

TABLE OF CONTENTS

SYNOPSIS.....	3
NAS PRODUCT TYPES.....	5
NAS GATEWAYS.....	5
INTEGRATED NAS SYSTEMS	6
CLUSTER AND PARALLEL FILE SYSTEM.....	7
WIDE AREA FILE SERVICES	9
NAS AGGREGATORS OR NETWORK FILE MANAGERS (NFM).....	9
NAS CACHING APPLIANCES	10
NAS FEATURES.....	11
NFS AND CIFS/SMB2 SUPPORT	11
FILE SIZE AND FILE SYSTEM SIZE.....	11
HIGH AVAILABILITY SUPPORT	11
NETWORK DATA MANAGEMENT PROTOCOL (NDMP) SUPPORT	12
PARTITIONING	12
VOLUME EXTENSION.....	12
POINT-IN-TIME (P-I-T) COPIES.....	12
VOLUME COPY	13
VOLUME CLONES	13
STORAGE EFFICIENCY.....	13
REMOTE REPLICATION.....	14
COMPLIANCE	14
GLOBAL NAME SPACE.....	15
UNIFIED STORAGE OR BLOCK I/O SUPPORT	15
DATA MIGRATION.....	15
AUTOMATED STORAGE TIERING.....	15
FLASH CACHE.....	16
DIRECT IO	16
NAS PERFORMANCE	21
NFS PERFORMANCE.....	21

CIFS/SMB PERFORMANCE 25
 NFS vs. CIFS/SMB PERFORMANCE 28

NAS PRICING 30

GLOSSARY 31

INDEX 34

LIST OF FIGURES

Figure 1 Traditional NAS Product Features 17
 Figure 2 Cluster/Parallel File System 20
 Figure 3 SPECsfs 2008 NFS Champions chart 21
 Figure 4 SPECsfs2008 Top 20 NFS throughput/disk spindle 23
 Figure 5 Top 20 NFS Operational Response Time results 24
 Figure 6 SPECsfs2008 CIFS/SMB champions chart throughput per disk results 25
 Figure 7 Top CIFS/SMB throughput/disk 26
 Figure 8 Top 20 CIFS/SMB Operational Response Time results 27
 Figure 9 Top 20 NFS vs. CIFS/SMB throughput per spindle 28

Synopsis

There are at least two different methods to provide file data services to most IT environments:

- Use direct attached disk drives and map a file system on top of them using host software
- Use Network Attached Storage (NAS) systems which provide an Ethernet attached storage environment purpose built to supply file data access.

There are at least six types of storage systems used to support file data: NAS gateways, Integrated NAS boxes, Cluster and/or Parallel file systems, wide area file services (WAFS), network file manager (NFM) or NAS aggregators and NAS caching appliances .

- NAS gateways and integrated NAS boxes are the more traditional storage system approaches, available from major vendors, and span from small to enterprise class customers.
- Cluster and/or parallel file systems generally are specifically designed storage for high performance or immense file data needs but may have limitations with respect to OS and/or file I/O protocol support.
- Wide area file services are used to support good performing file activity at remote locations connected to a central site, presenting a single image of the file data to all locations.
- NAS aggregators or Network File Managers (NFM) are used to consolidate file data across different vendor products within a single data center.
- NAS caching appliances are used to dramatically increase the performance of file access for other external NAS storage.

Networked file storage is typically accessed using one of two different protocols: NFS or CIFS/SMB2. Most Windows environments use CIFS/SMB2 while the majority of Unix/Linux data centers use NFS.

Some advanced capabilities (see Features section below) to look for in vendor products include: snapshot or point-in-time copies of file data, efficient storage of file data, volume copy, remote data mirroring, network data management protocol (NDMP) support, and both Windows and UNIX (CIFS/SMB2 and NFS) file access protocol support. In addition, file size, file system size, and maximum backend NAS storage supported are also worth considering. Finally as you

consolidate more file data into fewer networked storage systems, storage performance must also be a critical consideration.

The remainder of this Buying Guide describes these six NAS product types, NAS system main features and NAS storage performance. In the NAS Product Features tables below we list feature availability for over 40 current NAS product offerings. Lastly, in the NAS performance section below we discuss file system storage performance for many NAS NFS and CIFS/SMB2 storage solutions.

