



Session T06

IBM® Storage Strategy

Chris Saul

IBM @server xSeries
Technical Conference

Aug. 9 - 13, 2004

Chicago, IL

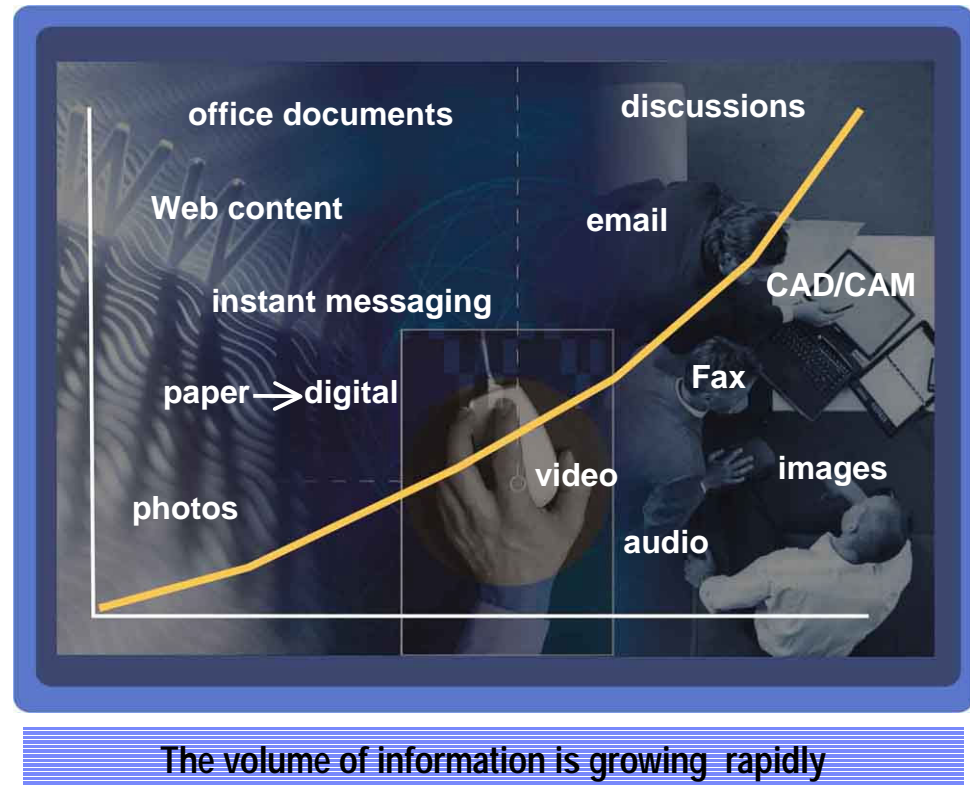
Information is the lifeblood of an *on demand* business

- *Information is an increasingly valuable – and costly – organizational asset.*
- *Organizations are seeking to minimize risk, reduce costs, and increase flexibility by aligning IT investments according to information value.*



The need to protect and manage information continues to grow – with the volume of information

- **Business/operational issues**
 - ▶ Business accountability depends on it
 - ▶ Laws and regulations mandate it
 - ▶ Shareholders and citizens demand it
 - ▶ Effective business processes reflect it
- **Surge in criticality, value and volume of digital information is overwhelming**
 - ▶ Projected to grow at an annual rate of 64% percent*
 - ▶ Outpacing IT's ability to collect, store and manage it by traditional means



- *ESG Impact Report™*
- *Compliance: The effect on Information management and the storage industry*
May 2003

Today's Realities

Per capita, Americans produce enough data each year to fill seven pickup trucks full of books

IT security/business continuity is the number 1 priority of IT professionals, and will translate into \$118 billion in worldwide spending in 2007 – John Gantz, IDC

There is no over-the-counter prescription for information management. Practical ILM requires a seasoned multidisciplinary approach – Joe Martins, Data Mobility Group, May 2004

Instant messaging generates five billion messages a day

A high-priced ILM infrastructure obviously does not deliver much value when no one can access information – Jon Oltsik, Enterprise Strategy Group

With information on demand, businesses can respond with flexibility and speed to any customer requirement, market opportunity, or external threat

Getting there involves:

1.

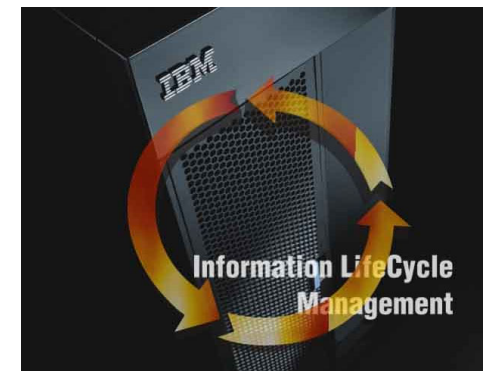
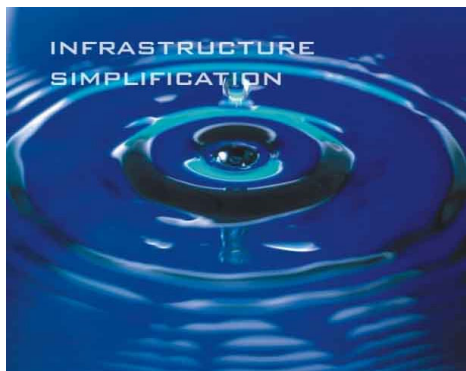
Simplification of the underlying IT infrastructure and its management are required to support the changes in the business and lower cost and complexity

2.

Assuring **business continuity**, security and data durability

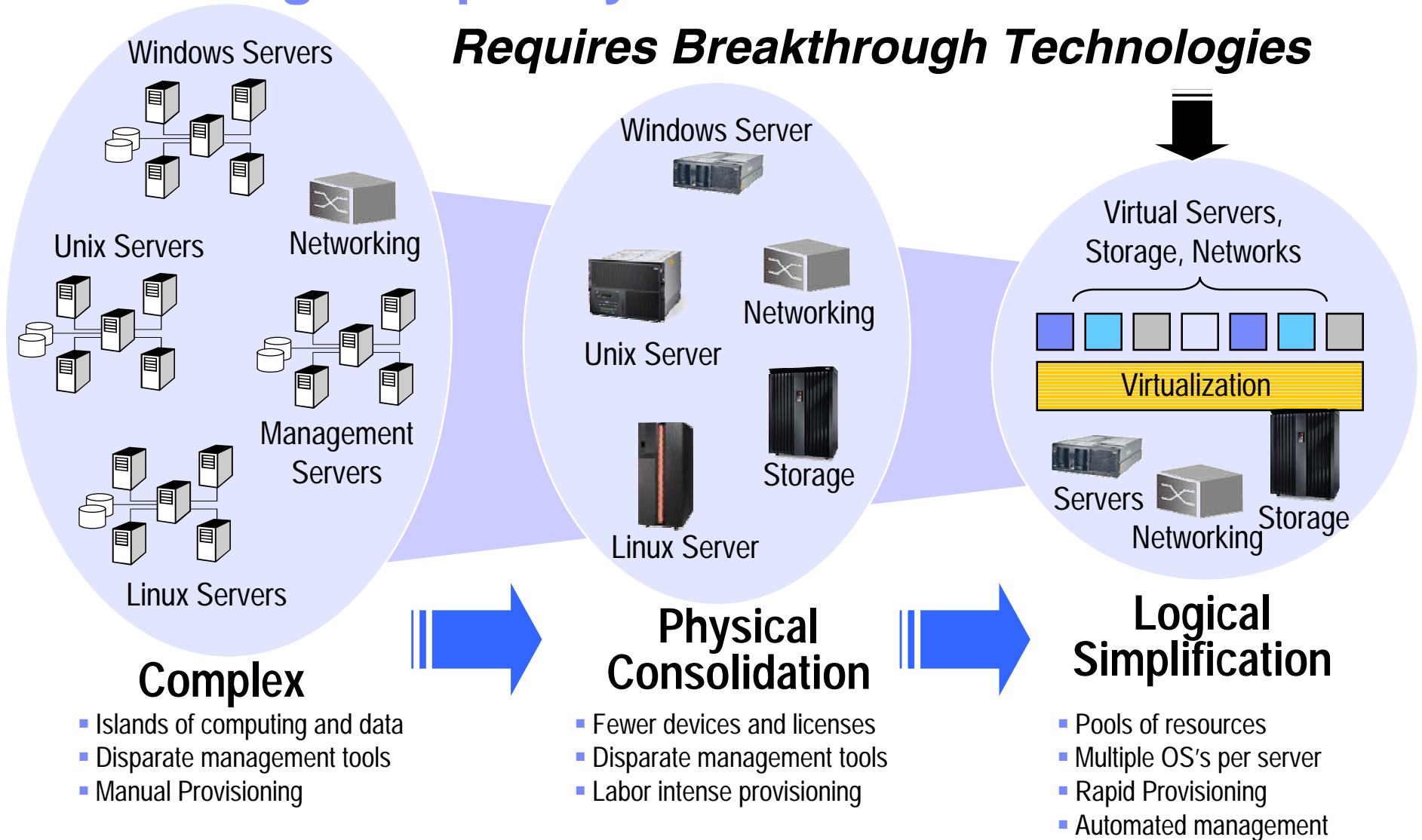
3.

Efficiently managing information **over its lifecycle**

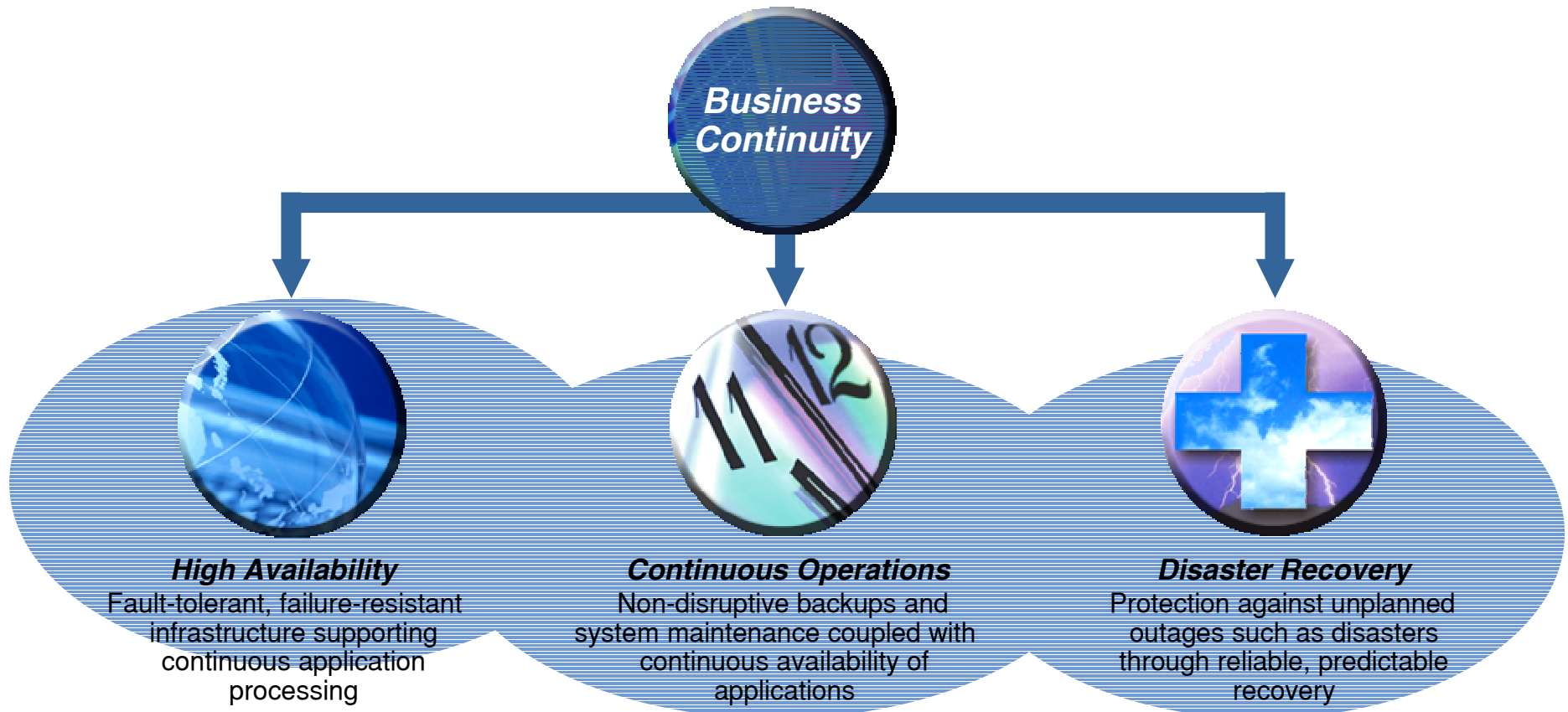


Reducing Complexity

Requires Breakthrough Technologies



Aspects of Business Continuity



Protection of critical Business data

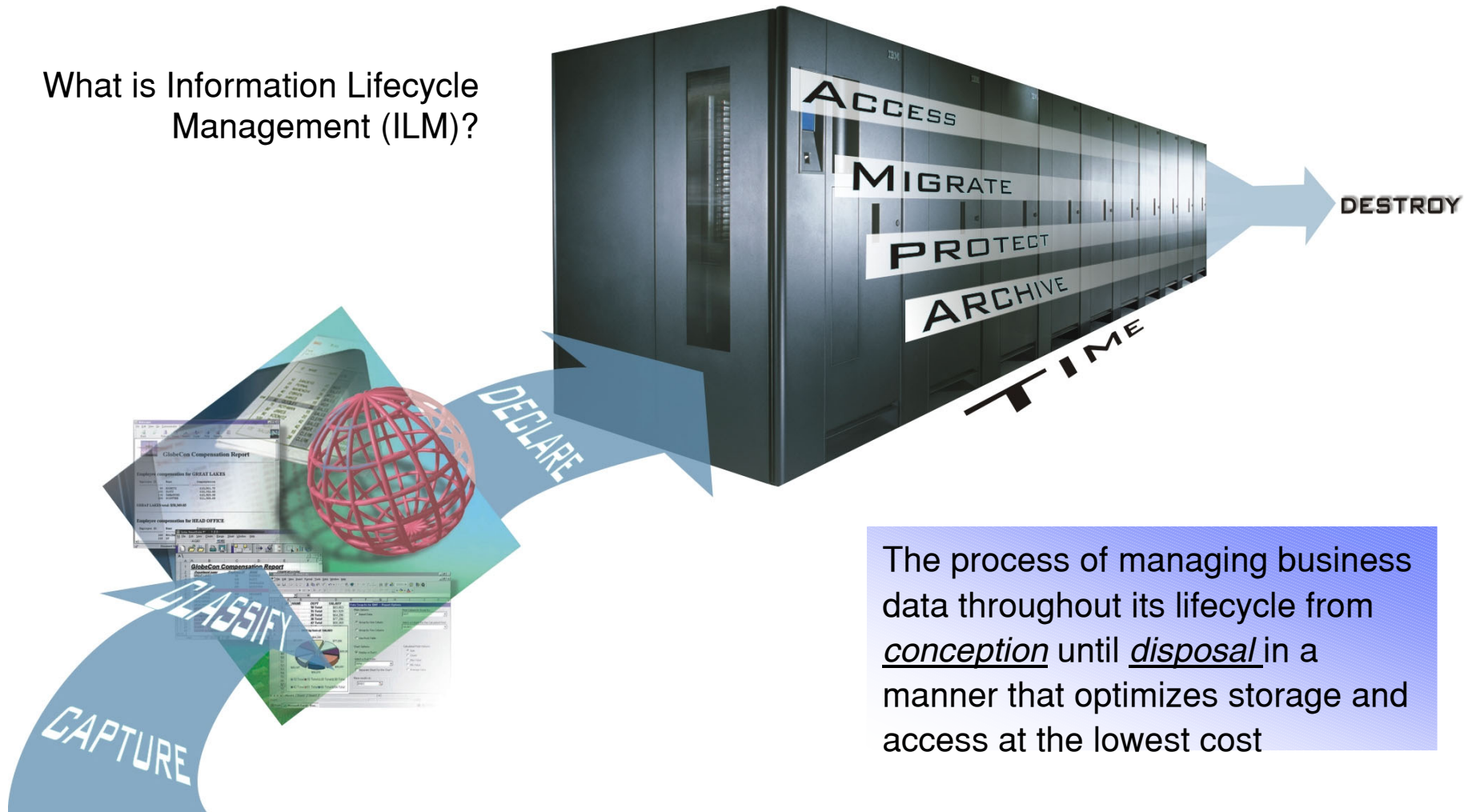
Operations continue after a disaster

Recovery is predictable and reliable

Costs are predictable and manageable

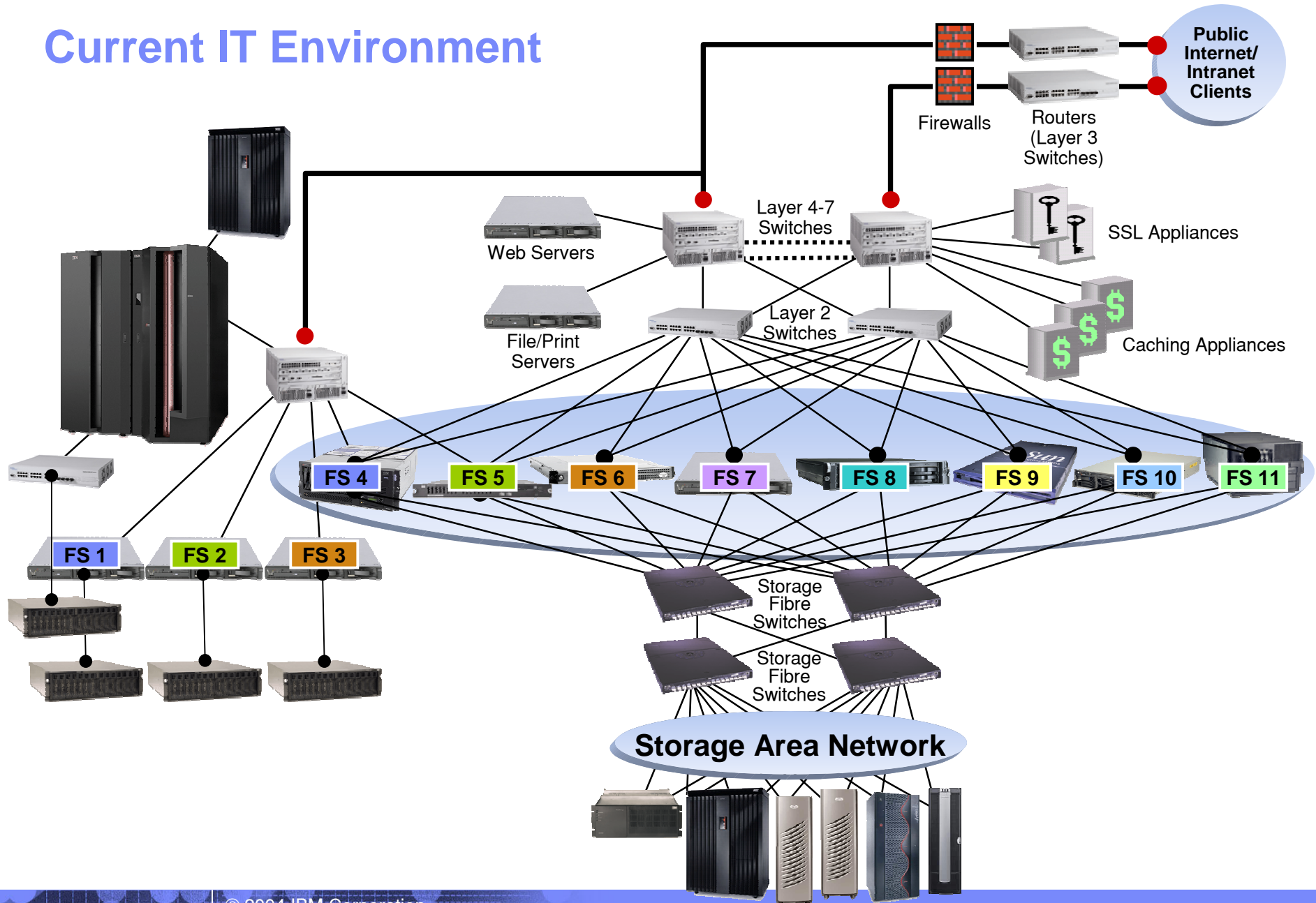
Many businesses are now focused on defining an Information On Demand strategy based in part on the information lifecycle

What is Information Lifecycle Management (ILM)?

