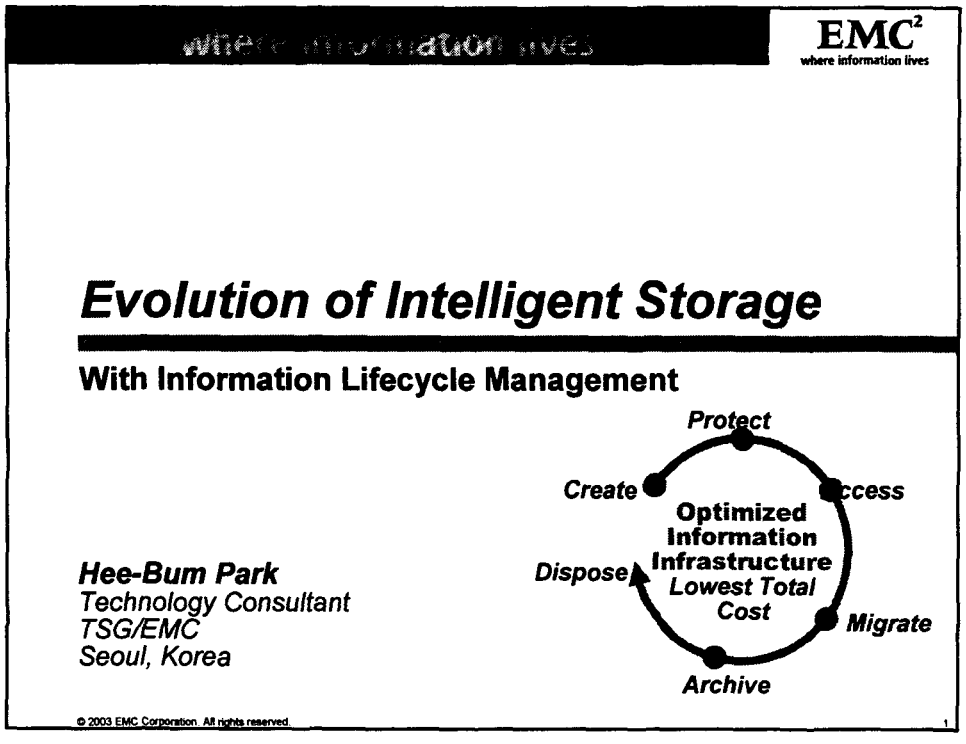
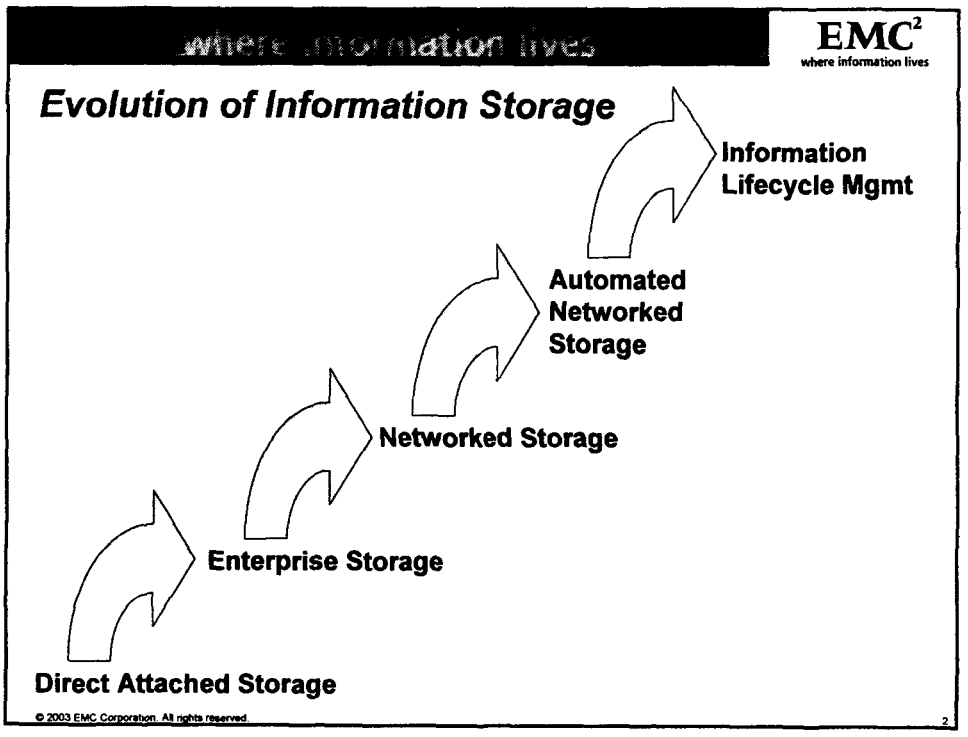
EMC Information Lifecycle Management





where information lives

EMC² where information lives

The Real Challenge
Too Much Information!

where information lives

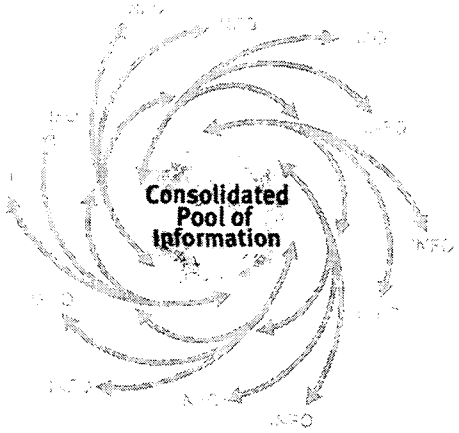
EMC² where information lives

The Value of Information Storage

Delivering the Right Information, At the Right Time, In the Right Hands

Storing Information
REMOVED FROM USE?

Using Information
ALIVE WITHIN AN ORGANIZATION



EMC Information Lifecycle Management

EMC²
where information lives

What Increases the Value of Information?

Having **all** of the information

One version of the information

Knowledge of the information

Access to the information

Security of the information

Protection of the information

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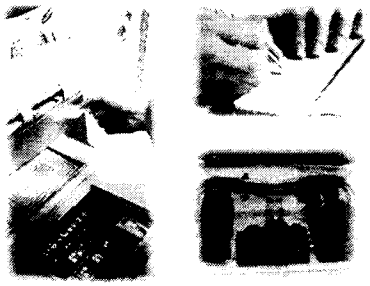
where information lives

How We Use Information Today



Departure City	Arrival City	Flight	Departure	Arrival	Frequency
Atlanta, GA	San Juan	DL 188	07:00am	11:24am	Th
		DL 289	09:20am	12:55pm	Sun
		DL 270	10:10am	02:42pm	Dai
		DL 701	10:15am	02:47pm	Sun
		DL 464	12:20pm	04:29pm	Dai
		DL 2155	08:15am	12:59pm	Dai
Baltimore, MD/Washington, DC	San Juan	AA 1785	07:30am	10:47am	Dai
Boston, MA	San Juan	TW 104	06:45am	11:07am	Dai
		AA 1019	07:15am	12:09pm	Dai
		AA 1571	08:20am	01:21pm	Dai
		AA 401	11:55am	04:50pm	Dai
		TW 92	06:35pm	12:28am	Dai
Charlotte, NC	San Juan	US 1919	06:05am	12:34pm	Sun
		US 1677	11:10am	03:41pm	Dai

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Business depends on Information

