

ENTERPRISE AI NAS BUYER'S GUIDE

Global Edge Computing
Solution Brand & System Integrator



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Building a Data-Centric Modern Enterprise Storage Architecture

1 Overview

Enterprise Data Infrastructure

In today's fast-moving digital and AI-driven environment, data has become a core production asset for enterprises. From R&D documents, design files, and code repositories to videos, business databases, and AI training datasets, organizations generate large volumes of data every day that must be stored reliably and accessed efficiently over time.

As data scales rapidly, managing enterprise data in a way that is secure, efficient, and sustainable has become a central challenge in digital transformation.

Traditional storage architectures rely on centralized servers or basic file-sharing systems such as SMB services on a single server or external storage arrays. While sufficient at small scale, these systems quickly show limitations as data and user demands grow—performance bottlenecks

appear, scalability is restricted, security risks increase, and operational complexity rises.

In this context, Network Attached Storage (NAS) has become a key element of modern enterprise storage architecture. NAS delivers unified data access over the network, enabling efficient sharing across teams, devices, and locations. Compared with traditional storage, it provides stronger centralization, easier scaling, simpler management, and improved data security.

MINISFORUM, as a global provider of edge computing solutions, has designed its NAS product line specifically for these needs. By combining compact hardware design, efficient storage architecture, enterprise-grade networking, and local AI computing capability, it delivers a flexible and scalable data infrastructure platform.

Whether used in SME data centers, creative studios, or AI development environments, MINISFORUM NAS functions as a stable core data node. In practice, NAS is no longer just storage—it has become a private edge computing hub. This shift is reflected in MINISFORUM's positioning of AI NAS as a dedicated product category.

As enterprise data continues to grow, the choice of NAS architecture directly affects infrastructure efficiency and long-term IT cost structure over the next several years.

2 Industry Insights

From "Data Storage" to "Data Value Management"

Three Major Challenges in Enterprise Storage

Explosion of unstructured data: Video, images, documents, and code are growing rapidly and driving the majority of new storage demand. Unlike structured database data, these file-based workloads require storage systems designed for scale and performance.

Disrupted collaboration boundaries: Hybrid work has removed traditional network boundaries. Enterprises now require fast and secure data exchange across LAN and WAN environments, placing higher demands on storage infrastructure.

Rising ransomware threats: Attacks targeting enterprise storage systems are becoming more frequent and sophisticated. Traditional backup mechanisms alone are no longer sufficient, making stronger data protection and recovery capabilities essential.

Why Enterprise NAS

Enterprise NAS has evolved beyond a simple “network storage box.” Today, it serves as an integrated data node combining file services, virtualization, private cloud collaboration, and AI capabilities.

From Fragmented Storage to Centralized Platforms

In earlier enterprise environments, data was scattered across PCs, department servers, and external drives. While simple to deploy, this model becomes difficult to manage at scale. Issues such as inconsistent file versions, fragmented backups, and higher security risks become persistent operational problems.

As collaboration becomes more structured, centralized storage has become the dominant model. By deploying NAS systems, enterprises can consolidate data into a unified platform and provide controlled access over the network. This improves accessibility while reducing data loss risk and version conflicts.

At the same time, enterprise data types have shifted significantly. Beyond documents, organizations now rely heavily on large-scale assets such as video files, engineering data, build artifacts, and AI datasets. These

workloads require much higher throughput, storage performance, and network bandwidth.

This is especially evident in media production, software development, and AI research, where storage performance directly impacts productivity.

Remote and distributed work further increases the need for flexible data access. Employees are no longer tied to a single location, so enterprises need systems that balance secure control with high-speed remote access.

Modern NAS platforms address this through multi-protocol support, high-speed networking, and remote access features, enabling secure and flexible collaboration.

As a result, NAS has shifted from a file server role to a core layer of enterprise data infrastructure.

Edge–Cloud Hybrid AI and Intelligent Endpoints

With the advancement of AI, enterprise computing is moving from a cloud-only model toward an edge–cloud hybrid architecture. In this model, workloads are split between local devices and cloud systems depending on latency, privacy, and compute requirements.

Local devices handle sensitive data, real-time inference, and frequent tasks, while the cloud is used for heavy computation and large-scale model processing.

At the same time, new endpoint devices are emerging that can run small to medium LLMs locally while dynamically offloading complex tasks to the cloud. With improved NPUs, larger memory capacities, and mature AI frameworks, local inference is becoming practical in more scenarios.

In this structure, local data infrastructure becomes even more important. AI systems depend on large volumes of enterprise data, including documents, images, and datasets.

