Infortrend EonNAS 3000 and 5000: Key System Features

White paper

Abstract

This document introduces Infortrend's EonNAS 3000 and 5000 systems and analyzes key features available on these systems.

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Product Models Covered by This Document

This document applies to the following product models:

- **EonNAS 3000 Series**
- **EonNAS 5000 Series**

For more information regarding individual product models, please visit www.infortrend.com.

Availability of Features

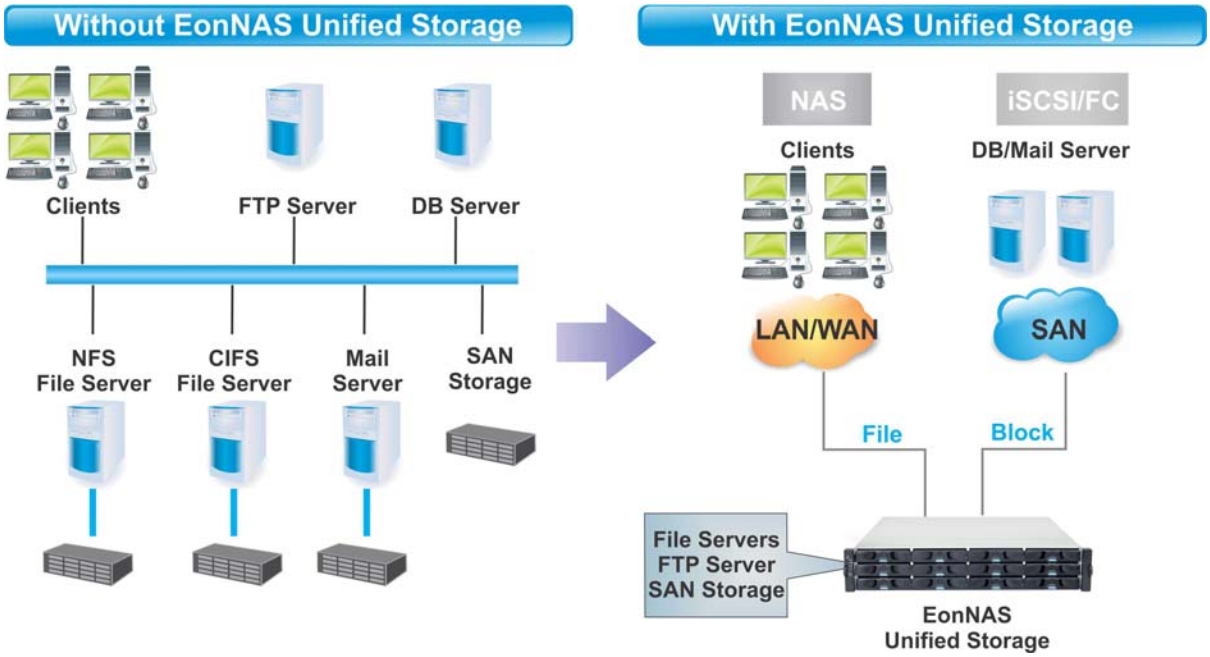
This white paper introduces key system features of Infortrend's EonNAS 3000 and 5000 solutions. The features introduced in this white paper may not be available on all models in the EonNAS family.

For detailed specifications of individual models, please refer to the Infortrend website and the product information and datasheets available there: http://infortrend.com/global/products/families/EonNAS.

EonNAS Family of Unified Storage Systems

IT environments often feature multiple types of storage infrastructures to accommodate various types of data and achieve different service levels. The scattered boxes for DAS (Direct-Attached Storage), SAN (Storage Area Network) and NAS (Network-Attached Storage) configurations lead to poor utilization and complicated management.

Infortrend EonNAS simultaneously serves file and block-based applications with a unified storage platform, and features easy management, optimized resource utilization, high availability, flexible scalability and competitive price/performance. In addition, EonNAS offers a comprehensive set of advanced software features at no additional costs. EonNAS systems help businesses effectively meet diverse and changing data demand while staying within budget.