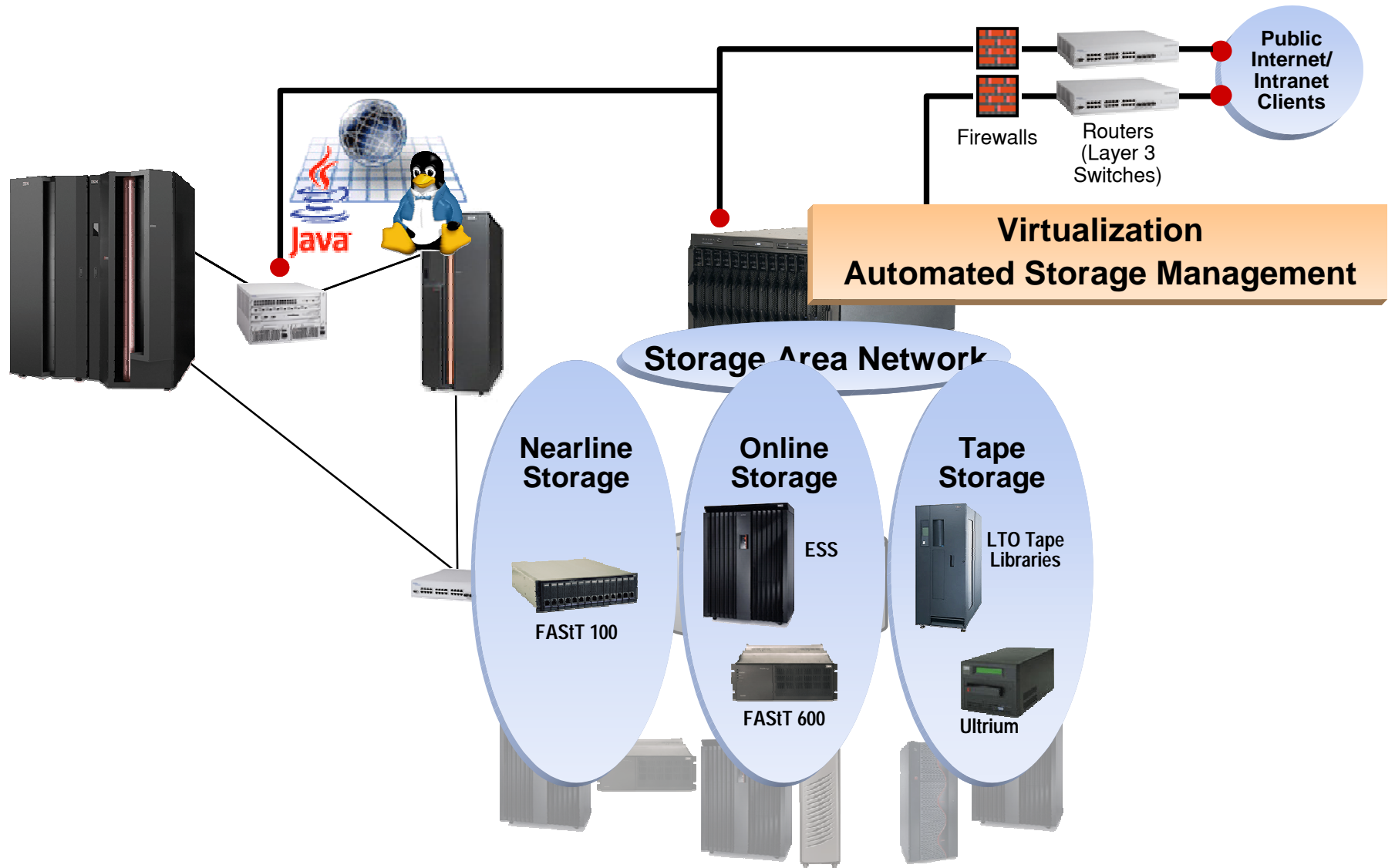


The process of managing business data throughout its lifecycle from *conception* until *disposal* in a manner that optimizes storage and access at the lowest cost

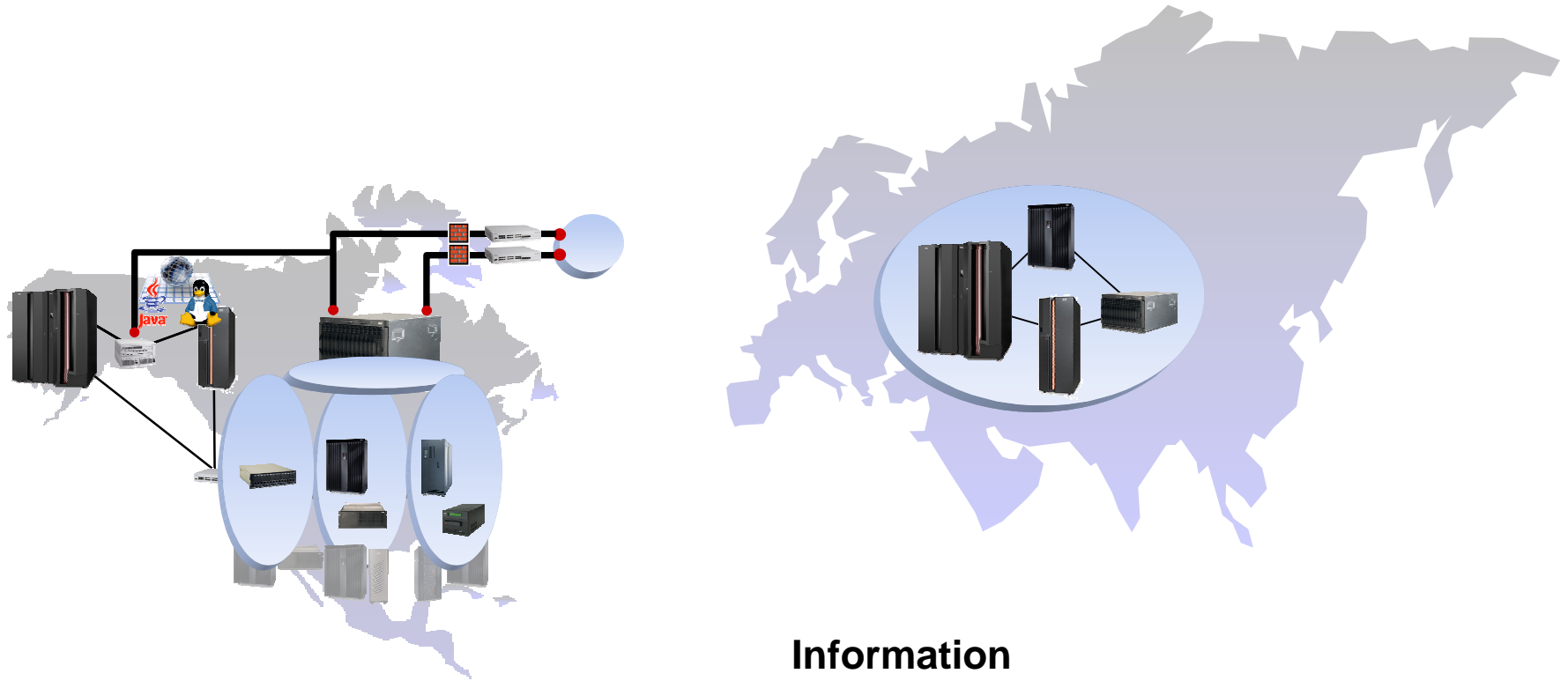
Current IT Environment



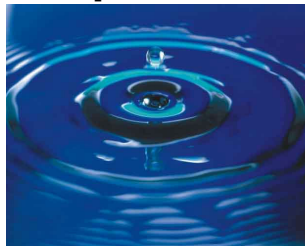
Result: Simplified IT Infrastructure



Global Mirroring of Business Critical Data



Infrastructure Simplification



Business Continuity





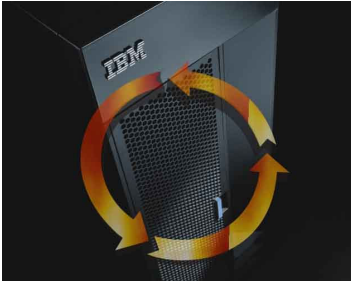

Information Lifecycle Management



on demand

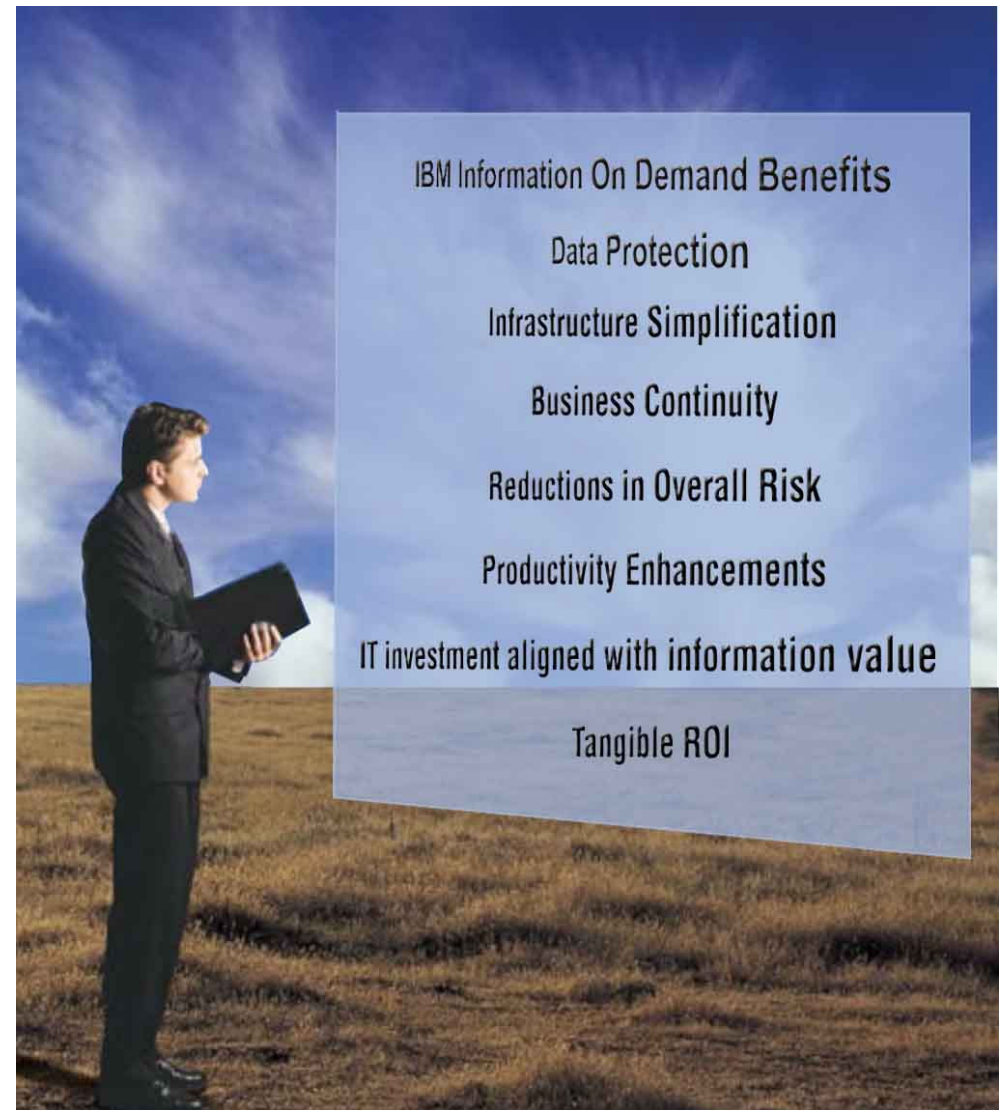


Managing Information Value – Breakthrough to On Demand

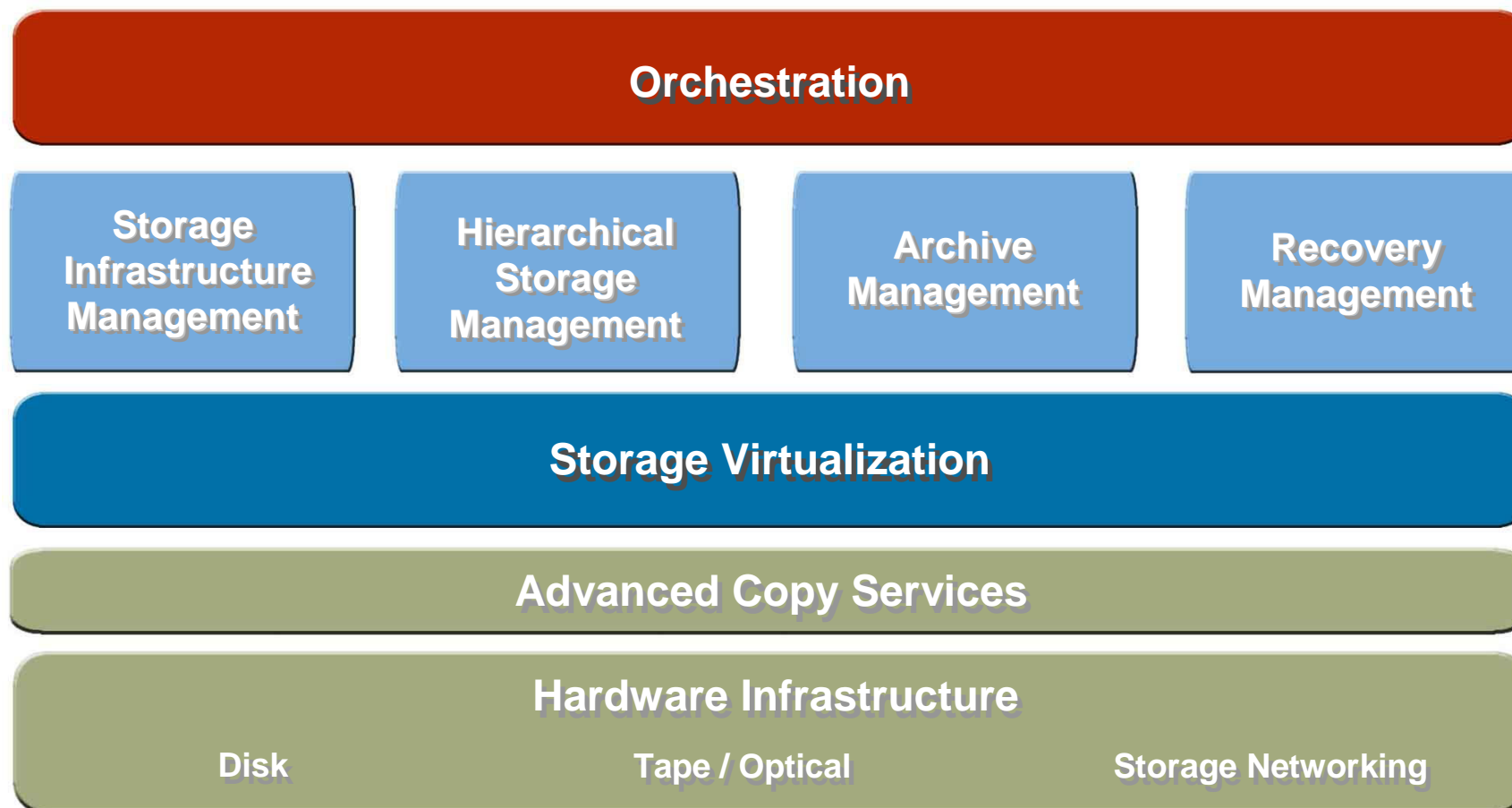
	BETTER	BETTER	BETTER	BREAKTHROUGH
Information On Demand Capabilities:	Infrastructure Simplification  <ul style="list-style-type: none"> • Scale up and Scale out technology • Virtualization • Automated Management • GRID 	Business Continuity  <ul style="list-style-type: none"> • Privacy and Security • Data Protection • Replication Management • Automation 	Information Lifecycle Management  <ul style="list-style-type: none"> • Policy based Retention management • Tiered Storage Management • Content Management 	On Demand  <ul style="list-style-type: none"> • Orchestration • Application & Information Integration • Business Process Management
	Business Benefits:	<ul style="list-style-type: none"> • Improved TCO • Greater productivity • High application availability 	<ul style="list-style-type: none"> • Continuous processing • Protection of critical business data • Reduced cost due to downtime 	<ul style="list-style-type: none"> • Risk Management • Storage optimization • Help address compliance

IBM provides the industry's most complete set of capabilities for Information On Demand

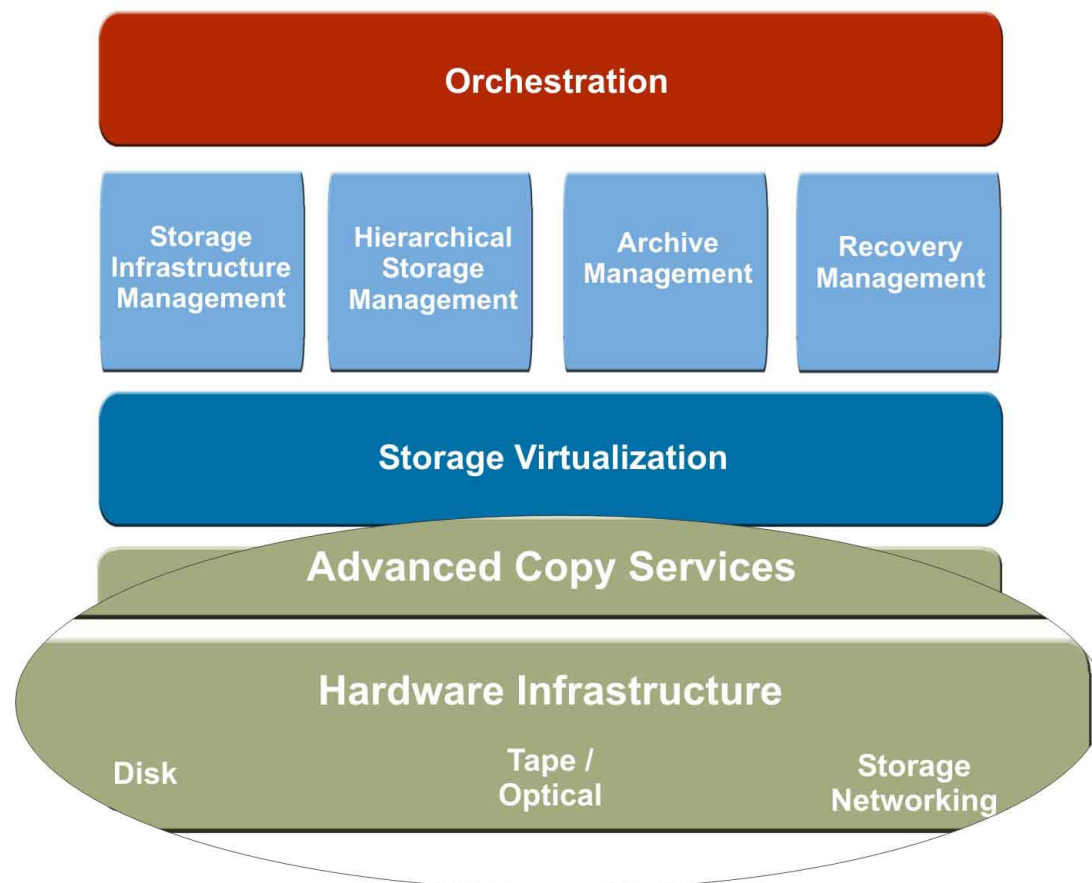
- **Based on industry standards**
- **A broad set of capabilities that is modular in design**
- **Supports heterogeneous environments**
- **Built on innovative technology**
- **Enables end to end solutions**



