



Networked storage overview

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Agenda



- Today's challenges
- HP's storage vision and strategy
- HP's network storage solutions
- Storage leadership





Today's challenges

Business realities



Business environment is volatile and unpredictable

Intense competitive pressure

IT budgets constrained



CIO's top 10 business trends



1. Costs/budget pressures
2. Data security concerns
3. Faster innovation
4. Business risk management
5. Single view of customer
6. Stakeholder pressure
7. Greater transparency of reporting
8. E-enabled business/government
9. Growing value of knowledge capital
10. Personal data privacy concerns



Source: Gartner, *CIO Agenda 2003: Leading for Productivity and Growth*, Ellen Kitzis, June 2003

Today's industry answer . . . chaos



hubs
directors
switches



V³ SAN initiative



SAN

Fibre Channel



SANITI

Too many choices
Changing vendor strategies
Piece-parts solutions
Vendor lock-in



Seascope



DAFS
Mammoth

HSM

CIFS



NAS

DAS

NFS



Storage ONE

FibreAlliance

Near field recording



OpenReady



**HP's storage vision
and strategy**

HP StorageWorks: Delivering business value



Operational cost savings

- Lower equipment costs
- Lower people costs
- Investment protection

Availability

- Reduced downtime
- Better integration

Agility

- IT flexibility
- Leverage time-to-market for competitive advantage

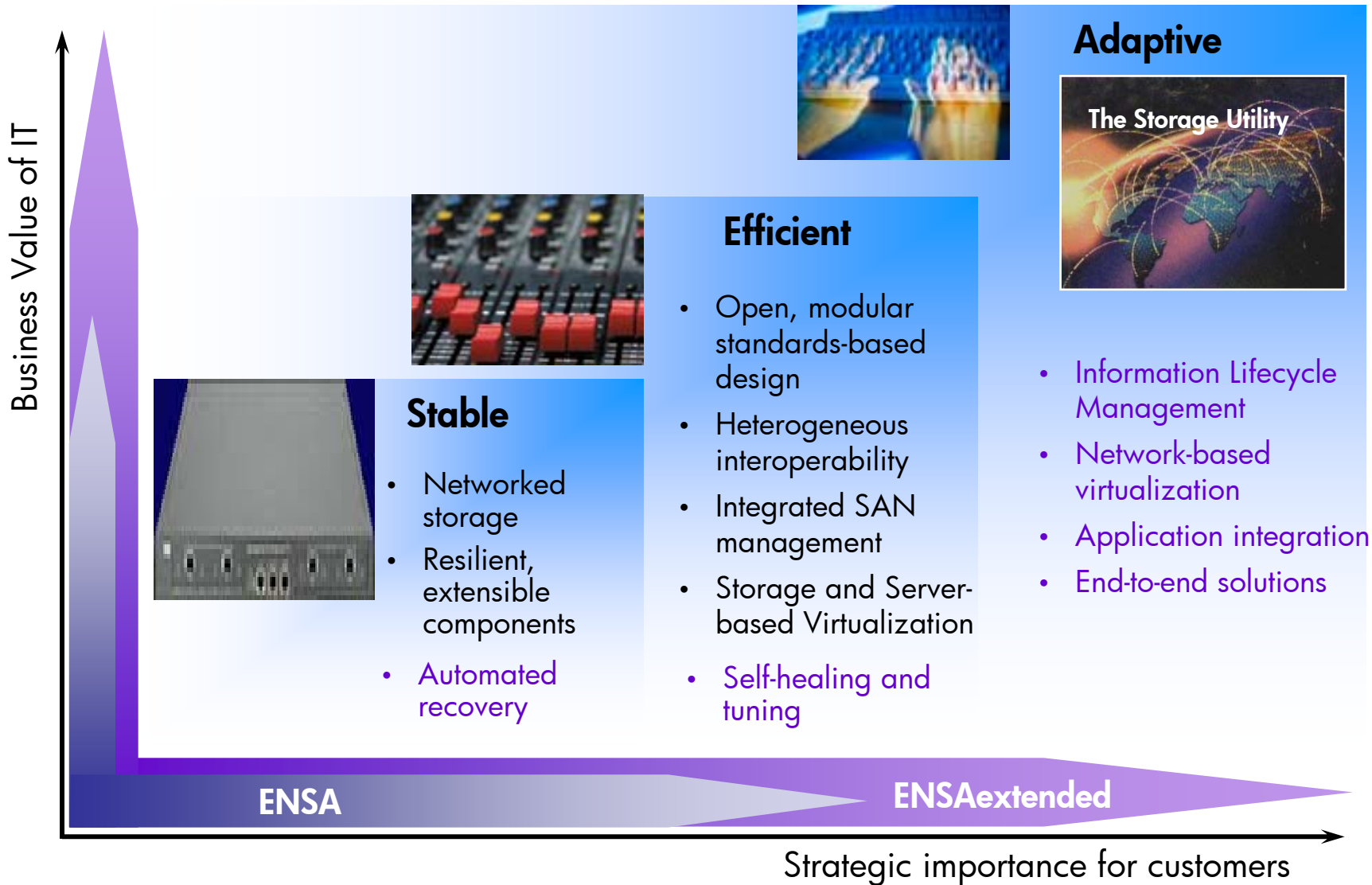


Storage utility