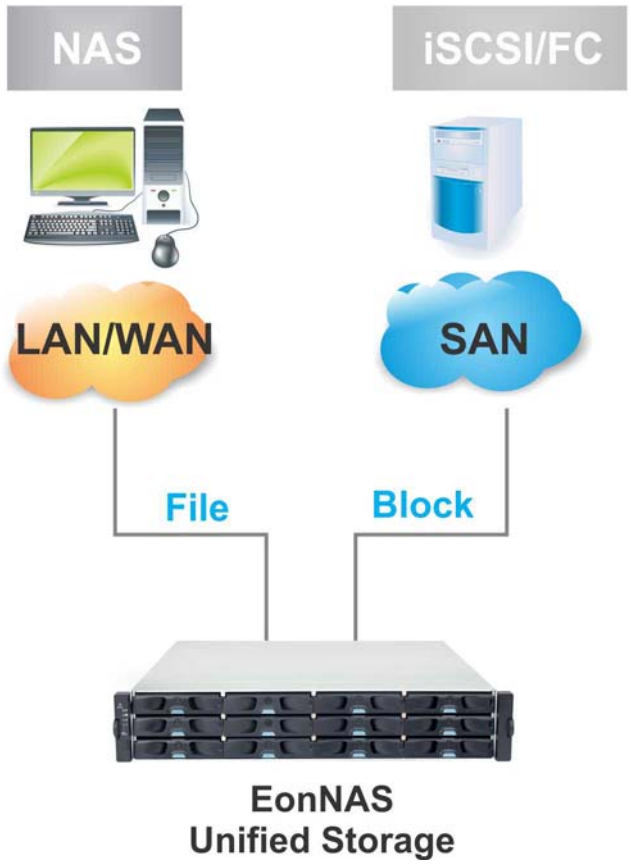


Network Protocol Support

Without a unified storage system, users often deploy different servers for different file systems, with storage attached to each server in a DAS configuration. If storage resources are dispersedly deployed in this way, storage utilization can be quite low as capacity cannot be pooled together. In addition, multiple servers and storage systems in a datacenter can lead to complicated management for IT administrators.

The key benefit of using unified storage systems is that they support multiple protocols. EonNAS supports both file-level and block-level protocols, including CIFS/SMB, AFP, NFS, HTTP, HTTPS, FTP, iSCSI and FC.

With this comprehensive protocol support, users can achieve storage consolidation in their datacenters. Storage consolidation based on support for multiple network protocols enables file-sharing among clients with different file systems, while also supporting block-based applications in SAN. Management tasks for IT administrators can also be greatly simplified as they now have to deal with fewer servers and storage systems.



Storage Resource Utilization

Deduplication

Application environments often feature many redundant copies of identical data sets. Storing these redundant copies consumes large amounts of storage space, leading to inefficient use of capacity and increasing costs associated with hardware resources and power consumption.

Data deduplication technology is designed to combat this phenomenon. Deduplication on EonNAS systems ensures that all duplicated data is removed, freeing up capacity that would be otherwise unnecessarily filled. Storage system users can thereby optimize capacity utilization and save costs, as they can get much more mileage out of their initial storage acquisition.

Data deduplication on the EonNAS systems is implemented on the block level. In-line deduplication ensures that duplication calculations are performed as data enters the storage systems. When the system sees that an identical block is already present in the volume, the new block will be discarded and only a pointer will be created for reference to the existing block.

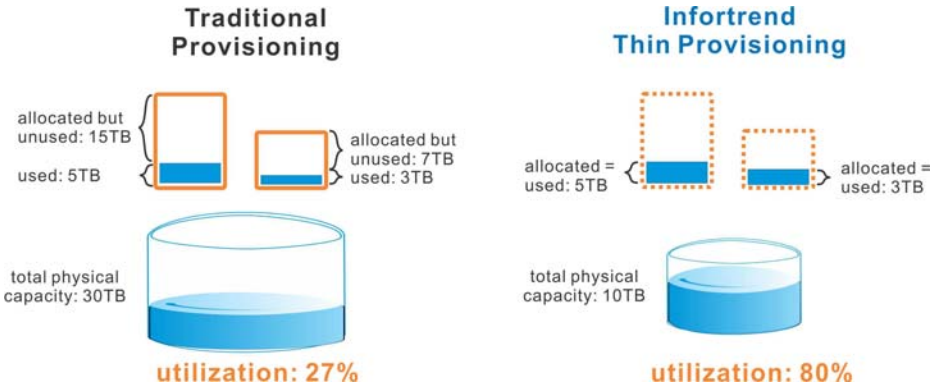
The storage savings achieved with data deduplication can be significant, but may vary by application and type of data. The technology offers storage space savings of around 90% in backup applications, 70% in virtualization environments and 40% for common office files.

