



# The Looming SAN Storm in the SMB

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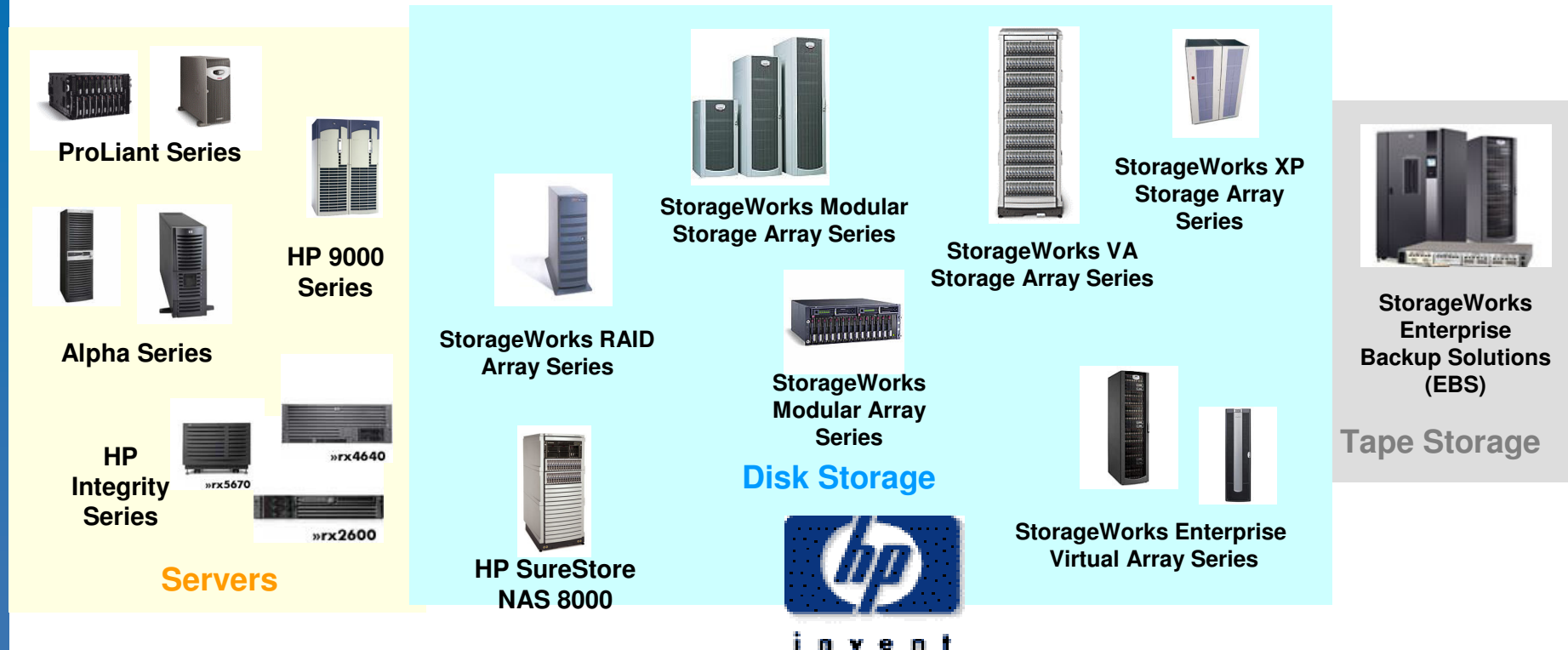
# Emulex: Building on a Foundation of Strength



- 500+ Employees
  - Costa Mesa, CA
  - Bothell, WA
  - Bolton, MA
  - Longmont, CO
- Worldwide manufacturing partners


















- Strong track record of growth
  - 6 Consecutive years of revenue growth
    - FY04 Revenue of \$364M
  - #1 HBA Market Share
  - 1.6M units shipped
- Strategic investments fuel continued growth
  - Vixel acquisition
  - Intel/Emulex joint silicon development

# Emulex is the #1 HBA Supplier to HP



- ◆ Over 350,000 HBAs Shipped to HP
  - ✓ HP-UX, Windows NT/2003 (IA32 & IA64), Linux, Solaris, and Netware
- ◆ InSpeed embedded switch technology Beginning to Ramp
  - ✓ EVA uses Root Switch implementation for back-end switching

