

Scalable and resilient
storage clusters through two
innovative technology leaders



**High-performance
solution scales
capacity &
performance**

- Delivers over 10 GB/sec data throughput and 300,000 IOPS

**Simple
to install
& manage**

- Single, seamless namespace and dynamic load-balancing

**Optimized
ROI with
industry-standard
technology**

- Standard components and infrastructure maximizes price/performance



Scalable Storage Network Solution

A fundamental change is occurring in the large-scale computing market. The emergence of Linux clusters, and the new generation of data-intensive applications built to run on these clusters, is driving a new approach to scalable computing. Whether imaging the earth's substructure to find new energy reserves, mapping the human genome, or generating the latest blockbuster animated feature, Linux clusters deliver a more scalable, easy-to-manage and cost-effective platform to process large tasks. The natural next-step for customers is to look for these same benefits in their storage and networking systems.

Panasas and Force10 Networks deliver a comprehensive, high-performance network storage solution that maximizes the benefits of Linux clusters. The Panasas ActiveScale Storage Cluster™ optimizes the data throughput capabilities of Force10's resilient switch/routers by establishing massively parallel data paths via Gigabit Ethernet between clustered Linux servers and Panasas StorageBlades. The result is an IP-based storage solution that delivers record-breaking performance in raw throughput and random I/O. The Force10-Panasas solution also scales in capacity and client access seamlessly while being managed in an always on appliance-like fashion.



Massively Scalable, Clustered Solution



Panasas ActiveScale Storage Cluster

- Object-based architecture allows direct client to disk access
- 30X bandwidth & 7X random I/O advantage over existing solutions
- Single namespace simplifies management

Force10 E1200

- Line-rate, non-blocking architecture even under full traffic load
- Fully redundant system with separate control & data paths ensures business continuity
- Standards-based for easy integration and management

Linux Cluster



Force10 E1200 Switch/Router

E-Series Chassis

E1200

14 line card slots
 Size: 36.75" h x 17.4" w x 24" d
 (93.3 cm x 44.2 cm x 61 cm)
 Weight with factory-installed components:
 99 lbs (44.9 kg)
 Weight fully loaded: 321 lbs (145.6 kg)
 Maximum thermal output: 4,700W
 (16,037 BTU/hour)
 Maximum current draw per DC PEM: 130A
 Maximum power dissipation:
 5,000W or 17,060 BTU/hour

Common Specifications

Physical

19" front, 19" middle (optional) & 23" middle
 rack mountable
 Maximum Operating Specifications:
 Temperature: 32° to 104°F (0° to 40°C)
 Altitude: no performance degradation to 10,000 feet
 (3,048 meters)
 Relative humidity: 5 to 85 percent, noncondensing
 Shock: Bellcore GR-63
 Vibration: Bellcore GR-63
 Maximum Non-operating Specifications:
 Temperature: -40° to 158°F (-40° to 70°C)
 Maximum altitude: 15,000 feet (4,572 meters)
 Relative humidity: 5 to 95 percent, noncondensing
 Vibration: Bellcore GR-63

E1200 Redundancy/Availability

1+1 redundant Route Processor Modules (RPM)
 8+1 redundant Switch Fabric Modules (SFM)
 1+1 redundant DC Power Entry Modules (PEM)
 Online insertion and removal of all components
 Built-in cable management
 Environmental self-monitoring

IEEE Compliance

802.3ae 10 Gigabit Ethernet
 802.3ab 1000Base-T
 802.1p/q VLAN Tagging
 802.1s Multiple Spanning Tree Protocol
 802.1w Rapid Spanning Tree Protocol
 802.3ad Link aggregation (static)
 802.1d Bridging
 802.3x Flow Control

Designed for NEBS

On board thermal and voltage monitoring
 GR-63-Core: NEBS, physical protection
 GR-1089-Core: EMC and Electrical Safety for
 Network Telecommunications Equipment
 SR-3580 NEBS criteria levels (Level 3 compliance)

Safety

UL listed (UL 60950, 3rd Edition)
 CUL CSA 22.2 #60950
 CDRH 21
 CFR 1040
 EN 60950
 EN 60825-1 Safety of Laser Products –
 Part 1: Equipmt. Classification Req., and User's Guide
 EN 60825-2 Safety of Laser Products –
 Part 2: Safety of Optical Fiber Communication Systems

EMC

USA: FCC CFR47 Part 15, Subpart J, Class A
 Canada ICES-003, Issue-2, Class A
 Europe: EN 55022 1998 (CISPR 22: 1997), Class A
 Japan: VCCI V3/01.4 Class A

Immunity

EN 300 386 V1.3.1 (2001-09) EMC for Network Equipmt.
 EN 55024 1998
 EN61000-4-2/IEC-1000-4-2
 EN61000-4-3/IEC-1000-4-3
 EN61000-4-4/IEC-1000-4-4
 EN61000-4-5/IEC-1000-4-5
 EN61000-4-6/IEC-1000-4-6



Panasas ActiveScale Storage Cluster

File System Software

Standard ActiveScale Features

Panasas ActiveScale File System™

ActiveScale File System virtualizes data to appear as a single unified storage space
 ActiveScale Clustering links DirectorBlades to maximize scalability/availability
 •Rapid Failover enabled through Active:Active DirectorBlades
 Dynamic Load-Balancing evenly and dynamically rebalances workload across blades¹
 DirectFLOW StorageBlade Software ensures optimum read/write performance to disks

Data Virtualization

Out-of-Band DirectFLOW Client moves ActiveScale FS to client for direct data access
 In-Band NFS & CIFS Virtualization creates single virtual NFS/CIFS server

Network Protocol Support

Panasas DirectFLOW for Linux IA 32, Itanium® and AMD Opteron™
 iSCSI RPC (Remote Procedure Call)
 NFS v3 over TCP
 Microsoft™ CIFS with NT LM 0.12 using NetBIOS over TCP/IP

RAID Specifications:

Supports RAID 0, RAID 1 and RAID 5

Data Backup and Recovery:
 Backup Tools

Scalable Snapshots: Point-in-time "snap shots" of all Panasas Storage Cluster data
 Scalable backup enables tailored performance to meet backup needs
 Compatibility with all leading backup solutions, including Veritas and Legato

System Specifications

Minimum System Capacity

Panasas ActiveScale Storage Cluster™

1.2 TB (5 - 240 GB StorageBlades)

Maximum System Capacity

Unbounded

Panasas Shelf:

Blade Support
 Network Interface
 System Management
 Power Inputs
 Dimensions
 Additional Reliability Features

11 Blade slots (up to 2 DirectorBlades)
 Redundant Gigabit Ethernet Switch Blades²
 Each module supports system readable serial number
 100 – 240VAC, 50/60Hz
 H: 7" (4U) x W: 19" (Rack Mount) x D: 26" (3" clearance on front and back required)
 Redundant hot-plug power supplies, AlwaysOn shelf fan (3), Shelf-wide battery backup
 module: minimum of 2 minutes (graceful shutdown), Redundant power grid support

Agency Certifications

FCC-A, UL/CUL

¹ Available in 2H04 ² Available in 2005



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