Thin Provisioning

In iSCSI volumes, thin provisioning is a technology that allows consolidated storage resources to be used in the most flexible manner. By automatically allocating system capacity to applications as needed, thin provisioning technology can help achieve up to 80% storage utilization, while significantly reducing power consumption.

Thin provisioning technology allows users to allocate a large amount of virtual capacity for an application, regardless of the physical capacity actually available. At initial setup, thin provisioning does not physically allocate capacity to the prescribed data volume, and the actual space is used only when data writes occur.

This on-demand method for capacity allocation not only optimizes storage utilization, but also greatly simplifies capacity planning and management tasks. In order to help users easily monitor capacity utilization, storage systems automatically issue notifications when the total capacity utilization is reaching the threshold set by the user. If users wish to expand capacity, they can do so non-disruptively.



Data Compression

EonNAS users can take advantage of data compression. In this way, the size of data stored in the system can be reduced, helping to save storage capacity. Data compression is an optional feature for users; data is not compressed by default on EonNAS systems.

Data compression on EonNAS systems is achieved with the LZJB algorithm. An advantage of LZJB is that it does not consume as much processing power as other algorithms.

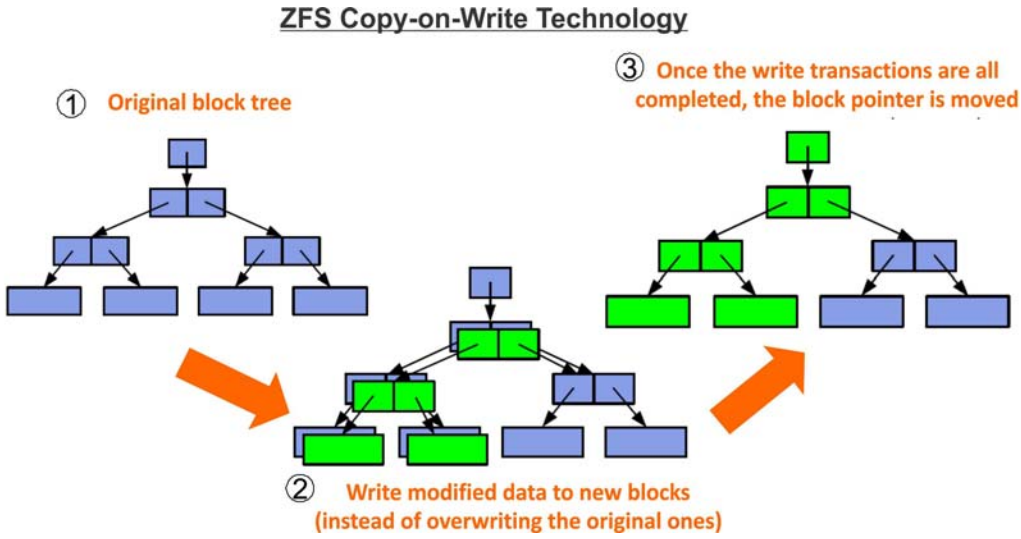
Data Protection

ZFS End-to-End Data Integrity

The EonNAS systems include the ZFS file system, which offers a number of features that safeguard data integrity.

ZFS significantly reduces silent data corruption with extensive use of data checksums. When a data block is created, a checksum of this block is stored in its parent block pointer. Whenever a block is accessed, its checksum is calculated and compared with the stored checksum value for integrity. This unique mechanism allows EonNAS systems to effectively detect data corruption phenomena that go undetected in other file systems, and automatically repair affected data with ZFS self-healing features.

ZFS offers enhanced data protection in the event of unforeseen power outages. The copy-on-write technology employed by ZFS uses an “all-or-nothing” approach to updating data, as shown in the diagram below. When conducting updates, existing data is never directly overwritten. Instead, updated data blocks are first created next to existing blocks. Only after the updated data has been created is existing data replaced. This technology helps avoid situations whereby files become unstable in the event of a sudden power outage that occurs when data blocks are updated and systems are overwriting existing data.



Snapshot

EonNAS systems provide snapshot technology to protect data against logical or human errors. Snapshot technology allows users to create space-efficient differential copies. These copies can serve as granular recovery points when users need to roll back data to a previous state, for example in the event of accidental deletions or virus attacks.