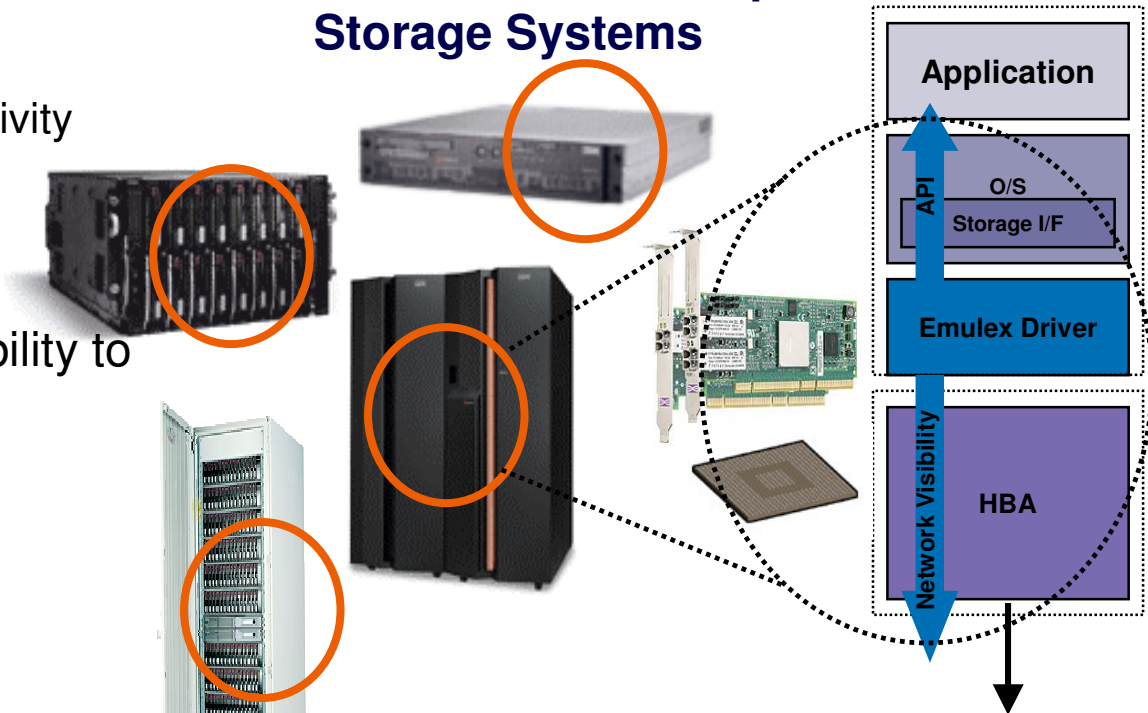
# HP/Emulex HBA Qualification Matrix

	 HBA Model #	 HBA Model#	   O/S Environment
 ProLiant DL Family  ProLiant BL p-Class	A7388A / A7387A FCA2404DC FCA2408 FCA2355 FCA2404 FCA2101	LP1050 / LP1050DC LP9802DC LP982 LP9002DC LP9802 LP950	Windows (32-bit) NT, 2000 & Server 2003
 HP Integrity Series  HP Alpha Servers  HP 9000 Superdome Server	AB232A AB467A/AB466A	LP9802 LP1050/LP1050DC	Windows Server 2003 (64-bit)/Linux
	A7298A	LP982	Linux 64-bit
		LP10000 LP9002L LP9002DC	HP-UX 11i V1
	FCA2684/DC	LP10000/DC	Tru64/OpenVMS
 StorageWorks RAID Array Series  StorageWorks XP Storage Array Series  StorageWorks NAS 8000  StorageWorks Enterprise Virtual Array Series  StorageWorks Modular Storage Array Series  StorageWorks Enterprise Backup Solutions (EBS)  StorageWorks VA Storage Array Series	FCA2404 FCA2355 FCA2404DC FCA2408 A7388A / A7387A	LP9802 LP9802 LP9002DC LP9802DC LP1050 / LP1050DC	Windows (32-bit) NT, 2000 & Server 2003
	FCA2101	LP952L	Windows (32-bit) NT, 2000 & Server 2003 Linux 32-bit
	FCA2354	LP9002L	Tru64/OpenVMS
	AB232A	LP982	Windows Server 2003 (IA 64-bit)

# Host Bus Adapters and I/O Controllers

- Emulex HBAs and I/O Controllers connect servers, storage, tape, and appliances to the SAN
  - Initiator and/or target connectivity
  - Management interface
  - Server off-load
- Provide applications with visibility to the network
  - HBAnyware centralized HBA management suite
- HBA solution includes:
  - Hardware
  - Firmware
  - Drivers

