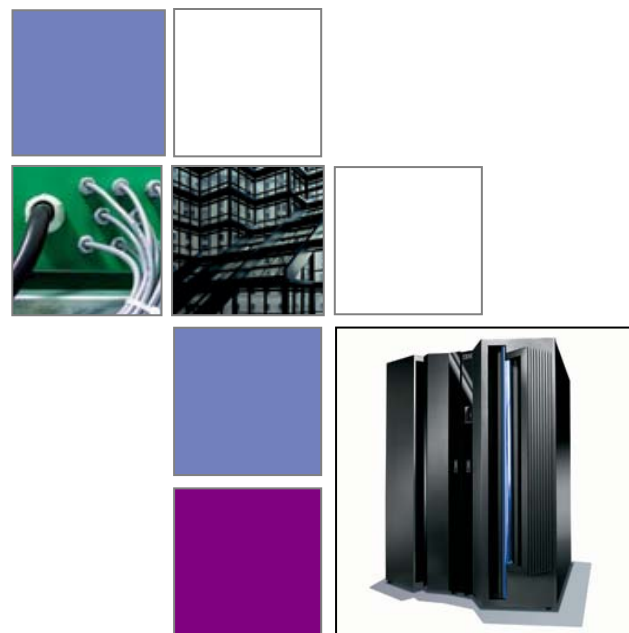# Announcement Overview

Introducing the new IBM System z9™
More than a server, it's a holistic approach to system design

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CICS*	IBM*	Parallel Sysplex*	z/OS*
ClearCase	IBM eServer	Rational*	z/VM*
DB2*	IBM logo*	System z9	zSeries*
e-business logo	IMS*	Tivoli*	
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GDPS*	On Demand Business logo		
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IBM applies a new way of thinking to systems

- **On Demand Business requires a focus on integration**

- **This requires a new, integrated computing model**

- **Why now?**
  - Open standards, virtualization and middleware are rapidly maturing
  - Technology and bandwidth enable a return to centralization
    - Customers find that the mainframe is a key integration point
    - Virtualization can be a force for openness, integration and investment protection
    - New system approaches are gaining rapid client acceptance
  - Clients want simplification; they are experiencing diminishing returns from existing computing model

IBM's holistic approach to systems design
The computing model for the On Demand Business

- **Bringing together industry-leading technologies**
  - Servers
  - Operating systems and middleware
  - Storage and networking technologies

- **Resiliency and security built in across the entire system**

- **The system has intelligent capabilities to self-optimize**
  - Across diverse resources
  - Across multiple workloads
  - As it constantly aligns with business priorities

- **Quality-of-service requirements drive platform selection**

Networking

Storage

Middleware

Operating systems

Server
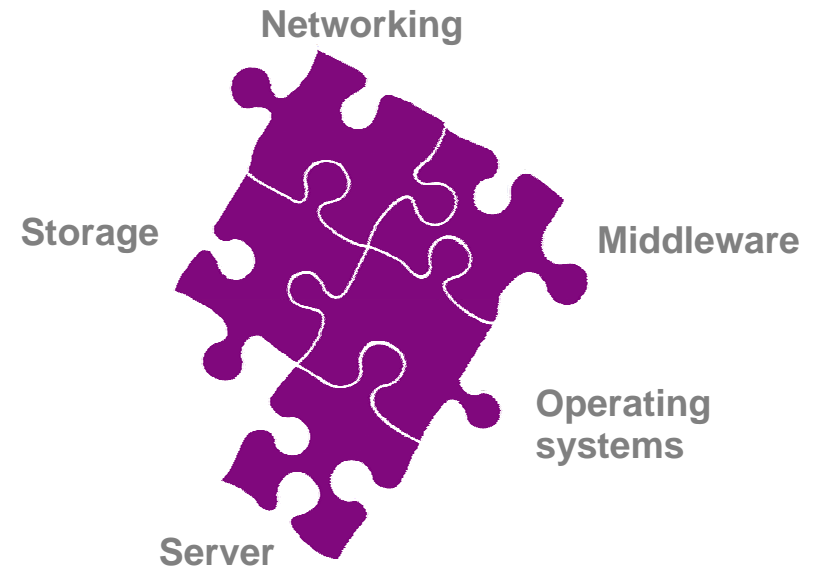
Holistic system design is at the heart of the IBM System z9 today

IBM is committed to deliver IT resources that support open standards and work better together to meet client needs.

The integrated computing model
A simplified, structured approach to managing your mixed environment

- **What does it allow you to do?**
  - Centrally integrate data, transactions and applications to better align with business processes
  - Centrally manage the infrastructure, spanning heterogeneous platforms
  - Optimize resource use across the infrastructure
  - Allocate enterprise-wide resources according to business priorities
  - Continue to build upon high levels of security and resiliency

- **How is it enabled?**
  - A simplified, virtualized foundation
  - Key open and industry standards throughout
  - Key capabilities extended from homogeneous world
    - Business resiliency and security
    - Intelligent workload management
    - Business integration