The maximum number of snapshots that can be theoretically created is 2^{64}, and already created snaphots are not affected by system reboots. The storage capacity required for snapshots is derived from the same storage pool on which the backed up data is stored.

Remote Replication (On EonNAS 3200 systems)

Remote replication allows EonNAS users to replicate data onto another EonNAS system at a remote site. Users can choose to replicate data in either synchronous or asynchronous mode. When using asynchronous mode, the system uses bitmap volumes to record which data blocks have changed. In the event of a system outage, only the changed data blocks have to be re-synchronized. Different types of remote replication can be distinguished:

- **1-to-1**: Data replication between one source system and one target system.
- **Many-to-1**: Data from multiple source systems is replicated on a single target system.

Remote replication is an essential part of a disaster recovery plan. The copy of the source data at a remote site is online and can be used to restore services in the event of source data failures.

Remote Replication via Rsync (On EonNAS 3210/3220/3230/5120)

Remote replication via the rsync protocol enables EonNAS system users to replicate data with encryption and compression. They can replicate data in the following three ways:

- Within the same EonNAS system
- To another EonNAS system
- To a third-party networked device over IP networks

Remote replication via rsync is conducted on a folder-to-folder basis, and is done in asynchronous mode. In addition, data can be encrypted using 128-bit SSH (Secure Shell) encryption.

Pool Mirror

The pool mirror function on EonNAS offers real-time data replication, and is able to keep data in two different EonNAS systems synced at all times. With this data synchronization, users can ensure that a standby system can seamlessly take over operations when the primary system suffers a failure. Online business applications can thereby continue to be served without major interruptions.

Pool mirror functionality on EonNAS systems is further strengthened by IPsec encryption, which offers secure data transmission.

ICAP-based Virus Scanning Support

EonNAS systems can communicate with remote scan engines for virus scanning, helping users detect potential viruses. The management console gives users the flexibility to include or exclude file patterns. Scanning all files could possibly affect the performance of the overall EonNAS system. In addition, user environments might only need to scan one file pattern to ensure their data integrity. EonNAS supports scanning engines such as Symantec and ClamAV.

NDMP

NDMP (Network Data Management Protocol) allows users to move data directly from a NAS system to backup systems without going through a network server. Network loading can thereby be reduced, and consequently the impact on the system's performance will not be as pronounced as without NDMP.

Apple Time Machine

Time Machine is a backup utility available in Mac OS X 10.5 (Leopard) or later. Time Machine creates differential copies of the most recent states of data in a manner similar to the snapshot and rollback features found in Infortrend storage systems. To create backup data, Time Machine first copies the entire content of the Mac OS primary hard drive onto an external storage device, and then starts automatically adding differential copies of modified data according to scheduled timing. When the data becomes corrupted due to unforeseen errors, users can roll back the data to a previous state by specifying a pre-accident date and time. Individual files as well as the whole system can be restored.

EonNAS has built-in support for AFP (Apple File Protocol), the standard file system for Mac OS X, enabling smooth integration with Time Machine.

Virtualization Support

EonNAS systems are compatible with major virtualization platforms, including VMware, Citrix and Hyper-V. This helps users integrate their EonNAS systems in virtualization environments and take advantage of the resource utilization and flexibility advantages offered by these environments.

Directory Services

EonNAS supports different directory services to access, search, monitor and manage network data. Supported directory services include LDAP (Lightweight Directory Access Protocol), NIS (Network Information Service) and Microsoft AD (Active Directory).

NIS is used for distributing system configuration data in Unix/Solaris environments. LDAP is a standard application protocol for querying and modifying data of directory services implemented in IP networks. Microsoft AD supports LDAPv2 and LDAPv3.

Microsoft Active Directory (AD) in Windows Server environments is a directory service designed for data management and resource distribution on network environments. Microsoft AD enables storing and sharing data, configuring storage parameters and managing account information from a central location. Using Microsoft AD with EonNAS offers the following benefits:

- Simplified account management: The same Microsoft AD account name and password can be used for EonNAS; there is no need to manage separate sets of account information.
- Consolidated access control: Read/write rights to shared directories on the network can be controlled from the EonNAS.
- Enhanced security: EonNAS can also benefit from the enhanced data protection protocol integrated in Microsoft AD.