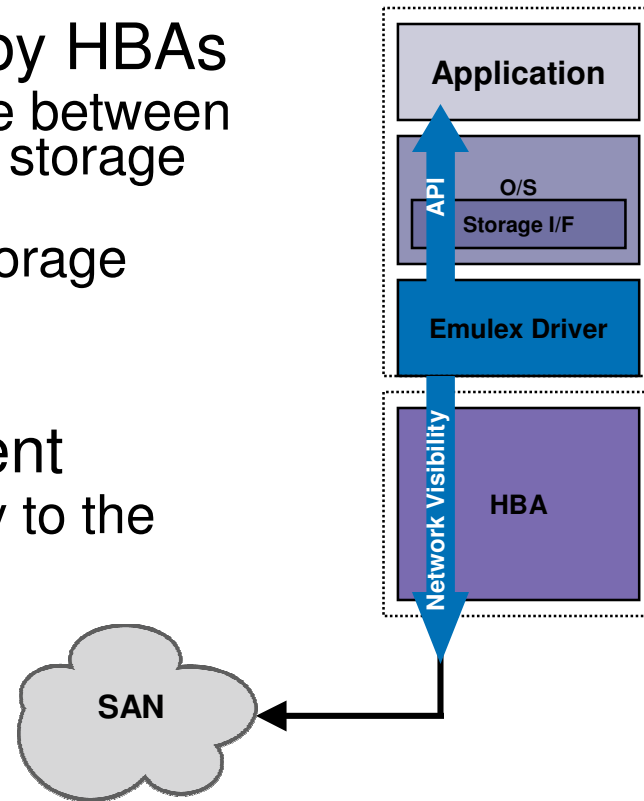
## Server, RAID, NAS & Tape Storage Systems





# Emulex HBAs Enable Interoperability & Management

- SAN interoperability enabled by HBAs
  - Software driver provides interface between O/S, server applications, and the storage devices
  - Interaction with wide variety of storage devices
- HBAs enable SAN management
  - Provide applications with visibility to the network
    - Configuration, status, statistics
    - cHBA API, SMI-S



**Emulex HBAs mask the complexity,  
delivering simplicity and interoperability**

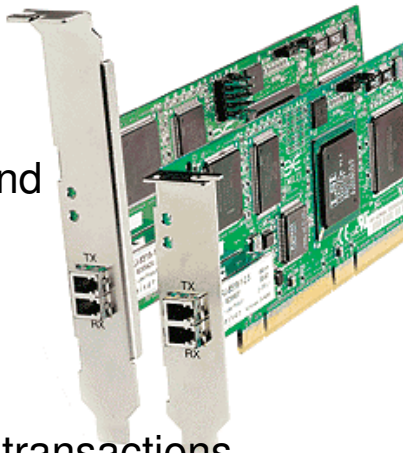
# Traditional Fibre Channel HBA Segments

## High-End:

- Emulex LP9002, LP9802, LP10000
- Single, dual channel

## Market Requirements:

- Highest performance
  - Bandwidth, I/Os per second
  - Server off-load
- Unlimited scaling
  - Thousands of servers
  - Dozens of switches
  - Thousands of concurrent transactions
- Long distance
  - Multi-site capability
- Multi-protocol: FCP (SCSI), FICON, etc