*At the heart of IBM's strategy is a simplified, and resilient **TotalStorage** environment that helps you efficiently manage information over its Lifecycle.*



IBM TotalStorage Capabilities



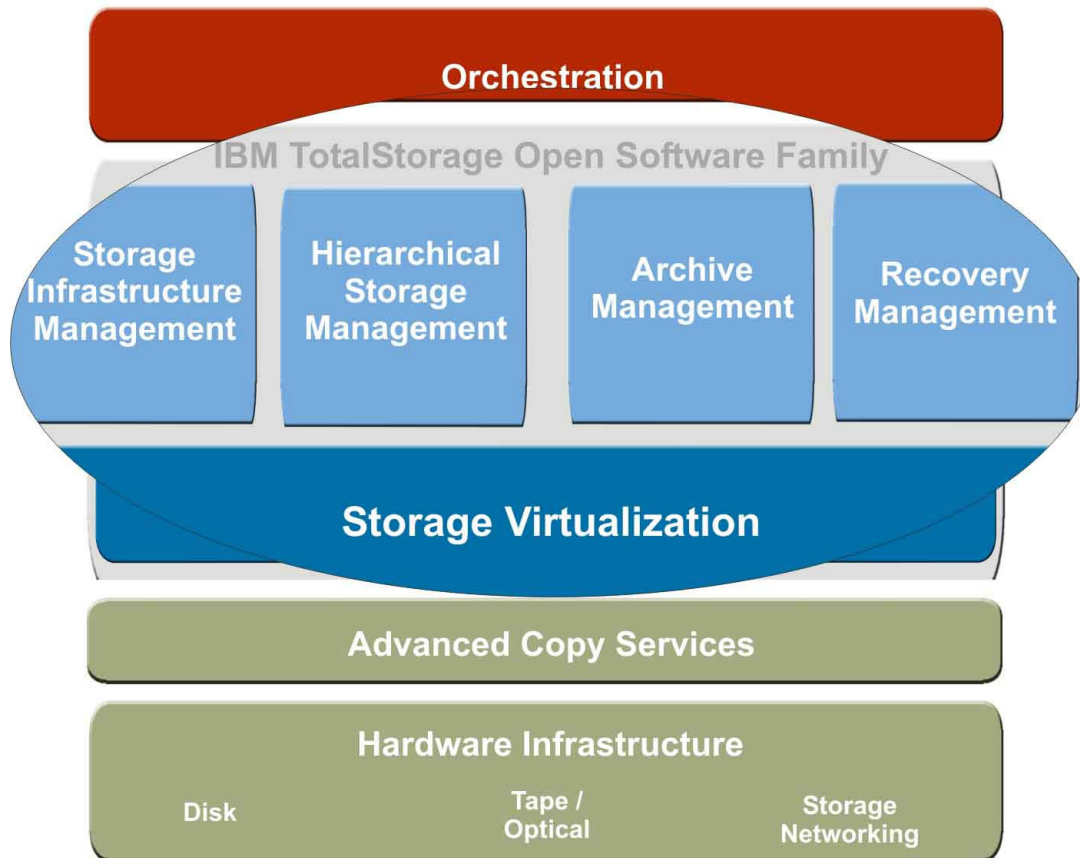
Advanced Copy Services

- *Flashcopy*
- *Global and Metro Mirror for ESS, FAStT, and VTS*

Hardware Infrastructure

- *Enterprise disk*
 - *ESS 800 , ESS 750*
- *Mid-range disk with FC or S-ATA*
 - *FAStT100, FAStT600, FAStT700, FAStT900*
- *Enterprise tape*
 - *3592, 3590, 3494, 3494-VTS*
- *Midmarket tape*
 - *3580, 3581, 3582, 3583, 3584*
- *Storage Networking*
 - *SAN Partnerships*
 - *Cisco, McDATA, CNT, Brocade*
 - *IP Attached*
 - *NAS Gateway 500*

IBM TotalStorage Capabilities



IBM TotalStorage Open Software Family

Storage Infrastructure Management

➤ IBM TotalStorage Productivity Center

- IBM Tivoli Storage Resource Manager
- IBM Tivoli SAN Manager
- IBM TotalStorage Multiple Device Manager

Hierarchical Storage Management

- IBM Tivoli Storage Manager for Space Management

Archive Management

- IBM Tivoli Storage Manager
- IBM Tivoli Storage Manager for Data Retention
- IBM DB2 CommonStore

Recovery Management

- IBM Tivoli Storage Manager

Virtualization Software

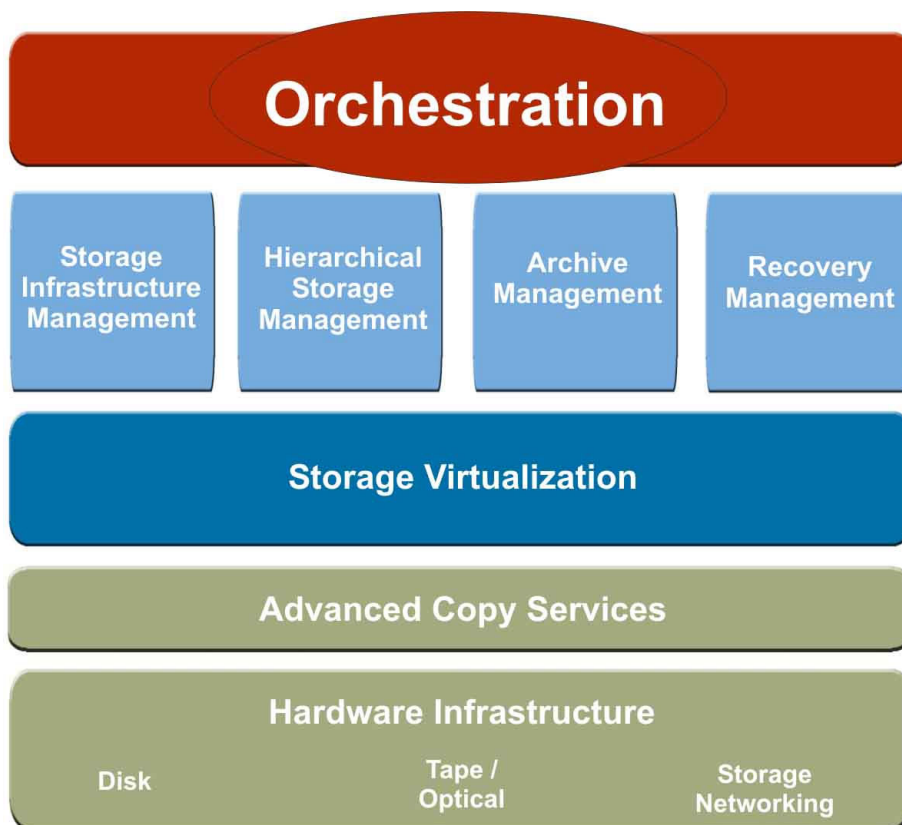
File and Data Virtualization

- IBM TotalStorage SAN File System

Block Virtualization

- IBM TotalStorage SAN Volume Controller
- IBM TotalStorage SAN Volume Controller for Cisco MDS 9000

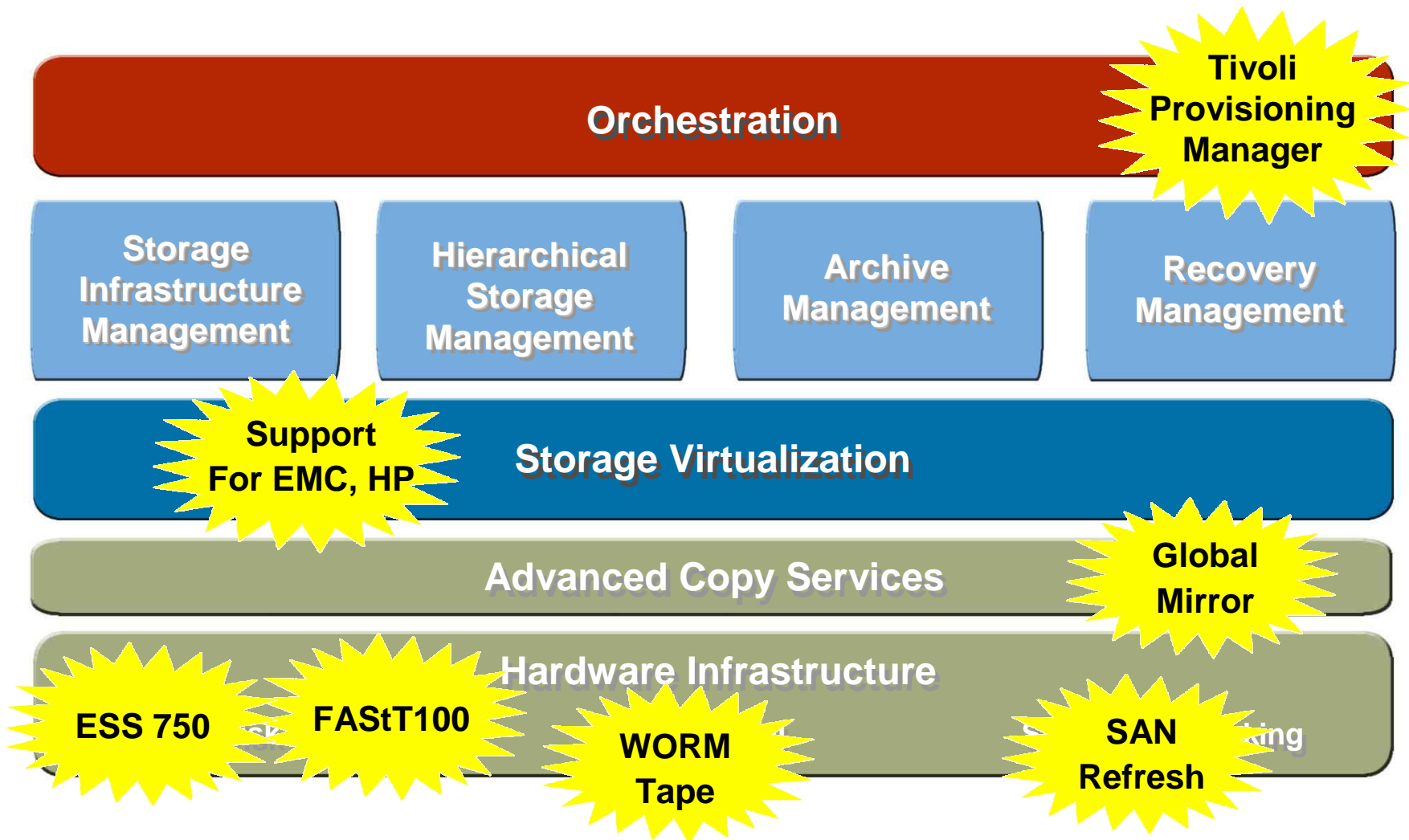
IBM TotalStorage Capabilities



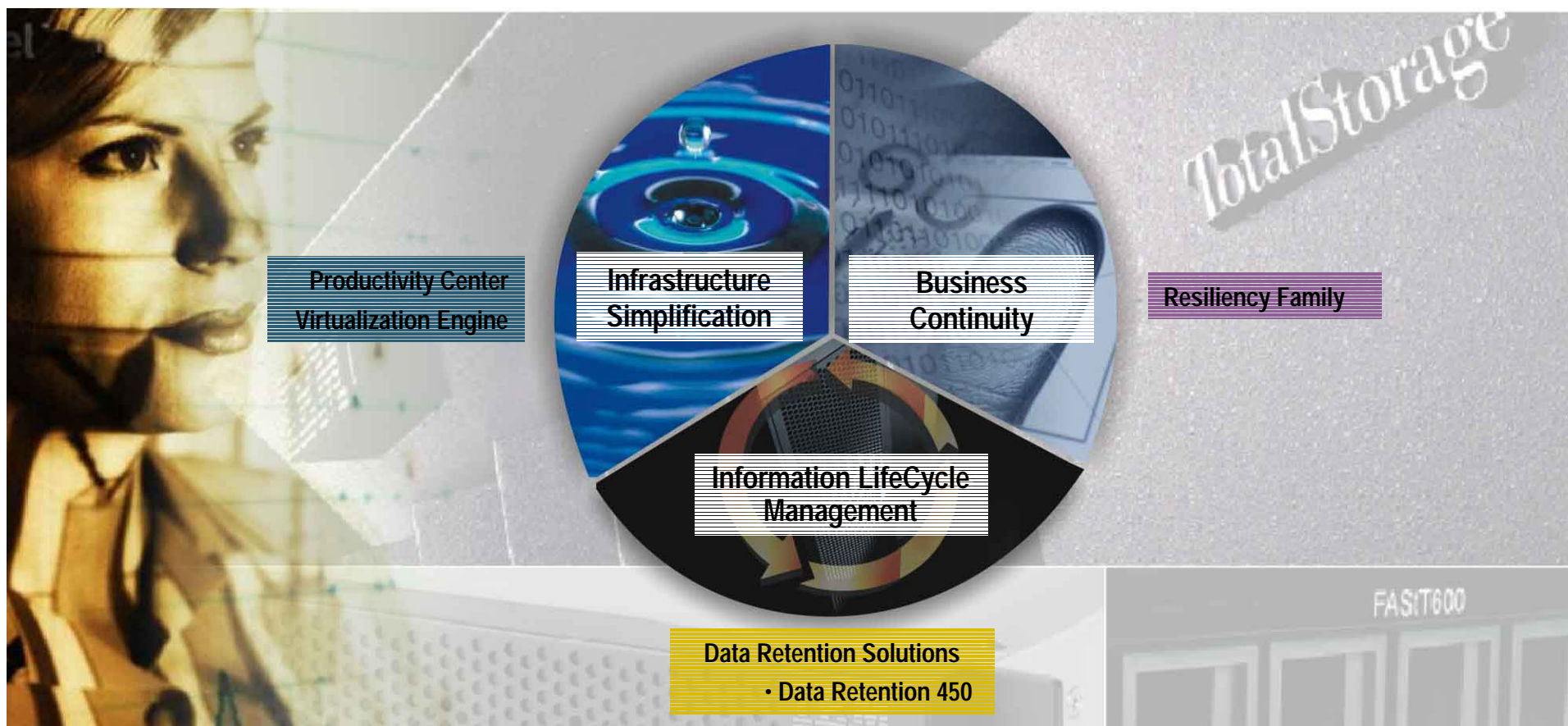
Orchestration

- *Tivoli Provisioning Manager*
- *Tivoli Intelligent Orchestrator*

IBM TotalStorage Announcements



With information on demand, clients can respond with flexibility and speed to any customer requirement, market opportunity, or external threat



Information On Demand Solutions featuring IBM TotalStorage

Infrastructure Simplification

Efficient utilization and automatic management of all IT resources (servers, storage, and network) required to meet business needs

- **Business Drivers**
 - ▶ Expense containment
 - ▶ Business growth
 - ▶ Reduce operational risk

- **Key technology enablers**
 - ▶ Consolidation (Scale up and Scale out technology)
 - ▶ Virtualization
 - ▶ Automated management

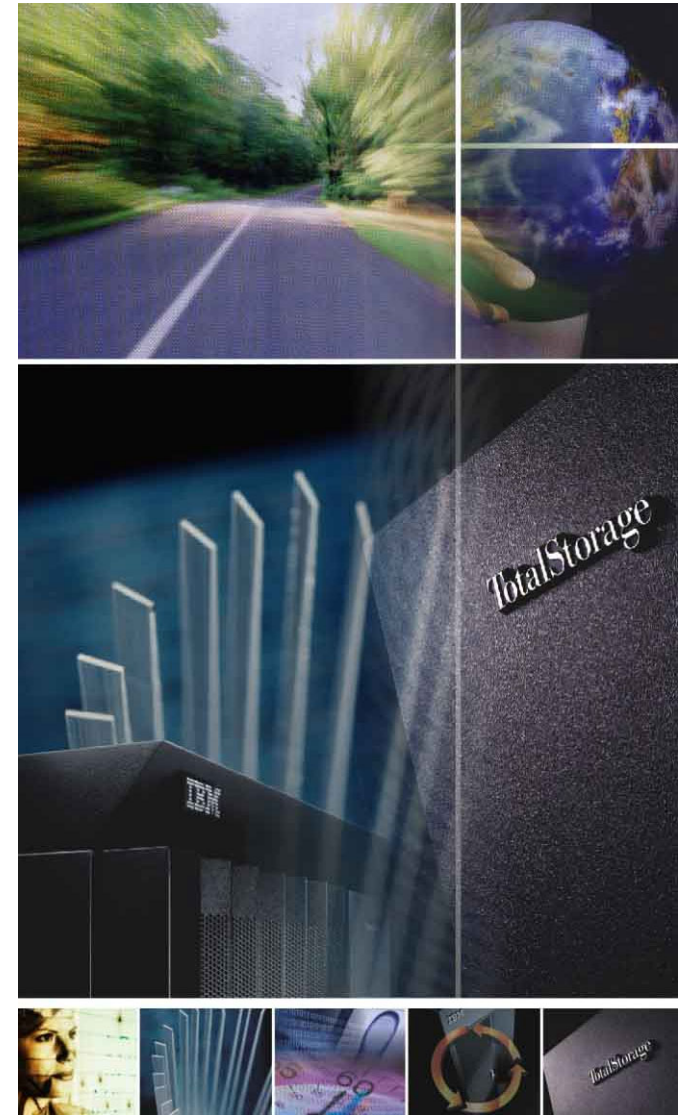
- **Benefits**
 - ▶ Improved system optimization and TCO
 - ▶ Higher personnel productivity
 - ▶ Greater application availability and infrastructure resiliency



