Blade Servers
State of the Industry 2006

Industry Keynote Address

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Markets Drivers / Industry Dynamics

- Chaos in the Enterprise DataCenter Infrastructure
- Achieving TCO & ROI - Volume Blade Economics
- Overcoming Complexity in 3 Tiered Computing
- Major Applications – OLTP, DSS, HPC, Streaming

• Technology Hurdles & Industry Issues
  - IP Stack, Backplane, IPC, SSI, SAS/SATA, Standards

• Competitive Positioning
  - Mgmt SW, Complexity, App-Awareness, Disty Channels

• Futures Opportunities
  - Semiconductors Opportunities for IP Everywhere, Grids,
    Data/Telecom Convergence, Data Management Structures
Chaos in the Enterprise . . .

(1) Scales poorly  (2) Difficult to manage  (3) Reliability is questionable  (4) Management costs out of control

DC Automation Driving Blades Market

- **Servers Utilization**: 20-25% vs. 80+% (Servers/Admin: 15-30 vs. 500+)
- **Storage Terabytes/DBA**: 1TB vs. 100TB
- **Networks Ntwk Ports/Admin**: 50-100 vs. 500+
- **System Availability**: HAL-3 (99.9%) vs. HAL-5 (99.999%)
Blades - TCO Savings & ROI

3 Year TCO Savings
Rack vs. Blade Servers

Rack Servers
Blade Servers

TCO Savings in..

OPEX
- Staff/Support
- Maintenance/Downtime

CAPEX
- Networking
- Servers
- Storage Infrastructure
- SW Infrastructure

HA End to End Internet with Security Products

Enterprise

Tier-1
Edge Servers

Tier-2 Applications

Tier-3
Data Base Servers

Software OS Platform

Directory Security Policy Management


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Switches: Layer 4-7, Layer 2, 10GbE, FC Stg

Caching, Proxy, FW, SSL, IDS, DNS, LB, Web Servers

Database, Middleware, Data Mgmt Servers

Application, HA, File/Print, ERP, SCM, CRM Servers

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WW Blade Servers Market Opportunity

Cum 2005-2009

Factory Revenues ~ $27B
Channel Revenues ~ $7B
Units ~ 9 Million

The Rise of PC Blades

PC Blades Revenues & ASP

Blade Infrastructure: Local Area Grid (LAG)
Blade Servers – Market Leaders 2005

- IBM
- Dell
- HP
- Others
- FJ/FSC
- NEC
- Rackable
- Hitachi
- Sun

Leveraging Pricing to gain share

Blade Servers 2005
ASP vs. Unit Shipments

Blade Servers: Vendor Positioning Index

Strategy (Potential)

Delivery (Execution)

As of 31 March 2005 See IMEXResearch.com
Blade Servers Industry Report 2006 for latest data & valuation metrics
Interconnect Price/Performance Hierarchy

High MB/s, Low Latency, Price/Port

- Quadrics
- Myrinet
- InfiniBand
- 10 GbE w/ RDMA, TOE
- 10 GbE w/ TOE
- 1 GbE

Microsoft Chimney Software

Market Size 2005-09

Market Segments by Applications

For in-depth product requirements by market segmentation see IMEX Research.com’s Blade Servers 2006 Report & Next Generation Data Center Infrastructure 2006 Report
HPC – Academia to Wall St to Hollywood

High Performance Computing

Commercial Visualization

Bioinformatics

Decision-Support Systems

Entertainment Audio/Video On Demand

Data: IMEX Research & Panasas

100+ Teraflops

Throughput = 100 GB/s

Rendering (Texture & Polygons)

Throughput = 1.2 GB/s

Data rate & capacity

Throughput: DSL/Cable

**Fabric based Clusters Architecture**

- **Network Fabric**: Ethernet, Wi-Fi
- **Management Fabric**: SNMP, IETF/CIM, SMI-S, SMASH
- **System Fabric**: Quadrics, Myrinet, InfiniBand, Ethernet / IP, Ethernet IP w/TOE, Ethernet IP w/TOE and RDMA
- **Storage Fabric**: SCSI, Fiber Channel, ISCSI

HPC Architecture & Challenges

Architecture Goals & Criteria

Goals
- Maximize compute time vs. messaging time
- High constant cross-sectional throughput
- Reduce or hide latency

Metrics
- Bandwidth
- Latency
- System Interface
- SW Stack

HPC Communications Stack

Entire Stack Needs Attention

Challenge is to move data from application to the network and back with minimum latency
Enterprise Market is cost conscious

SAS/SATA Market ready to explode

SAS Controller Market

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Management – Blade Servers

Ultra-dense HW
- Density
- Power Consumption
- Cable Management

Management
- Platforms integration:
  - Hardware
  - Software
  - Network
  - Management
- Scalability
- Security
- Manageability
- Lowest TCO

80%
20%
Future: IP Storage Management on a chip

Host Services Integration

- File system monitoring
- Storage provisioning
- Win, LINUX, Solaris

IP SAN Management

- Management Console
- Management of iSCSI HBAs
- MultiPath IO Support and Failover
- Security (iSNS, CHAP, SRP)

Virtualization

Mirroring

Snapshot

Fail-Over

iSCSI Target Management

- LVM, Error Handling, SCSI Daemon, API Interoperability

HW Acceleration: TOE, iSCSI Offload, IPsec

Go-to-market: Channels of Distribution

Industry Structure

Manufacturers
- RAID
- Contllrs
- VIA IPC
- Controllers
- Hubs
- NICs
- Switches
- Routers
- LANs
- WANs
- Internet Backbone
- HA + Ntwk + System Mgmt SW
- Servers
- Clusters
- SANs
- VADS
- F1000
- Large
- Small
- Medium
- Vertical Markets
- Telecom
- ISPs
- Govt.
- Manufacturing
- Medical

Global IT Spending by Verticals

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