NAS therefore acts as a local data hub, enabling fast access for both users and AI systems. This supports flexible AI workflows while maintaining full data control within the enterprise.

3 Architectural Characteristics of Enterprise NAS

Integrating High-Performance Storage into Compact Systems

Modern enterprise NAS systems are designed to integrate high-performance storage, data protection, and network sharing capabilities into compact hardware form factors. Compared with traditional

file servers, NAS emphasizes efficiency, stability, and simplified management.

- **Multi-disk architecture with RAID protection:** Enterprise NAS typically uses multi-drive configurations. RAID combines multiple disks into a logical pool, improving capacity utilization while providing redundancy. In case of drive failure, data integrity is preserved, ensuring business continuity.
- **High-speed networking capabilities:** Modern NAS devices support 2.5GbE, 5GbE, and 10GbE interfaces. Compared with traditional gigabit networks, they significantly improve throughput and reduce transfer bottlenecks in high-load scenarios such as media production, development, and AI workloads.
- **Cross-platform file sharing:** NAS systems are generally built on Linux or dedicated NAS OS platforms and support SMB, NFS, and FTP protocols, enabling seamless access across Windows, macOS, and Linux environments.
- **Integrated data management functions:** Features such as snapshots, remote synchronization, access control, and versioning are standard in modern NAS systems. These capabilities reduce IT workload while improving data security and recoverability.

Core Technologies of Enterprise NAS

Enterprise NAS relies on multiple foundational technologies that together ensure performance, reliability, and scalability.

- **RAID (Redundant Array of Independent Disks):** Combines multiple drives into a single logical storage system, improving performance and redundancy. Common levels include RAID 1, 5, 6, and 10, balancing capacity efficiency and data protection.
- **ZFS file system:** Provides end-to-end data integrity through copy-on-write and checksum mechanisms. Supports snapshots for instant rollback in cases of failure, deletion, or ransomware attacks.
- **Real-time compression:** Lossless compression technologies such as LZ4 improve storage efficiency while maintaining performance.
- **Docker containers:** Enables lightweight application deployment directly on NAS, including CI/CD tools, collaboration services, and internal applications.
- **Virtualization support:** NAS can run virtual machines for testing, development, or lightweight workloads, extending its role beyond storage.

MINISFORUM Technical Advantages

- **Hardware reliability and redundancy:** Designed for 24/7 enterprise operation, supporting RAID-based redundancy to ensure system stability and data protection.
- **High-speed networking:** Supports 10GbE networking and link aggregation to eliminate bandwidth bottlenecks. Selected models also support WiFi 7 for high-speed wireless access.
- **High scalability and compute performance:** Built on MINISFORUM's mini PC architecture, enabling strong performance for containerized workloads and virtualization in addition to storage tasks.
- **Integrated intelligent system (MinisCloud OS):**
 - AI-powered photo management with semantic search
 - ZFS snapshots and LZ4 compression for data protection and efficiency
 - Identity-based access control with full audit traceability
 - Multi-user isolation for privacy protection
 - Optional built-in AI agent support for hybrid local/cloud AI workloads

4 MINISFORUM NAS Product Portfolio

MINISFORUM provides a full NAS product lineup ranging from entry-level office use to high-performance all-flash systems.

Table 1: MINISFORUM NAS Product Matrix

Model	Core Positioning	Storage Architecture	Network Capability	Recommended Scenarios
N5 Air	Entry-level lightweight model	Hybrid storage up to 174TB	10GbE + 5GbE	Surveillance, personal studios, mobile office nodes, general file sharing for SMEs
N5	Standard enterprise model	Hybrid storage up to 188TB	10GbE + 5GbE	General file sharing for SMEs, departmental backup
N5 Pro	Advanced professional model	Hybrid storage up to 188TB	10GbE + 5GbE	Software development teams, mid-sized design studios
N5 MAX	Flagship high-performance model	Hybrid storage up to 200TB	Dual 10GbE	4K video editing workflows, high-concurrency office environments, AI model inference
S5	All-flash performance system	Full NVMe SSD architecture up to 40TB	10GbE + 2.5GbE	Database acceleration, AI model inference, virtualization storage

When selecting enterprise NAS solutions, key evaluation criteria include storage capacity, network bandwidth, system performance, and scalability. These factors directly determine real-world performance and long-term usability.