- The era of the "Fast Company"
  - Internet
  - E-commerce
  - Strategic value of knowledge
- Information-centric organizations
  - Velocity of change
  - Differentiation based on knowledge
  - Knowledge is everywhere
  - Huge growth in volume of information
- Effective utilization of knowledge
  - Time to market
  - E-commerce presence
  - Market differentiation

where information lives

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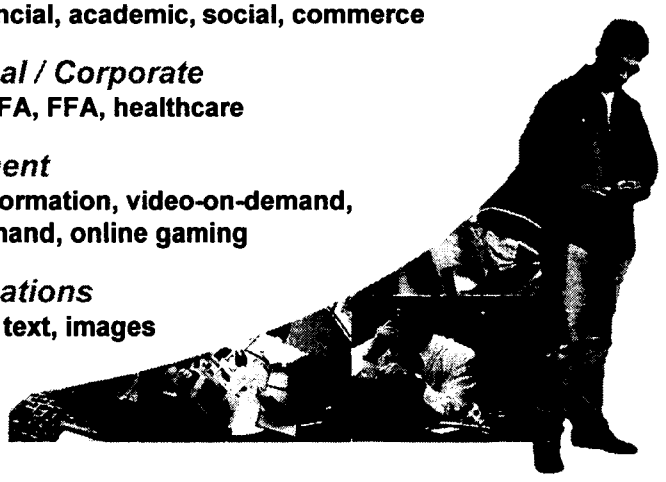
Information at Any Time, Anywhere, on Any Device, Always On

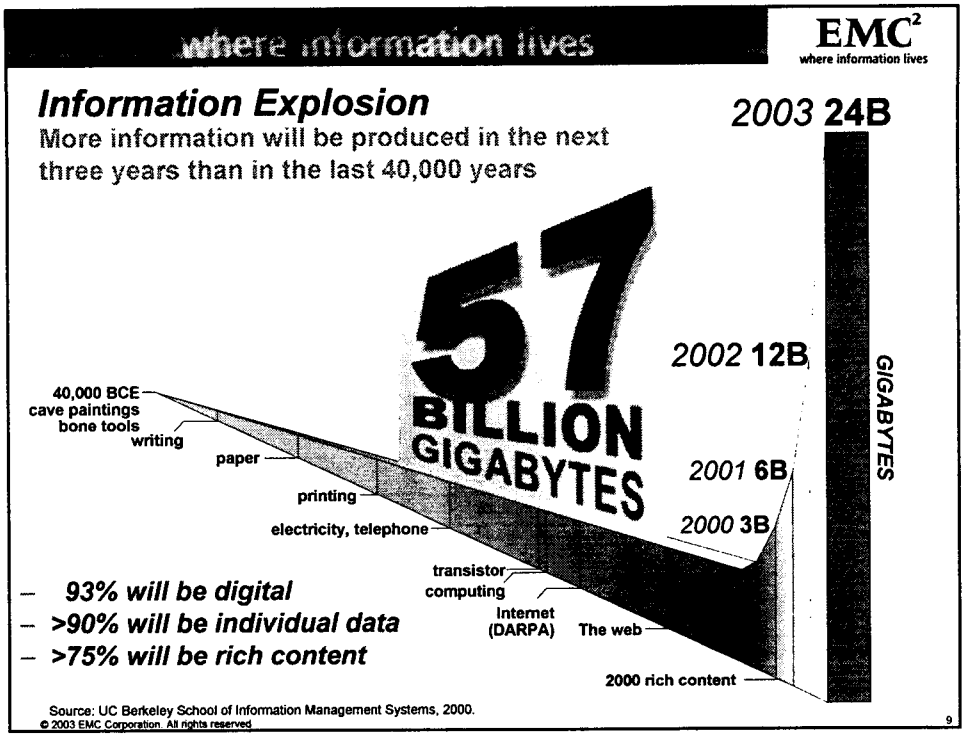
Personal / Individual
Medical, financial, academic, social, commerce

Professional / Corporate
CRM, ERP, SFA, FFA, healthcare

Entertainment
News and information, video-on-demand, audio-on demand, online gaming

Communications
Video, voice, text, images




where information lives
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where information lives
Information Explosion
More information will be produced in the next three years than in the last 40,000 years
2003 24B
2002 12B
2001 6B
2000 3B
GIGABYTES
57 BILLION GIGABYTES
40,000 BCE
cave paintings
bone tools
writing
paper
printing
electricity, telephone
transistor
computing
Internet (DARPA)
The web
2000 rich content
– 93% will be digital
– >90% will be individual data
– >75% will be rich content
Source: UC Berkeley School of Information Management Systems, 2000.
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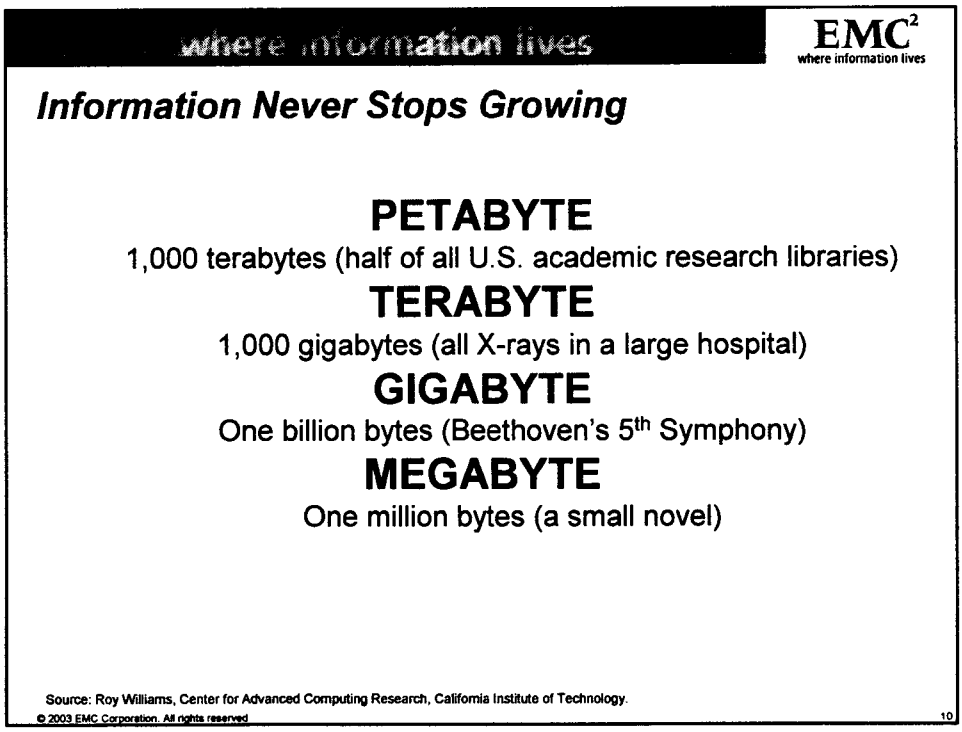
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EMC²
where information lives
Information Never Stops Growing
PETABYTE
1,000 terabytes (half of all U.S. academic research libraries)
TERABYTE
1,000 gigabytes (all X-rays in a large hospital)
GIGABYTE
One billion bytes (Beethoven's 5th Symphony)
MEGABYTE
One million bytes (a small novel)
Source: Roy Williams, Center for Advanced Computing Research, California Institute of Technology.
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EMC Information Lifecycle Management

where information lives

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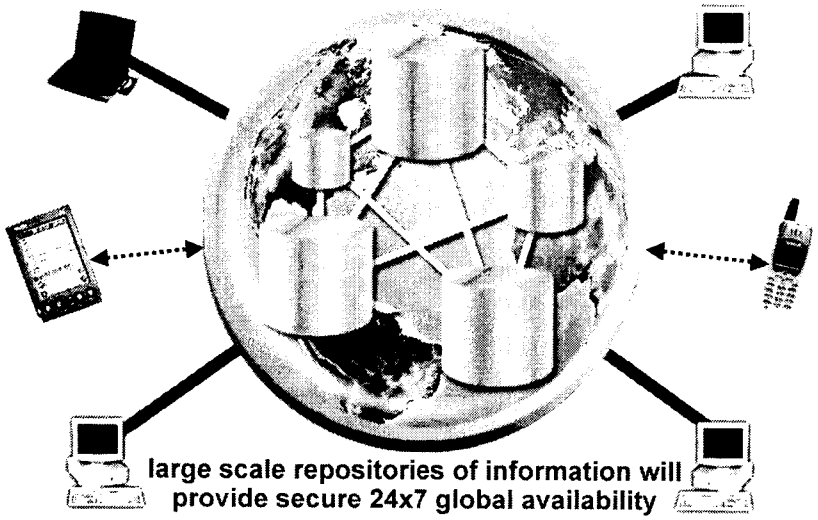
Ubiquitous Access to Information



large scale repositories of information will provide secure 24x7 global availability