Entry points for simplifying the storage infrastructure with IBM TotalStorage

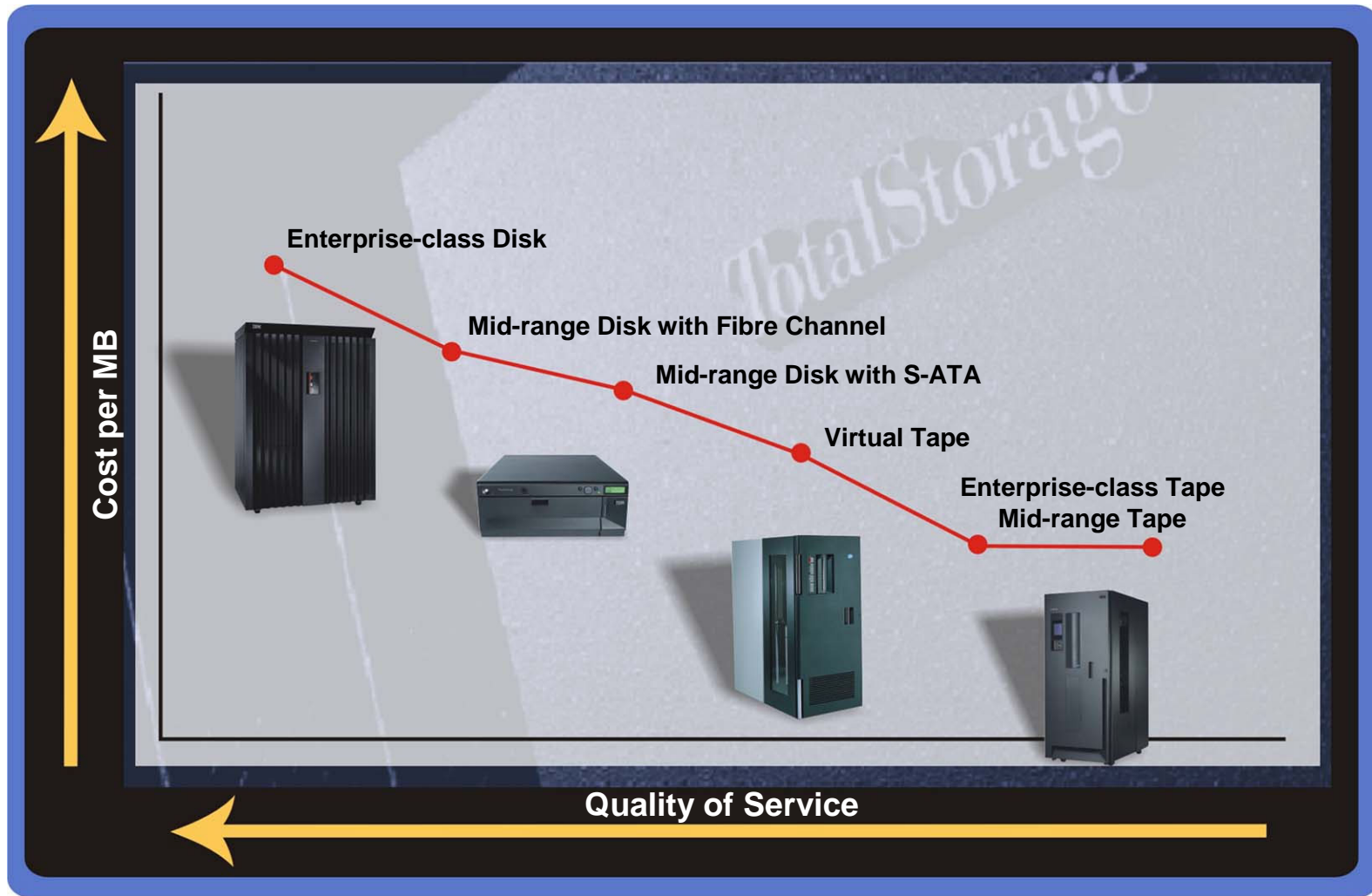
- **Evaluation and Services**
- **Consolidation**
- **Automated Management**
- **Virtualization**

Our broad portfolio allows clients to attack complexity when and where most necessary



A complete range of tiered storage technology

Optimize IT investment to Information Value



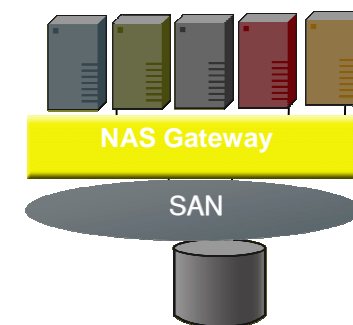
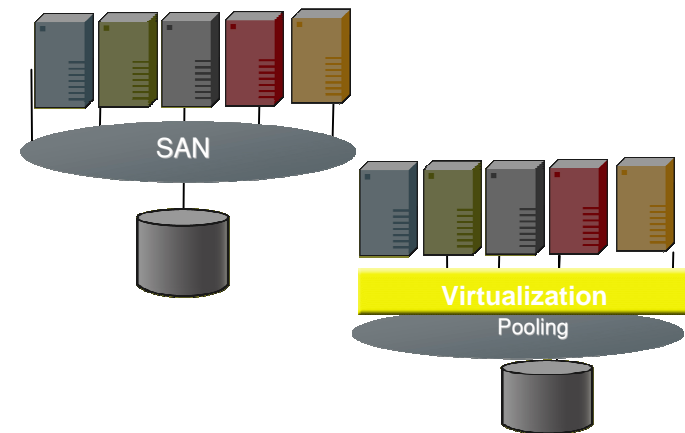
Consolidation: IBM TotalStorage SAN and NAS-based solutions

■ Storage network simplification with SAN

- ▶ Continue to work with partners in storage fabric space for innovative solutions
- ▶ Storage Consolidation (DAS to SAN)
- ▶ Network-resident storage virtualization with Brocade and Cisco

■ Storage network simplification with NAS

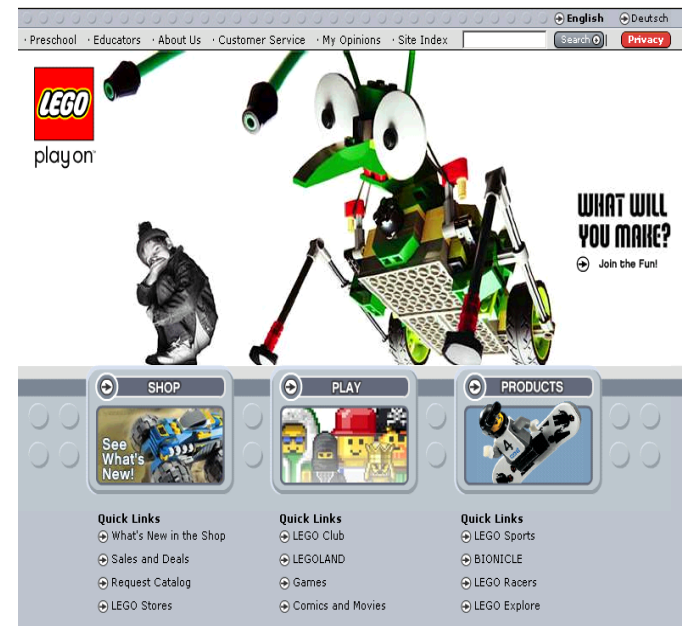
- ▶ IBM TotalStorage NAS Gateway 500
 - Ease of file serving via NAS
 - Simplicity of a single, scalable SAN-based infrastructure



No more file islands

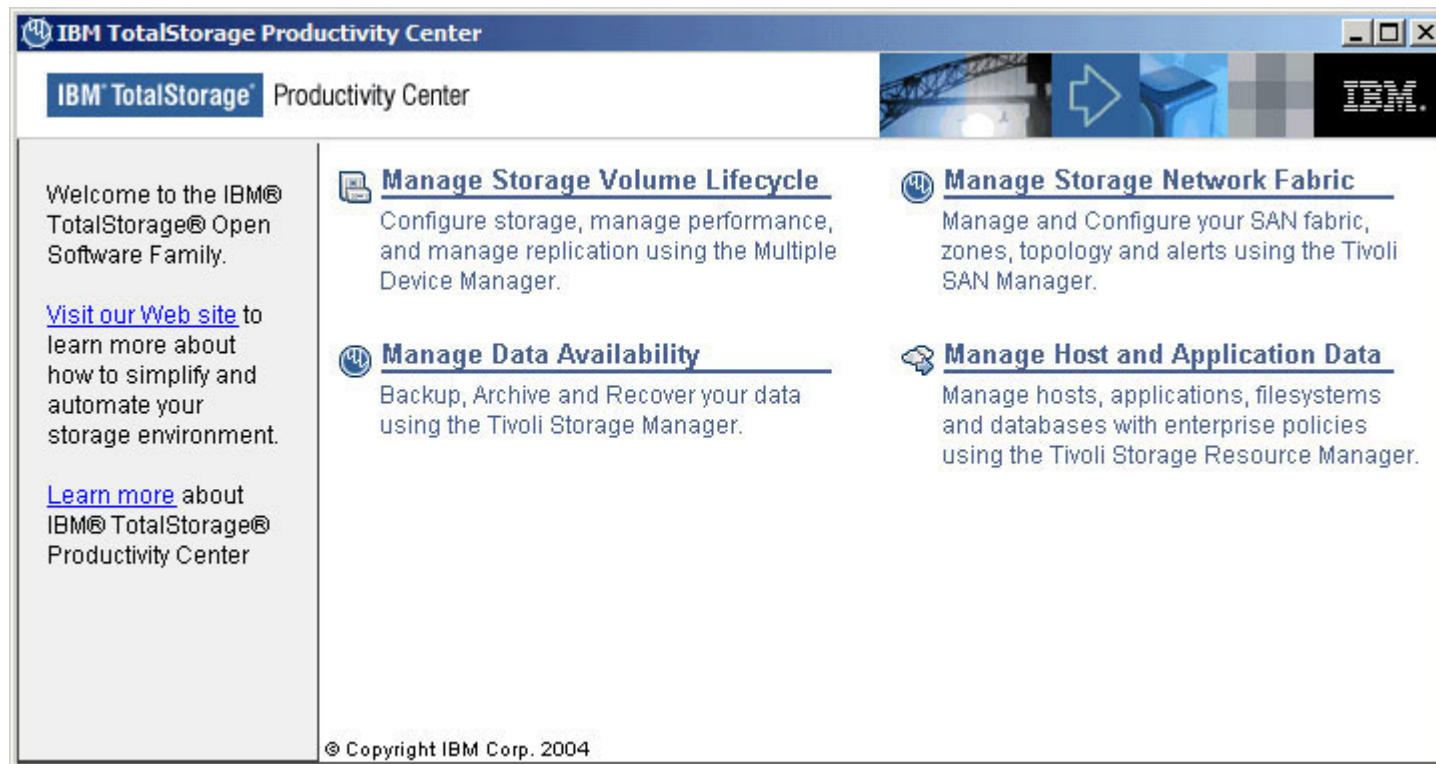
Consolidation - Lego

- To balance production of Lego's classic toys while responding to a constantly changing marketplace with new products.
- Create a more responsive, more flexible infrastructure through server consolidation and the installation of Storage Area Networks (SANs).
- Dynamic addition and reallocation of server and storage capacity.
- Estimated to reduce the number of servers to be managed by a factor of 10.
- Additional capacity available instantly to handle peak loads.



IBM TotalStorage Productivity Center

Optimizes Storage Resources through Integration and Automation



Improving Personnel Productivity with a Unified User Experience
Managing Heterogeneous Environments through Open Interfaces

Automated Management - Philips Domestic Appliances & Personal Care



“ IBM Tivoli Storage software has performed well for Philips DAP for over 10 years, and we find Tivoli Storage Resource Manager a welcome extension to the automation family. It does what it says on the box, and will enable us to regain control of our storage environment .”

—Bart Lezwijn
Storage Consultant
Philips DAP

Business Challenge

To control the growth of storage capacity requirements and reduce costs through storage optimization

on demand Business Benefits:

- Easy to deploy and use gives rapid time to value
- Detailed reports showing what data is where, enable storage optimization planning
- Reduced administration from automation through policy-based actions agreed with user base
- Minimal administration effort due to automated, unattended backups with no human interference
- Reliable data storage and recovery in a cross platform environment

Solution

- IBM Tivoli Storage Resource Manager
- IBM Tivoli Storage Manager

IBM Virtualization Engine™ Offerings

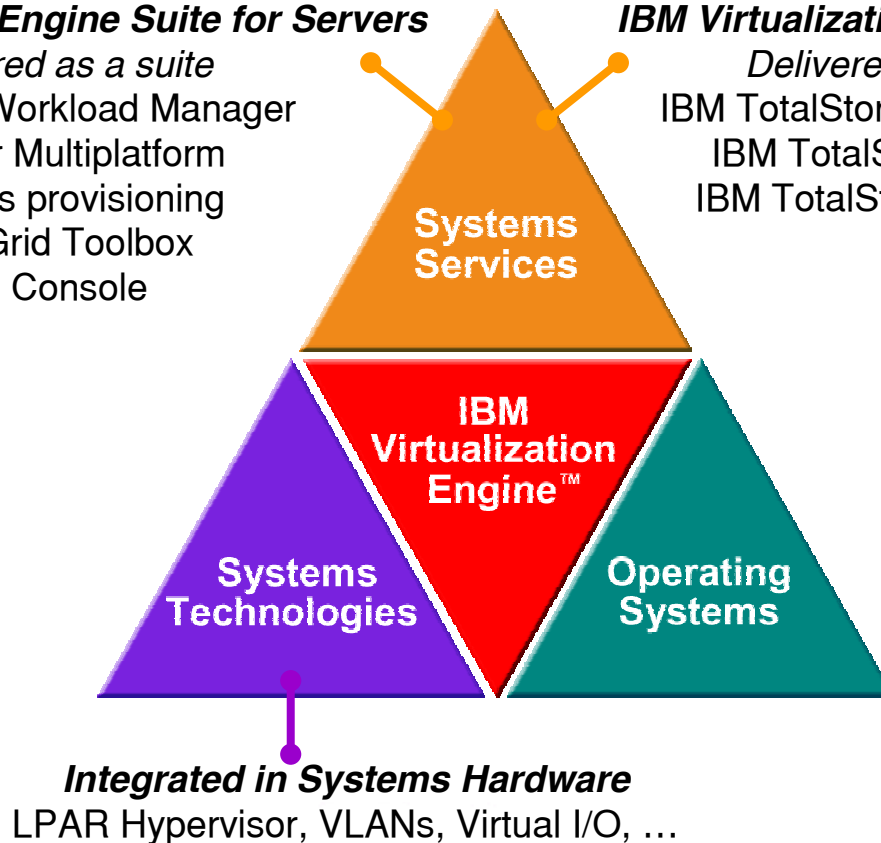
IBM Integrated & Tested

IBM Virtualization Engine Suite for Servers

Delivered as a suite
 Enterprise Workload Manager
 Director Multiplatform
 Systems provisioning
 IBM Grid Toolbox
 VE Console

IBM Virtualization Engine Suite for Storage*

Delivered as separate products
 IBM TotalStorage SAN Volume Controller
 IBM TotalStorage SAN File System
 IBM TotalStorage Productivity Center



* TotalStorage elements are part of IBM TotalStorage Open Software Family

ibm.com/storage/success

BT Conferencing

- **Vision**

Offer outstanding remote conferencing facilities to international customer base

- **Challenge**

Manage heavy and constantly changing storage requirements, reduce system downtime, cut costs

- **Solution**

Implemented a virtualised storage solution based on IBM TotalStorage SAN Volume Controller with IBM TotalStorage FASTT700 Storage Server

- **Value**

Faster management of data storage, lower costs, reduced system downtime during system upgrades

“With SVC, we have the flexibility to allocate storage in the exact quantities required, with no wastage, and we are not subject to individual system capacity constraints... SVC has completely revolutionised the way we use our storage.”

Bob Tetstall, Systems Administrator, BT Conferencing

The screenshot shows the BT Conferencing website interface. On the left is a navigation menu with links: HOME, LOGIN TO ONLINE SERVICES, EMAIL ADDRESS, PASSWORD, Remember my email, FORGOT MY PASSWORD?, NOT REGISTERED YET?, AND IT DOESN'T WORK?, GET A CONFERENCING ACCOUNT, OUR SERVICES, HELP AND TRAINING, ABOUT US, CONTACT US, and TERMS & CONDITIONS. The main content area features a search bar, a language selector set to 'United Kingdom', and a large purple banner that reads 'Welcome to BT Conferencing'. Below the banner is a text block stating: 'As the market leader in the provision and running of Phone, Video and Web Conferencing in the UK, Europe and US, you can be sure that BT can match your ambitions. At BT Conferencing we can provide systems, solutions and services to meet your conferencing needs - find out here what BT Conferencing can do for you.' To the right of this text is a photo of four smiling people. Below the photo is a 'BT MeetMe' section with the text: 'Meeting made easy. BT MeetMe is your Always-on Conferencing service that allows you to meet over the phone and web, whenever you choose, without the need to pre-book. More...'. At the bottom of the page are two buttons: 'BT Conference Call' and 'BT Enterprise solutions'.

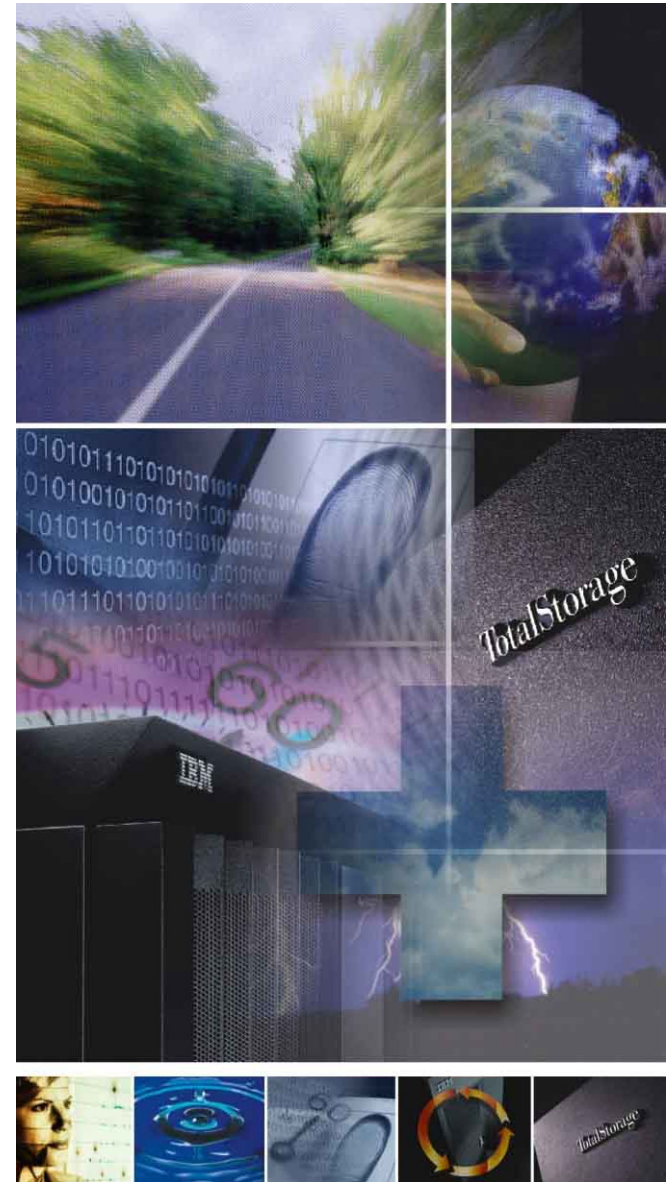
Business Continuity

Maintaining access to data at all times, protecting critical business assets, and aligning recovery costs based on business risk and information value

- **Business Drivers**
 - ▶ Business risk reduction
 - ▶ Operational continuity
 - ▶ Asset protection

- **Key technology enablers**
 - ▶ Resilient infrastructure
 - ▶ Point in time copy, Metro/Global Mirroring
 - ▶ Centralized, efficient management
 - ▶ Platform and application specific automation

- **Benefits**
 - ▶ Continuous application processing
 - ▶ Protection of critical business data
 - ▶ Reduced cost due to downtime



Customers' Business Trade-offs

Recovery time and Recovery Point objectives

Rapid recovery time?
Any data loss?