Performance and Capacity Scaling

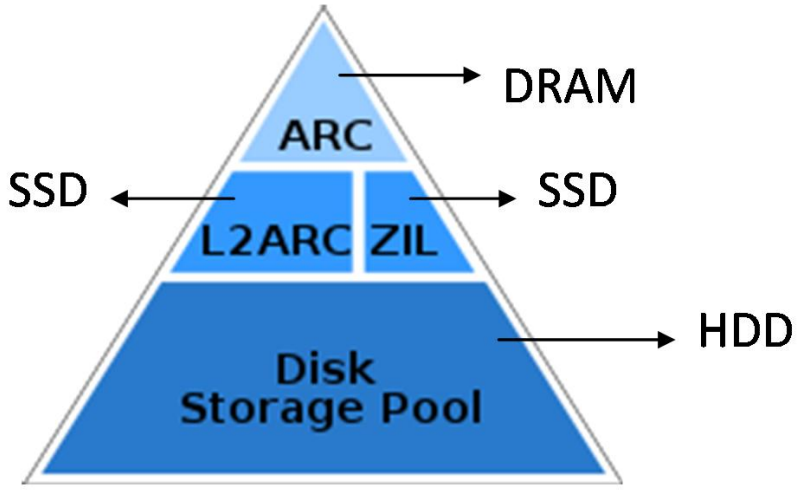
Performance Scaling

Several options are available to increase the performance of systems, including:

- Upgrading RAM
- Integrating low-latency SSDs to automatically enhance caching operations and in turn accelerate I/O processing.

The diagram below shows how SSDs are integrated. SSDs are installed in internal drive bays of the EonNAS system.

SSDs are used for Read cache (L2ARC) and Write cache (ZIL). How users actually deploy their SSDs depends on the characteristics of their application environments. In general, the performance impact on Read operations is more evident than the impact on Write operations.



Capacity Scaling

EonNAS offers excellent capacity scaling, enabling users to add many Terabytes of storage capacity. This scalability is achieved by connecting extra enclosures to the EonNAS system.