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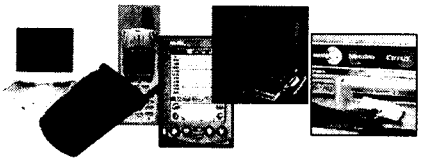
IT Infrastructure

IP Network

Access Devices

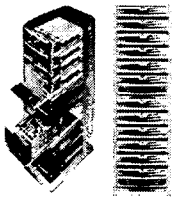


Servers

Database

Applications

Enterprise Resource Planning
Customer Relationship Management
Supply Chain Management
Etc.



Storage

Information

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where information lives

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The Evolving Computing Landscape

IT Infrastructure

Compute	**Client interface** **Access capability** **Application processing** **Database management** **Information management** **Data storage**

13

where information lives

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The Evolving Computing Landscape

IT Infrastructure

Personal Devices

Compute	**Client interface** **Access capability** **Application processing** **Database management** **Information management** **Data storage**

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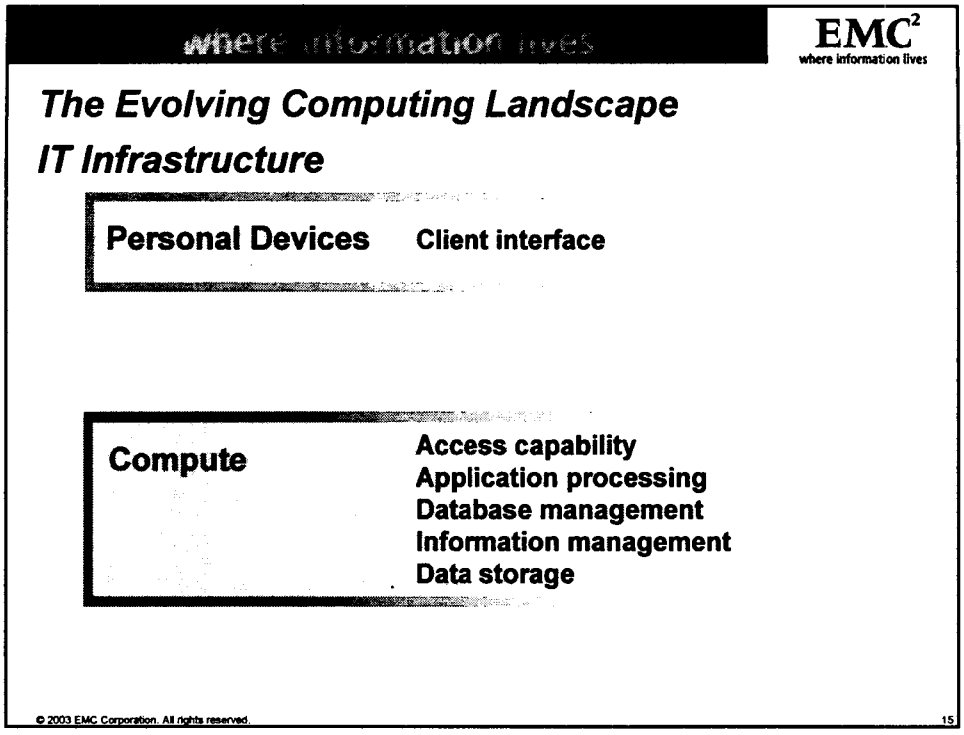
where information lives
EMC²
where information lives
The Evolving Computing Landscape
IT Infrastructure
Personal Devices
Client interface
Compute
Access capability
Application processing
Database management
Information management
Data storage
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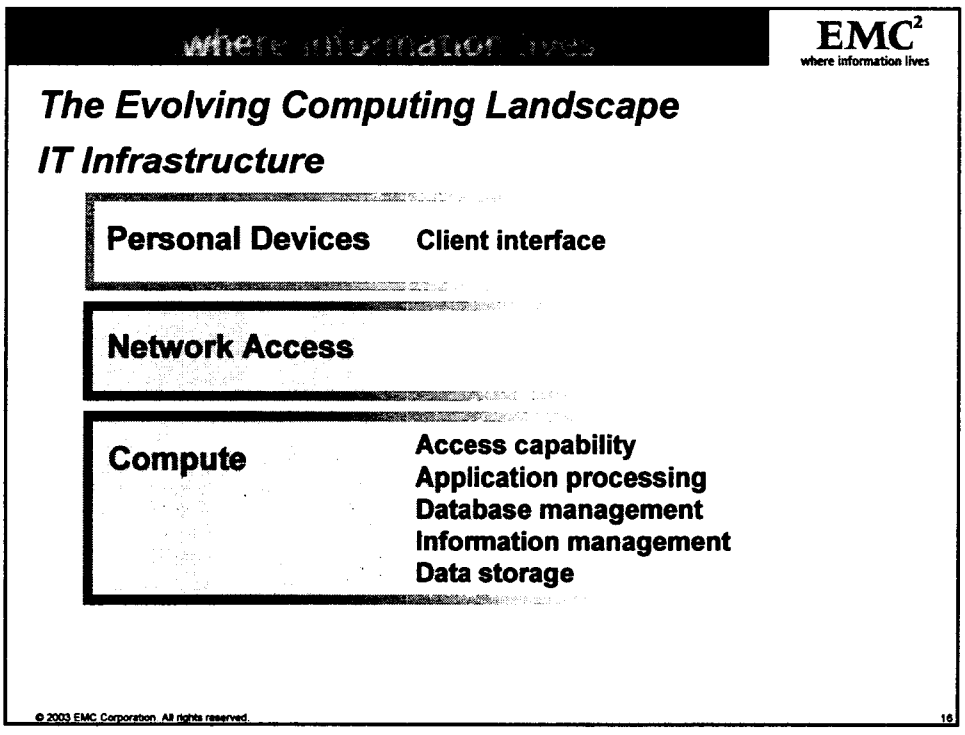
where information lives
EMC²
where information lives
The Evolving Computing Landscape
IT Infrastructure
Personal Devices
Client interface
Network Access
Compute
Access capability
Application processing
Database management
Information management
Data storage
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The Evolving Computing Landscape