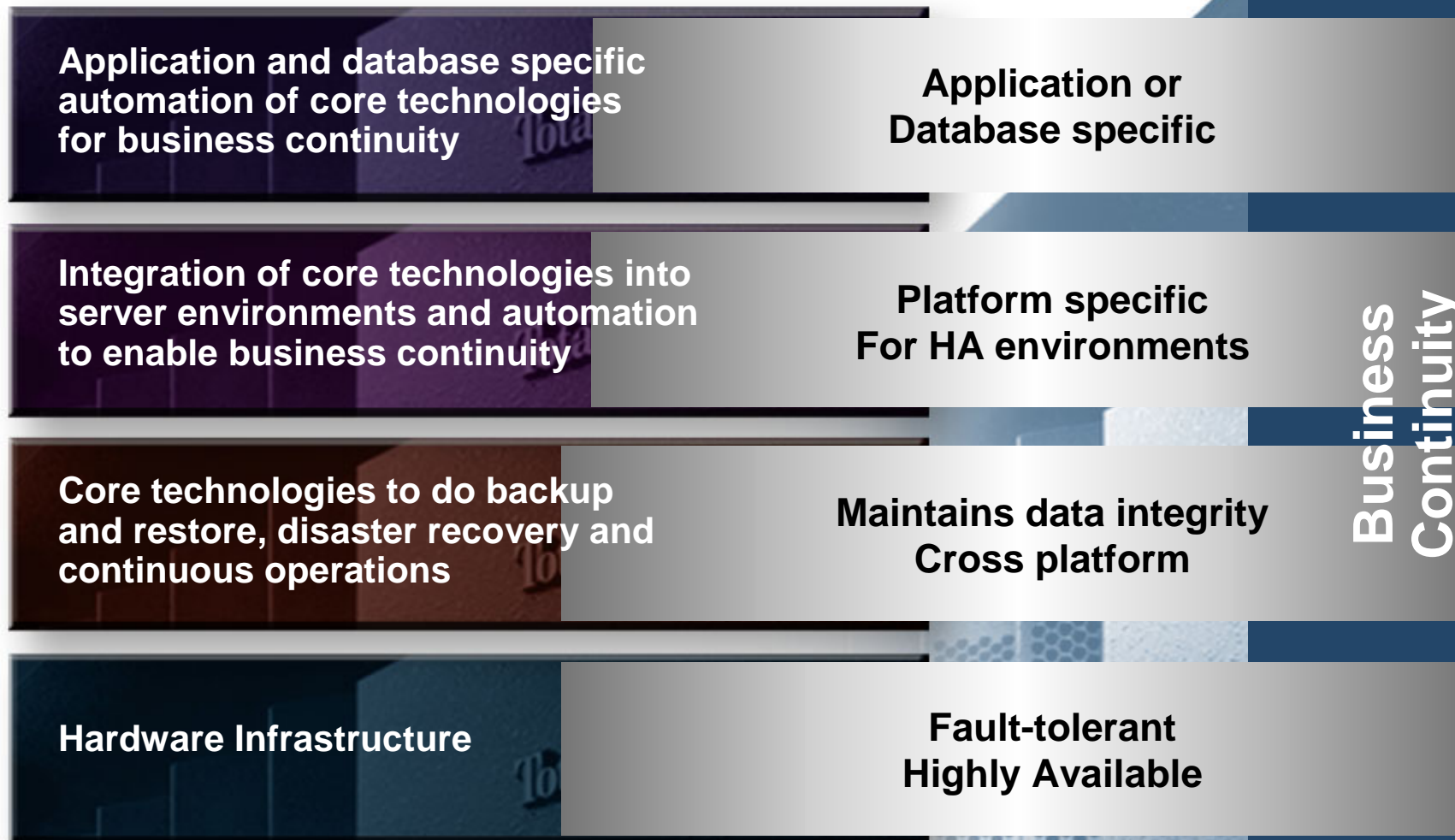
Business process flexibility Time to market

Rapidly deploy new applications?
Responsive to customers?

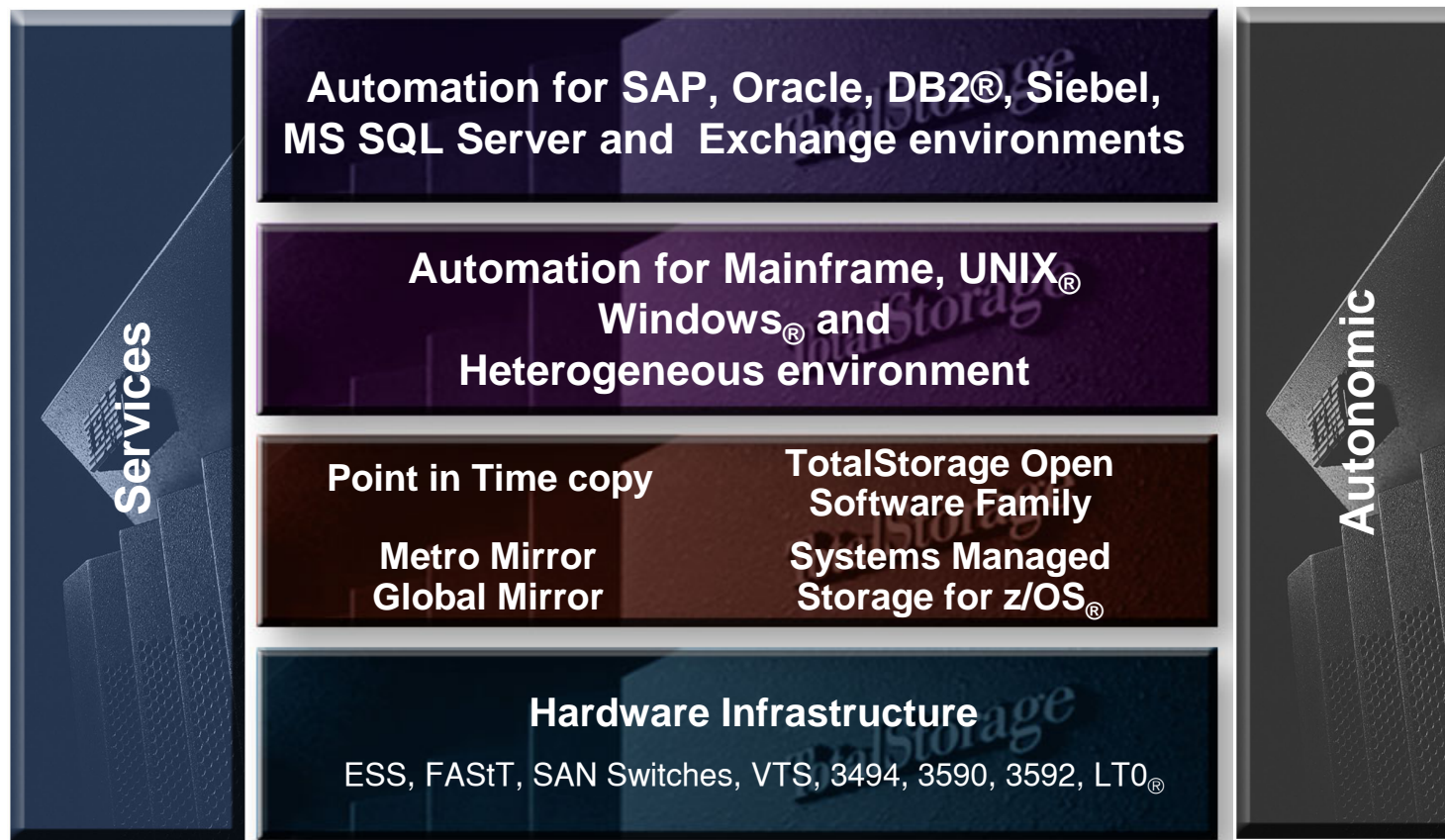
Total Cost of Ownership

Don't spend too much
Can't expand IT staff

Roadmap to Business Continuity



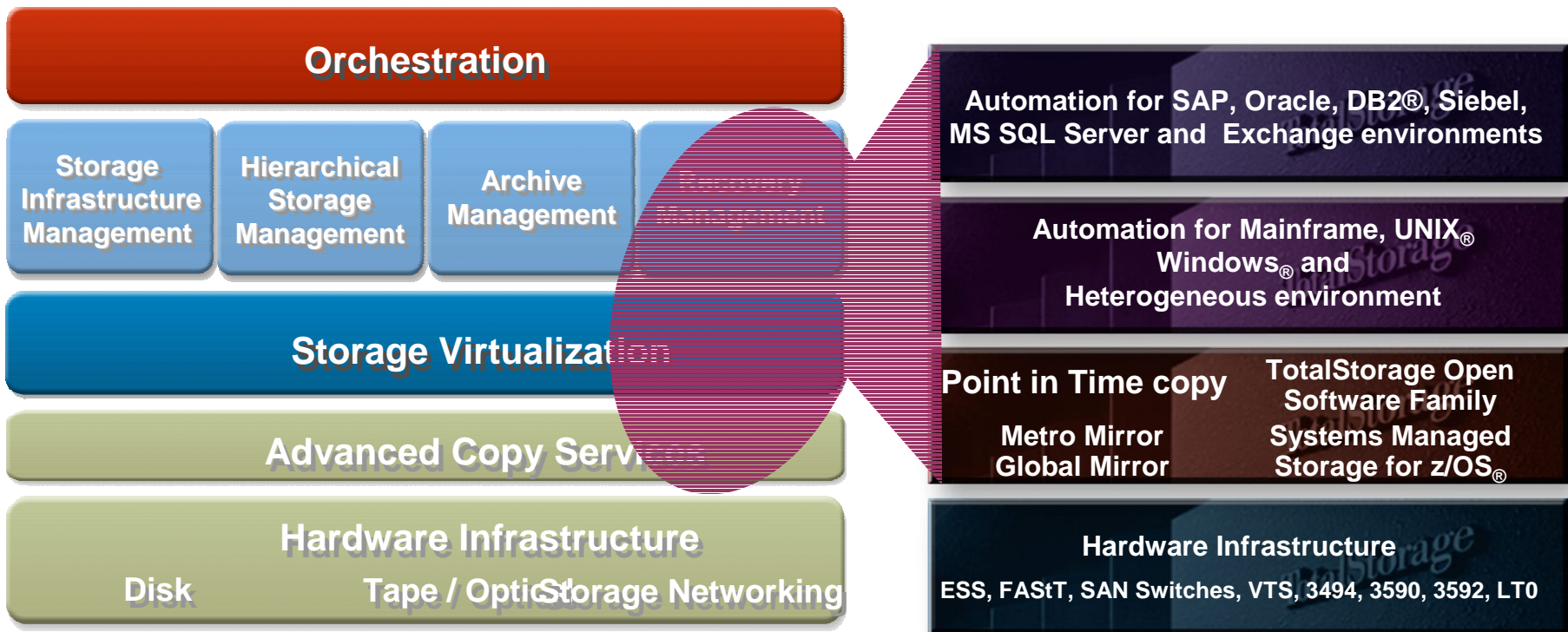
Introducing IBM TotalStorage Resiliency Family



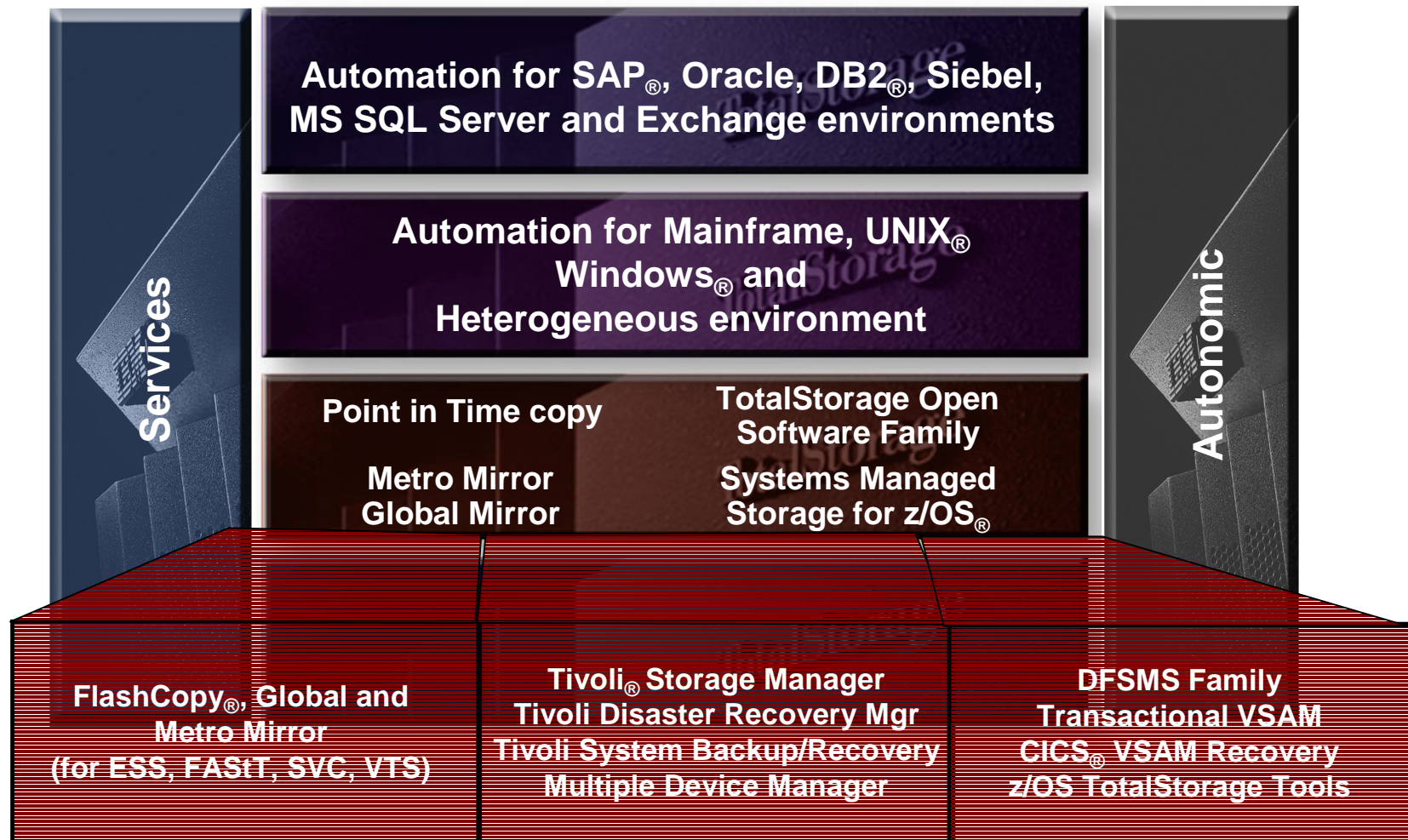
A comprehensive set of integrated solutions that are automated and optimized to address business continuity needs

IBM TotalStorage Resiliency Family

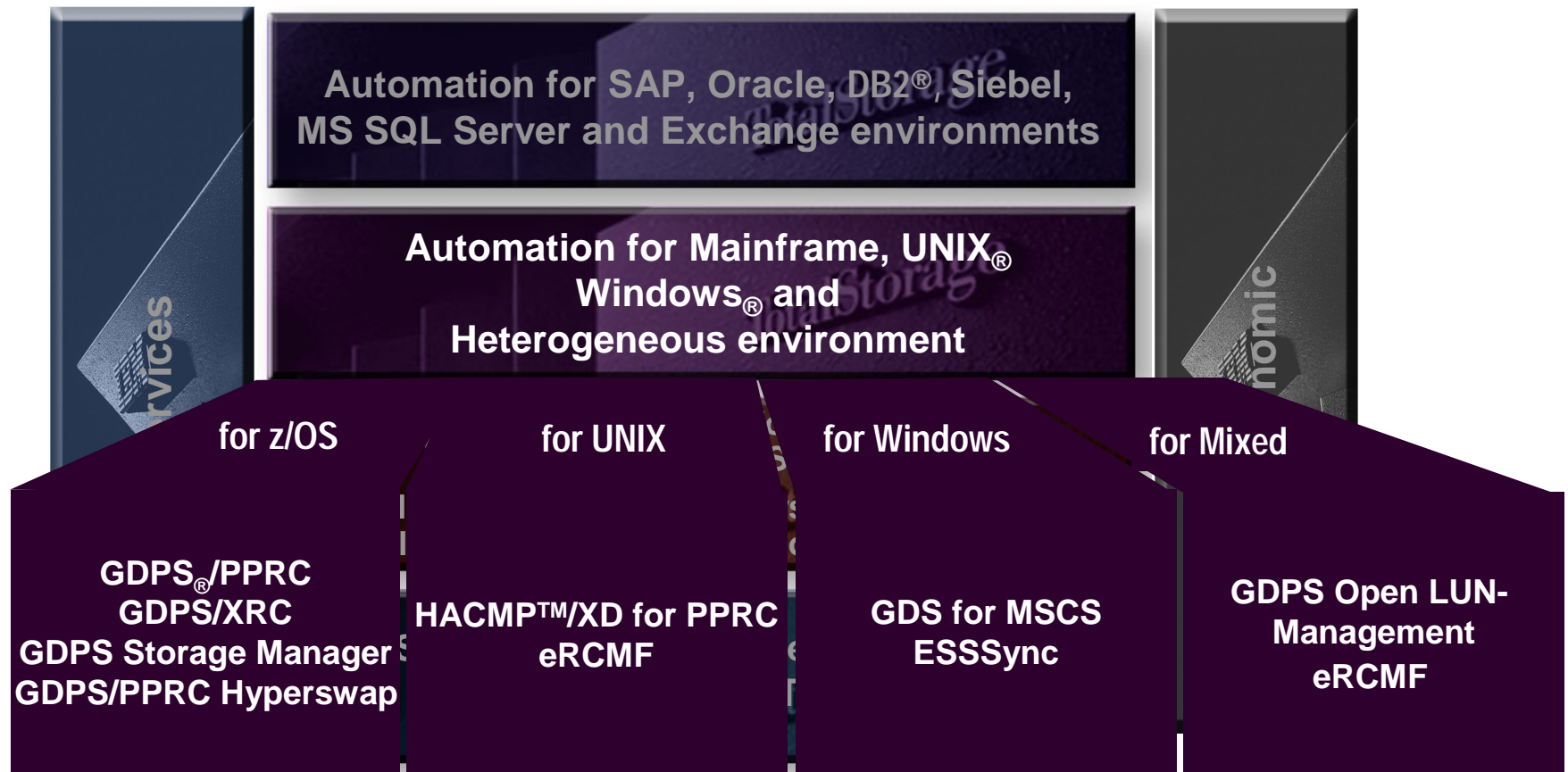
Important part of TotalStorage portfolio



Introducing IBM TotalStorage Resiliency Family



Introducing IBM TotalStorage Resiliency Family



TotalStorage Resiliency Family is designed to provide server awareness and exploitation of core technologies to help improve business continuity