Heterogeneous enterprise

Single platform

Business resiliency & security

Workload management

Integration

IT simplification
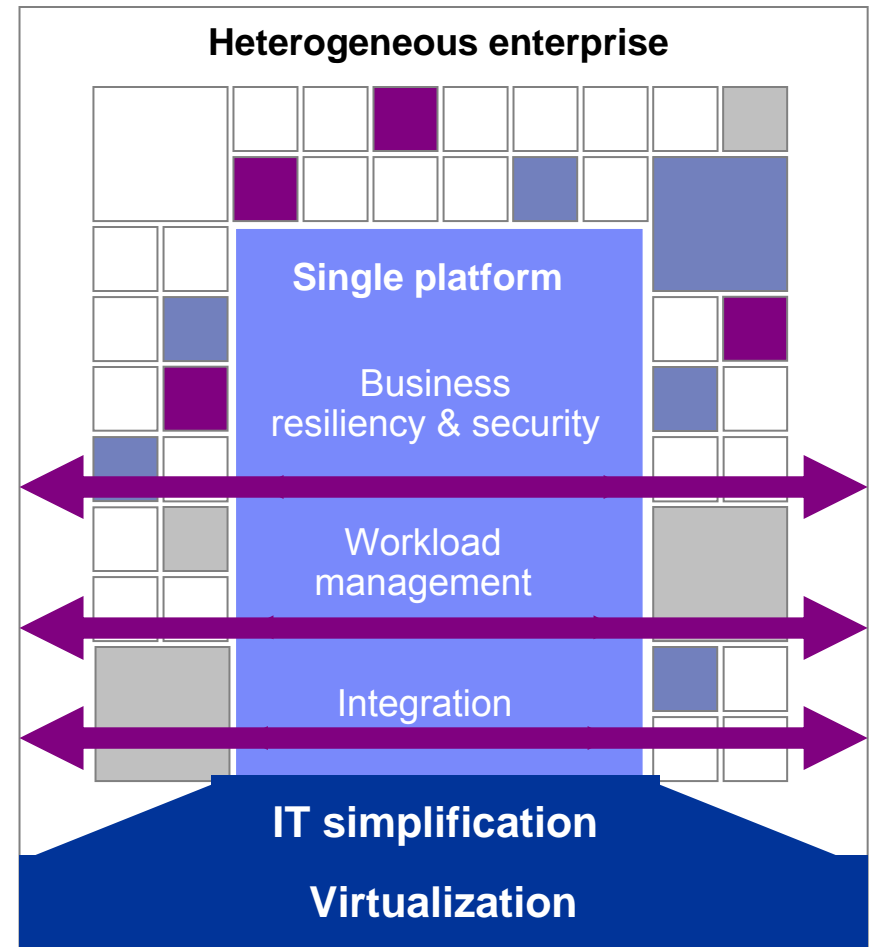
Virtualization

IBM announces the IBM System z9
Delivered via a holistic approach to systems design

- **Built on IBM's industry-leading mainframe technologies**
  - Virtualization of key resources
  - Resiliency and security
  - Intelligent workload management
  - Data, transaction and application integration

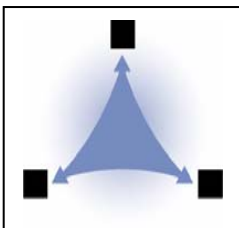- **Delivered through IBM's new systems approach**

- **Holistic systems design featuring**
  - An all-new server designed to be more:
    - Secure
    - Available
    - Scalable
  - Announcing new software designed to further:
    - Integrate applications and information
    - Enable resiliency across the enterprise
    - Manage the breadth of the infrastructure
    - Simplify IT operations
  - Working with networking and storage to help deliver:
    - Improved responsiveness
    - Lower costs
    - Higher availability
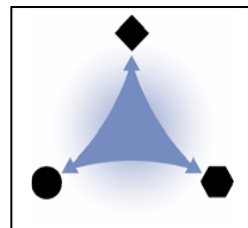   - Better recoverability

System z9 is built on IBM's industry-leading technologies

- **Nearly four decades of IBM virtualization heritage and technology enhancement**
  - Shares processors, memory and channels between mixed application workloads
  - Designed for highly granular allocation and reallocation of resources on the fly according to business priorities

- **With virtualization comes simplification**
  - Create multiple virtual servers on a single system
  - Create virtual pools of storage not tied to any specific hardware
  - Run diverse applications, even multiple operating systems, simultaneously without necessarily investing in new hardware

- **IBM plans to extend mainframe capabilities to intelligently manage virtualized resources**
  - Across multiple resource pools
  - Spanning heterogeneous platforms
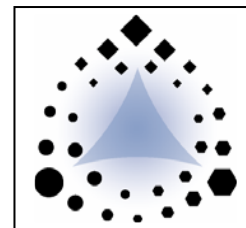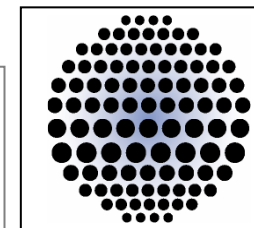 - Automatically across the entire infrastructure

Virtualize like resources	Virtualize unlike resources	Virtualize the enterprise	Virtualize beyond the enterprise

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Getting the most value from your IT
Delivering value today and tomorrow

- **The mainframe charter recognized the need to continually improve price/performance**
  - Lowering costs across the board with each successive generation
    - Specialty engines delivered up to a 58% percent price/performance improvement from z900
    - No charge MES for specialty engines
    - z9109 memory pricing now as low as US$8,000 per GB
    - z9109 hardware maintenance cost down 46 percent from z900
  - Delivering better value out of your software
    - z9109 delivers a 19 percent reduction in chargeable MSUs from z900
    - Innovative integration solutions with zAAPs
    - Competitive tools portfolio
  - Delivering aggressive pricing to enable new workloads
  - IBM plans to continue to deliver innovative and flexible pricing, providing solid value*
    - Further refinement in utilization pricing metrics
    - Further leveraging specialty engines to improve integration and provide differentiating value

Arcati

Predicted average cost
per end user in 2010

US$24,000

US$19,000

US$6,250

Mainframes　　UNIX minis　　PC servers

Five-year costs for hardware, software and maintenance

Arcati Research 2005.
"The Dinosaur Myth 2004 Update."

Prediction: *The five-year cost of mainframes will be one third of UNIX mini environments and one quarter of PC server environments.*