IT Infrastructure

Personal Devices	**Client interface**
Network Access	**Access capability**
Compute	**Application processing** **Database management** **Information management** **Data storage**

where information lives

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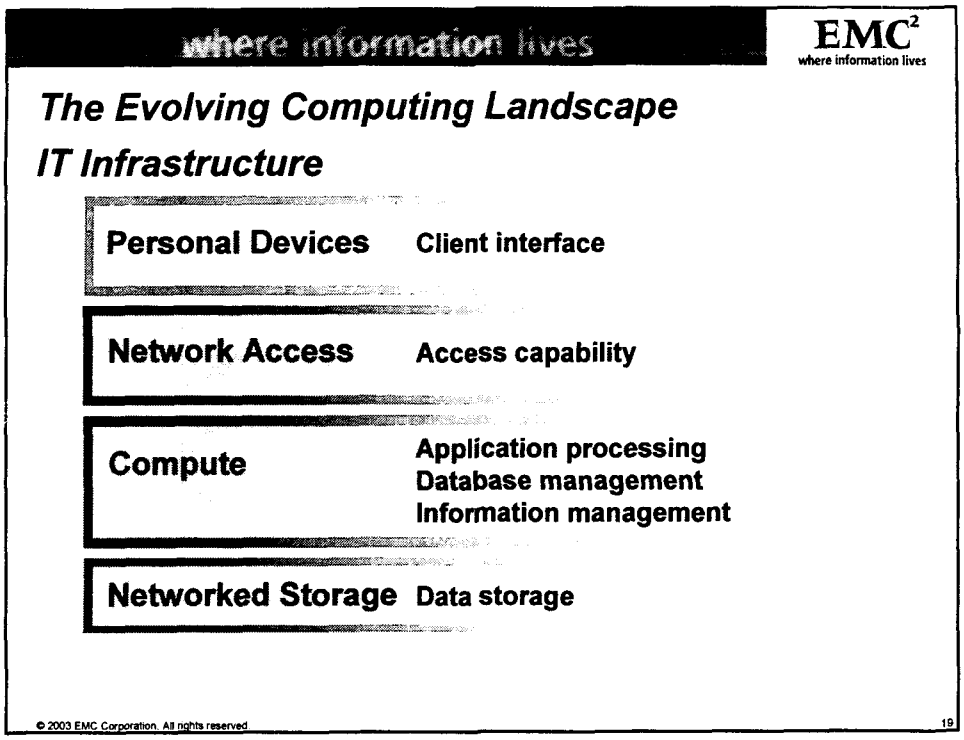
The Evolving Computing Landscape

IT Infrastructure

Personal Devices	**Client interface**
Network Access	**Access capability**
Compute	**Application processing** **Database management** **Information management** **Data storage**
Networked Storage	


where information lives
EMC²
where information lives
The Evolving Computing Landscape
IT Infrastructure
Personal Devices
Client interface
Network Access
Access capability
Compute
Application processing
Database management
Information management
Networked Storage
Data storage
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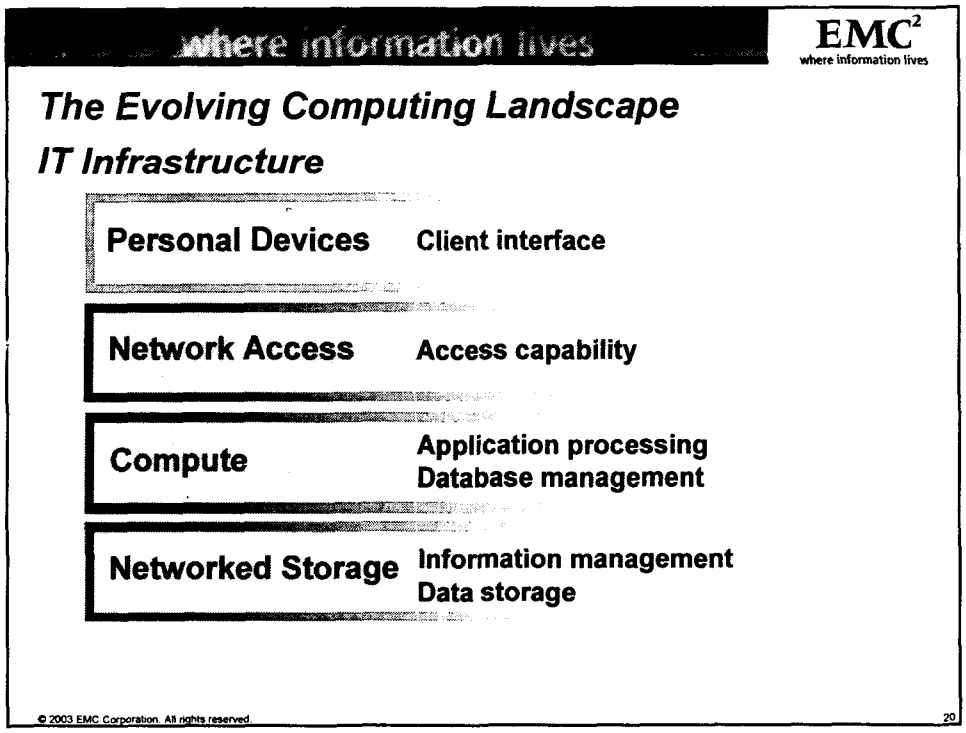
where information lives
EMC²
where information lives
The Evolving Computing Landscape
IT Infrastructure
Personal Devices
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Access capability
Compute
Application processing
Database management
Networked Storage
Information management
Data storage
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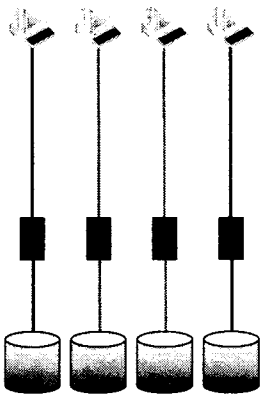
1980s



Servers
Applications
File System
Communications

Storage
Information protection

Total control of network and storage

where information lives

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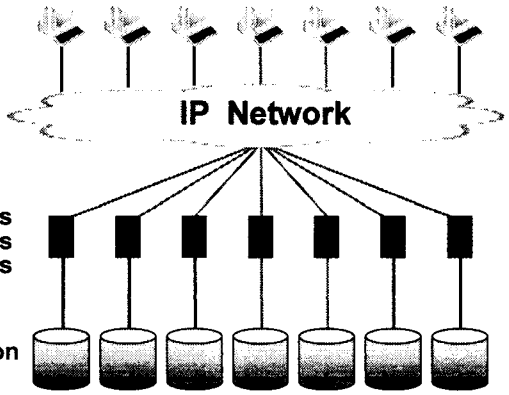
1990s: Direct Attached Storage



Servers
Applications
Databases

Information

Why this costs more:

- Only half of capacity is utilized
- Requires more people to manage
- Backup / restore takes too long
- Information silos interrupt flow of business applications

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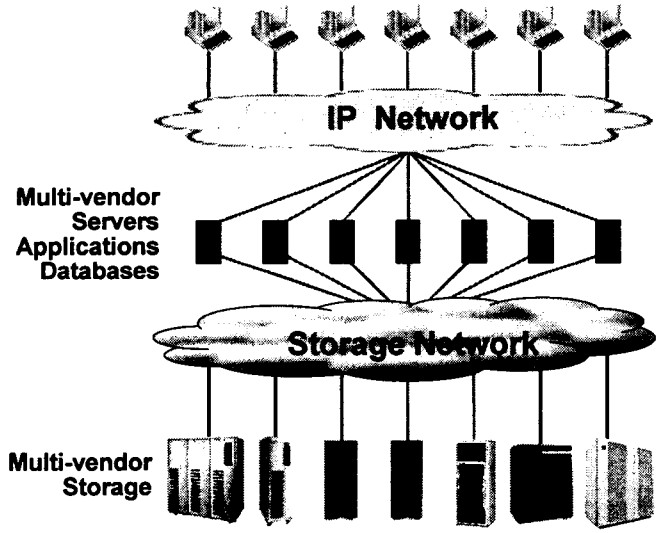
Better Way: Networked Storage



