Cluster Network)2 x 10GbE Switch (Data Service Network)2 x 2.5GbE Switch (Management Network)	<ul style="list-style-type: none">2 x 25GbE Switch (Cluster Network)2 x 10GbE Switch (Data Service Network)2 x 2.5GbE Switch (Management Network)
Data Pool Devices	<ul style="list-style-type: none">72 x 20TB Enterprise 3.5-inch SATA HDD36 x 960GB Enterprise 2.5-inch SATA SSD	<ul style="list-style-type: none">144 x 20TB Enterprise 3.5-inch SATA HDD36 x 960GB Enterprise 2.5-inch SATA SSD
Data protection	Erasure code (4+2): 67% layout usable	Erasure code (4+2): 67% layout usable
Raw Capacity (TB)	1440	2880
Usable Capacity (TB)	965	1930
Rack space Required	17U	29U

Node	QSN-3000	QSN-3050
CPU	Intel® Xeon® E-2336 6 cores/12 threads 2.9GHz	Intel® Xeon® E-2378 8 cores/16 threads 2.6 GHz
System Memory	128GB DDR4 ECC UDIMM	128GB DDR4 ECC UDIMM
Network Interface	<ul style="list-style-type: none">2 x 10GbE BASE-T2 x 2.5GbE BASE-T	<ul style="list-style-type: none">2 x 10GbE BASE-T2 x 2.5GbE BASE-T
Drive Bay	18 (12 x 3.5-inch SATA + 6 x 2.5-inch SATA)	30 (24 x 3.5-inch SATA + 6 x 2.5-inch SATA)
Form Factor	2U Rackmount	4U Rackmount

Note: The final configuration will be subject to change at any time as needed.

Additional Resources

Inquiry & Quotation



QNAP's Scale-out NAS



Tutorial



QNAP SYSTEMS, INC.

www.qnap.com

QNAP Systems, Inc.

New Taipei City
Email: sales@qnap.com
Tel: +886 2 2641 2000

QNAP Inc. (USA)

Pomona CA
Email: usasales@qnap.com
Tel: +1-909-595-2782

QNAP Inc. (Canada)

Markham, Ontario
Email: canadasales@qnap.com
Tel: +1-905-947-1000

QNAP GmbH (Germany)

Willich
Email: desales@qnap.com
Tel: +49-2154-88428-0

QNAP SRL (Italy)

Roma
Email: eusales@qnap.com
Tel: +39-(0)687-738456

QNAP UK Limited

Swindon
Email: uksales@qnap.com
Tel: +44-(0)333-344-2522

QNAP Japan

Tokyo
Email: jpsales@qnap.com
Tel: +81-3-5901-9735

QNAP Korea

Seoul
Email: krsales@qnap.com



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