The Journey Towards an Adaptive Enterprise

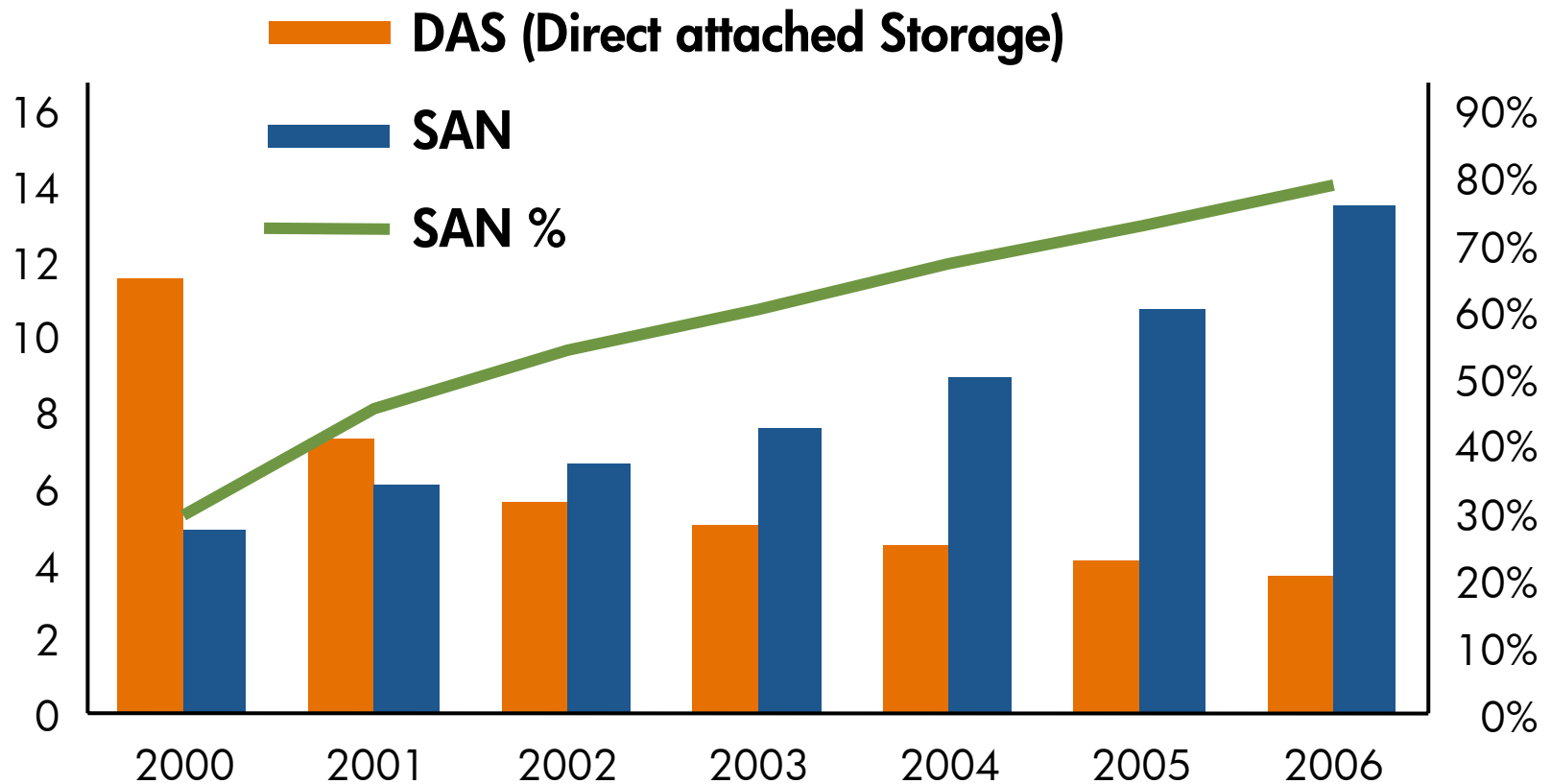
- a Storage perspective



Market has shifted to SANs



Annual vendor revenue \$B



Source: "Worldwide external raid controller-based storage forecast, 2000-2006", Gartner, August 2002

Why network storage?



DAS	Networked storage	Benefits
Proliferation of servers with storage	Consolidation of storage, servers and tape libraries	Lower TCO
'Islands' of storage	Shared pools of physical storage	Reduced storage isolation Greater utilization—use more of what you buy
People intensive management due to numbers of servers and storage-higher TCO	Fewer boxes to manage and a unified view of storage	Improved staff productivity
One-to-one relationship of application to storage	One-to-many relationship of application to 'storage pool'	Higher availability and inherent redundancy

Broadest range of storage products and solutions



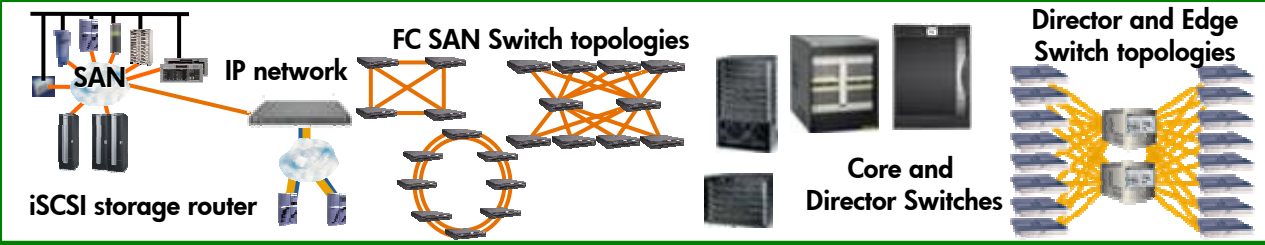
Foundation

- Scalable SAN fabric
- Network storage arrays
- Network attached storage

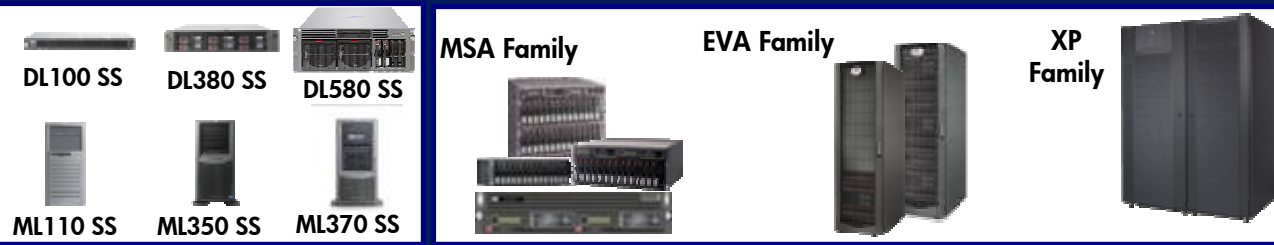
HP StorageWorks Product Portfolio



Infrastructure



Storage Servers (NAS) & Storage Arrays



Tape & Optical storage



Software

Storage resource management portfolio

- Device management
- Storage area management
- Array-based software



Information Lifecycle Management portfolio

- Protect and recover
- Active archiving focused on retrieval
- ISV solutions across hardware portfolio