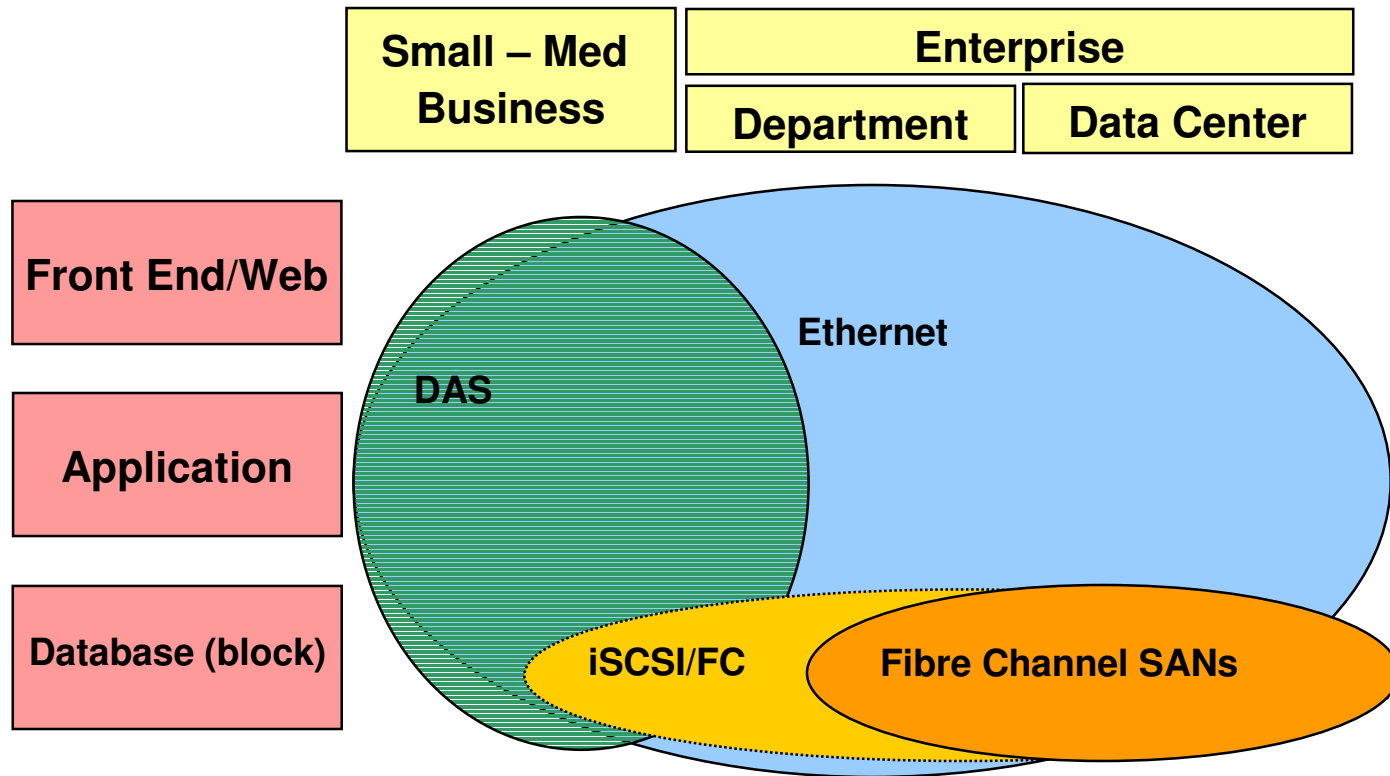
## Mid-Range:

- Emulex LP952, LP982, LP1050
- Single, dual channel

## Market Requirements:

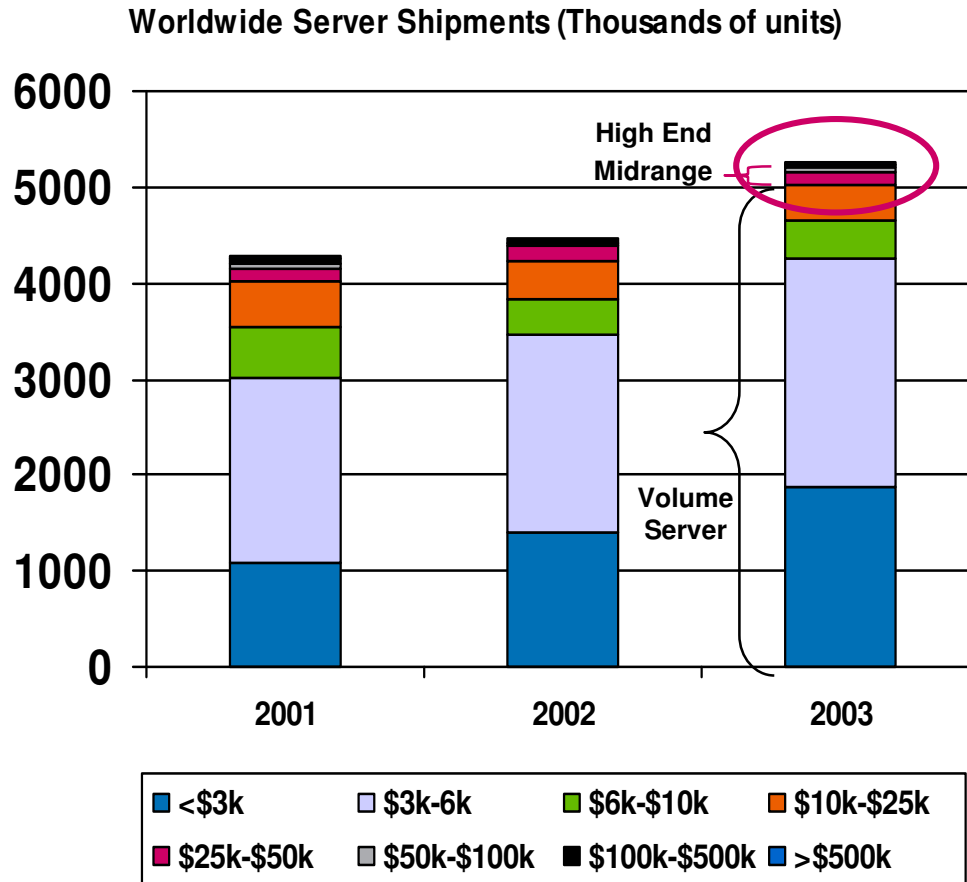
- High-performance
  - Dozens of servers
  - Several switches
  - Hundreds of concurrent transactions
- Local connectivity
- FCP protocol only

