



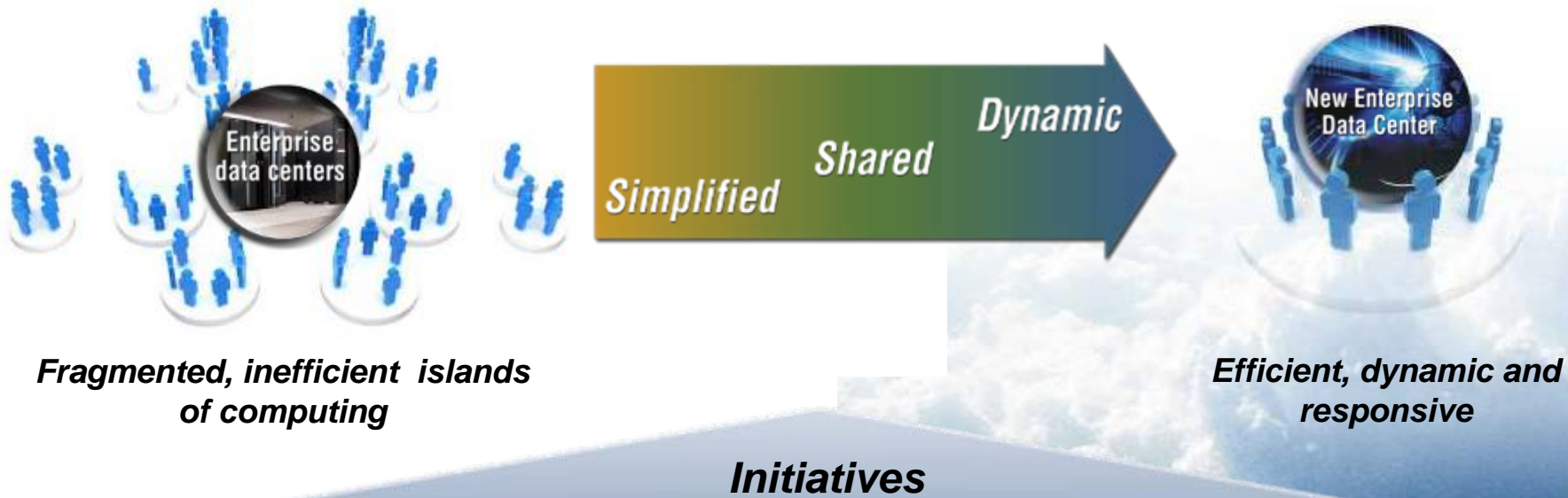
IBM Information Infrastructure: *Virtualising the Data Centre*



Steve P Legg
CTO Storage
IBM UKI

The New Enterprise Data Center

An evolutionary new model for efficient IT service delivery



Definition

The image shows a screenshot of the Wikipedia article for "Virtualization" in a Google Chrome browser window. The browser's address bar shows the URL "http://en.wikipedia.org/wiki/Virtualization". The article title is "Virtualization" and it is categorized as "From Wikipedia, the free encyclopedia".

The main text of the article begins with: "In computing, **virtualization** is a broad term that refers to the abstraction of computer resources:". This is followed by a bulleted list of types of virtualization, including Platform virtualization, Full virtualization, Hardware-assisted virtualization, Partial virtualization, Paravirtualization, Operating system virtualization, Hosted operating systems, Resource virtualization, Virtual machines, RAID (Redundant Array of Independent Disks), Storage virtualization, Channel virtualization, Network virtualization, Computer virtualization, Disk partitioning, Encapsulation, Application virtualization, Portable applications, Cross-platform applications, Emulation of hardware, and Virtualization Development Frameworks.

A large, light blue callout box with a black border is overlaid on the article text. It contains the text: "Abstracting the 'thing-ness' from a thing".

Below the list, the text continues: "Desktop virtualization, the replication of a computer desktop". It then states: "Virtualization can also refer to:", followed by a bulleted list including "a fictional use of this term in the anime series *Code Lyoko*".