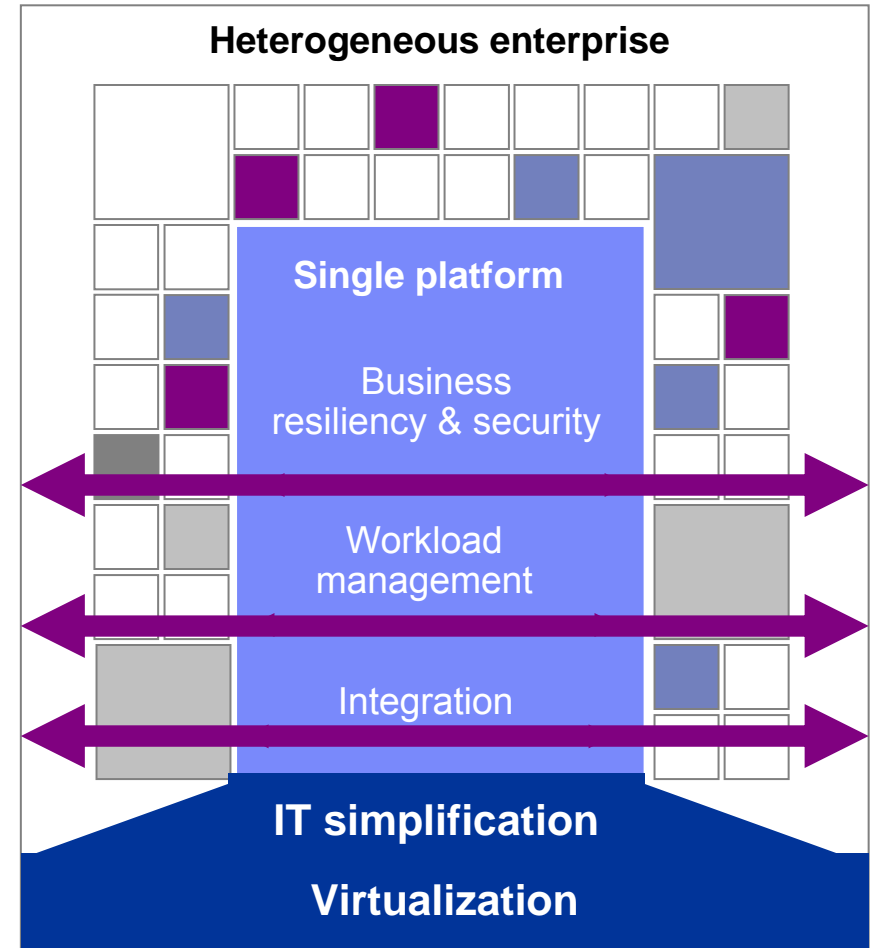*Arcati Research 2005. "The Dinosaur Myth 2004 Update."*
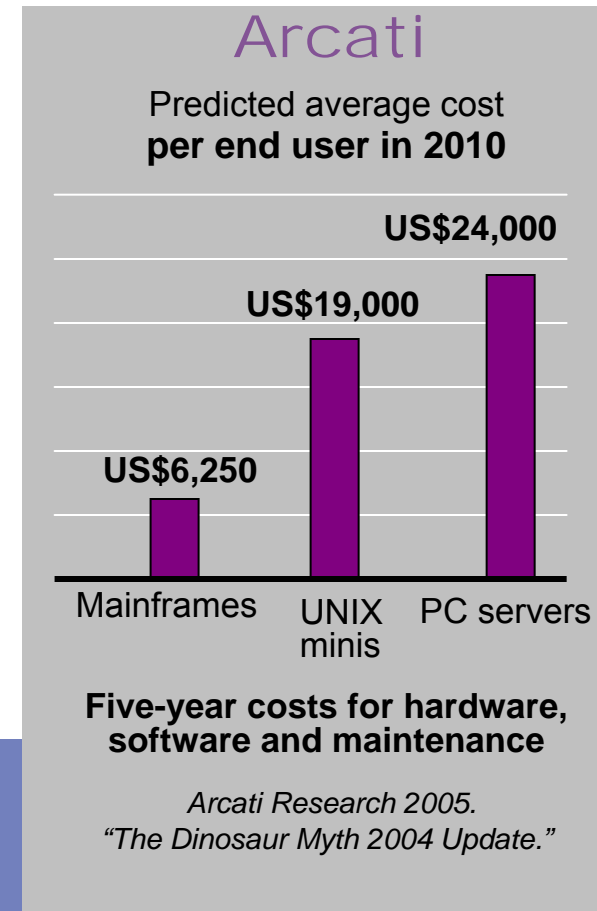
IBM System z9

Meeting business needs today, providing a foundation for the future

- **Extending its leadership in**
  - Business resiliency and security
  - Intelligent workload management
  - Business integration

- **Designed with a holistic systems approach**

- **Able to intelligently manage across the enterprise**

"Leadership is not only about technology innovation, but also delivering value and actively supporting the mainframe community."

IBM Mainframe Charter

Heterogeneous enterprise

Single platform

Business resiliency & security

Workload management

Integration

IT simplification

Virtualization

IBM System z9-109 Overview

ENABLING BUSINESS. A THROUGH Z.

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DB2*	IBM eServer	S/390*	z/VM*
DB2 Universal Database	IBM logo*	System z9	z/VSE
DirMaint	IMS	Tivoli*	zSeries*
ESCON*	NetView*	TotalStorage*	zSeries Entry License Charge
FICON*	OMEGAMON*	VSE/ESA	
GDPS*	On Demand Business logo	VTAM*	
HiperSockets	Parallel Sysplex*	WebSphere*	
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Introducing the IBM System z9-109

The server built to protect and grow with your on demand enterprise

The IBM System z9™ 109 (z9-109) delivers excellence in large scale enterprise computing and is designed and optimized for the on demand enterprise

intelligent

powerful

innovative

- **Built on more than 40 years of industry-acknowledged leadership and taking that leadership to new levels**
  - Scalability
  - Availability
  - Security

- **Breaking new ground**
  - Greater scalability and performance to grow with your business
  - Reducing outages to help your business stay always on
  - Flexibility to efficiently respond to your business needs

System z9 raises the standard !
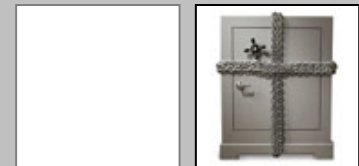
z9-109 – Delivering increased capacity and performance

- **Delivering new levels of scalability**
  - Built on modular book design – one to four books
  - Five models with one machine type
    - 1 to 38-way high performance server (four models)
    - Up to 54-way enhanced model for high performance and maximum capacity
  - The z9-109 uniprocessor is expected to deliver 35% more capacity than the z990 uniprocessor *
  - The S54 offers 95% more server capacity than z990 **
  - Two spare processor units per server
  - Increased memory – up to 512 GB per server
  - Multiple Subchannel Sets (MSS) for an increased number of logical volumes
  - Up to 60 logical partitions (2X improvement)

- **Improved I/O Performance**
  - Up to 80% more bandwidth than the IBM eServer zSeries 990 (z990)
  - Can improve FICON performance with Modified Indirect Data Address Word (MIDAW) facility

  - * LSPR mixed workload average. z9-109-701 Vs z990-301
  - ** This is a comparison of the z9-109 54-way and the z990 D32 and is based on LSPR mixed workload average.
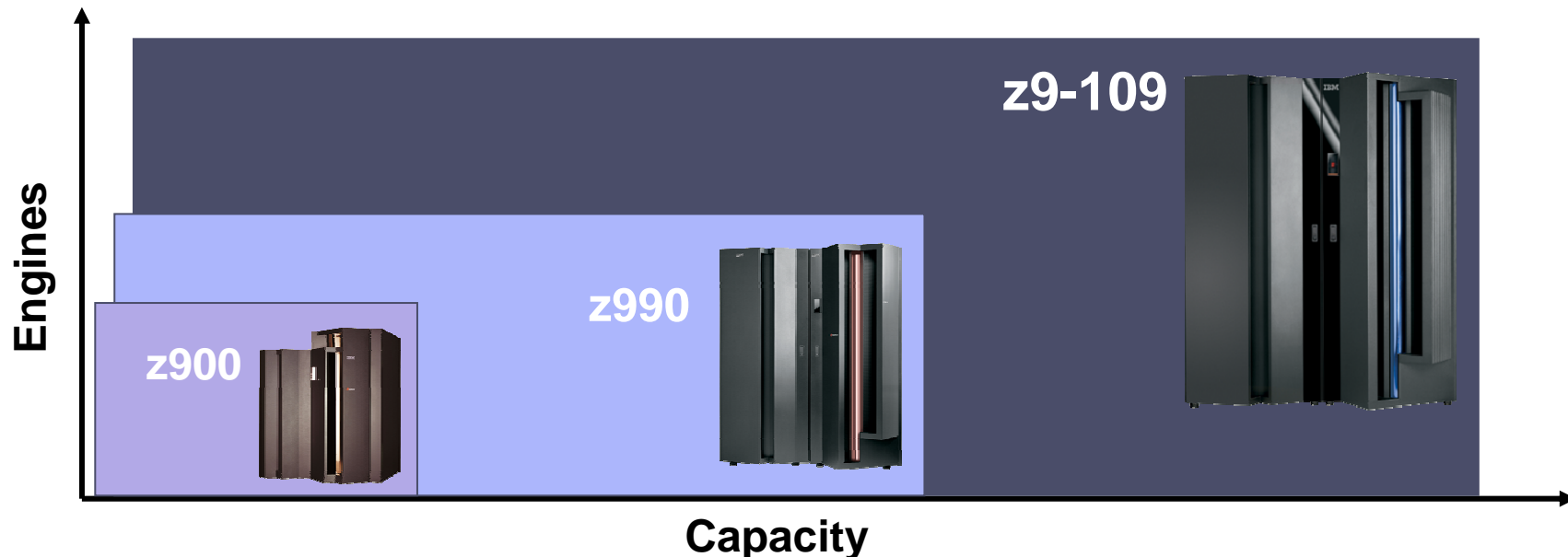
z9-109 – Improved performance on FICON
Modified Indirect Data Address Word (MIDAW) Facility