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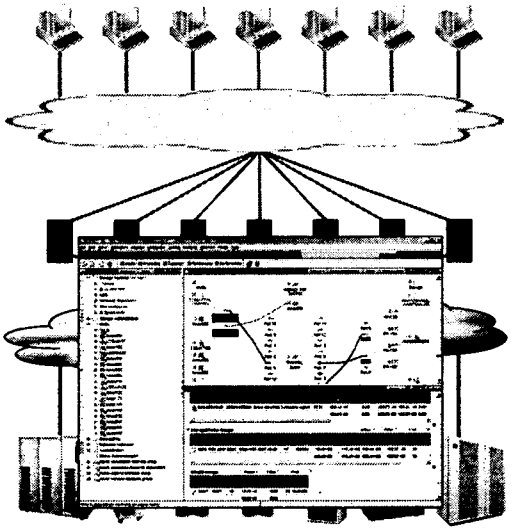
Even Better Way: Automated Networked Storage



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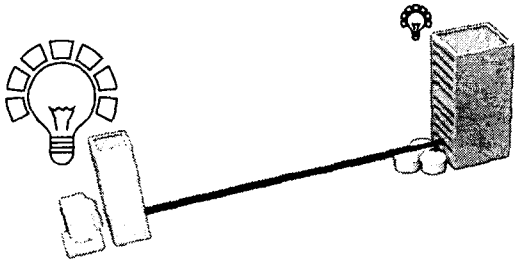
1980s: Direct-Attached Storage



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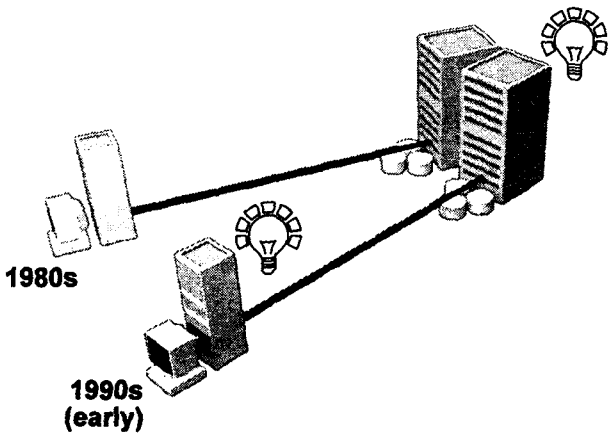
Early 1990s: Intelligent Storage



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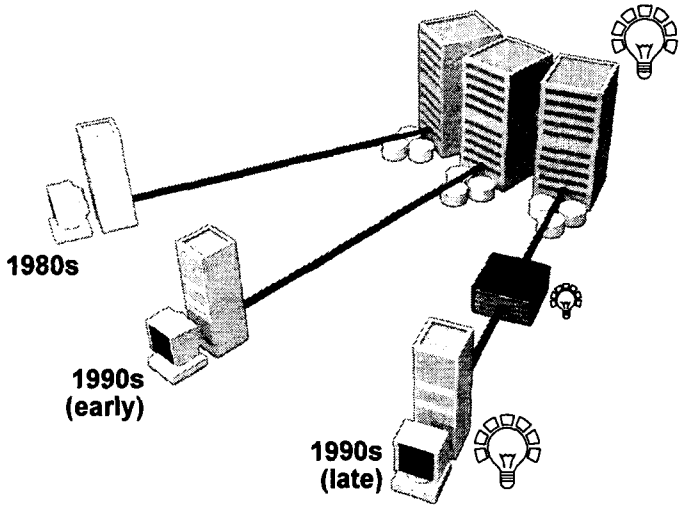
Late 1990s: Networked Storage



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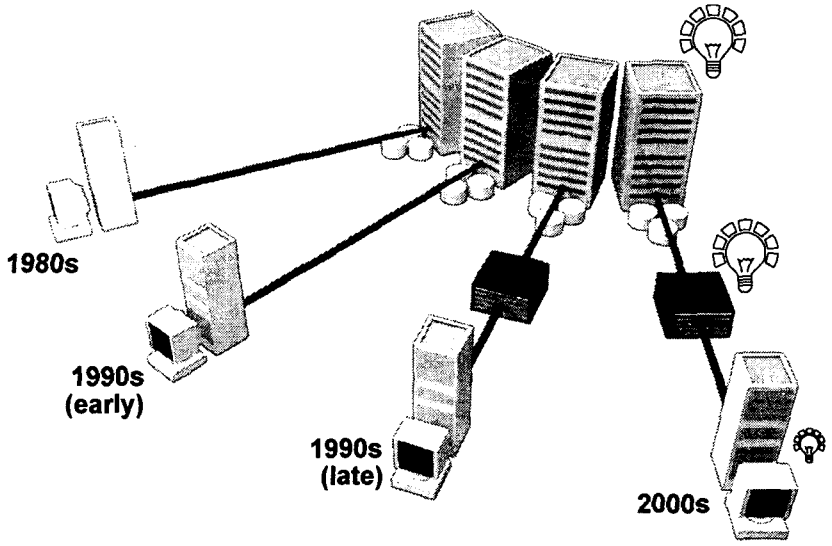
2000s: Automated Networked Storage



EMC Information Lifecycle Management

where information lives

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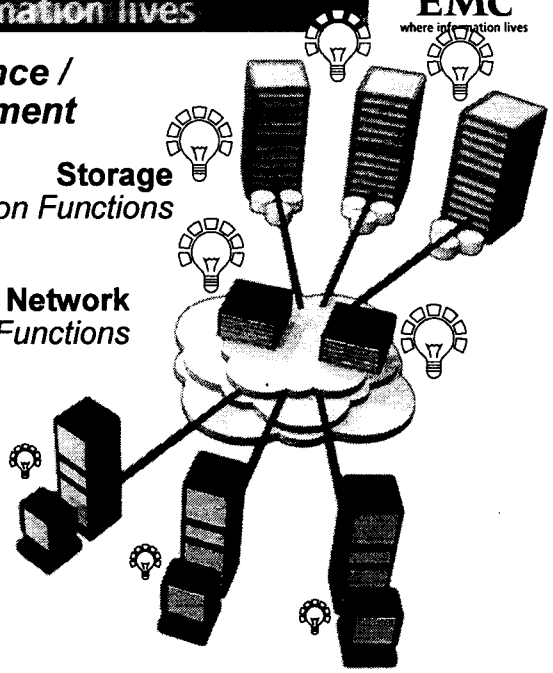
Distributed Intelligence / Centralized Management

Storage
Data Preservation Functions

Network
Data Delivery Functions

Server
Application Functions



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Network-Storage Convergence

30

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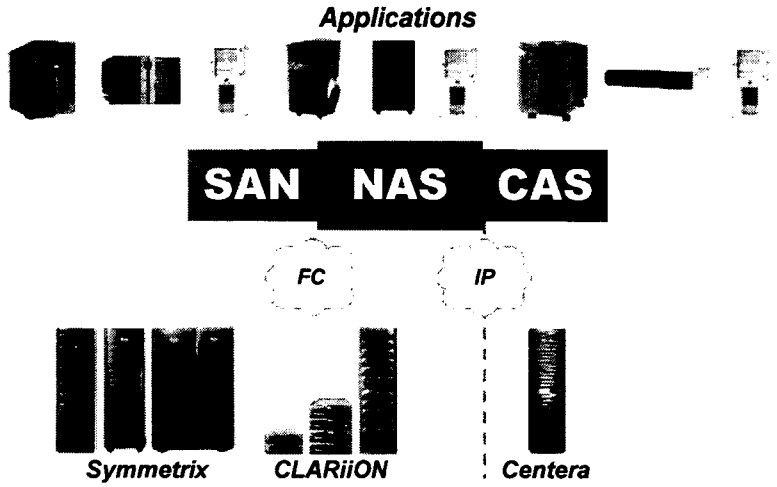
Using Automated Network Storage to Create Tiered Service Levels