Introducing IBM TotalStorage Resiliency Family

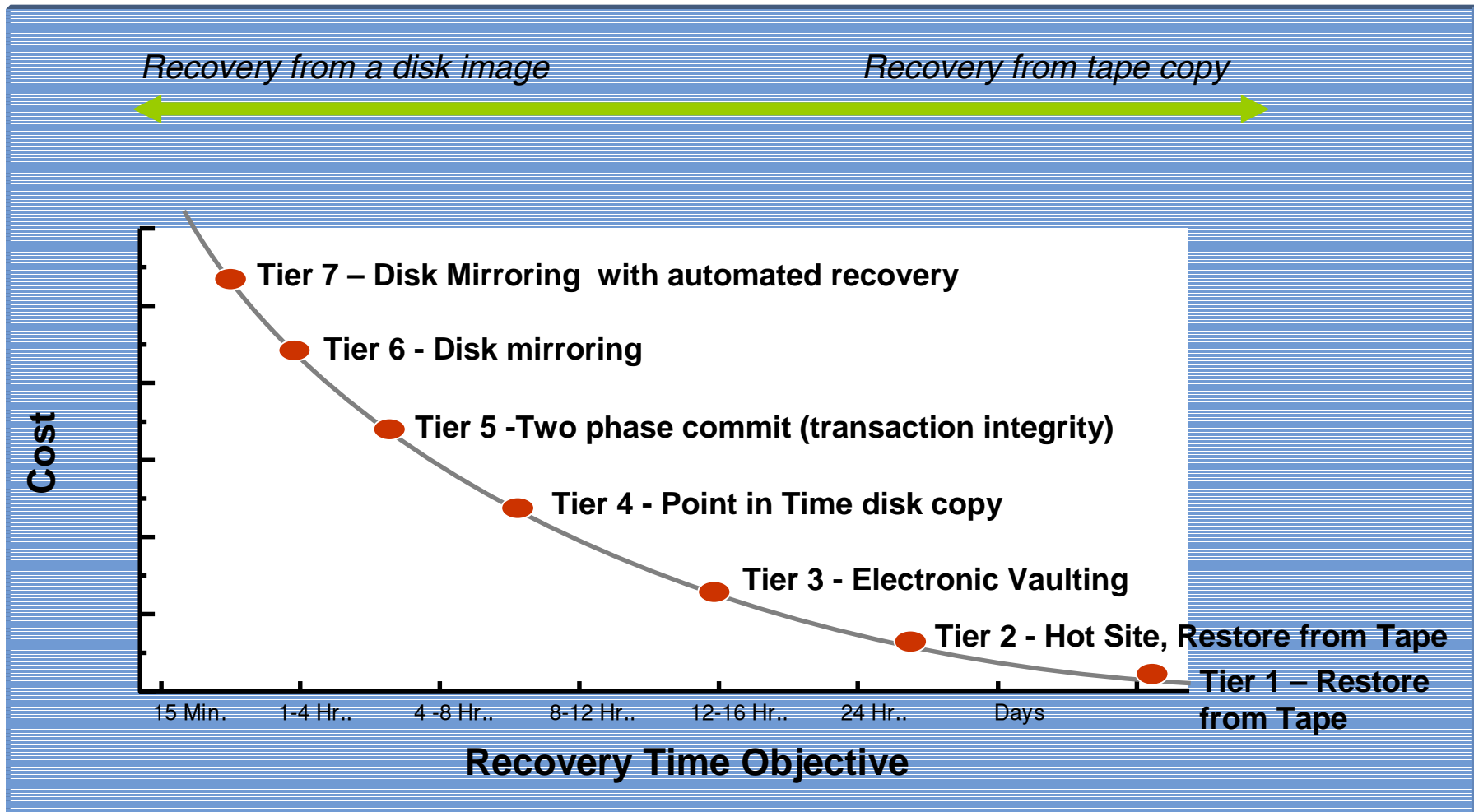
Automation for SAP, Oracle, DB2, Siebel,
MS SQL Server and Exchange environments

Automation for Mainframe, UNIX,
Windows, and iSeries

Metropolitan Distance Disaster Recovery for SAP/Siebel
Metropolitan Distance D/R for SAP with Federated Oracle/DB2
Global Distance Disaster Recovery for SAP
Automated System Cloning for SAP for Oracle on pSeries
TotalStorage Enterprise Storage Server-based Federated Backup/Recovery for mySAP
High Availability Backup for SAP
Exchange 2000 Copy Services Integration
Data Manager for SQL 2000 Services
Tivoli Storage Manager for IBM ESS for Oracle, SAP and DB2
Application aware backup/recovery using TSM (ex: Tivoli Storage Manager for ERP/Databases/Mail)

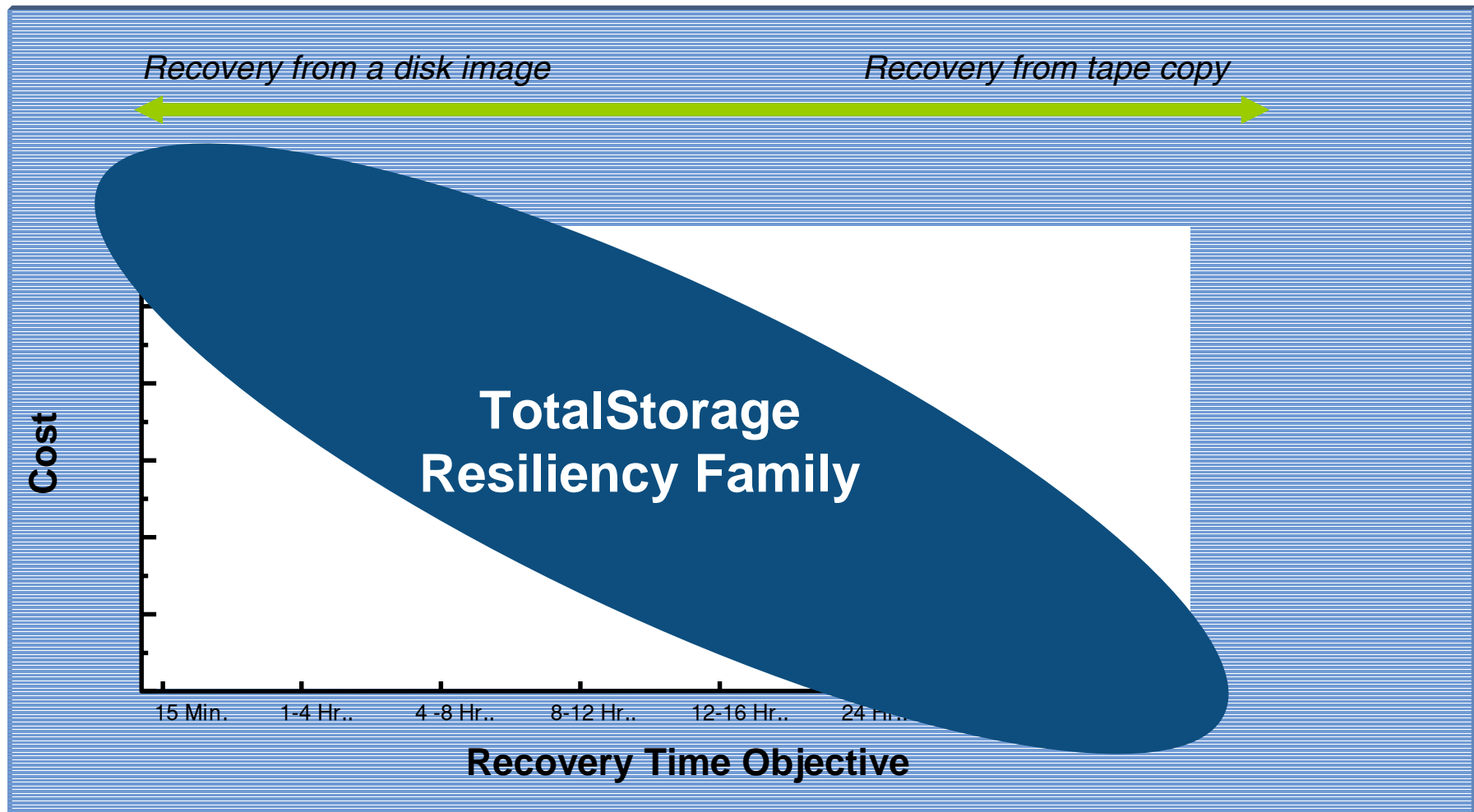
TotalStorage Resiliency Family is designed to provide application and database awareness and exploitation of core technologies to help improve business continuity

Resiliency Family Provides Recovery Option Flexibility



Best Business Continuity practice is to blend solutions in order to maximize application coverage at optimum cost

Resiliency Family Provides Recovery Option Flexibility



Speed. Security. Simplicity. Choose IBM when resiliency matters!

TotalStorage Resiliency Family

A comprehensive set of integrated solutions that are automated and optimized to address business continuity needs

Solutions ranging from basic backup and restore, to multi-site "real-time" disaster recovery – helping businesses better align IT costs according to the value of information

TotalStorage Resiliency Family is designed to:

- ▶ Protect business data
- ▶ Improve resiliency
- ▶ Lower daily operating costs

St. Anthony's Medical Center

Business Need

- ▶ High availability and failover storage architecture
- ▶ 24x7 availability and protection for its PACS data

Solution

- ▶ 10TB ESS with PPRC, 3494, SAN switches
- ▶ 3TB backed up/archived per day
- ▶ Automated, unattended backup via TSM

Benefits

- ▶ Provides online, real-time images to physicians
- ▶ 10 fold reduction in Recovery Time Objectives
- ▶ Automated , unattended backup/recovery
- ▶ 25% reduction in administrative costs overall



Third largest hospital in St Louis, Missouri

St. Michael's Hospital

ST. MICHAEL'S HOSPITAL

A teaching hospital affiliated with the University of Toronto

■ Need

- ▶ Establish an online PACS system to store and retrieve images/data electronically
- ▶ Enterprise wide disaster recovery plan
- ▶ Better leverage IT staff and resources
- ▶ Automated, centralized backup/recovery
- ▶ Scalable, reliable storage solution

■ Solution

- ▶ IBM Tivoli Storage Manager for automated, centralized backup.
- ▶ IBM TotalStorage SAN Volume Controller with FlashCopy and PPRC
- ▶ IBM eServer pSeries and xSeries servers
- ▶ IBM TotalStorage 3584 Ultrium UltraScalable Tape Library for centralized tape
- ▶ IBM TotalStorage 3583 Ultrium Scalable Tape Library at secondary data center
- ▶ IBM TotalStorage Enterprises Storage Server for main data center
- ▶ IBM FAStT900 Storage Server for secondary data center

Benefit

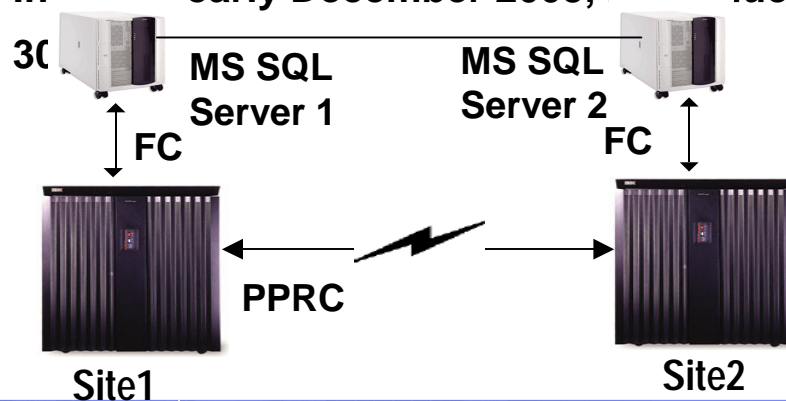
- Continuous access to data
- Increased staff productivity due to automated, centralized backup/recovery
- Protection of critical PACS repository
- Highly available, resilient IT infrastructure (99.999% availability)

SANDVIK (Sweden)

- Need
 - ▶ Continuous application availability (for clustered MS SQL servers)
 - ▶ Protection of data
 - ▶ Complete Site Recovery within minutes (tier 7)

- Solution

- ▶ IBM TotalStorage Solution: Geographically Dispersed Sites for Microsoft® Cluster Service (MSCS)
- ▶ IBM ESS Model 800 with Metro Mirror
- ▶ Installed early December 2003, in production over



Manufactures equipment and tools for metalworking industry; rock excavation; and variety of specialty steel products

Benefit

- Complete Site failover in matter of seconds
- Protection and recovery of business data
- Protection against downtime

Financial Services Company

“Astounding” Results!

Benefits

- Performance
 - 4X Throughput
- Reduced Costs
 - Infrastructure
 - TCO
- Resiliency Family Optimization

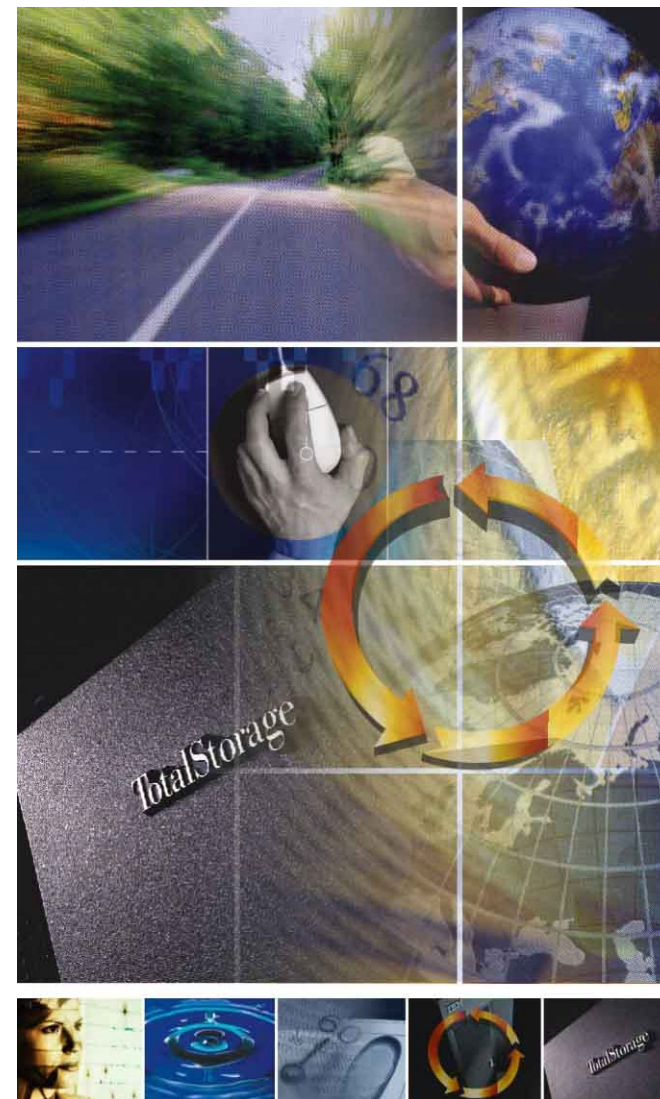


The Value of IBM Technology!

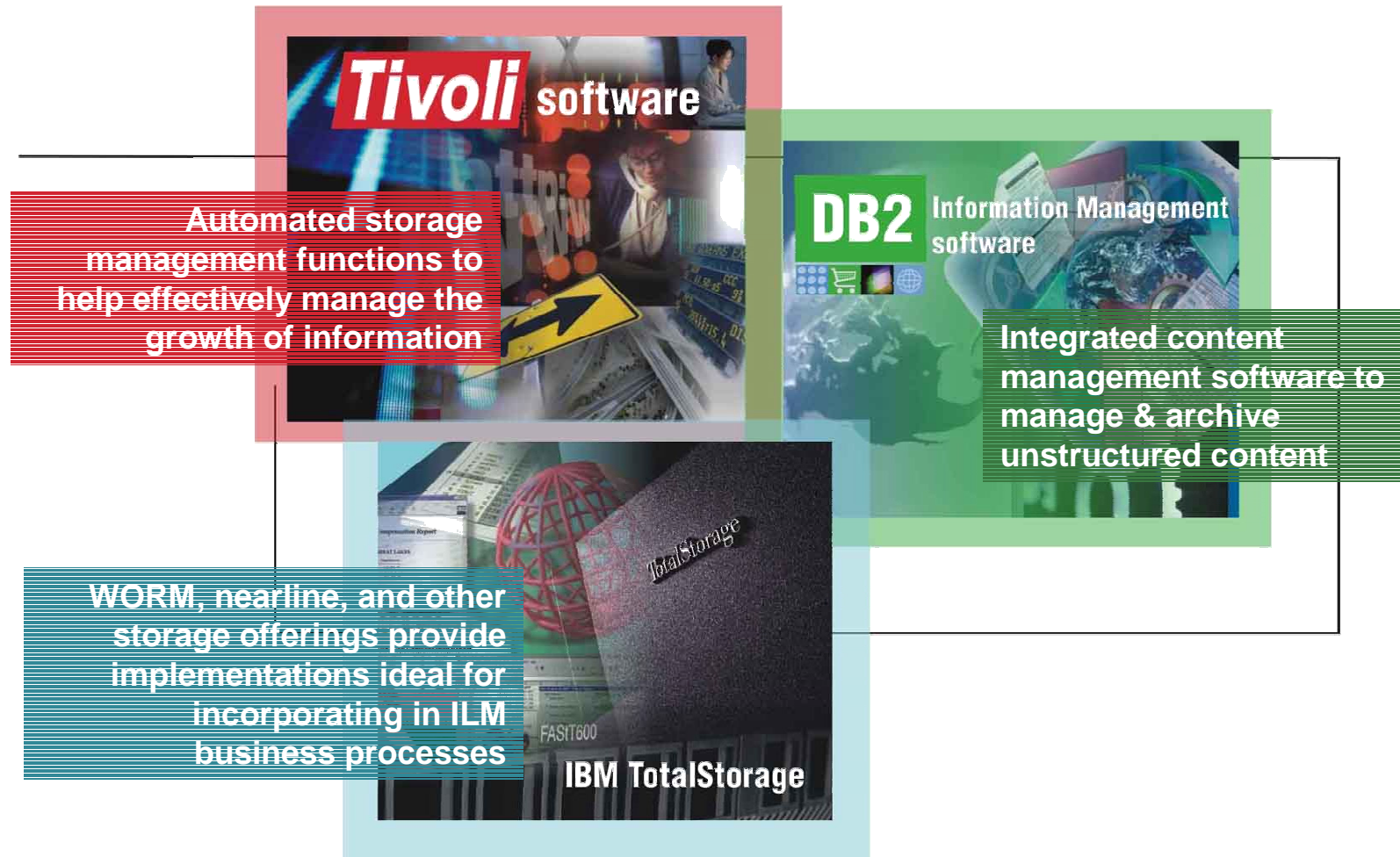
Information Lifecycle Management (ILM)

Managing business data through its lifecycle from conception until disposal, in a manner that optimizes storage and access at the lowest cost

- **Business Drivers**
 - ▶ Information growth
 - ▶ Information has become mission critical
 - ▶ Compliance
 - ▶ Business risk
- **Key technology enablers**
 - ▶ Policy-based archive management
 - ▶ Records retention and disposition
 - ▶ Automated storage management
 - ▶ Non-erasable, non-rewriteable storage
 - ▶ Tiered storage
 - ▶ Nearline storage
- **Benefits**
 - ▶ Enable policy automation
 - ▶ Storage resource optimization
 - ▶ Help meet the challenges of compliance
 - ▶ Risk management



The heightened business focus on ILM is being addressed by the convergence of several technologies



IBM has a long history in ILM and Retention Managed Data



Tape Storage since 1952 – IBM Tape Drives and Libraries

- ▶ 3590/3494 Enterprise class tape drives and libraries
- ▶ 3584/LTO Midrange class tape drives and libraries

Tivoli Storage Manager

Multi-platform Data Protection since 1993 – IBM Tivoli Storage Manager (TSM)

- ▶ Backup, archive, lifecycle management for a wide range of operating platforms
- ▶ Data protection for clients, databases, and applications
- ▶ Archive API open and based on industry standard
- ▶ Supports non-erasable, non-rewriteable disk protection