SERVICES & SOLUTIONS

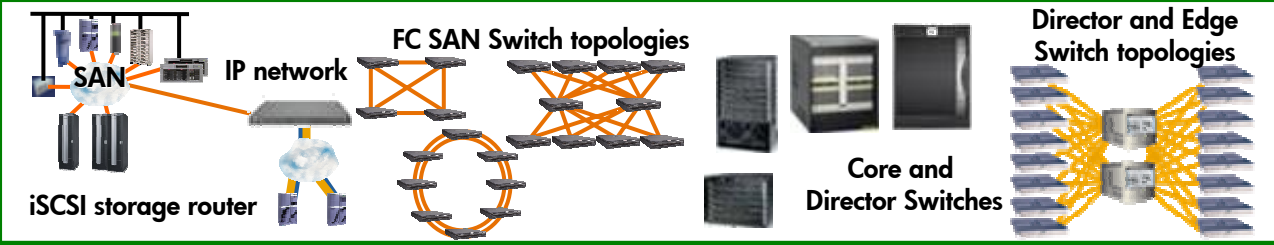


**HP's storage
network solutions**

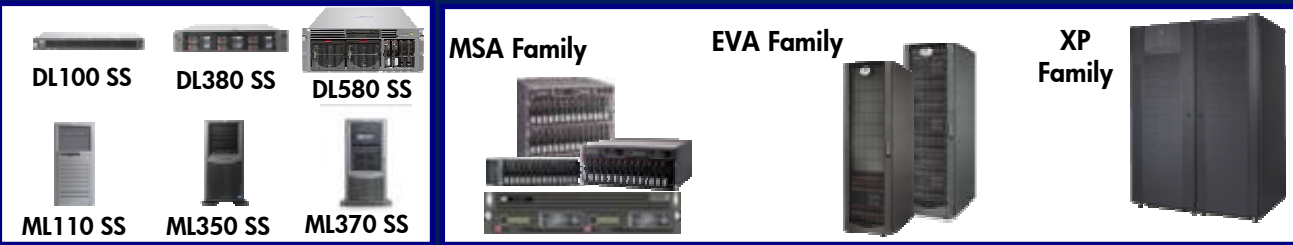
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SERVICES & SOLUTIONS

What is NAS?



- It's an appliance?
- Ethernet based storage pool?
- Departmental drop-in storage?

**We've been doing
this stuff for more
than 30 years!**

Hewlett-Packard:

NAS = "file and print serving!"

- Multi-protocol
- Centralized backup
- Anti-virus
- Available
- Scalable
- Common storage management

Network storage



- SAN infrastructure
- Online array storage
- Network Attached Storage (NAS)