Table 2: Product Specification Comparison Table

Model	N5 Air	N5	N5 Pro	N5 MAX	S5
CPU					
CPU	AMD Ryzen 7 255	AMD Ryzen 7 255	AMD Ryzen AI 9 HX PRO 370	AMD Ryzen AI Max+ 395	Intel Wildcat Lake
CPU Spec	8C/16T, Max 4.9GHz	8C/16T, Max 4.9GHz	12C/24T, Max 5.1GHz	16C/32T, Max 5.1GHz	6C/6T, Max 4.3GHz
GPU	AMD Radeon 780M	AMD Radeon 780M	AMD Radeon 890M	AMD Radeon 8060S Graphics	Intel Graphics
Memory	2×DDR5 SO-DIMM, up to 5600MT/s & 96GB	2×DDR5 SO-DIMM, up to 5600MT/s & 96GB	2×DDR5 SO-DIMM, up to 5600MT/s & 96GB	LPDDR5x UMA memory, 8533MT/s & 64GB	LPDDR5x, 7500MHz, 12GB
ECC Support	No	No	Yes	No	No
System Disk	64GB(Pre-installed in SSD Slot1)	128GB(Pre-installed in SSD Slot1)	128GB(Pre-installed in SSD Slot1)	128GB(Pre-installed in SSD Slot1)	64GB UFS
HDD Bays	5×3.5"/2.5" SATA 3.0 (Up to 30TB each, 150TB total)	5×3.5"/2.5" SATA 3.0 (Up to 30TB each, 150TB total)	5×3.5"/2.5" SATA 3.0 (Up to 30TB each, 150TB total)	5×3.5"/2.5" SATA 3.0 (Up to 32TB each, 160TB total)	N/A
SSD Slots	3×M.2 NVMe SSD (Up to 8TB each, 24TB total)	3×M.2 NVMe SSD (Up to 38TB total)	3×M.2 NVMe SSD (Up to 38TB total)	5×M.2 NVMe SSD (Up to 40TB total)	5×M.2 NVMe SSD (Up to 40TB total)
Max Storage Capacity	174TB	188TB	188TB	200TB	40TB
Wireless	N/A	N/A	N/A	N/A	Wi-Fi 7
Network	1×10GbE LAN 1×5GbE LAN	1×10GbE LAN 1×5GbE LAN	1×10GbE LAN 1×5GbE LAN	2×10GbE LAN	1×10GbE LAN 1×2.5GbE LAN
I/O	2×USB4 3×USB 3.2 Gen2 1×HDMI™ 2.1 FRL 1×OCuLink 1×10GbE LAN 1×5GbE LAN 1×USB 2.0 1×PCIe x16 (PCIe 4.0 x4)	2×USB4 3×USB 3.2 Gen2 1×HDMI™ 2.1 FRL 1×OCuLink 1×10GbE LAN 1×5GbE LAN 1×USB 2.0 1×PCIe x16 (PCIe 4.0 x4)	2×USB4 3×USB 3.2 Gen2 1×HDMI™ 2.1 FRL 1×OCuLink 1×10GbE LAN 1×5GbE LAN 1×USB 2.0 1×PCIe x16 (PCIe 4.0 x4)	1×USB4 2×USB4 V2 2×USB 3.2 Gen2 2×10GbE LAN 1×USB 2.0 1×HDMI™ 2.1 FRL	2×USB4 2×USB 3.2 Gen2 1×10GbE LAN 1×2.5GbE LAN 1×HDMI™ 2.1 TMDS

Model	N5 Air	N5	N5 Pro	N5 MAX	S5
Dimensions	199×202×252mm	199×202×252mm	199×202×252mm	199×202.4×252.3mm	154×60×176mm
Weight	4Kg	5Kg	5Kg	5.8Kg	1.8Kg
OS	MinisCloud OS / Windows 11 Pro / Linux	MinisCloud OS / Windows 11 Pro / Linux	MinisCloud OS / Windows 11 Pro / Linux	MinisCloud OS / Windows 11 Pro / Linux	MinisCloud OS / Windows 11 Pro / Linux
Features	·Lightest N5 model ·Slide-out motherboard allows quick RAM and SSD upgrades ·PCIe expansion for internal add-on cards ·Supports booting from external USB drives	·Slide-out motherboard allows quick RAM and SSD upgrades ·PCIe expansion for internal add-on cards ·Supports booting from external USB drives ·M.2 and U.2 enterprise SSDs support	·High-performance processor ·Up to 80 TOPS AI compute capability ·Slide-out motherboard allows quick RAM and SSD upgrades ·PCIe expansion for internal add-on cards ·Supports booting from external USB drives ·M.2 and U.2 enterprise SSDs support	·Ultra-high-performance processor ·Up to 126 TOPS AI compute capability ·Slide-out motherboard allows quick RAM and SSD upgrades ·PCIe expansion for internal add-on cards ·Supports booting from external USB drives ·M.2 and U.2 enterprise SSDs support ·One-click deployment AI agent MinisOpenClaw	·Compact lightweight design ·Low power consumption ·Fanless design and quiet operation ·Full NVMe SSD architecture ·Built-in WiFi 7 ·Built-in AI powered photo album

Note: Specifications may vary by model version. Please refer to the official MINISFORUM website for the latest details.