# Market Segments & Positioning





# HBA Market Segmentation & Expansion

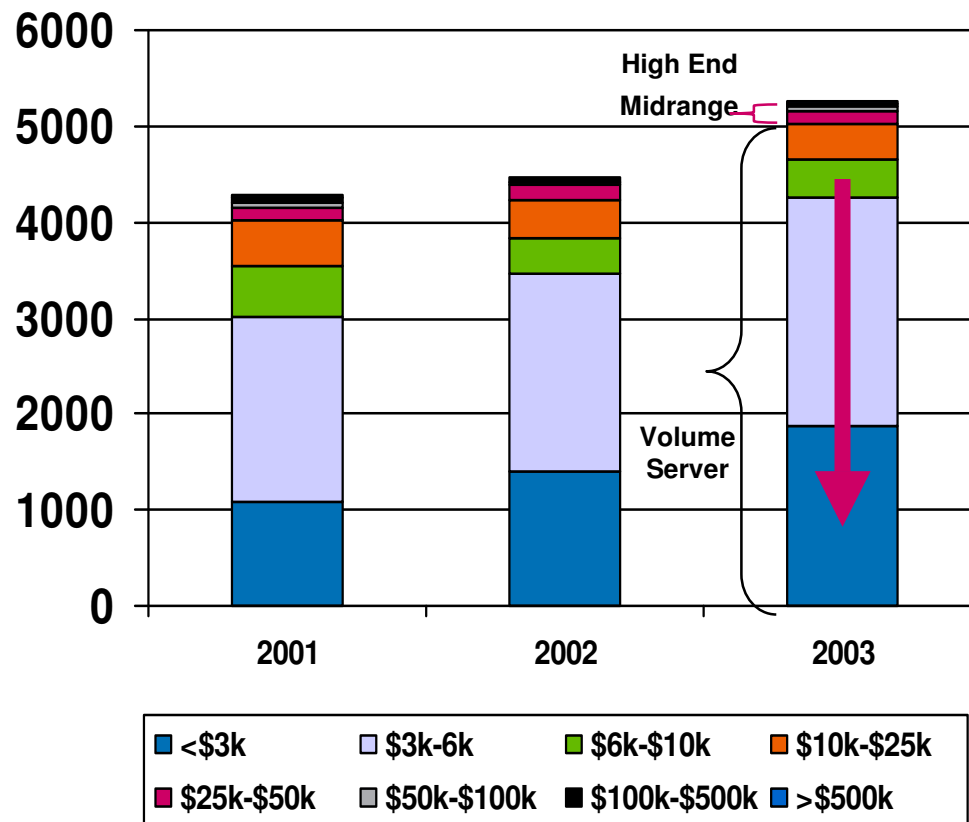


Source: IDC 2004

- Fibre Channel historically focused on the high-end
  - Gartner: <200k Servers were SAN attached in 2003
  - Midrange growing strongly
- Emulex HBAs are well positioned for high-end and midrange segments