Switches and directors



Switches

Architectural flexibility

Inter-Switch Link (ISL) connections used to create SAN fabrics



Fabric Mesh



Ring Fabric



Cascade Fabric



Skinny Tree

Directors

Architectural efficiency

Integrated switch design with equivalent data path protection

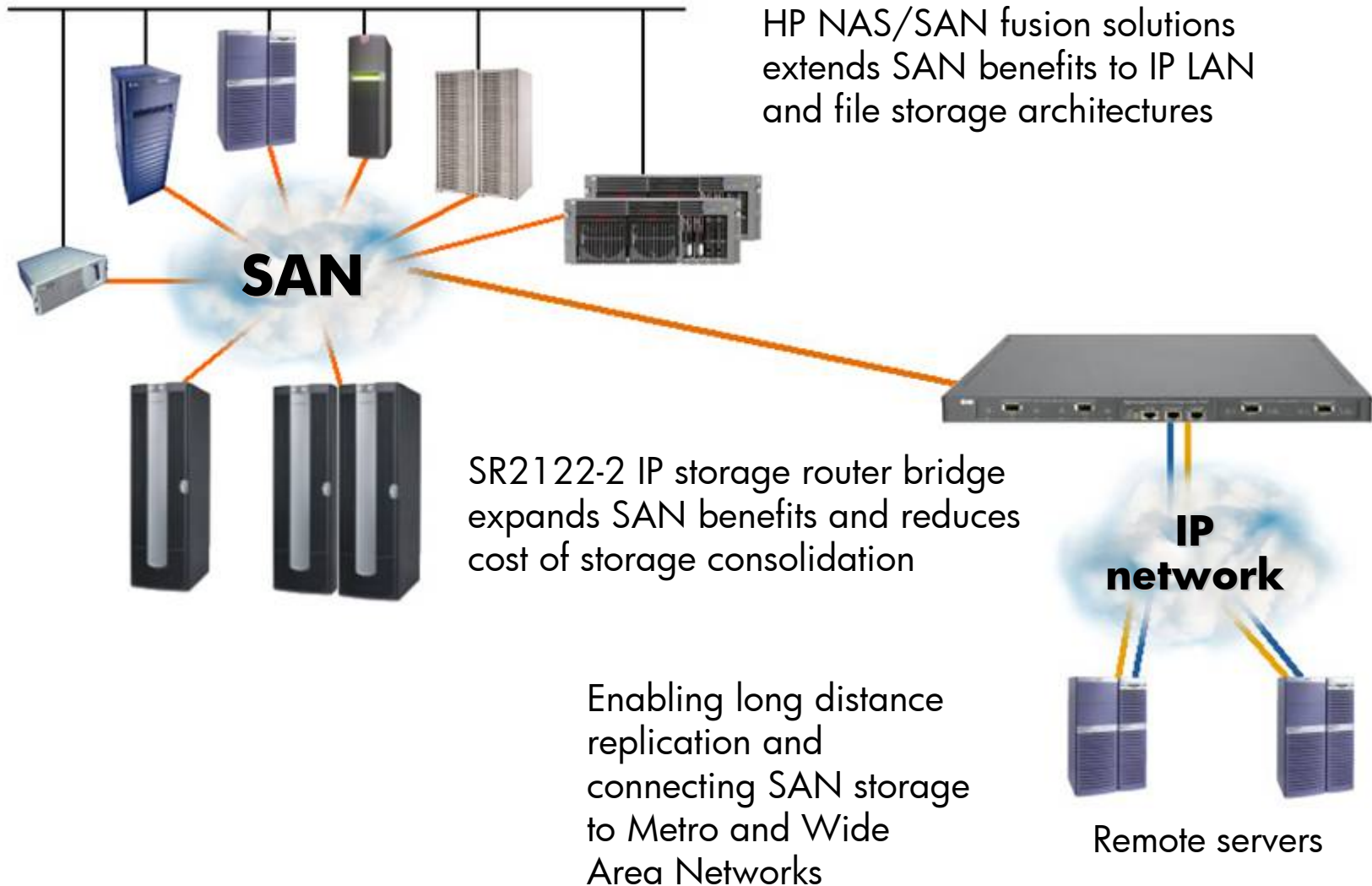
64 Port Director



Director and Edge Switch Skinny Tree

IP storage routers

Extending the SAN architecture



SAN Infrastructure product portfolio



Infrastructure alternatives that span the enterprise

**Business
enterprise**



**Business
mid-range**



**Business
entry**



B-series

M-series

C-series

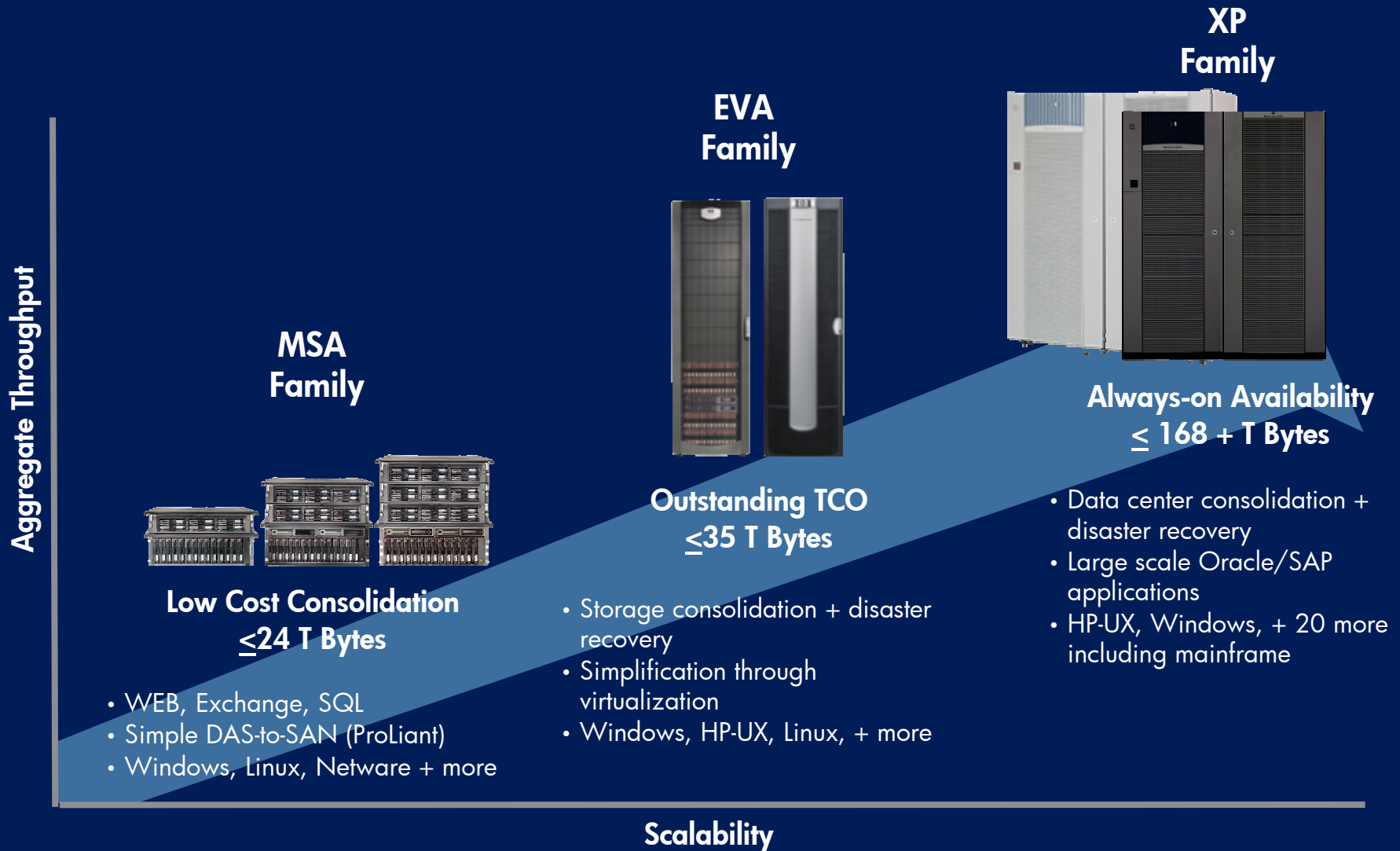
Online array storage



- The industry's most comprehensive suite of products
- Higher system and application availability
- Converges storage islands
- Serves up block data
- Reduces overall complexity
- Drives down TCO
- Increases IT staff efficiency



HP StorageWorks arrays: Modular, flexible and scale-able storage



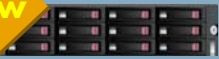
Modular Smart Array Family



Modularity

- Dynamic storage scalability
- Scale to meet your needs today, and reuse to meet your needs for tomorrow

New



MSA20



MSA30

New



MSA500G2



DL380 Packaged Cluster
w/ MSA storage



MSA1000

New



MSA1500

- Family of external solutions from JBOD to entry level SAN
- External MSA enclosures migrate from DAS to SAN
- Smart Array technology - allows for hot expansion of RAID sets

Modular Smart Array 1000

HP's answer to the DAS dilemma



Entry level array making SAN simple!