Each model is positioned for different usage scenarios and workload requirements.

MINISFORUM N5 Air

N5 Air focuses on compact design and low power consumption. It is suitable for space-constrained environments such as small offices or creative studios. Despite its size, it provides stable storage capabilities for daily data management.

MINISFORUM N5

N5 is an entry-level NAS designed for SMEs and team collaboration. It supports multi-bay storage and stable networking, covering common use cases such as file sharing, project storage, and team backup.

MINISFORUM N5 Pro

N5 Pro enhances performance and network capacity compared to the base model. It is designed for higher concurrency workloads, such as teams that require simultaneous access to shared project files.

It is particularly suitable for software development and media production environments where multiple users operate on shared datasets.

MINISFORUM N5 MAX

N5 MAX is positioned as a high-performance enterprise NAS. It features a next-generation platform and dual 10GbE interfaces, delivering high throughput in demanding environments.

It is suitable for workloads such as video production, high-resolution media processing, and AI data pipelines that require sustained high-speed access.

MINISFORUM S5

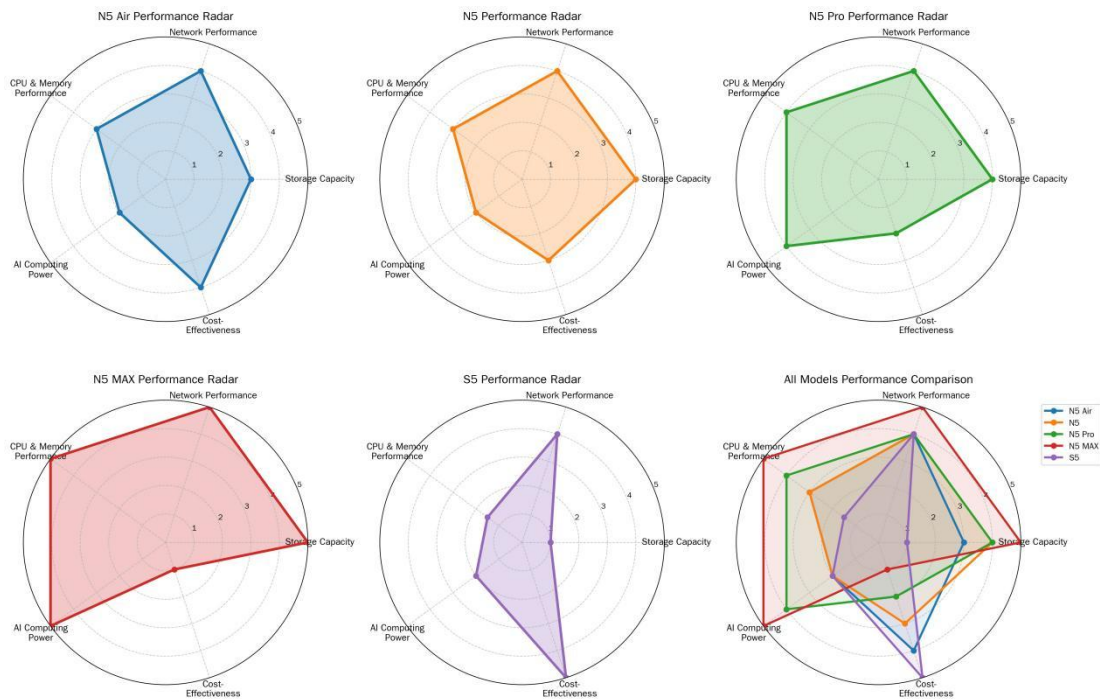
S5 adopts an all-flash NVMe architecture, designed for high-performance workloads requiring low latency and high IOPS.

It is ideal for databases, virtualization platforms, and AI datasets where random read/write performance is critical.

NAS Selection Radar Dimensions

- Storage capacity and scalability
- Network performance
- CPU and memory performance
- AI computing power
- Cost-efficiency

Figure 3: MINISFORUM NAS Selection Radar Chart



5 Key Application Scenarios & Deployment Guide

Enterprise NAS supports a wide range of scenarios. Its core value lies in enabling centralized data management and high-speed access through a unified storage platform.