- **MIDAW facility – new system architecture and software exploitation designed to improve FICON performance**

  - Can improve FICON performance for

    - Extended format data sets – including DB2® and VSAM

  - Can improve channel utilization and can significantly improve I/O response times

    - Internal IBM DB2 Table Scan tests(*) with the z9-109, FICON® Express2 and the DS8000 control unit comparing MIDAW facility configurations to pre-MIDAW configurations showed:

      - 36% to 58% reduction in response times

      - 35% to 56% reduction in channel busy

      - 56% to 126% improvement in I/O throughput

  - Supported on z/OS® 1.6 and above

    * See Backup slide "Parallel DB2 Table Scan, EF 4K (single channel)" This document contains performance information

    Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the numbers stated here.
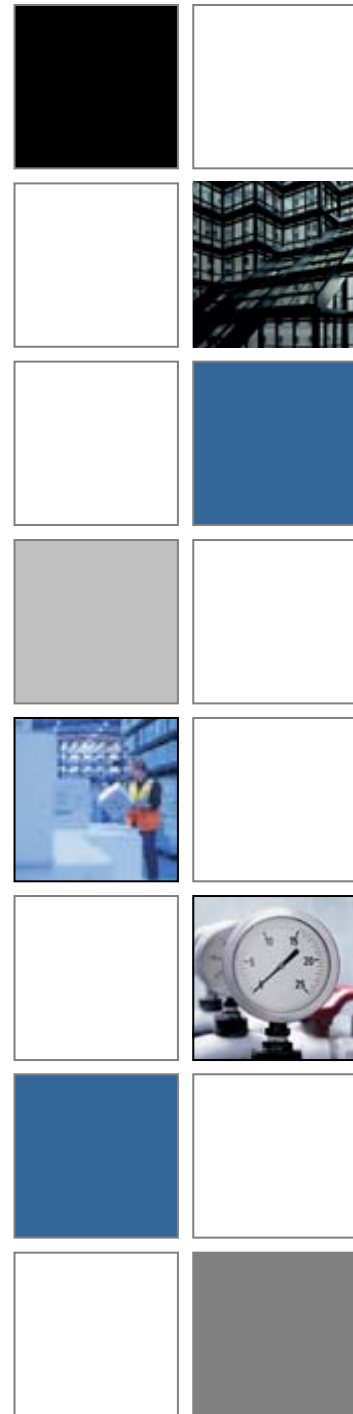
z9-109 – Providing new levels of availability

- **New enhanced book availability and redundant I/O interconnect – increasing z9-109's availability by helping to avoid unplanned outages:***

  – Enhancing recovery of resources

  – Improving ability to nondisruptively add and repair memory resources

- **Improving the application of hardware driver maintenance:***

  – Potentially reducing planned outages using enhanced driver maintenance

- **Extending capability for Capacity Backup Upgrade (CBU) to include specialty engines**

- **Improving memory availability with flexible memory offering**

*Customer pre-planning is required and may require purchasing additional hardware resources

z9-109 – Enhancing security

- **New integrated cryptography features offer more security options on z9-109**
  - Advanced Encryption Standard (AES) support in z9-109 hardware
  - Stronger hash algorithm with SHA-256
  - Pseudo Random Number Generator
- **Crypto Express2 improved flexibility and speed**
  - Configurability options, two coprocessors, two accelerators or one of each
  - With both adapters configured as accelerators each Crypto Express2 card is designed to provide up to 6000 SSL handshakes per second *
- **Secure encryption facility for z/OS to help protect data shared with partners, suppliers, and customers ****
  - Designed to leverage z/OS key management and high performance hardware encryption
- **Can help to achieve higher levels of certifications and compliance**
- **Virtualized cryptographic capabilities for card sharing by Linux virtual servers**
- **Complementary IBM technology and vendors' advanced security solutions**
  - Can enable a cross-platform model that can extend RACF capabilities to the enterprise
  - May provide the capability of integrating security enforcement across the networking enterprise

* These measurements are examples of the maximum transaction/second achieved in a lab environment with no other processing occurring and do not represent actual field measurements. Details available on request.

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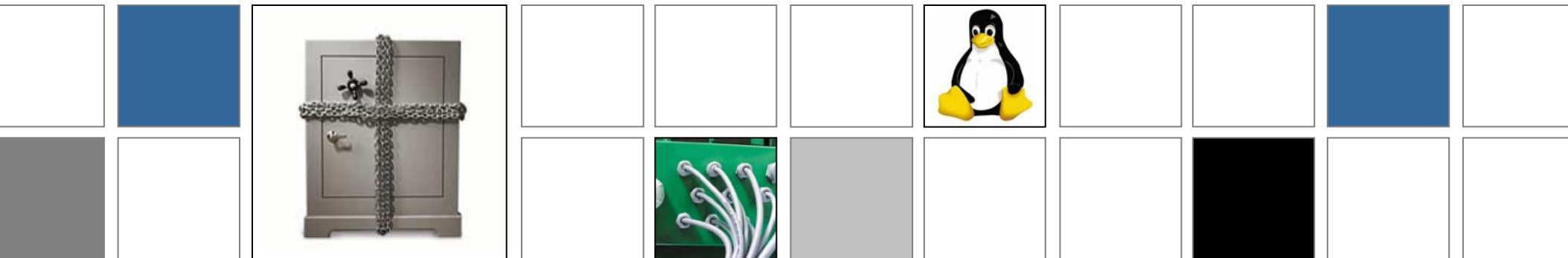
z9-109 – Delivering enhanced connectivity for the system
Within the server, between servers, to the data and to the network