- Scalable to 6TB
- 2Gb FC host connections
- Ultra3 SCSI – 1" universal drives
- Windows 2000, Windows 2003, Netware Tru64*, OVMS*, and Linux
- Embedded 2Gb fabric switch option
- Advanced data guarding
- Optional: business-data protection, business continuance and storage management software

**Built on HP's exclusive
DtS architecture**



* With Alternate Firmware

Introducing the new StorageWorks Modular Smart Array 1500 cs



Entry level array or enterprise replication target for "near-online" disk storage

- Support for either **SATA** or **SCSI** drives and enclosures (MSA20 or MSA30 respectively)
- Scalable to 24TB in 18 U (SATA drives)
- 2U Fibre Channel controller shelf
- 2Gb FC host connections
- Windows 2000, Windows 2003, HP-UX, Netware, Tru64*, OVMS*, and Linux
- Advanced data guarding
- Broad support of data migration tools
 - OV Data Protector, Veritas NetBackup, BrightStor ARCserve, Legato NetWorker, others

New!



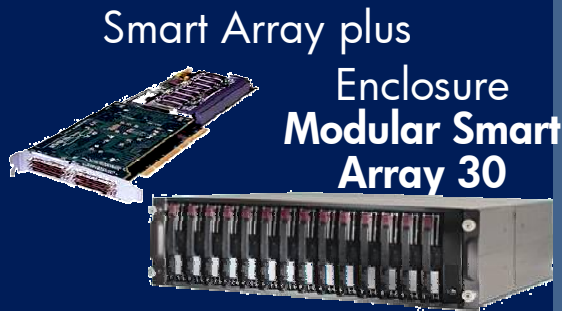
MSA1500
with MSA20
SATA
enclosures



MSA1500 with MSA30
SCSI enclosures

Modular Smart Array

Seamless Data/Drive Migration



Smart Array PCI RAID



Integrated Smart Array 5i



four easy steps to a SAN:

1. set up new SAN array.
2. move existing drives.
3. turn on servers and array.
4. create LUN security and GO!



- Universal disks migrate from DAS to cluster storage or SAN
- Smart Array generational consistency to migrate data
- ACU Ensures that
 - Data is preserved
 - No restore required
 - RAID level is maintained
 - Storage admin training re-used

Modular Smart Array 500
Remote & Distributed Environments



Conversion to the SAN



Modular Smart Array 1000
Departmental/Data Center

HP StorageWorks EVA3000

Enterprise functionality to the mid-range



The new mid-range HP StorageWorks virtualized RAID array providing significant business savings in time, space and cost enabled by VersaStor technology

Highlights

- **Segment:** Mid-range
- **Architecture:** Virtual
- End-to-end 2Gb/s FC architecture
- Up to 141k IOPs w/one controller-pair
- Up to 340MB/s per controller-pair
- Great for moderate storage growth environments
- Scalable up to 8TB per controller pair
- Simplification through virtualization—lower management costs
- Store more in what you paid for—buy less
- Optional: business-data protection, business continuance and storage management software



HP StorageWorks EVA5000

The new enterprise storage benchmark



The new generation HP StorageWorks virtualized RAID array providing significant business savings in time, space and cost enabled by VersaStor technology

Highlights

- **Segment:** Enterprise-class
- **Architecture:** Virtual
- End-to-end 2Gb/s FC architecture
- Up to 141k IOPs w/one controller-pair
- Up to 525MB/s w/one controller-pair
- Scalable up to 24TB/cabinet
- Simplification through virtualization—lower management costs
- Store more in what you paid for—buy less
- Improved application availability—enhanced customer satisfaction
- Optional: business-data protection, business continuance and storage management software



HP StorageWorks XP disk array family

Delivering on the promise of maximum uptime



Unprecedented performance and capacity for the enterprise

Highlights



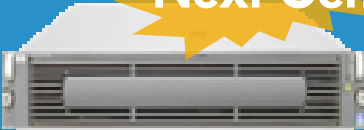





- **Segment:** Enterprise-class
- **Architecture:** Traditional
- Crossbar architecture
- 1.900.000 IOPs w/four controller-pairs
- 8000MB/s w/four controller-pairs
- Up to 168TB/array system internal storage, up to 16PB external Capacity
- Broad connectivity including mainframe
- HP-specific firmware that allows the HP-developed software and solutions to work their best
- HP-developed software includes business-data protection, business continuance and storage management software



HP ProLiant Storage Servers

NAS Product Portfolio



	Remote Office	Departmental	Enterprise	
	Standalone NAS		Gateways for NAS/SAN fusion	
Rack Line	<p>NAS 1500s</p> <p>DL100 Storage Server</p> 	<p>NAS 2000s</p> <p>Next Gen</p> <p>DL380 Storage Server (Standalone)</p> 	<p>Next Gen</p> <p>DL380 Storage Server (SAN)</p>  <p>NAS 4000s</p>	<p>DL580 Storage Server</p>  <p>NAS 9000s</p>
Tower Line	<p>New</p> <p>ML110 Storage Server</p>  <p>NAS 500s</p>	<p>New</p> <p>ML350 Storage Server</p>  <p>ML370 Storage Server</p> 		
	Fixed configuration, SATA storage	Scalable, SCSI/SATA storage	Entry-level NAS/SAN fusion	Flagship NAS/SAN fusion

Appliance

Scalability, HA

Network Attached Storage (NAS)

The fusion of NAS and SAN



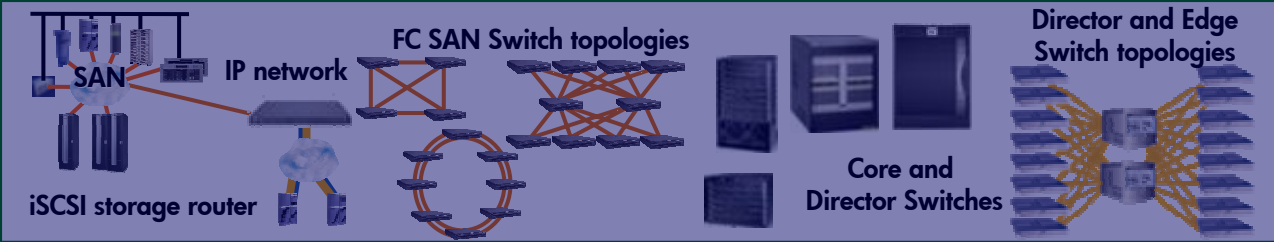
- Combines the **best of both** technologies
- **Enhances NAS** with SAN scalability and management
- **Enhances SAN** with file-level access and virtualization
- Converges storage islands
- Reduces overall complexity
- Drives down cost
- Optimized for different storage environments