- **Team collaboration:** NAS provides a centralized file system for teams, enabling shared access to project files, documents, and assets. It

eliminates version fragmentation and improves collaboration efficiency.

- **Creative industries:** In video production, animation, and design workflows, large media files are accessed by multiple users simultaneously. NAS enables shared storage access without repeated file duplication or transfer overhead. For example, N5 MAX, with dual 10GbE networking and high-capacity storage, supports multi-stream 4K editing workflows. SSD caching further reduces latency for large media assets.
- **Software development:** NAS can serve as a backend for code repositories, build caches, and test environments. It is particularly effective in environments with frequent small file operations and continuous integration workloads. N5 Pro can be deployed as a Docker-based Git mirror or build cache node to accelerate development pipelines.
- **AI and research workloads:** AI training and inference require fast access to large datasets. NAS acts as a centralized data layer for compute clusters. S5 all-flash NAS provides high IOPS performance, making it suitable as backend storage for AI training and data-intensive workloads.

6 Enterprise Storage Architecture

Comparison

Enterprise data storage can be implemented through multiple architectures, including traditional file servers, SAN systems, and cloud storage. Each differs in performance, complexity, and cost structure.

- **NAS vs traditional file servers (DAS):** Traditional file sharing often relies on a single server with directly attached storage (DAS). While simple, it lacks scalability and high availability. Storage expansion typically requires downtime, and server failure can disrupt services. NAS improves this model by providing network-based storage with better scalability, redundancy, and centralized management.
- **NAS vs SAN:** SAN is designed for high-performance data center environments, providing block-level storage over dedicated high-speed networks. It is commonly used for databases, virtualization, and HPC workloads. However, SAN requires specialized hardware and operational expertise, resulting in higher cost and complexity. For SMEs and team-level deployments, NAS offers a more balanced cost-to-performance ratio.
- **NAS vs cloud storage:** Cloud storage provides flexible, hardware-free deployment with pay-as-you-go pricing, making it suitable for distributed collaboration and temporary workloads. However,

long-term usage can lead to high recurring costs. For high-bandwidth workloads such as media production, development, or AI processing, local NAS provides more stable performance. In practice, NAS and cloud storage are complementary: NAS serves as the primary data hub, while cloud storage is used for backup and cross-region access.

7 Cost Model

Enterprise IT procurement decisions are typically driven by Total Cost of Ownership (TCO), which includes not only hardware cost but also energy consumption, maintenance, and scalability.

- **Energy efficiency:** MINISFORUM NAS uses efficient processor platforms, resulting in lower power consumption compared with traditional server architectures.
- **Maintenance cost reduction:** Built-in automation features such as backup scheduling, system monitoring, and remote management reduce IT operational workload.
- **Space efficiency:** Compact form factors allow desktop deployment, eliminating the need for rack infrastructure in many scenarios.

- **Zero licensing model:** Unlike cloud storage systems with recurring per-user fees, NAS uses a one-time hardware investment model, reducing long-term storage costs.
- **Scalability advantage:** Modular expansion allows enterprises to increase capacity gradually without replacing the entire system.

In addition, AI workloads introduce a new cost dimension: token consumption. AI agents such as OpenClaw may generate significant token usage at scale. In cloud-based AI models, this translates into recurring operational costs.

In contrast, local deployment of large language models eliminates ongoing token expenses, replacing them with a fixed infrastructure investment. For high-frequency AI usage scenarios, this leads to significant long-term cost advantages.

8 Procurement Action Guide

When selecting an enterprise NAS solution, organizations should first define workload requirements, including concurrency levels, data volume, and network performance expectations.

A structured procurement process typically includes four steps:

1. **Capacity planning:** Evaluate current and future data growth. In addition to primary storage, consider snapshots, backups, and virtual machine

images. Scalable architectures are recommended for growing workloads.

2. **Network assessment:** NAS performance depends heavily on network infrastructure. Enterprises should evaluate whether existing networks support 2.5GbE, 5GbE, or 10GbE. If not, model selection should align with infrastructure constraints.
3. **Functional requirements definition:** If workloads include virtualization, containers, or AI services, higher-performance models (such as Pro or MAX) should be selected to ensure compute headroom.
4. **Security and compliance planning:** Enterprise NAS should support encryption, access control, redundancy mechanisms, and snapshot-based recovery to meet data protection requirements.

It is recommended to deploy RAID-based redundancy with at least two additional drives and implement a layered backup strategy, including scheduled snapshots, offsite backup, or cloud synchronization.

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