Within the Server
- **Network in a box with HiperSockets**
- **Integrated console controller**
- **Integrated communications controller support (OSA for NCP)** ⭐

To the Data
- **Up to 336 FICON or 1024 ESCON channels** ⭐
- **NPIV provides channel virtualization for Fibre channels** ⭐
- **FICON performance improvement with MIDAW facility** ⭐

To the Network
- **Performance assists for z/VM guests**
- **HiperSockets IPv6 support** ⭐
- **New 1000BASE-T support** ⭐
- **VLAN Mgmt – GVRP** ⭐

For Clustering
- **Parallel Sysplex®**
- **Preview STP** ⭐

z9-109 delivering new functions and features

Five New Hardware Models

Faster Uni Processor

Up to 54 CPs

Up to 512 GB Memory

Up to 60 LPARs

CBU for IFL, ICF and zAAP

Separate PU Pool Management

Redundant I/O Interconnect

Enhanced Driver Maintenance

Enhanced Book Availability

Dynamic Oscillator Switchover

Preview*
Server Time Protocol

Faster 2.7 GB STI and more of them

MIDAW facility

Multiple Subchannel Sets per LCSS

63.75K Subchannels for Set-0

Up to 336 FICON® Express2 Channels

N_Port ID Virtualization

IPv6 Support for HiperSockets™

OSA-Express2 1000BASE-T

OSA-Express2 OSN (OSA for NCP)

Enhanced CPACF with AES, PRNG and SHA-256

Configurable Crypto Express2

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z9-109 Operating System Software

| Operating System	ESA/390 (31-bit)	z/Arch (64-bit)
z/OS Version 1 Release 4, 5, 6, 7	No	Yes
Linux, 64-bit distribution	No	Yes
Linux, 31-bit distribution	Yes	No
z/VM Version 5 Release 1, 2	No	Yes
z/VM Version 4 Release 4	Yes	Yes
z/VSE™* 3.1, VSE/ESA™ 2.6, 2.7	Yes	No
z/TPF Version 1	No	Yes
TPF Version 4 Release 1 (ESA mode only)	Yes	No

*z/VSE can execute in 31-bit mode only. It does not implement z/Architecture™ and specifically does not implement 64-bit mode capabilities. z/VSE is designed to exploit select features of IBM System z9 and eServer zSeries hardware.

Note: Please refer to the latest PSP bucket for latest PTFs for new functions/features.
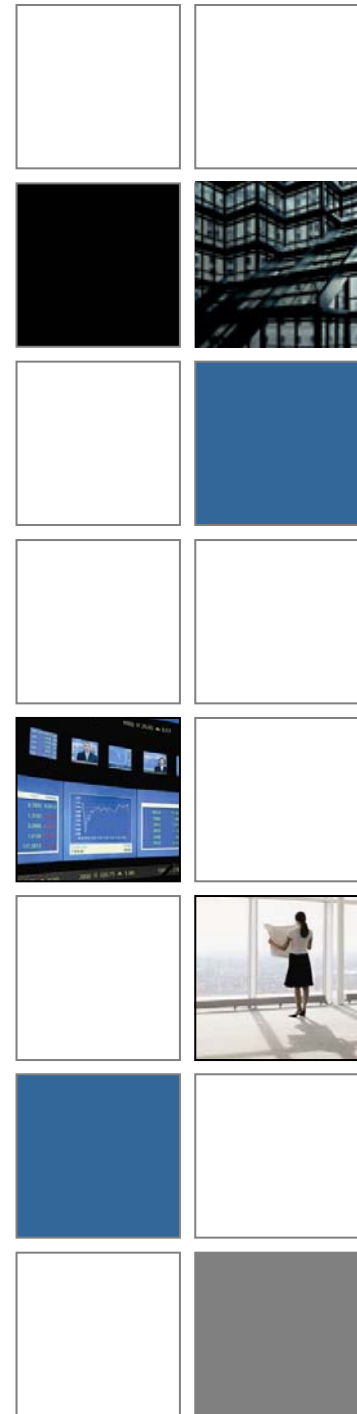
Leadership in systems innovation

- **New innovations in business resiliency help to keep your business secure and provide peace of mind**
  - Helping to keep your applications protected against planned and unplanned outages
  - New security options help to tighten system security

- **Advanced virtualization and intelligent workload management help you maximize resources**
  - z9-109 offers improved scalability, increased logical partitions and management of specialty engines

- **The System z9 environment provides the ability to integrate applications and data**
  - Specialty engines can provide price/performance improvements
  - Upgradeability options to z9-109 help provide investment protection
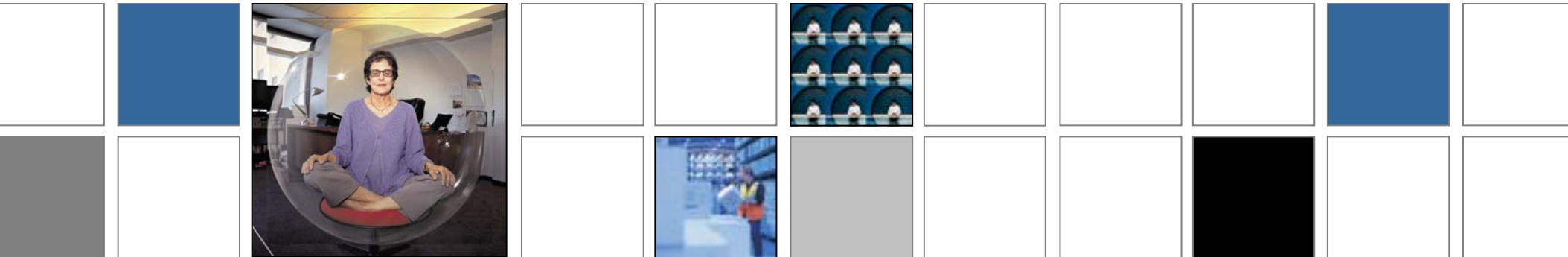
IBM TotalStorage Announcement Overview

The latest IBM storage technology extending the scope of the IBM System z9 and eServer zSeries integrated infrastructure

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ESCON*
FICON*
GDPS*
IBM*
IBM eServer
IBM e (logo) server
IBM logo*
iSeries*