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Networked Storage Technologies

	SAN *Storage Area Networks*	**NAS** *Network-Attached Storage*	**CAS** *Content Addressed Storage*
Type of Transport	Fibre Channel IP (emerging)	IP, Fibre Channel	IP
Type of Data	Block (database)	File systems	Object, fixed content
Key Requirement	Deterministic performance	Multi-protocol Sharing (NFS/CIFS)	Longevity, integrity assurance
Typical Applications	OLTP, data warehousing, ERP	Software and product development, file server consolidation	Content management

where information lives

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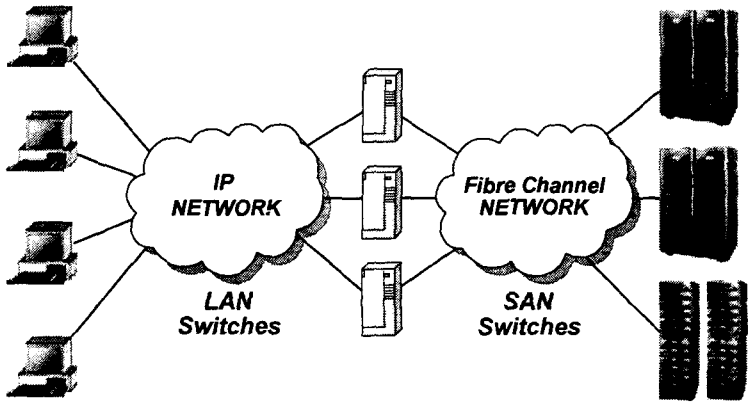
What is a Storage Area Network (SAN)?

...A dedicated network carrying storage traffic



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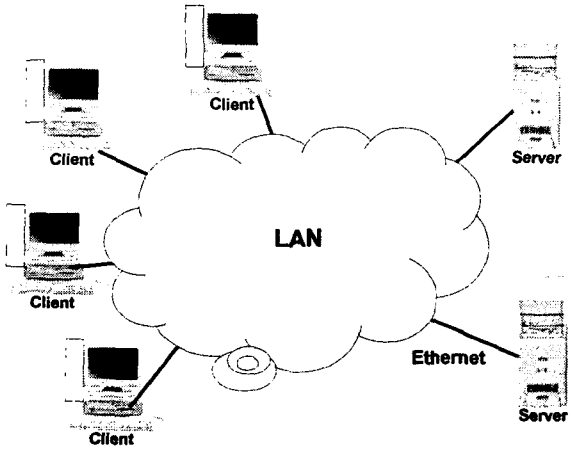
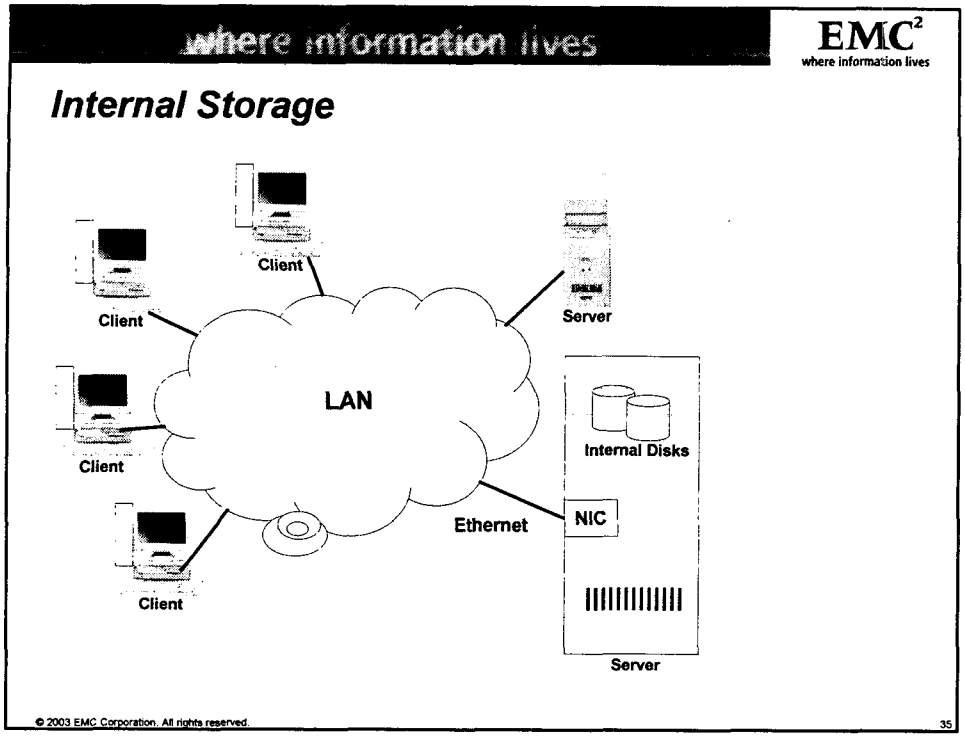
The Client Server Model