# HBA Market Segmentation & Expansion

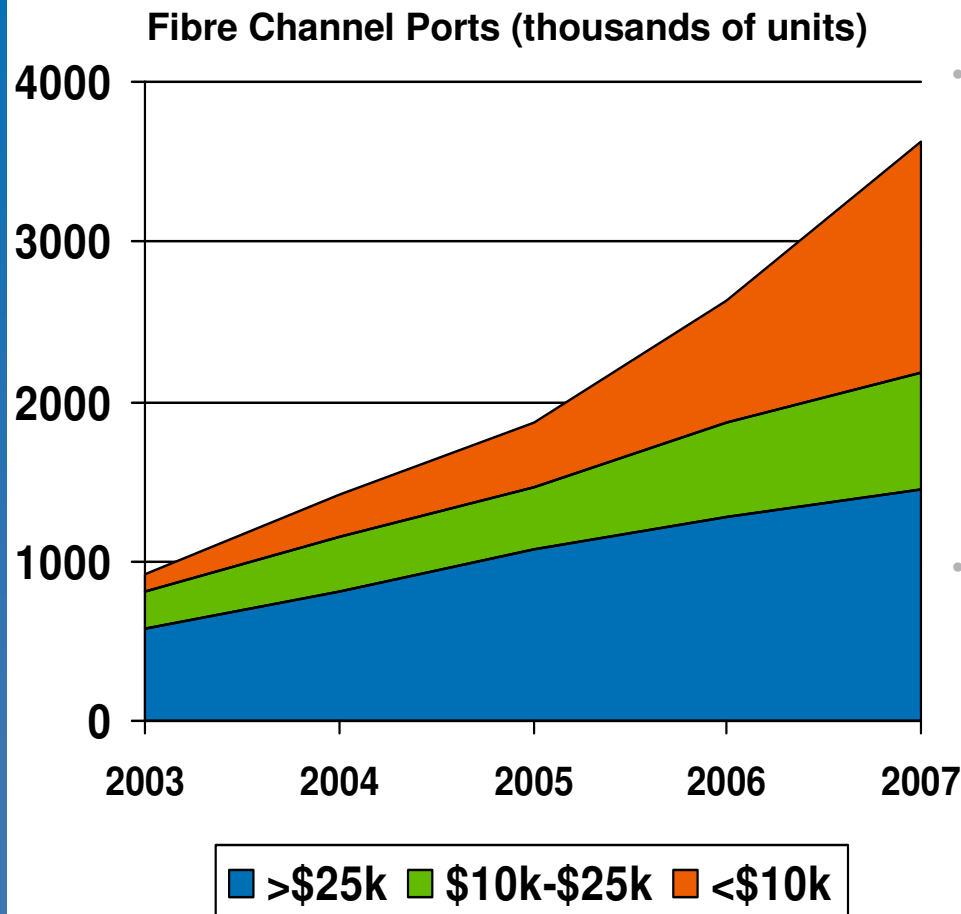
Worldwide Server Shipments (Thousands of units)



Source: IDC 2004

- Fibre Channel SANs are migrating to lower cost systems
  - Replacing DAS
  - Keeping up with CPU speeds and capacity growth
    - SMB and departmental computing
  - Centralized storage provides compelling benefits
    - Disk allocation/re-allocation
    - Tape backup
- Leading OEMs driving Fibre Channel into lower end servers

# Fibre Channel Penetration Continues to Grow



Source: Gartner 2003

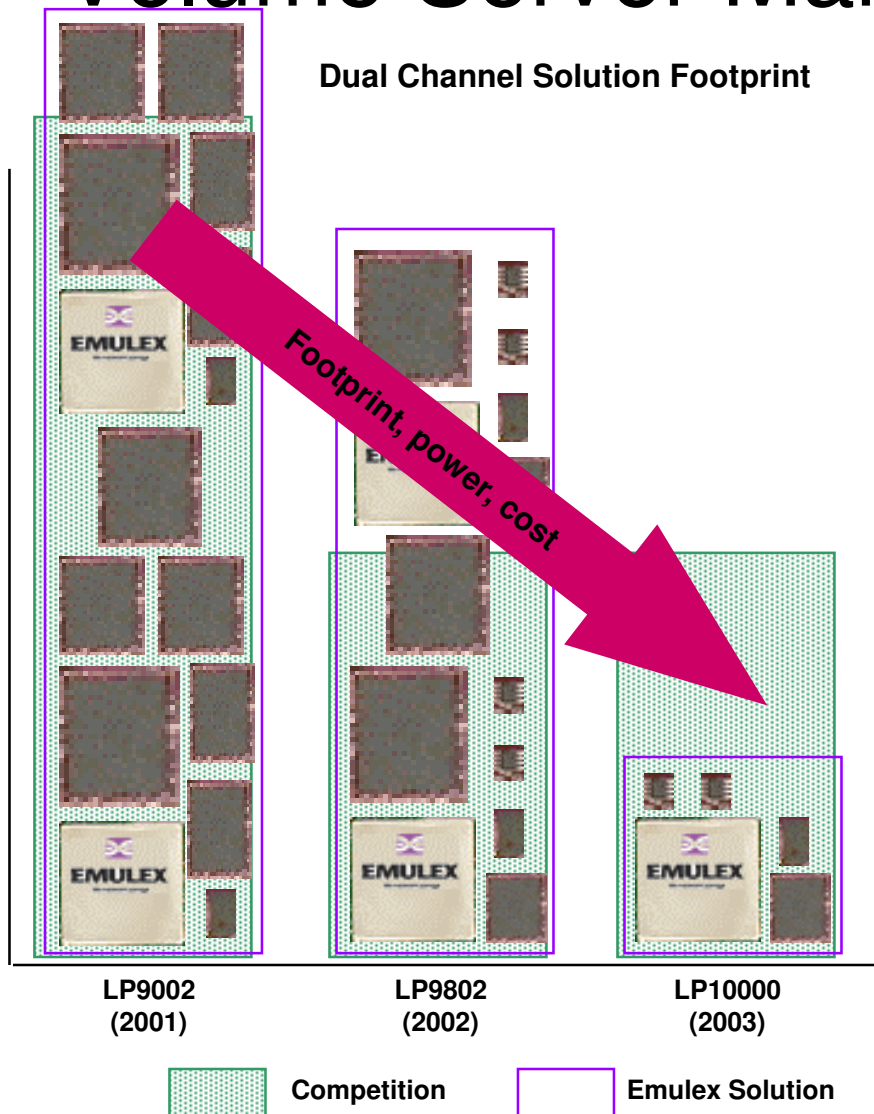
- HBA Usage:
  - Growth across all sectors
  - 2003: ~30% of total were in <\$25k server segment
  - 2007: ~60% of total in <\$25k server segment
    - Driven by greater SAN penetration
- New classes of Fibre Channel products are emerging to meet market needs
  - Purpose-built, SAN-ready servers
    - Mezzanine cards
    - Chip-on-motherboard
    - Blade servers
  - SMB HBAs