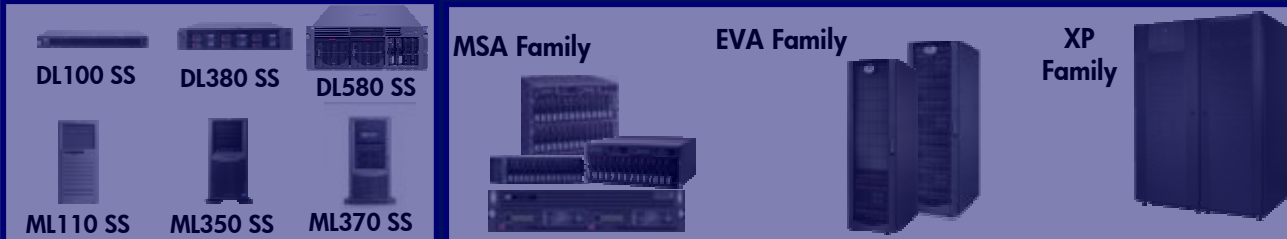
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Tape & Optical storage



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SERVICES & SOLUTIONS

HP storage software portfolio

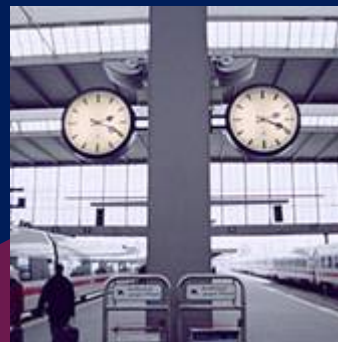


Virtualization

Data management

Availability management

Integrated storage resource management



HP StorageWorks
Command View

HP OpenView storage
area manager

HP OpenView Continuous Access
Storage Appliance (CASA)