IBM Information Lifecycle Management



Disk Storage since 1960 – IBM Disk

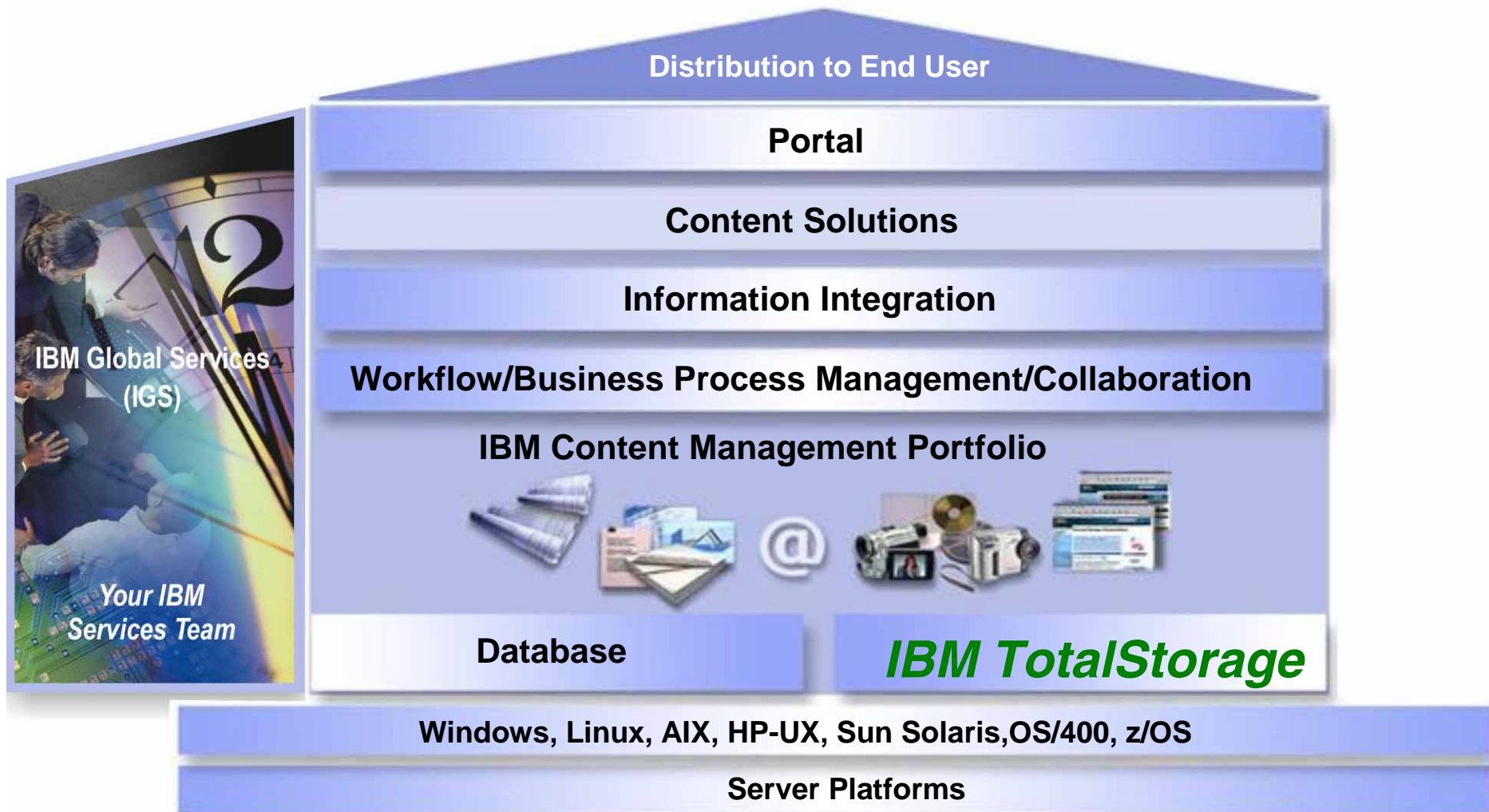
- ▶ Enterprise Storage Server – high availability/function for Windows, Linux, Unix, zSeries, iSeries servers
- ▶ FASTT – midrange disk storage for Windows, Linux, and Unix servers

DB2 Content Manager

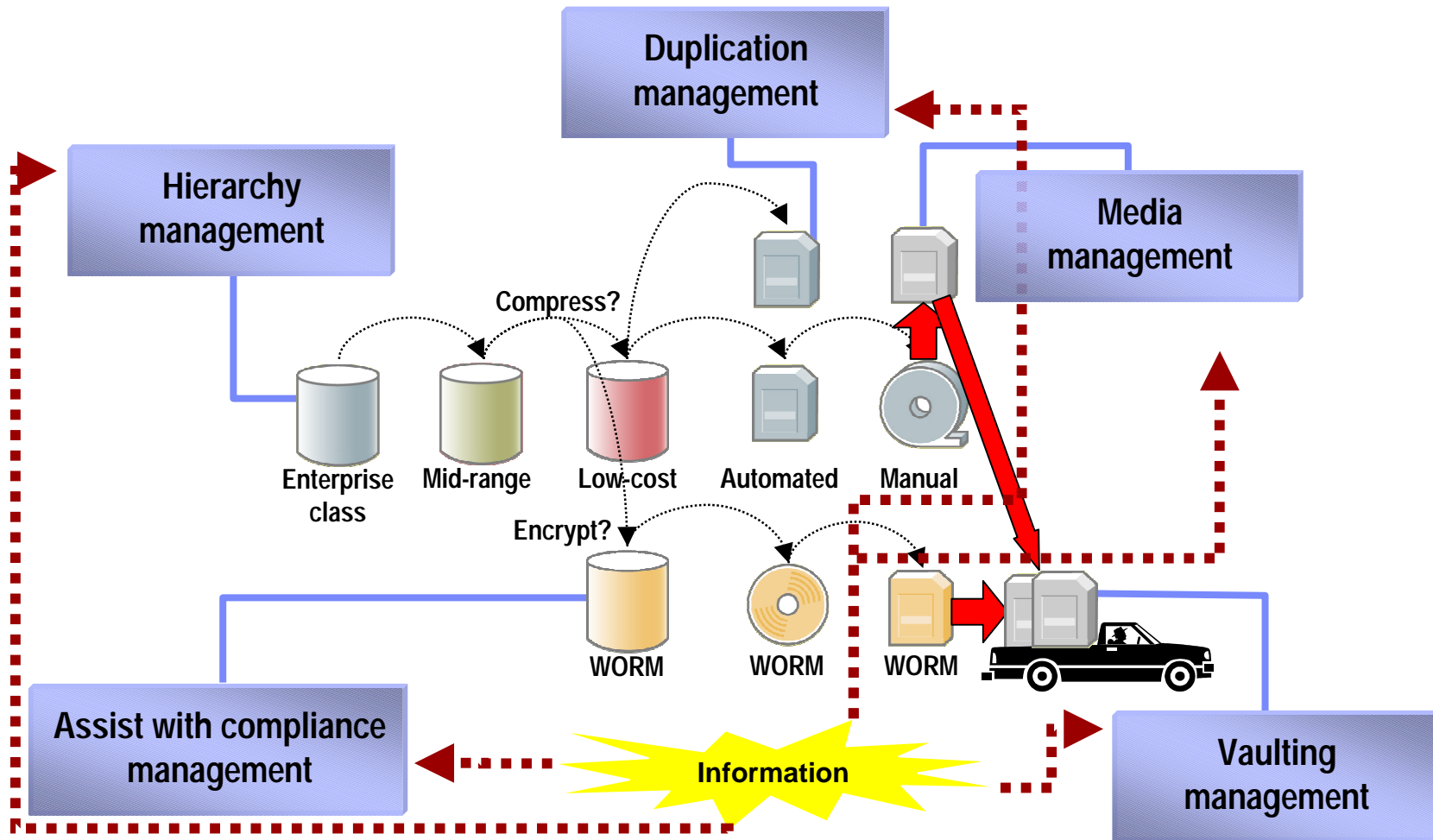
Content Management since 1988 – IBM DB2 Content Manager (CM)

- ▶ Records retention and lifecycle management
- ▶ Digital rights and distribution management
- ▶ Multimedia streaming

IBM Leadership in Information Lifecycle Management



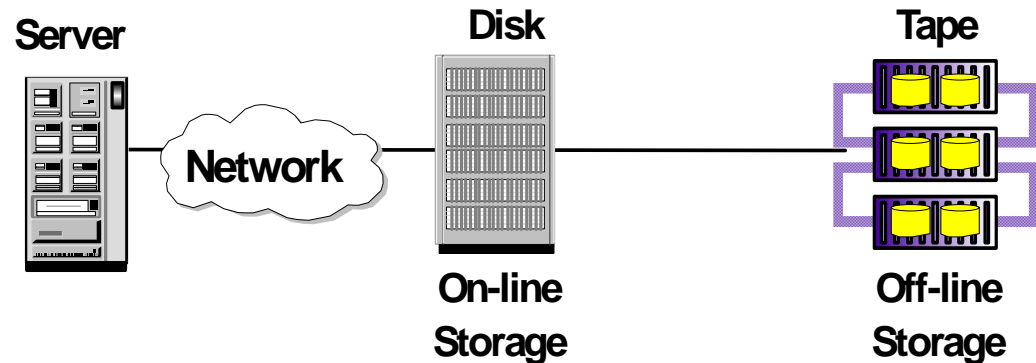
True ILM integrates data storage optimization and information management



Storage Solution Scenarios

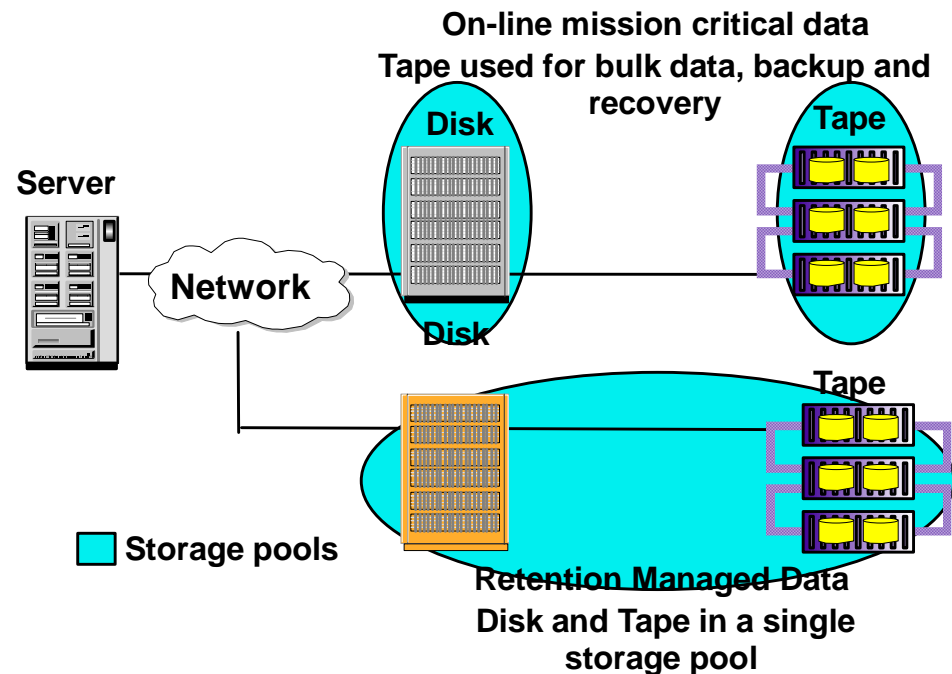
Traditional Scenario

- ▶ All data resides on high performance / high reliability disk
- ▶ Tape is used to archive and backup data



Retention Managed Data Scenario

- ▶ Transactional data resides on-line on high performance / high reliable disk
- ▶ Retention Managed Data resides on less expensive disk (SATA) or tape
- ▶ Tape (when present) is a part of the storage pool



The IBM TotalStorage Data Retention 450 provides a flexible, cost-efficient solution to build, grow and manage data

- Available Now
- Tiered Storage; add WORM Tape, Optical and/or DVD-ROM to significantly lower TCO
- Event-based retention management
- Deletion Hold/Release
- Media migration
- Integrated Solution based on modular components
 - ▶ **pSeries 615**
 - ▶ **FAStT 600 Controller**
 - ▶ **EXP100 (SATA HDDs)**
- Includes Tivoli Storage Manager for Data Retention
- Interoperable with existing IT systems
- Additional ISV integration to be announced



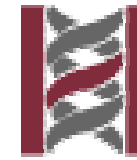
IBM Tivoli Storage Manager provides an open platform to manage heterogeneous business environments

- Available Now
- IBM Tivoli Storage Manager for Data Retention included in the Data Retention 450
- Data backup and restore
- Managed data archive & retrieve
- Centralized, comprehensive management
- Broad hardware support – 700+ devices
- Intelligent data movement
- Intelligent data storage
- Policy-based automation
- Integrated with DB2 Content Manager
- Additional ISV integration to be announced



Storage

Fred Hutchinson Cancer Center



FRED
HUTCHINSON
CANCER
RESEARCH
CENTER

■ Challenge

- ▶ Faced with the complex task of backing up millions of cancer research files and a database of more than 21 million objects
- ▶ Previous IT back up and recovery process was time consuming and required too much manual intervention.
- ▶ Needed to better manage storage, growing 30% per year

■ Solution

- ▶ IBM Tivoli Storage Manager
- ▶ IBM TotalStorage LTO 3584 tape library
- ▶ IBM pSeries and xSeries servers

Why IBM

- Automated backups to protect data
- Data can be cost-effectively staged on different types of media based on its research value to scientists
- On demand system frees up existing storage capacity
- Can now deliver better services to internal researchers

VÄRMLANDS COUNTY COUNCIL

ibm.com/storage/success

Vision

Integrated, standardised healthcare information system throughout Sweden

Challenge

Reduce time to access data including large x-ray image files, reduce costs, enhance security and reliability

Solution

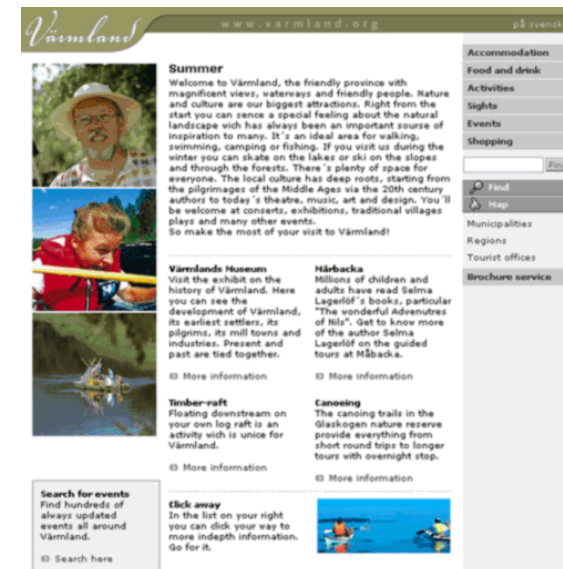
IBM TotalStorage Enterprise Storage Server model 800, IBM TotalStorage LTO UltraScalable Tape Library 3584, IBM eServer pSeries, IBM eServer xSeries

Value

Rapid access to patient data, highly-secure storage, shared data between hospitals, improved patient care

“We selected IBM TotalStorage LTO UltraScalable Tape Library 3584 because we believe it offers the highest availability and security on the market today.”

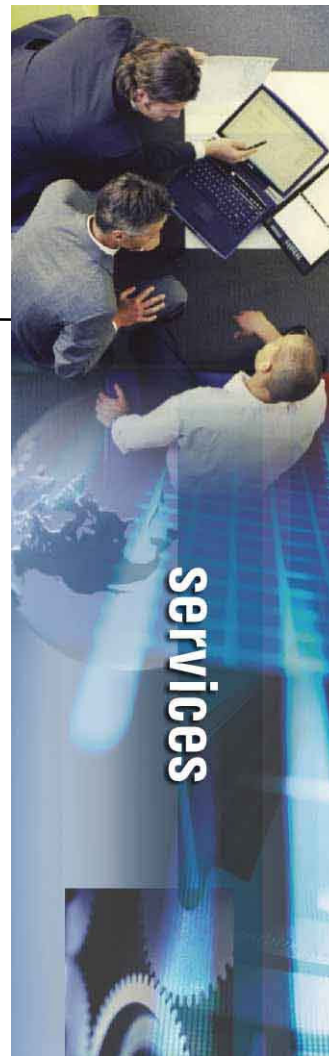
Eije Fritiofson, IT Manager, Värmlands County Council



How IBM can help

Business ←

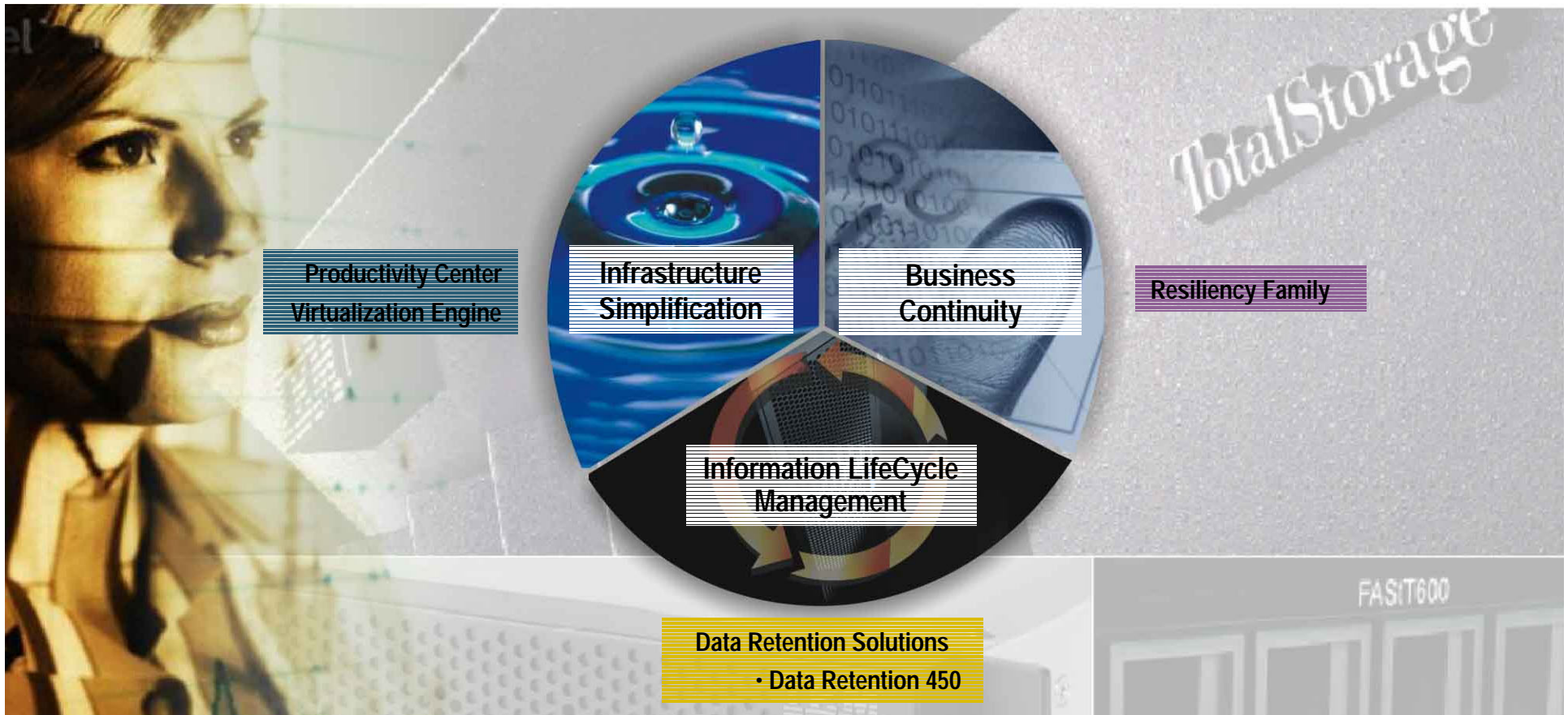
- **Assessment**
 - Financial
 - Business Risk and Compliance
 - Business Impact Analysis
 - Business Resiliency
- **Data Classification**
- **Strategy and Change**
- **Vertical expertise**