On demand business logo
OS/390*
S/390*
System z9
TotalStorage*
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A Holistic Approach – IBM TotalStorage Solutions
*Offering storage built to help protect and grow with your on demand enterprise*
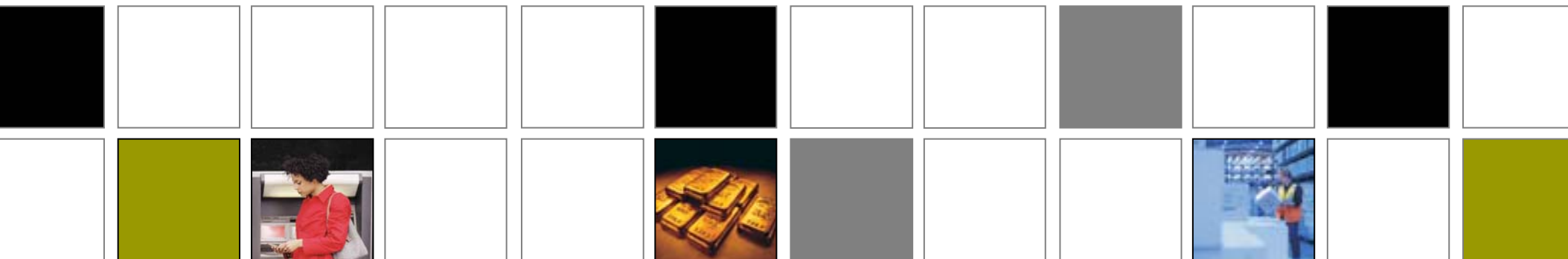
IBM TotalStorage® products

for IBM System z9™ and

IBM eServer™ zSeries®

environments provide further

leadership in large scale,

enterprise computing

- **Enhanced scalability, performance and affordability with IBM TotalStorage DS8000 and DS6000 Series disk systems**

- **Support for enhanced data protection and application availability with leadership products for replication, mirroring, and disaster recovery**

- **Support for greater productivity through infrastructure consolidation / simplification**

- **Support for lower costs through better management of data throughout its lifecycle**

- **Solutions designed for the On Demand enterprise – IBM SAN, Disk, Tape, Software, and Services**

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The Mainframe Charter – Providing a Strategic Framework

It is our intention to…
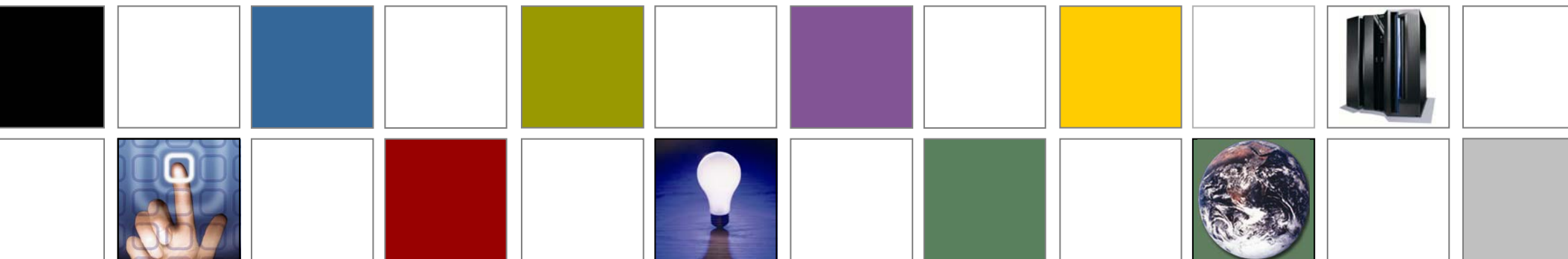
Innovation

- Provide leadership in innovation to enhance the use of IBM System z9 and eServer zSeries platforms to support increasingly integrated and flexible business processes for the On Demand Business.*

Value

- Enhance the value proposition and lower the cost of computing of System z9 and zSeries solutions in a way that is compelling, clear, and consistent.*

Community

- Support programs designed to foster vitality in the System z9 and zSeries communities, helping to promote a strong application portfolio and world-class support services.*

* Excerpted from the Mainframe Charter – August 2003

The IBM TotalStorage Disk System Family

Disk Storage for IBM System z9 and eServer zSeries

New Standard in Pricing and Packaging	Foundation	New Standard in Functionality, Performance, TCO
IBM TotalStorage DS6000	ESS 750 / 800	IBM TotalStorage DS8000

Common management platform

Common suite of copy services

Highly scalable

Outstanding ROI, TCO

World-class service and support

Enterprise Storage Continuum

**IBM TotalStorage DS Family innovations designed to help you:**

- **Simplify** the underlying IT infrastructure of storage and its management to lower cost and complexity while increasing the ability to respond to changing needs

- Support **business continuity**, security and data durability

- Efficiently manage information **throughout its lifecycle**, relative to its business value

Leadership in Resiliency

- **Statement of Direction: Capability for enhanced business continuity using the IBM TotalStorage DS8000 Series**

- **Consistency groups that span z/OS® Global Mirror (XRC) and Global Mirror (Asynch. PPRC). This is intended to help customers:**

  - Achieve rapid recovery by providing a common, consistent recovery point for applications and data residing on open (UNIX, Windows, Linux®, etc.) and System z9 and zSeries systems

  - Protect investment in z/OS Global Mirror (XRC), the industry's most robust global mirroring solution for System z9 and zSeries

  - Enable exceptional scalability with consistency groups that span multiple IBM DS8000s or Enterprise Storage Servers (ESS)