where information lives
EMC²
where information lives
Internal Storage
Client
Client
Client
Client
Client
LAN
Ethernet
Server
Internal Disks
NIC
Server
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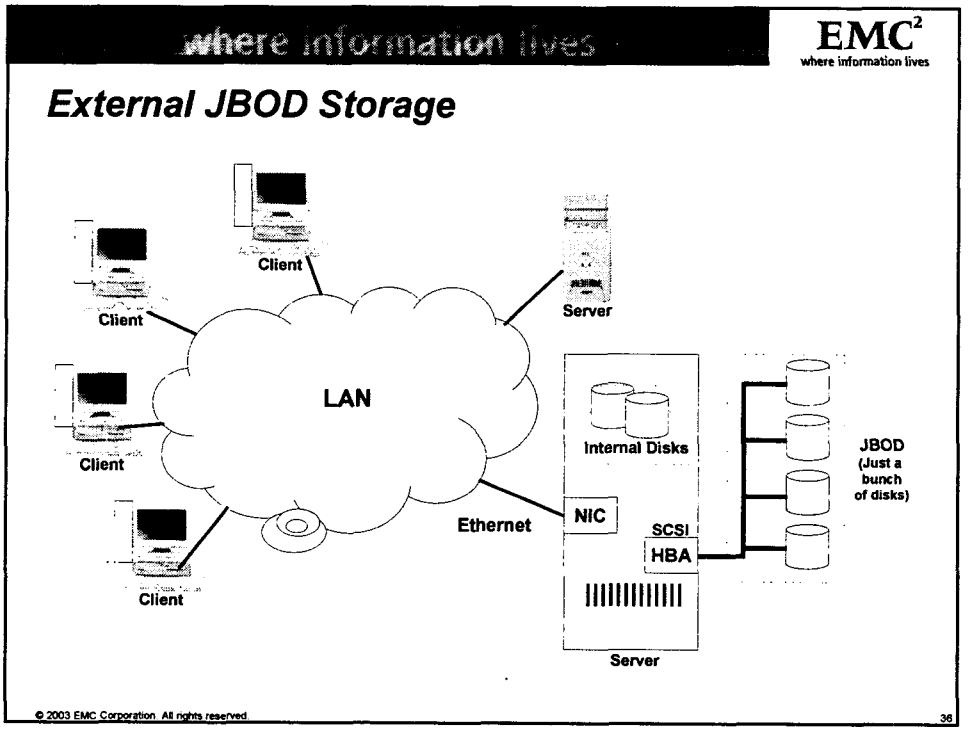
where information lives
EMC²
where information lives
External JBOD Storage
Client
Client
Client
Client
Client
LAN
Ethernet
Server
Internal Disks
NIC
SCSI
HBA
Server
JBOD
(Just a
bunch
of disks)
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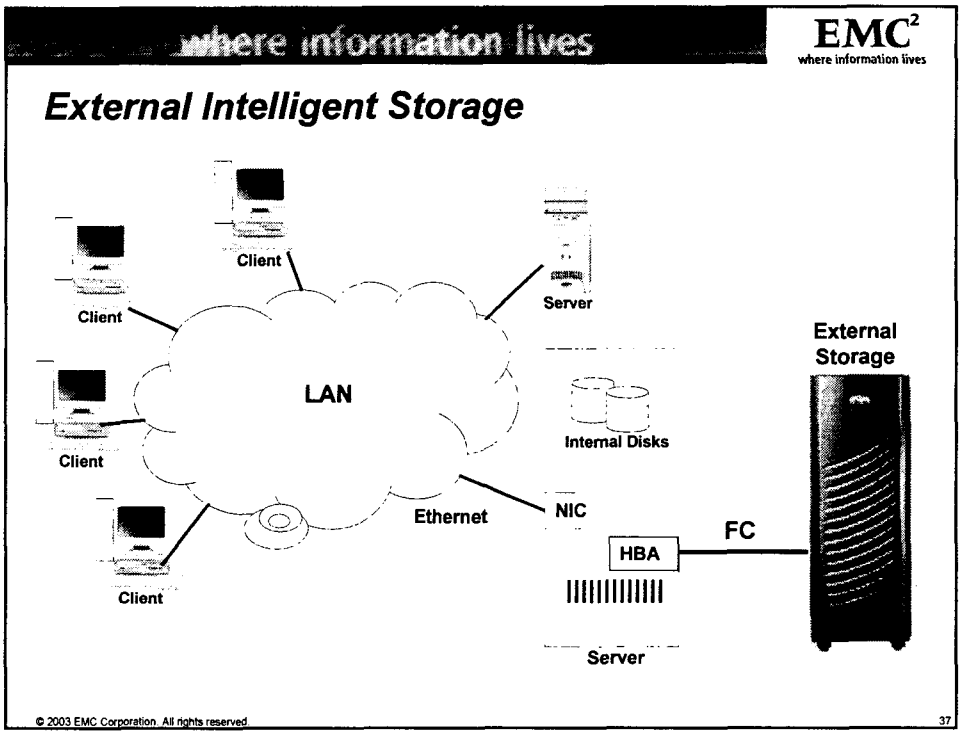
where information lives
EMC²
where information lives
External Intelligent Storage
Client
Client
Client
Client
LAN
Server
Internal Disks
External
Storage
Ethernet
NIC
HBA
FC
Server
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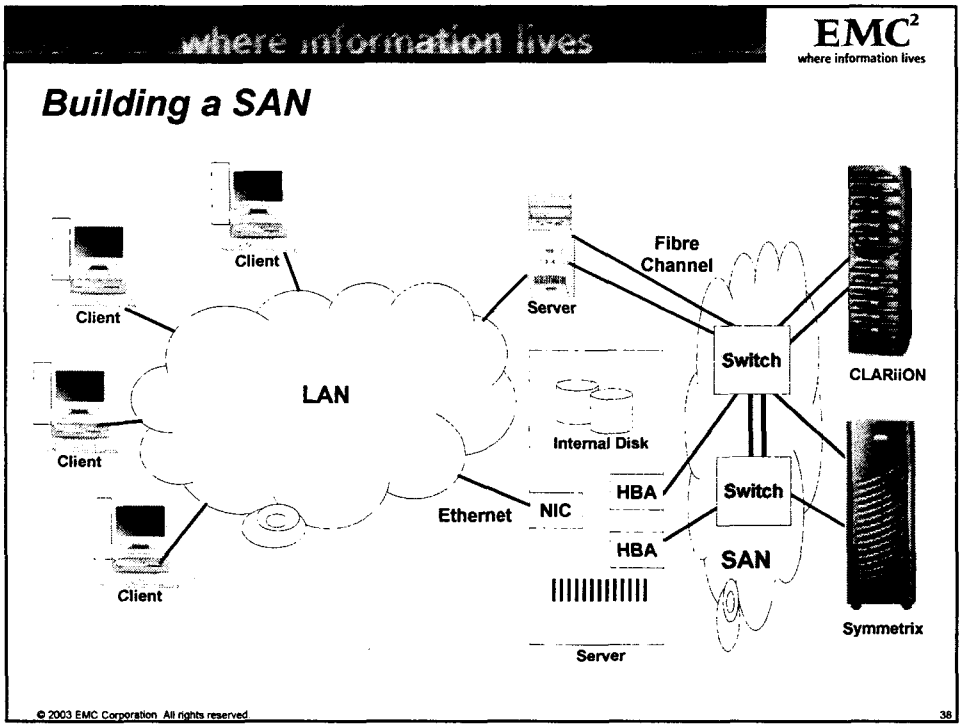
where information lives
EMC²
where information lives
Building a SAN
Client
Client
Client
Client
LAN
Server
Fibre
Channel
Switch
CLARiiON
Internal Disk
HBA
Switch
Ethernet
NIC
HBA
SAN
Symmetrix
Server
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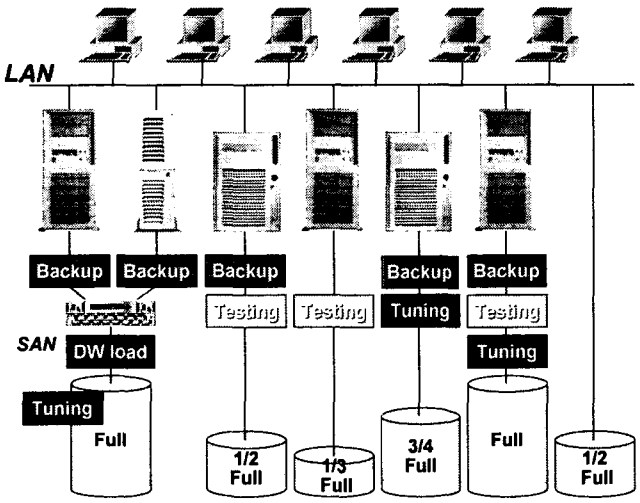
Need for Consolidation



Challenges:

- Backups
- People costs
- Adding capacity unnecessarily
- Hard to manage
- Constant storage replacement
- Single use storage
- Short useful life
- Downtime
- Data replication
- Recovery
- Data mobility

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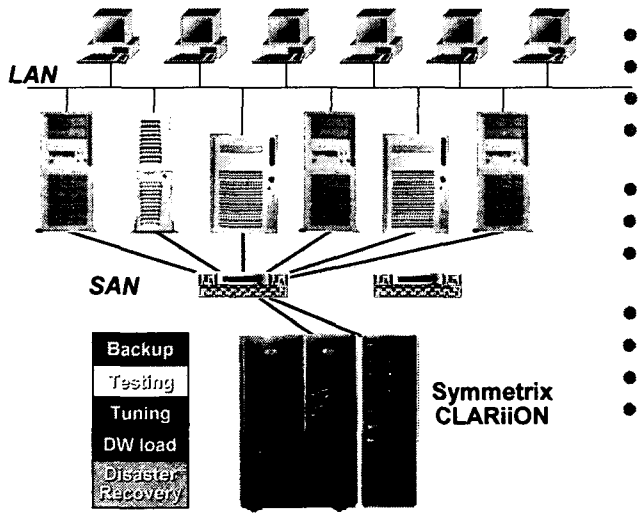
After Consolidation



Benefits:

- Higher availability
- On-the-fly upgrades
- Add / remove servers
- Improved resource utilization
- Centrally managed
- Information mobility
- Leverage software functionality
- Server failover
- Cluster support
- Local / remote copies
- Disaster recovery