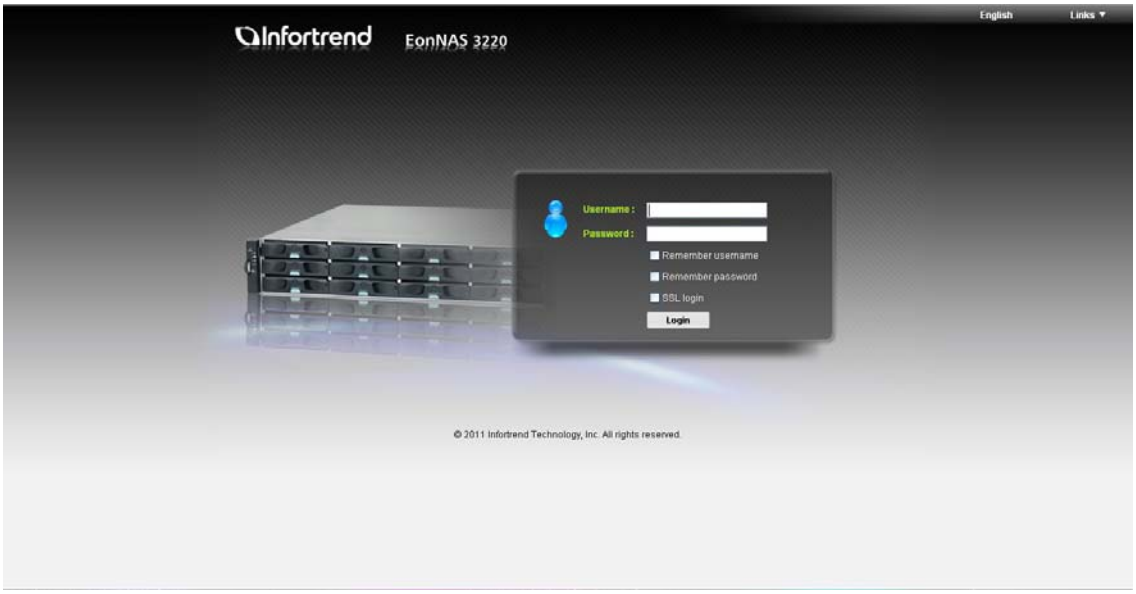
System Management

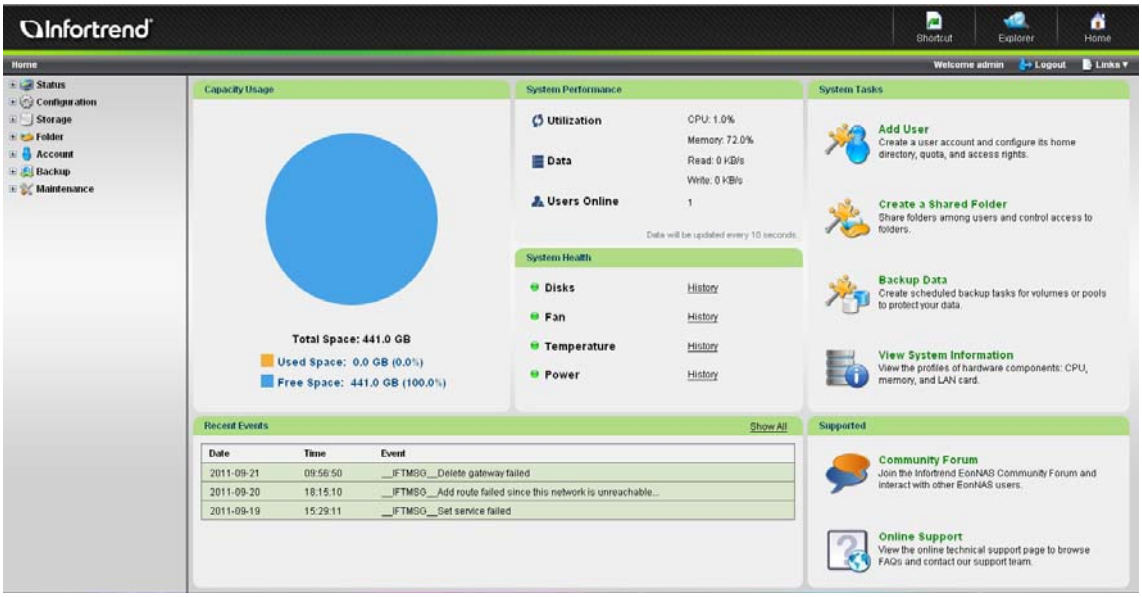
Easy Start-Up Wizard

An easy start-up wizard helps EonNAS system users set up their systems. With this start-up wizard, users can get their systems up-and-running quickly to start serving their business applications.

Web-based User Interface

EonNAS systems are managed by an easy-to-use, web-based user interface (UI). Clear tabs and sub-menus help users easily identify the functions they want to configure, while easy-to-understand tables and diagrams offer a graphical representation of key system functions.





System Analytics and Monitoring

EonNAS allows users to monitor and analyze the performance and utilization of their EonNAS system. The GUI shows the utilization and performance of the EonNAS system's hardware components and software services.

SNMP

SNMP (Simple Network Management Protocol) helps EonNAS users monitor the networks to which their systems belong and to be notified in the event of network errors.

Appendix: EonNAS 3000 and 5000 Specifications

Specifications of EonNAS systems can be found on Infortrend's website via the following links:

- **EonNAS 3000**: http://www.infortrend.com/global/products/families/EonNAS/3000
- **EonNAS 5000**: http://www.infortrend.com/global/products/families/EonNAS/5000

Datasheets are available on the Infortrend website via the following links:

- **EonNAS 3000**: http://www.infortrend.com/ImageLoader/LoadDoc/323
- **EonNAS 5000**: http://www.infortrend.com/ImageLoader/LoadDoc/392

The table below offers additional specifications that provide more details regarding maximum pool/file size and the number of users/connections etc. on the EonNAS systems:

Model / Spec	EonNAS 3210	EonNAS 3220	EonNAS 3230	EonNAS 5120
Max. pool size (ZFS limitation)	No limitation 16 EB ($16*10^6$TB)			
Max. single file size (ZFS limitation)	No limitation 16 EB ($16*10^6$TB)			
Windows AD	20,000	20,000	50,000	60,000
Max. Users	20,000	20,000	50,000	60,000
Max. Groups	2,048	2,048	4,096	4,096
Max. concurrent connections	512	1,024	2,048	2,048
Max. shared folders	2,048	2,048	4,096	4,096
Max. FTP connections	3,000	3,000	3,000	3,000
Max. iSCSI targets	1,024	1,024	1,024	1,024
Max. FC targets	1,024	1,024	1,024	1,024