# Small/Midsize Business Market Dynamics

## Emulex Focus Group Research Highlights

- Multiple markets within “SMB”
  - Need for SANs varies from smallest to larger organizations
- Small staff of IT generalists
  - Simplicity, plug-and-play required
- DAS (SCSI) or NAS are currently used
  - These technologies set the bar for price, ease-of-use
  - High-availability is not seen as critical
- Fibre Channel is seen as a stable, proven technology

# Emulex is Driving Fibre Channel Into Volume Server Market



- Emulex technology provides world-class performance, solution footprint, and cost
  - Solution real estate reduced 84%\*
  - Performance increased by 143%\*
- Ideal technology for the high volume server market
  - Embedded chip-on-motherboard (COMB)
  - Server blades
  - HBAs

\*From LP9002 to LP10000 generations

# Meeting the Requirements for SMB and Departmental SANs

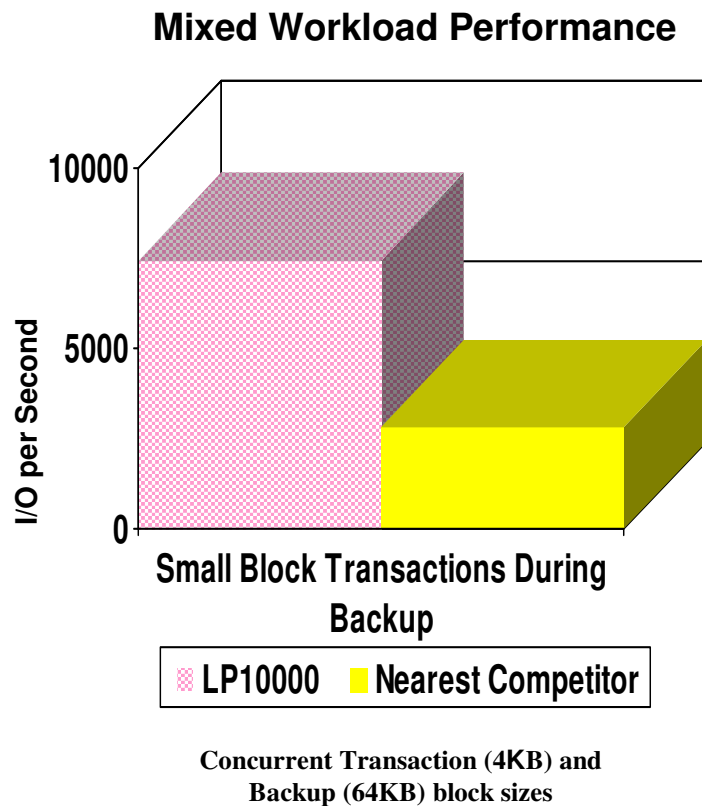
- Introducing the Emulex LP101
  - New 2Gb/s, PCI-X HBA
    - Designed & optimized for the SMB market
    - Part of OEM array solution
  - Creates a new price point for Fibre Channel HBAs
    - Complements our high-end and mid-range products
    - <\$500 Street price
  - “AutoPilot” Installer/Manager Tools & End-user Documentation
    - Unmatched ease-of-use