  - Provide flexibility and choice to implement multiple IBM global mirroring solutions across the enterprise with support for data integrity and consistency at a remote site
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Integrating the enterprise
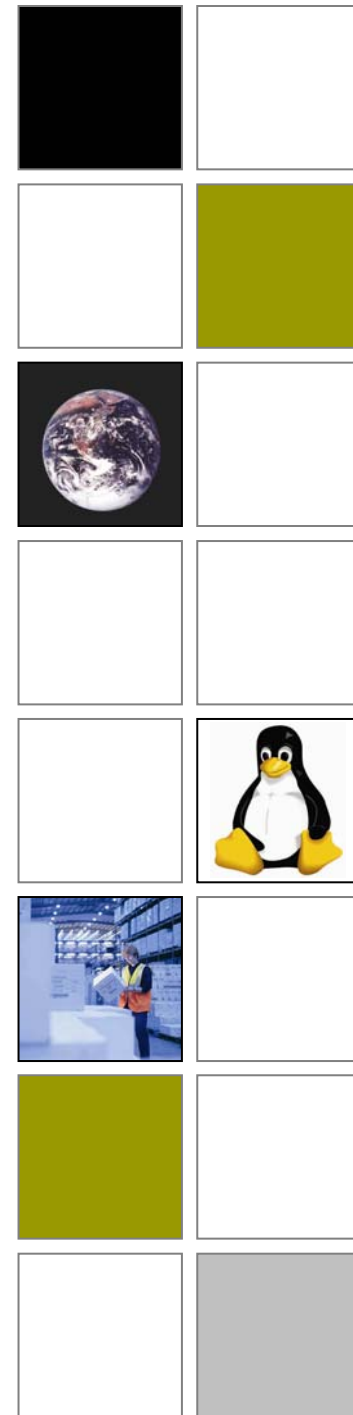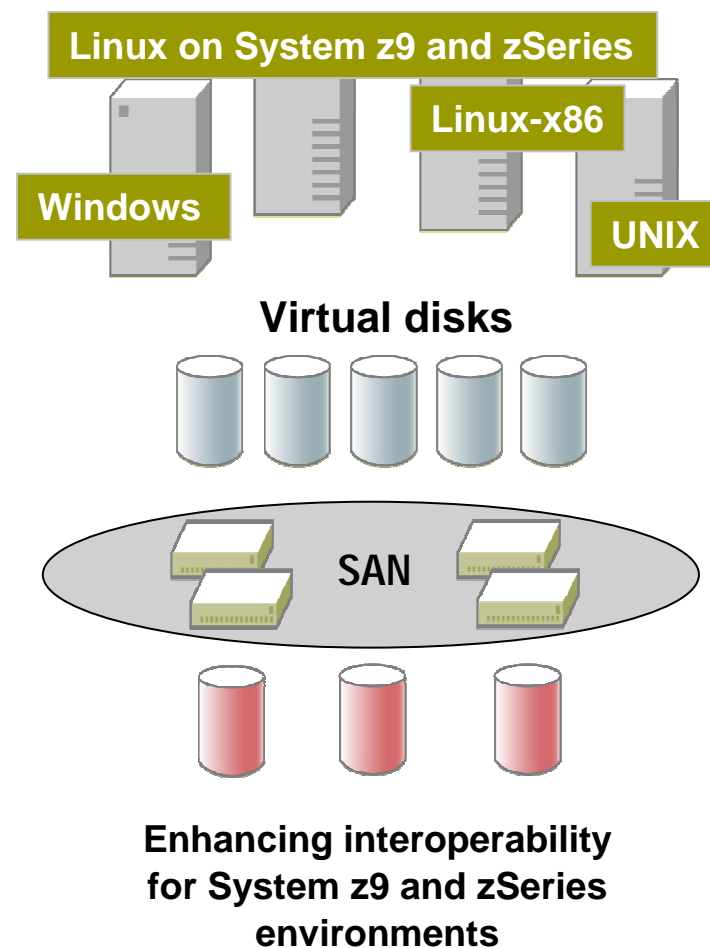
Continuous Data Protection

- **Statement of Direction: Continuous data protection function on the IBM TotalStorage DS8000 Series for data in System z9 and zSeries environments. This capability is intended to:**

  - Offer a new level of protection with a function for data backup and recovery on System z9 and zSeries using IBM TotalStorage enterprise disk products

  - Record data changes continually, as opposed to halting an application's I/O to create the data copy

  - Take less disk capacity than multiple point in time copies using traditional implementations

  - Store data changes incrementally rather than storing numerous data images

  - Provide rapid recovery of data from any point in time captured in the backup capacity

  - Increase data resiliency

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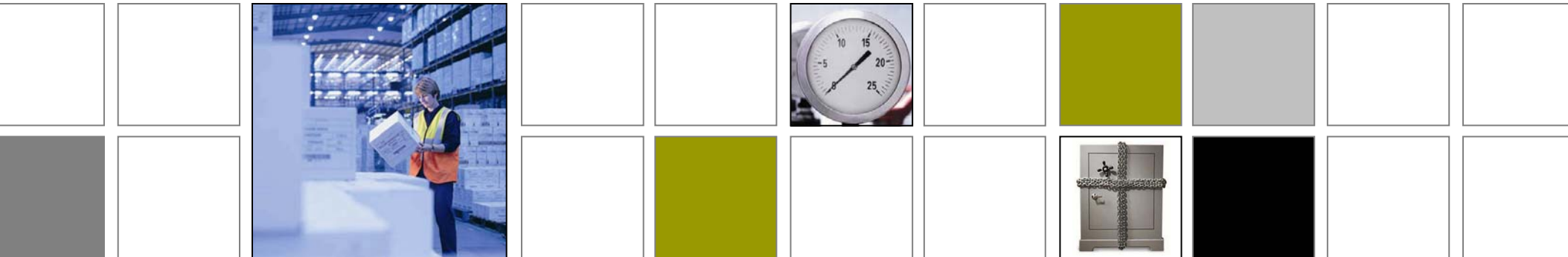
Expanded Interoperability for IBM TotalStorage SAN Volume Controller

- **Statement of Direction: Support for Linux operating environments implemented on IBM System z9 and zSeries platforms with storage managed by SAN Volume Controller. This capability is intended to:**

  - Enable System z9 and zSeries servers to utilize open systems storage pools created by SAN Volume Controller

  - Create a tiered storage environment for Linux operating environments in System z9 and zSeries server environments

  - Simplify volume management by combining mainframe and open systems storage environments into a single pool, managed from a central point

  - Expand the host environments managed by SAN Volume Controller

  - Improve application availability by enabling changes to the storage infrastructure without disrupting the applications running on the hosts

Linux on System z9 and zSeries

Linux-x86

Windows

UNIX

Virtual disks

SAN

Enhancing interoperability for System z9 and zSeries environments

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The IBM TotalStorage Tape Family

Virtualization and direct attachment options

3592 J70 | **VTS** | **PtP VTS**

- Can help to reduce resources required to support the System z9 and zSeries environments
- Supports up to 5 TB of usable cache capacity, 256 virtual drives and **500,000** virtual volumes
- Advanced Policy Management allows DFSMS control volume placement and cache
- Includes a Peer-to-Peer configuration that offers immediate or deferred copy modes

- **Solutions support System z9 and zSeries as well as major open system platforms**

- **Advanced Management tools support automated data management**

- **Support virtualization to help reduce TCO and improve operational efficiencies**

- **Designed to provide enterprise class reliability to help support continuous operations**

Common support for current components

3584 Library | **3494 Library**

- Scalable from 1 to 16 frames to address diverse customer requirements and allow linear growth
- Supports up to **8 Virtual Tape Servers** and up to **192 tape drives** per 3584 Tape Library
- Designed to support multiple tape generations to facilitate adoption of new technology
- Stores up to 6,000 cartridges with a storage capacity of **5.6 PB** (with a 3:1 compression factor)

Tape Enhancements for Vaulting Efficiencies

- **Statement of Direction: IBM TotalStorage Virtual Tape Server (VTS)**

  - Enhanced Import/Export capability for IBM TotalStorage VTS products that will allow 'sets' of cartridges to be interchanged

    - Can enhance operational efficiencies for customers who choose to move cartridges offsite for manual vaulting

