IP Storage

The next generation
Enterprise Storage

An Industry Report
2006

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1 Executive Summary

1.1 Summary – State of the Industry
1.1.1 Drivers: Volume driven economics of IP - Confluence of Storage & Networking
1.1.2 Inhibitors/Issues: Standards, Interoperability
1.1.3 Value Proposition
1.1.4 Outstanding Issues

1.2 Prerequisites for Success
1.2.1 Dependencies/Thresholds/Issues/Solutions Development
1.2.2 Technology Barriers
1.2.3 Migration and displacing incumbent technologies and installed base

1.3 Recommendations
1.3.1 Keys to success for Vendors (Hardware, Software), Integrators (xSPs, Systems), End Users, Startups and Investors.

2 Market Drivers / Industry Dynamics

2.1 Exponential Growth of Data
2.1.1 Information Explosion Driven by Connectivity, Ubiquity and Reach of the Internet
2.1.2 Wide spectrum of Existing Applications, New Applications (EC, Multimedia), Continuous Availability Requirements
2.1.3 Autonomics – To Lower Cost of Data Storage Management vs. Acquisition Costs

2.2 Convergence
2.2.1 Storage, Servers, Networks, Telecom, Entertainment using IP everywhere

2.3 Volume Driven Economics of IP Everywhere
2.3.1 Ubiquity, Historical Installed Base Management Tools

2.4 Drivers
2.4.1 Rich Data (Bandwidth), Ease of Data Sharing (NAS/IP Storage),
2.4.2 Emergence of Homogeneous Peer to Peer IP Connectivity Infrastructure
2.4.3 Utility Model: Telestorage/SSP’s Overcome distance limitations
2.4.4 Leverage IP Networking Tools - Class of Service, Flow Control, Scalability/Link Aggregation, VLANS, Reliability, Low Cost (Cabling/NICs), High Performance, Consolidation of Storage/Server), Increased Storage Utilization, Multi-Protocol Usage

2.5 Inhibitors
2.5.1 iSCSI Performance Myths
2.5.2 Interoperability with existing network standards
2.5.3 Integration of Transport and Storage Management
2.5.4 Standards Evolution: Standards Bodies (IEEE, IETF, T11) vs. defacto (market leaders)

3 Market Segmentation & Product Requirements

3.1 Market/Product Segmentation
3.1.1 By Large and Midrange Enterprises, Small and Entry level Systems
3.1.2 By Operating Environments & File Systems: (MF z/OS, UNIX & Linux, Windows, Other)
3.1.3 Major Strategic market positioning: Incumbent storage vendors vs. 35 startups
3.2 Product Requirements by Market Segments:
3.2.1 Features Requirements at Product Integration Level: Embedded Components, Storage Subsystems, System Integration & Managed Systems for SSPs
3.2.2 4 Tier Applications: Access, Web, Application and DB/Transaction Servers
3.2.3 Environments: Enterprise Data Centers, IDCs, xSPs, Telecoms ...
3.2.4 Vertical Markets: Manufacturing, Finance, Medical, Communications, Govt., ...

3.3 Technology & Architectural Segmentation
3.3.1 FCIP, iFCP and iSCSI standards
3.3.2 Migrations from Parallel SCSI, Fibre Channel and Hybrid Models

4 Market Demand Forecast & Market Shares
4.1 WW Market Demand Forecast 2002-2006
4.1.1 By OS (MF z/OS, UNIX & Linux, Windows, Other)
4.1.2 By Applications – OLTP (Business Processing, Collaboration, Web Infrastructure), Decision Support (Data Warehousing, OLAP..), Numeric Intensive Computing, Streaming (Data Acquisition, Medical, Video on Demand ..)
4.1.3 By Environment – Large & Midrange Enterprises, Small and Entry Systems
4.1.4 By geography (US, Europe, Asia Pacific, ROW)