HP StorageWorks virtual replicator

HP StorageWorks family of local
and remote replication software

HP StorageWorks secure path and
auto path

HP OpenView storage
data protector

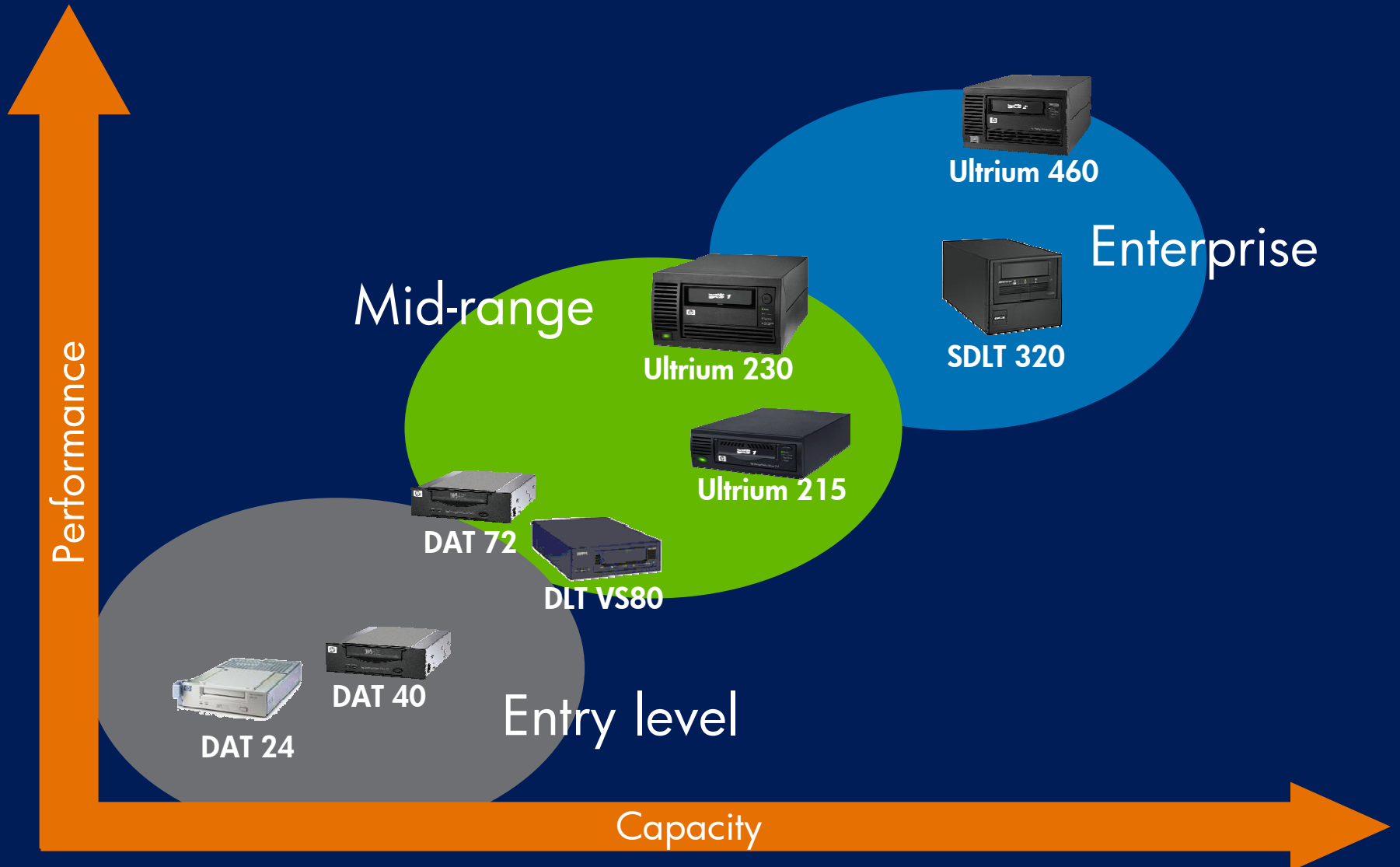
HP OpenView storage
media operations

ILM and RISS

HP CASA

HP StorageWorks
virtual replicator

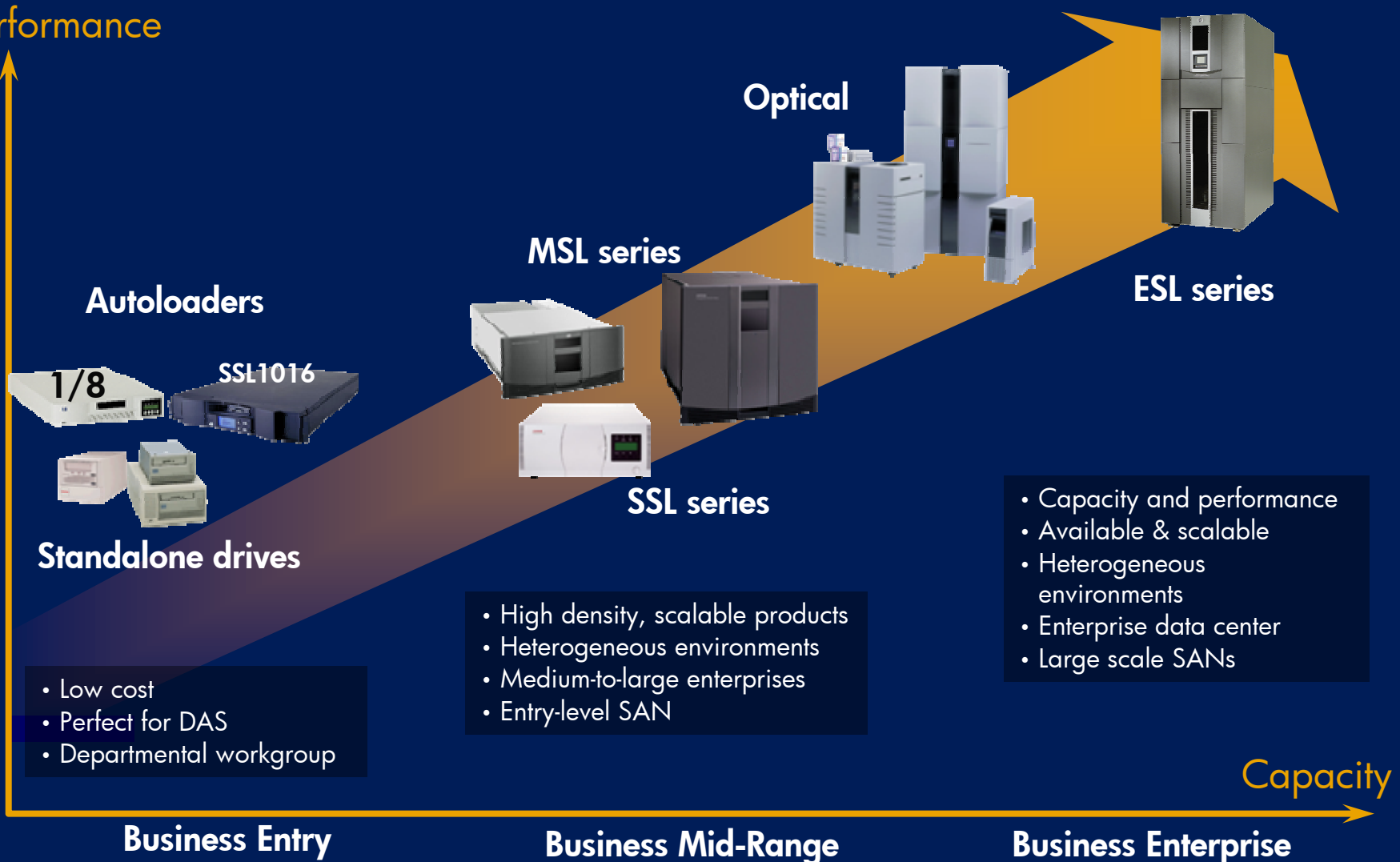
HP StorageWorks tape drive family



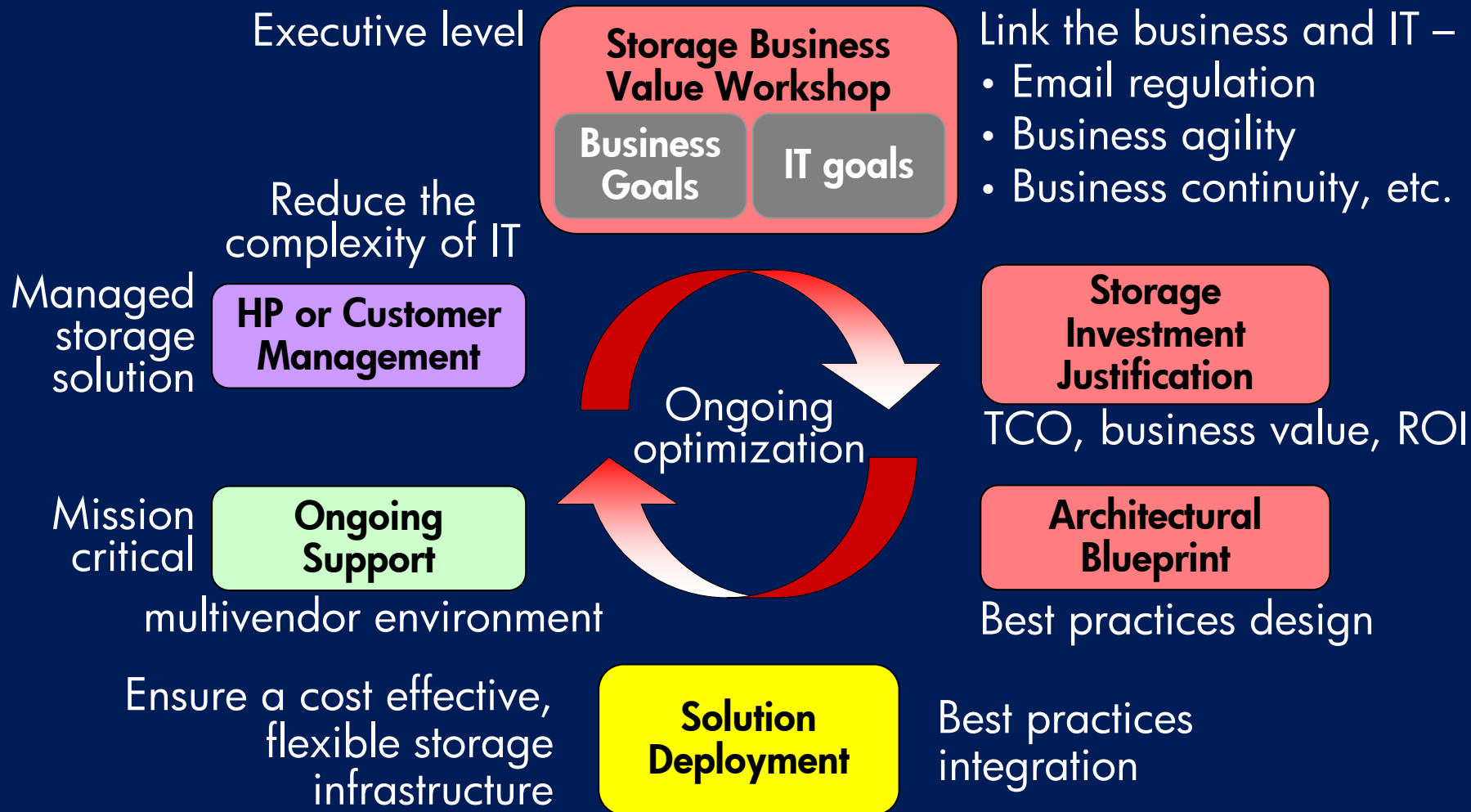
Tape & Optical storage



Performance



Services engagement model



What customers tell us they value most about our services



- Knowledge of environment
- Experienced professionals
- Proactive 24x7 support
- Fast response time
- Sensitivity to business needs and pressures
- Problem avoidance
- High availability priority
- Customizable features
- Single point of contact
- Integrated support for storage, servers, networks

**Maximum uptime
with minimal risk**





Storage leadership

The business value of network storage



- Consolidate storage and servers—**lower your TCO**
- Increase system and application availability—**improve customer satisfaction**