  - Support for full-duplex communication between three sites for enhanced electronic vaulting with PtP VTS
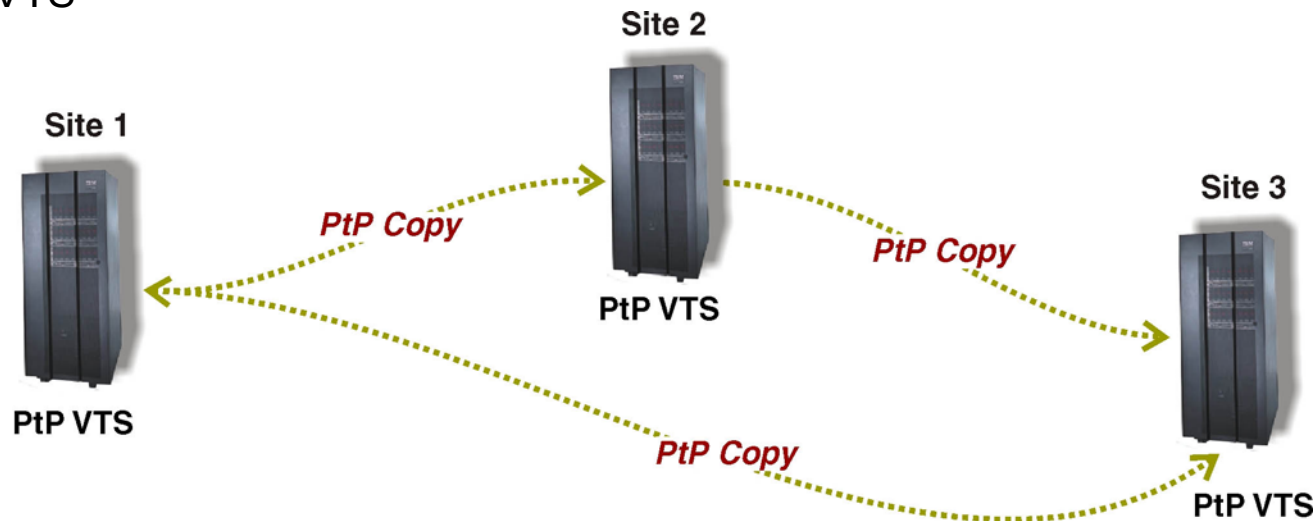
Statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only
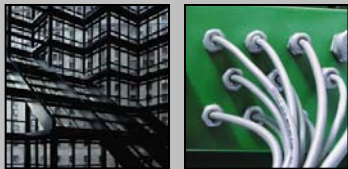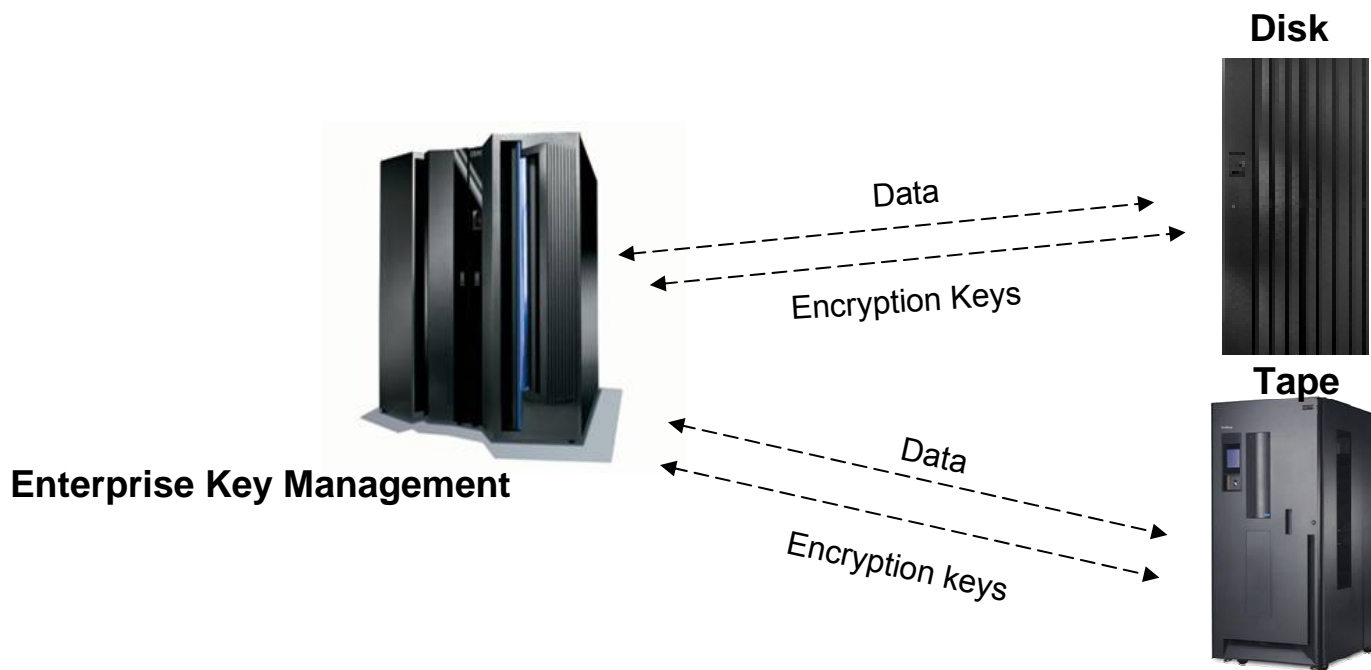
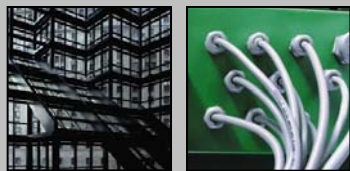*Extending System z9 and zSeries Business Continuance Solutions for Tape*

Enhancements for Data Encryption

- **Statement of Direction:**

  - To address customers' growing concern with data security, IBM is announcing a statement of direction for the development, enhancement and support of encryption capabilities within storage environments such that the capability does not require the use of host server resources (so called "outboard" encryption capabilities).

  - This includes the intent to offer, among other things, capabilities for products within the IBM TotalStorage portfolio to support outboard encryption and to integrate with the key management functions planned for ICSF.

Disk

Data

Encryption Keys

Enterprise Key Management

Tape

Data

Encryption keys

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Extending System z9 and zSeries Business Continuance Solutions for Storage
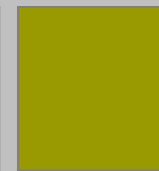
IBM TotalStorage:
An exceptional combination with System z9 and zSeries

- **Reduce business risk, supports improved data resiliency and business continuity**

  - IBM can provide one-stop shopping and support for end-to-end world class solutions encompassing SAN, disk, tape, server, software and services to help support continuity of business operations

- **Lower costs with effective information lifecycle management**

  - Leverage existing and next generation IBM tape technology as well as IBM's enterprise continuum of disk products to best fit the accessibility needs and value of the data

- **Improve productivity through storage infrastructure simplification and consolidation**

Resilient, cost effective, world-class solutions. IBM's integrated infrastructure for On Demand Business.

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