4.2 WW Market Shares 2006
4.2.1 By Environment - Large & Midrange Enterprises, Small and Entry Systems
4.2.2 By Operating System - MF z/OS, UNIX & Linux, Windows, Other

5 Enabling Technologies – Trends & Standards
5.1 Network Stack Approach to Storage
5.1.1 Application to Storage: Direct Reach via DAFS, SRP
5.1.2 Data Access Through Records (e.g. DB SAN or Blocks) or FS or both

5.2 Storage Protocols
5.2.1 SCSI Architectural Model - Client/Server Ios, Initiators/Targets
5.2.2 SCSI Commands/Response Sequences
5.2.3 Interconnect Infrastructures

5.3 IP Protocols
5.3.1 IP Addressing, Routing/Switching
5.3.2 Layer 2/3, Spanning Tree, ARP, OSPF, BGP

5.4 IP Storage Protocols & Standards
5.4.1 Parallel SCSI vs. Serial

5.5 IP SANS – Key Leverages
5.5.1 Class of service (8 Levels of Frame Prioritization for transport of Mission Critical Data over SAN)
5.5.2 VLAN (Segregation of devices on SAN)
5.5.3 Flow Control (Reliable transport of data over connectionless protocol without loss of performance e.g. UDP/IP)
5.5.4 Scalability (using trunking or link aggregation)
5.5.5 Low cost (Standard Cabling - CAT 5 or Fibre Optic – Single or multimode)
5.5.6 High Bandwidth Performance (1.25 Gbps)
5.5.7 Multiprotocol Accommodation of SCSI, FC & Native IP Storage Devices
5.5.8 IP Networking Tools (Control Lists, Authentication, SNMP based management, QoS)
5.5.9 Consolidated storage/server management
5.5.10 Business Continuity across enterprise utilizing existing tools
5.5.11 Increased Storage utilization via Networking
5.6 Issues
5.6.1 Performance - Improving IP Storage Performance using TOE

6 Competitive Product Positioning & Strategies
6.1 Basis of Competition: PACSIMS
6.1.1 Performance – OLTP, Decision Support & Streaming Computing Environments
6.1.2 Availability – SLA Guarantees by HA Levels
6.1.3 Cost - Total Cost of Ownership (TCO)
6.1.4 Scalability – Virtualization, Clustering
6.1.5 Interoperability
6.1.6 Manageability (Virtualization, Autonomics/Self-Configuring, Self-Optimizing with Workload & Self-Healing …)
6.1.7 Security – IPsec6 vs. CIM based

6.2 Business Positioning Matrix – Vision vs. Execution
6.3 Keys to success for
6.3.1 Incumbent Vendors -
6.3.2 New Leaders –
6.3.3 Startups – Primary exit strategy: Acquisition vs. Sustaining
6.3.4 Emergent Startups – Specialty Niches and emergent companies - 1st & 2nd Waves
6.3.5 Investors

7 Suppliers: Portfolio & Strategies

8 Channels of Distribution
8.1 Industry Structure
8.2 Channels of Distribution
8.2.1 By EU Business Size & Application Markets
8.2.2 Addressing Major Vertical Markets
8.2.3 Addressing High Availability Markets & Requirements
8.3 Pricing Structures by Channel
8.4 Distributor Services
8.4.1 Distributors, System Integrators, Service Provider Partnering Programs

8.5 Major Channel Players
8.5.1 Top 65 System OEMs
8.5.2 Top 100 System Integrators – Large & Medium
8.5.3 Top 100 Federal Players
8.5.4 Top 75 VADs

9 Future Of IP Storage
9.1 Convergence
9.2 Virtualization
9.2.1 Autonomics – Self Identification & Configuring, Application Aware Self-Optimizing, Self Management, Self Healing

9.3 Volume Driven Economics
9.3.1 The Tsunami of Next Generation Storage & Networking

9.4 Strategies of Surviving Players

10 Methodology & Appendices