**Driver compatible with all Emulex HBAs**



# Emulex HBAs are Ideal for the Unique Challenges of the Small/Midsize Business



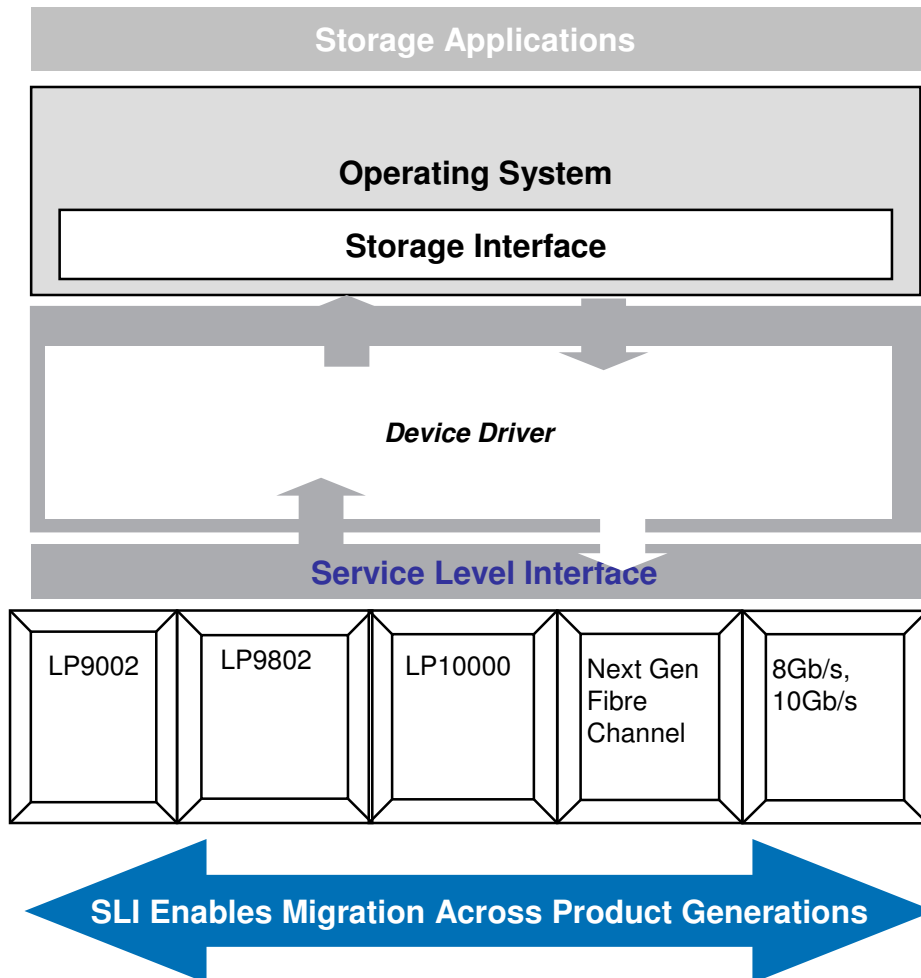
- Ideal for mixed workload environments
  - Tape backup and disk I/O on same HBA
    - 166% greater Database transactions!
    - 36% greater Database data throughput!
    - 21% greater backup throughput!
  - Enabled by unique frame-level transport capability
- F/W Upgradeable HBAs
  - Add features and functions
  - Incorporate emerging standards
  - Preserve value of HBA investment

# Top-to-Bottom Solutions From Emulex

## Meeting the Market Requirements for SAN Connectivity

Market Requirement	High-End (LP10000)	Mid-Range (LP1050)	SMB (LP101)
Scalability	100s or 1,000s of servers Dozens of switches	Dozens of servers Several switches	<10 servers 1 or 2 switches
Performance	Full Bandwidth (400MB/s) 100,000+ I/Os per second	High Bandwidth 50-100k I/OPS	Moderate B/W <50k I/OPS
Distance	Up to 100km	<500m	10s of meters
Concurrent Transactions	1,000s	100s	<100
Protocols	FCP, IP, FICON, etc.	FCP	FCP
Availability	OEM and Std Products	OEM and Std Products	OEM array solution

# Emulex's Service Level Interface (SLI): Tying it All Together



- Enables Seamless Migration to New Generations of Products and Technologies
  - New products driver fully driver compatible with installed base
  - 1Gb/s, 2Gb/s, as well as new 4Gb/s, 8Gb/s, and 10Gb/s Fibre Channel all use the same driver
- New products inter-operate seamlessly with existing management applications

# Emulex: Well Positioned to Satisfy Needs of the Small/Midsize Business

- ✓ The Small/Midsize Business market is ready for SANs
- ✓ Emulex HBAs provide market leading features and interoperability
  - ✓ Ideal for connecting disk and tape to the same HBA
- ✓ New LP101 HBA leverages same driver as existing HBAs, insuring robust interoperability
- ✓ Emulex sets the standard for ease-of-use

# Questions?