- Increase utilization rates—**reduce purchasing costs**
- Enhance ability to efficiently exploit the full value of your company's information assets—**increase competitiveness**
- Provide more-flexible infrastructure to adjust to business demands—**increase competitiveness**



HP StorageWorks ranks first in network storage



#1 in Worldwide Disk Storage Systems

#1 in External Storage Systems

#1 in External RAID

#1 in Storage Area Networks

#1 in Tape drives and Automation

#1 in Virtualization Technology



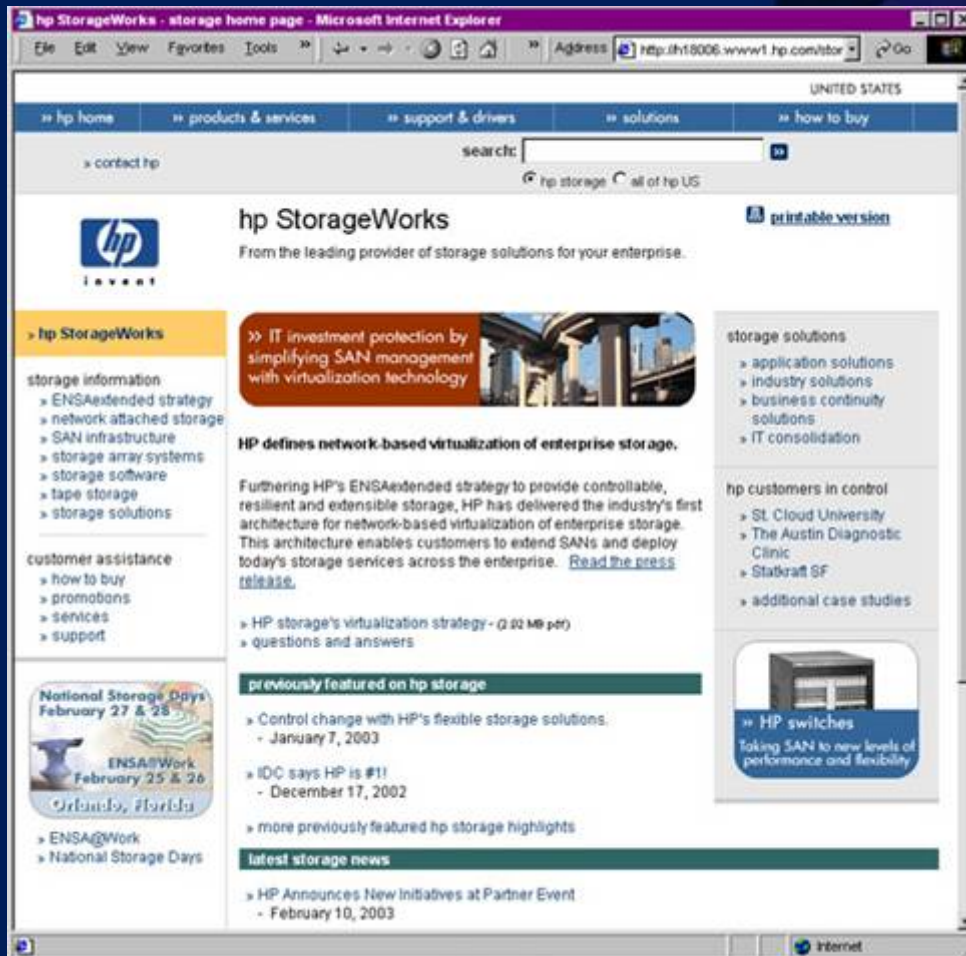
“HP StorageWorks products continue to revolutionize our storage environment with an easy-to-use, modular, scalable architecture and a high-performance, high-availability design. HP’s Enterprise Network Storage Architecture (ENSA) defines an evolutionary path that solves our business issues.”

Dave Walsh
Information Technology Group
Microsoft Corporation

For further information



Visit . . . <http://www.hp.com/go/storage>



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