→ Technology

- **Assessment**
 - TCOnow! Tool
 - Infrastructure Simplification Support Guide
 - Scorpion TCO studies
 - IT Optimization
 - IT Recovery
 - Storage strategy and planning
- **Design and Implementation**
 - eBusiness On Demand Design Centers
 - BP Innovation Centers and TSSCs
 - Piper Data Migration Tool
 - ILM Architecture and Design
 - Storage virtualization
 - Business Continuity and Recovery
 - Tiered Storage Deployment
- **Hosting**
 - Recovery services and facilities

With information on demand, clients can respond with flexibility and speed to any customer requirement, market opportunity, or external threat



Information On Demand Solutions featuring IBM TotalStorage

Announcements

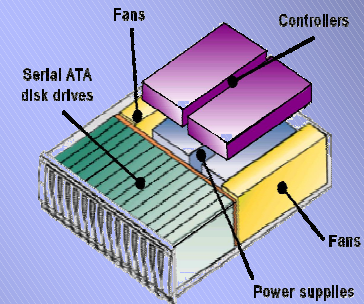
New IBM TotalStorage Offerings to improve businesses ILM implementations



Data Retention 450 –
Available Now



3592 Tape Drive with
WORM Capabilities –
Available May 2004



FAST100 Storage Server

FAST100 Storage –
Available 2Q2004

Statements of IBM's future product plans and direction are provided for information purposes only.
Plans and direction are subject to change without notice

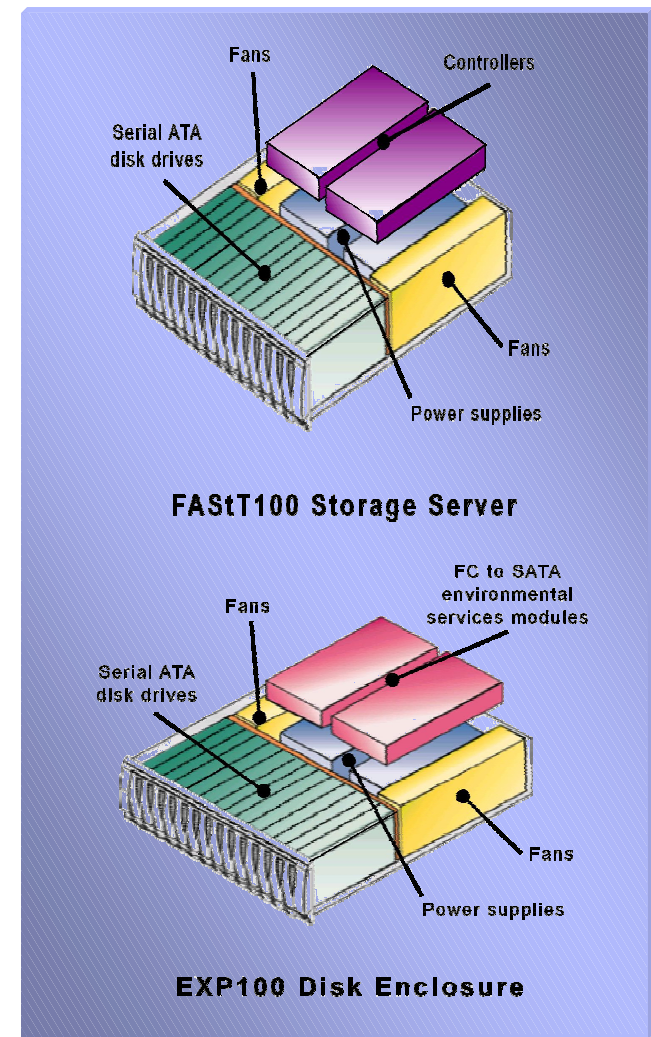
The IBM TotalStorage Enterprise Tape Drive 3592 with WORM capabilities provides flexible, cost-efficient non-rewriteable, non-erasable media to build, grow and manage data

- Planned Availability May 2004
- WORM function is planned to be supported on all IBM 3592 Tape drives
- 60GB and 300GB WORM tape cartridges also to be available
- Provides for appending of customer data on cartridge
- Broad subsystems support
 - ▶ **IBM 3494 Library, IBM 3584, Rack-mounted or STK Silo**
- 3592 WORM media may coexist in same library as standard media



The IBM TotalStorage FAStT100 provides a flexible, Serial ATA platform to build, grow and manage data

- Planned Availability 2Q2004
- FAStT Storage Server
 - ▶ Nearline Storage
 - ▶ Hot-swap and redundant power supplies and fans
 - ▶ Up to fourteen 250GB SATA HDD's inside the controller (3.5 TB)
 - ▶ Attach up to three EXP100's (3.5 TB each)
 - ▶ Four 2 Gbps host ports/SAN connections (two per controller)
- EXP100 Storage Expansion Unit
 - ▶ 14 Serial ATA disk drives
 - ▶ 2 Gbps Fiber Channel connectivity



IBM CONFIDENTIAL

IBM TotalStorage Resiliency Family

Core Data Replication Technologies on ESS

- **FlashCopy**

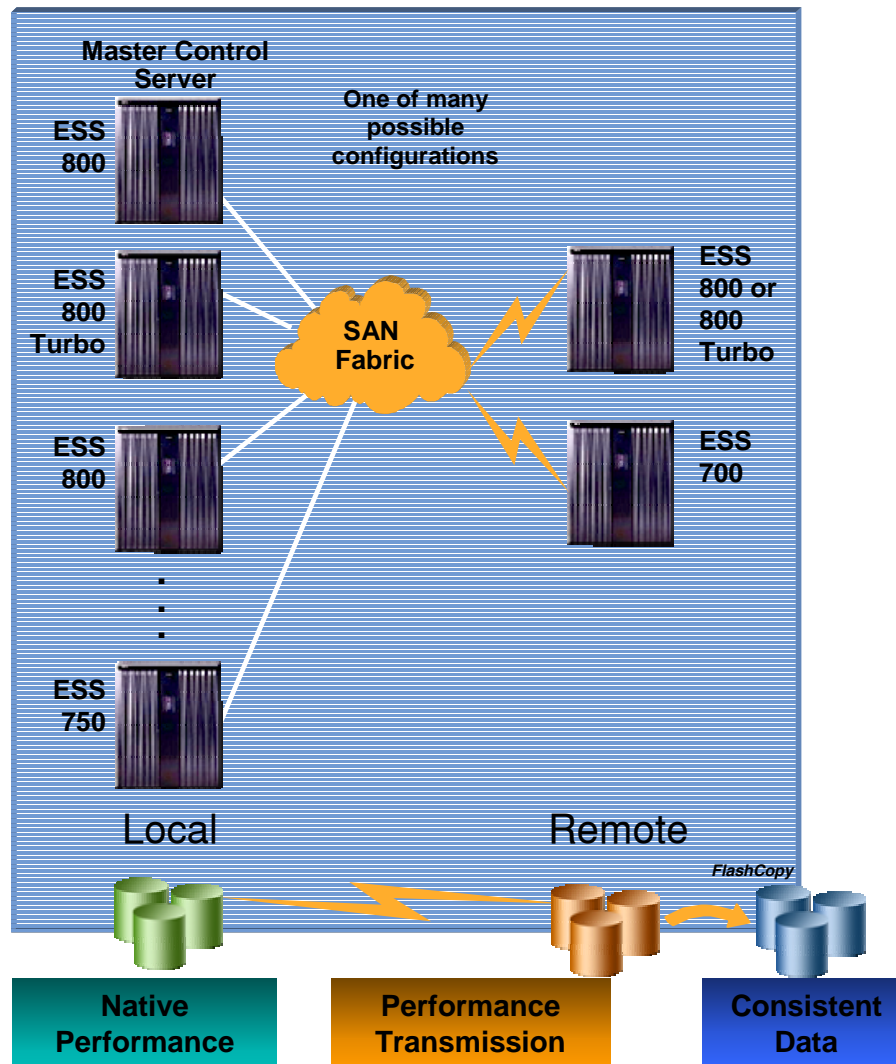
- **PPRC**

- ▶ *Metro Mirror (Synchronous PPRC)*
- ▶ *Global Mirror (Asynchronous PPRC)* *New ESS Enhancement*
- ▶ *Metro/Global Copy (two or three-site Asynchronous Cascading PPRC)*
- ▶ *Global Copy (PPRC Extended Distance)*

- **XRC**

- ▶ *Global Mirror for zSeries (XRC)*
- ▶ *Metro/Global Mirror for zSeries (three-site solution using Synchronous PPRC and XRC)*

Storage Consolidation and Disaster Recovery with *Global Mirror for ESS*



Designed to Provide:

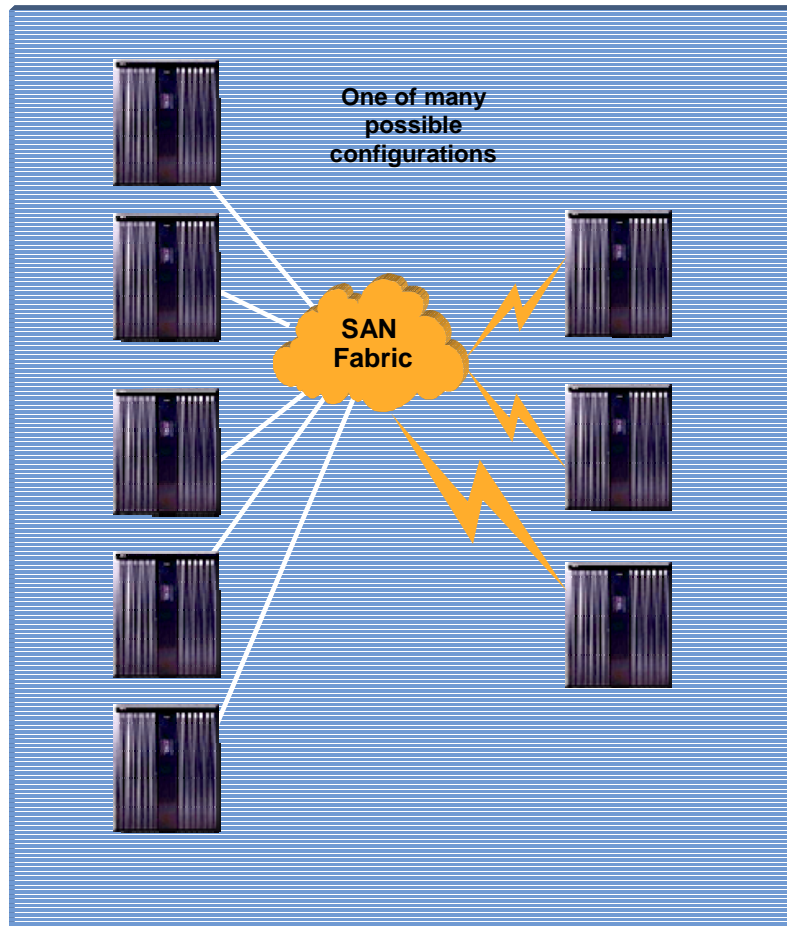
- **Global Distance:** Two-site consistent asynchronous disk mirroring functionality
- **Scalability:** Allows consistency groups to be created across multiple ESSs and to contain a mix of zSeries® and open systems data
- **Heterogeneous:** Data can span zSeries® and open systems data
- **Application Performance:** Native
- **Mirroring Performance:** Two ESS fibre channel disk mirroring links helps support large workloads

Intended Benefits

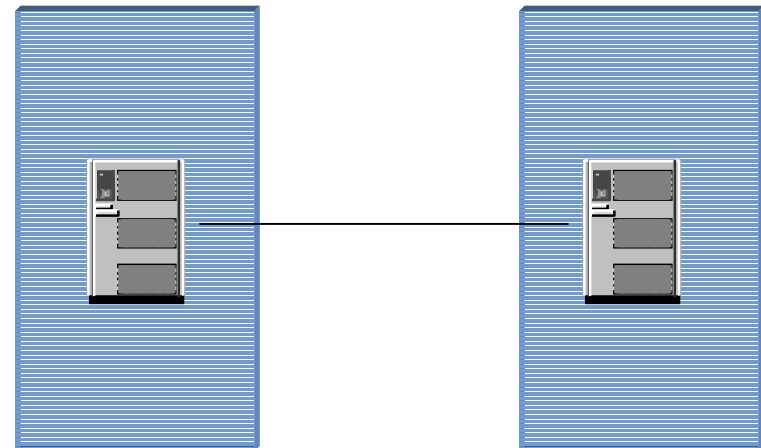
- **Autonomic:** Avoids the need for active external controlling software required to form consistency groups
- **Cost savings:** Avoids the need for server cycles to manage consistency groups
- **Low TCO**

Global Mirror for ESS

Characteristics and Customer Value



Scalability

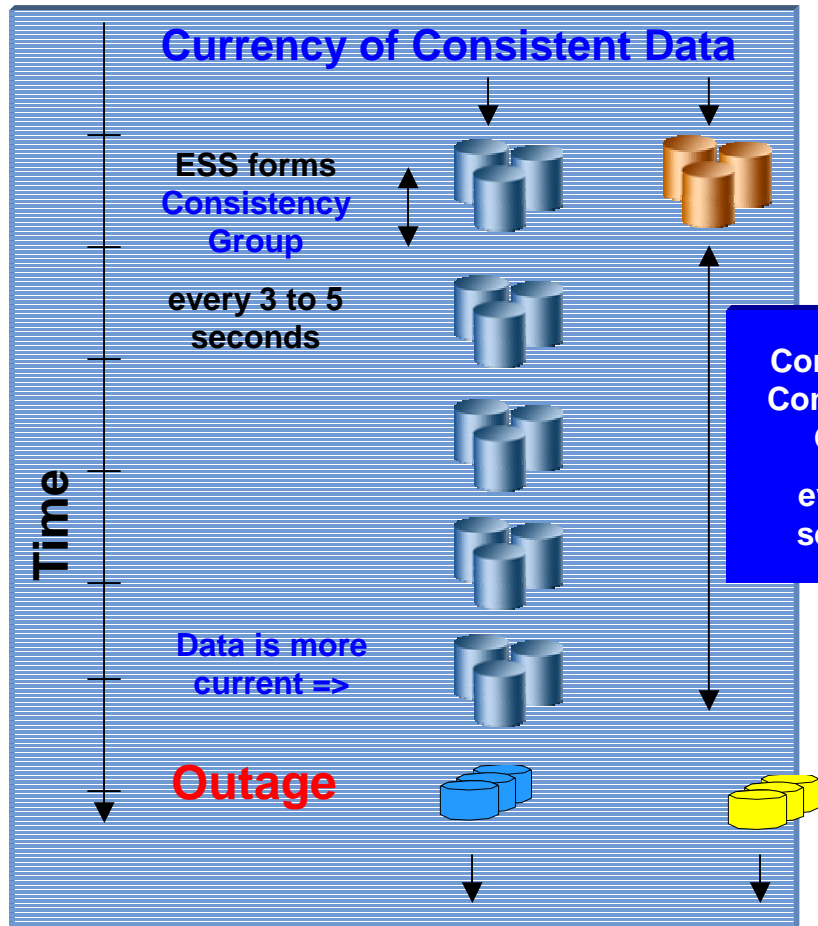


Up to 8 ESSs in Global Mirror Session

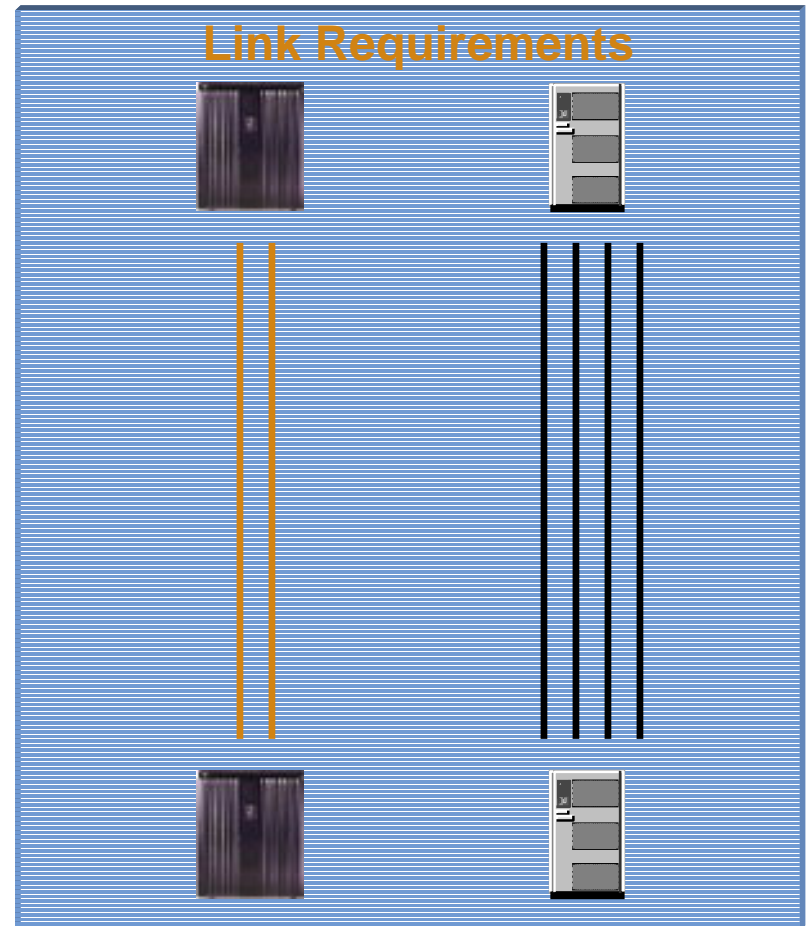
2 disk subsystems in competitive asynchronous disk mirror configuration

Global Mirror for ESS

Characteristics and Customer Value



Improved currency of 25 seconds could save up to 8000 OLTP transactions



Reduced number of mirroring links help save significant telecom costs

ESS Model 750

Enterprise Reliability, Entry Capacity & Price

- **An exciting new alternative to meet today's "on demand" storage requirements**
- **An excellent solution for mid-range physical disk capacity environments that demand the highest availability and functionality, at entry prices**
- **Designed to meet the high availability requirements of mainframe and open environments**
- **Designed to support non-disruptive upgrade to ESS Model 800**
- **Comes standard with many popular ESS Management options and three year warranty to help provide outstanding TCO**

Designed to offer low cost secondary site solution for business continuity

TotalStorage Software Roadmap

1H04	2H04	1H05
<ul style="list-style-type: none"> ▪ Storage Resource Mgr (agent for Linux on zSeries, reporting, CLI) ▪ SAN Mgr control/config, Cisco, TEC integration) ▪ Data Retention 450 (pre-configured & integrated, Tivoli Storage Manager for Data Retention) ▪ Multiple Device Manager (base device management, replication and performance mgmt) ▪ TotalStorage Productivity Center single orderable package including TSRM, MDM, TSANM and product Launchpad) ▪ SAN Volume Controller (more non-IBM storage, WinK3+clustering, VMWare, Bladecenter) 	<ul style="list-style-type: none"> ▪ Multiple Device Mgr (ESS Async Replication mgmt, updates) ▪ TotalStorage Productivity Center (provisioning workflows, Tivoli Provisioning Manager integration) ▪ SAN File System (multi-vendor storage, more heterogeneous clients, high availability enhancements) ▪ Tivoli Storage Mgr (improved admin, ease of use, more devices) ▪ Data Retention Offering capable, simplified cluster setup) 	<ul style="list-style-type: none"> ▪ Tivoli Storage Mgr (continued ease of administration improvements, TSM for SMB, compliance enhancements) ▪ SAN Volume Controller (more hetero disk, clustering) ▪ TotalStorage Productivity Center (UI integration, advanced workflows) ▪ San File System (Heterogeneous security, more clients)

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