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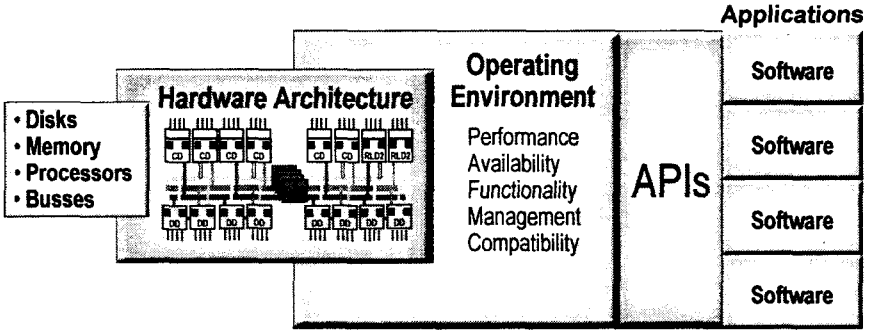
Integrated Hardware and Software Architecture



- Highly intelligent
- Supercomputer power / performance
- Highest availability through full redundancy and fault tolerance
- Applications can leverage storage OS services via APIs

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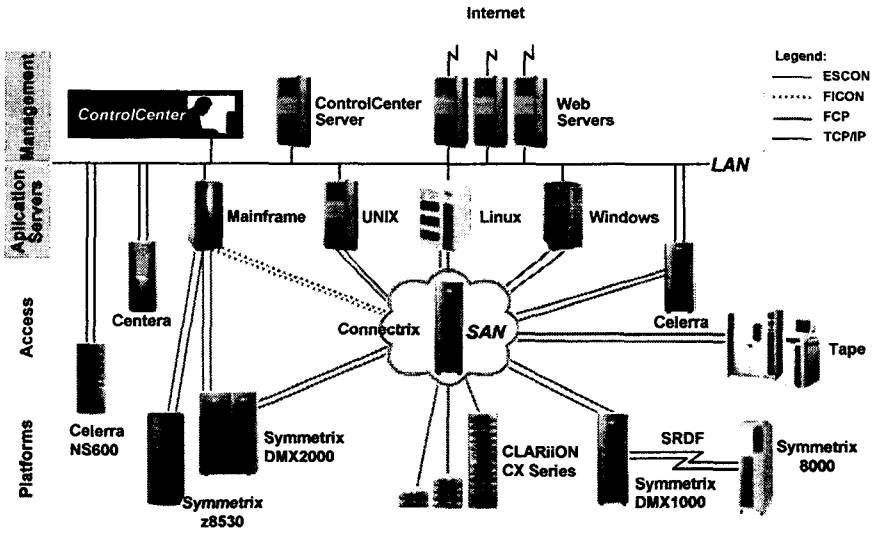
Automated Networked Storage Topology



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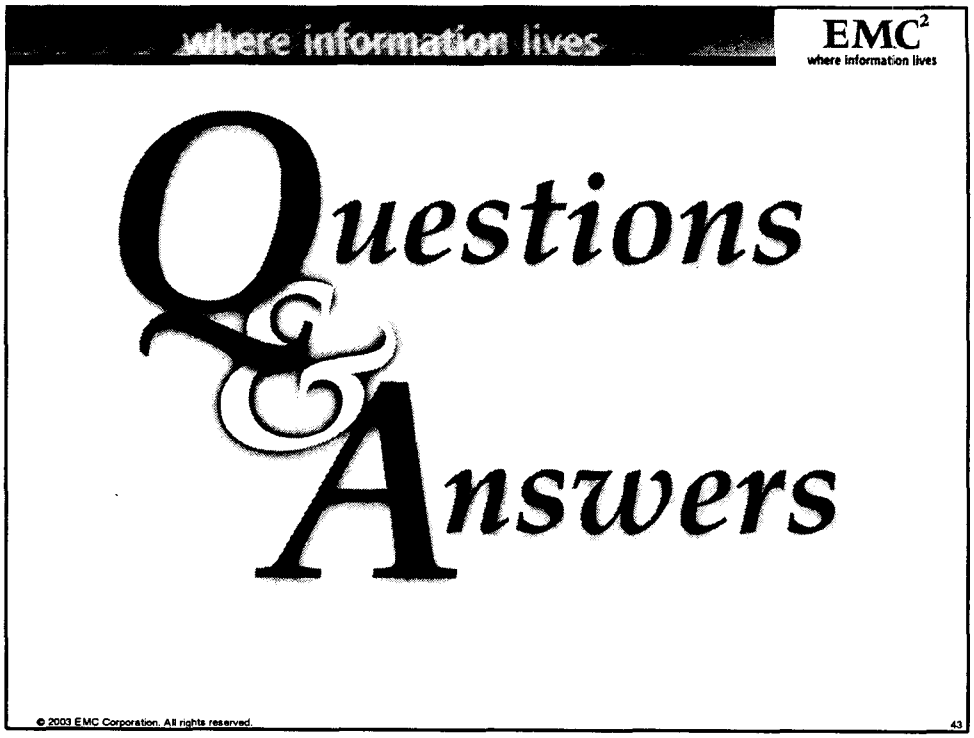
where information lives
EMC²
where information lives
Questions
&
Answers
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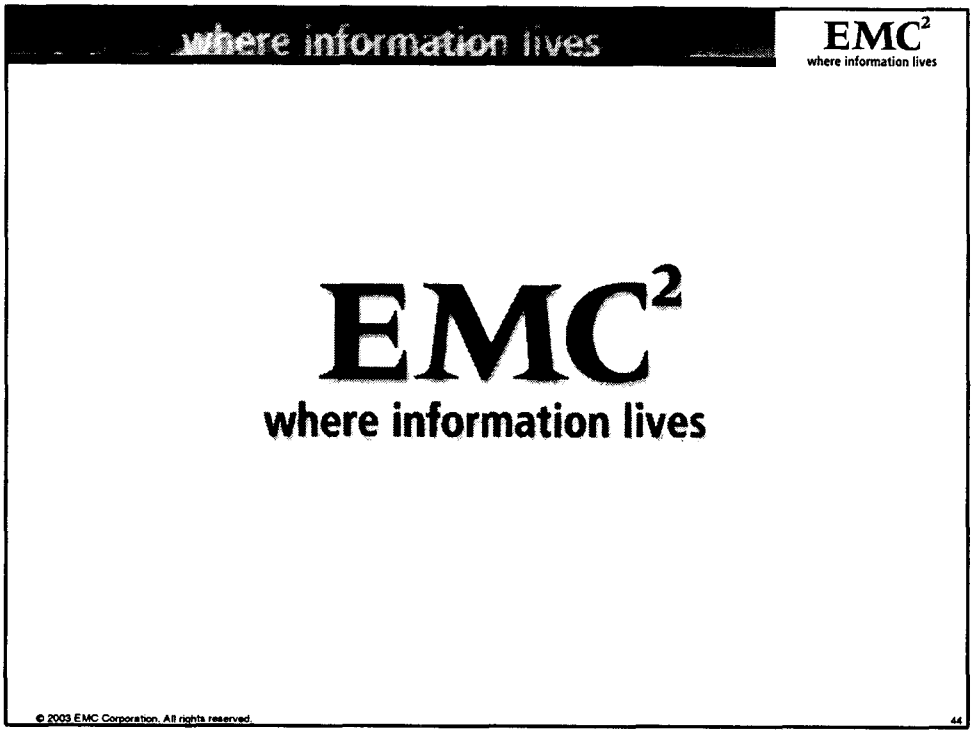
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EMC²
where information lives
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where information lives
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