At the bottom of the article, there is a disambiguation notice: "This disambiguation page lists articles associated with the same title. If an internal link led you here, you may wish to change the link to point directly to the intended article." Below this, there is a category box: "Categories: Disambiguation pages".

The left sidebar of the Wikipedia page includes navigation links (Main page, Contents, Featured content, Current events, Random article), a search box, and interaction links (About Wikipedia, Community portal, Recent changes, Contact Wikipedia, Donate to Wikipedia, Help). The toolbox section includes links for What links here, Related changes, Upload file, Special pages, Printable version, Permanent link, and Cite this page.

IBM Systems Agenda

Openness – Exercise choice!

IBM provides the industry's richest portfolio of interoperable server and storage systems



Collaborative Innovation –

Transform your business!

IBM provides the breadth of expertise and resources to design, build and implement IT solutions that can help you drive innovation



Virtualization –

Optimize IT operations!

Dynamically respond to the priorities of the business by managing the IT environment more efficiently

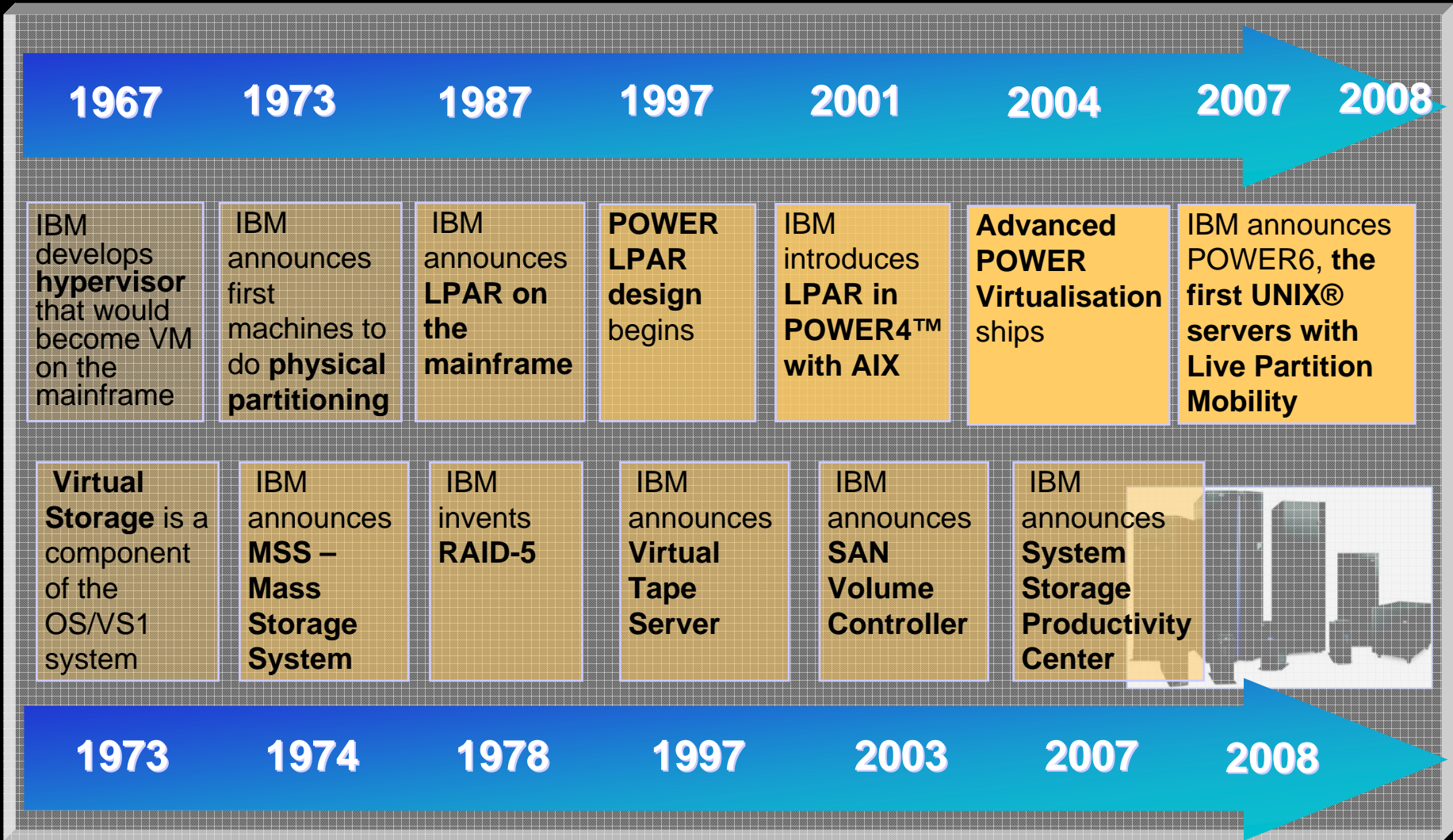
IBM Virtualisation

Key Principles

- Comprehensive
- Open
- Heterogeneous
- Common skills



IBM's 40 years of Leadership in Virtualisation

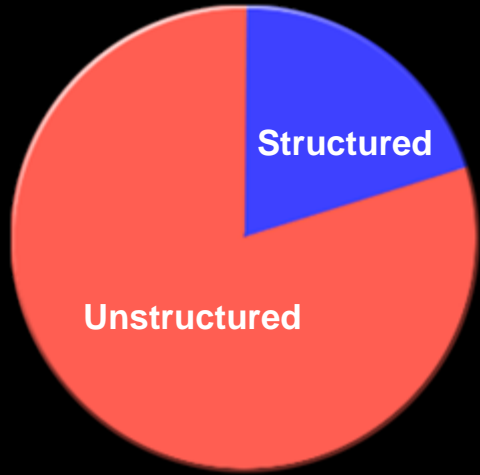


3 Current trends in the Storage industry

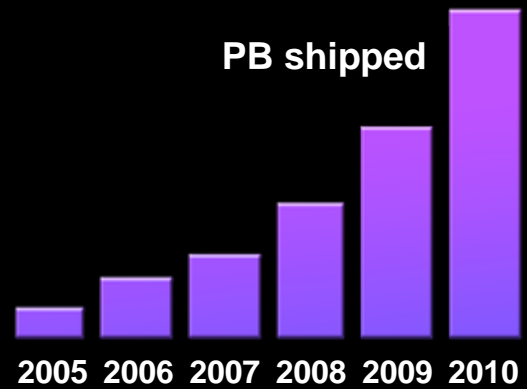
- Storage density
 - Response – make better use of what's there !
- Green agenda
 - Response – improve efficiency, use appropriate technology
- Commoditisation
 - Response – complementary disk architectures

Information is Driving Data Center Transformation

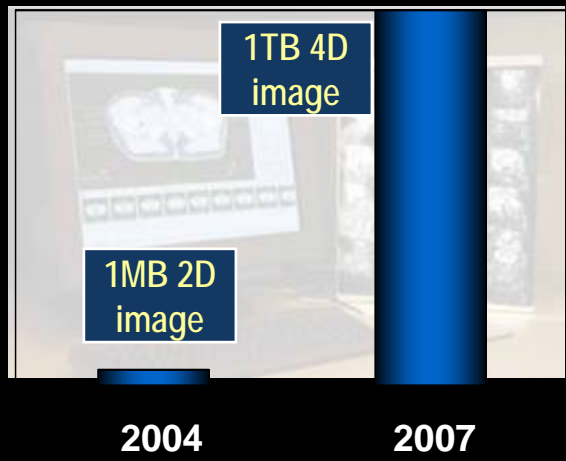
Data Types



Data Growth



Data Quality



Today . . .

80%
unstructured data

Through 2012 . . .

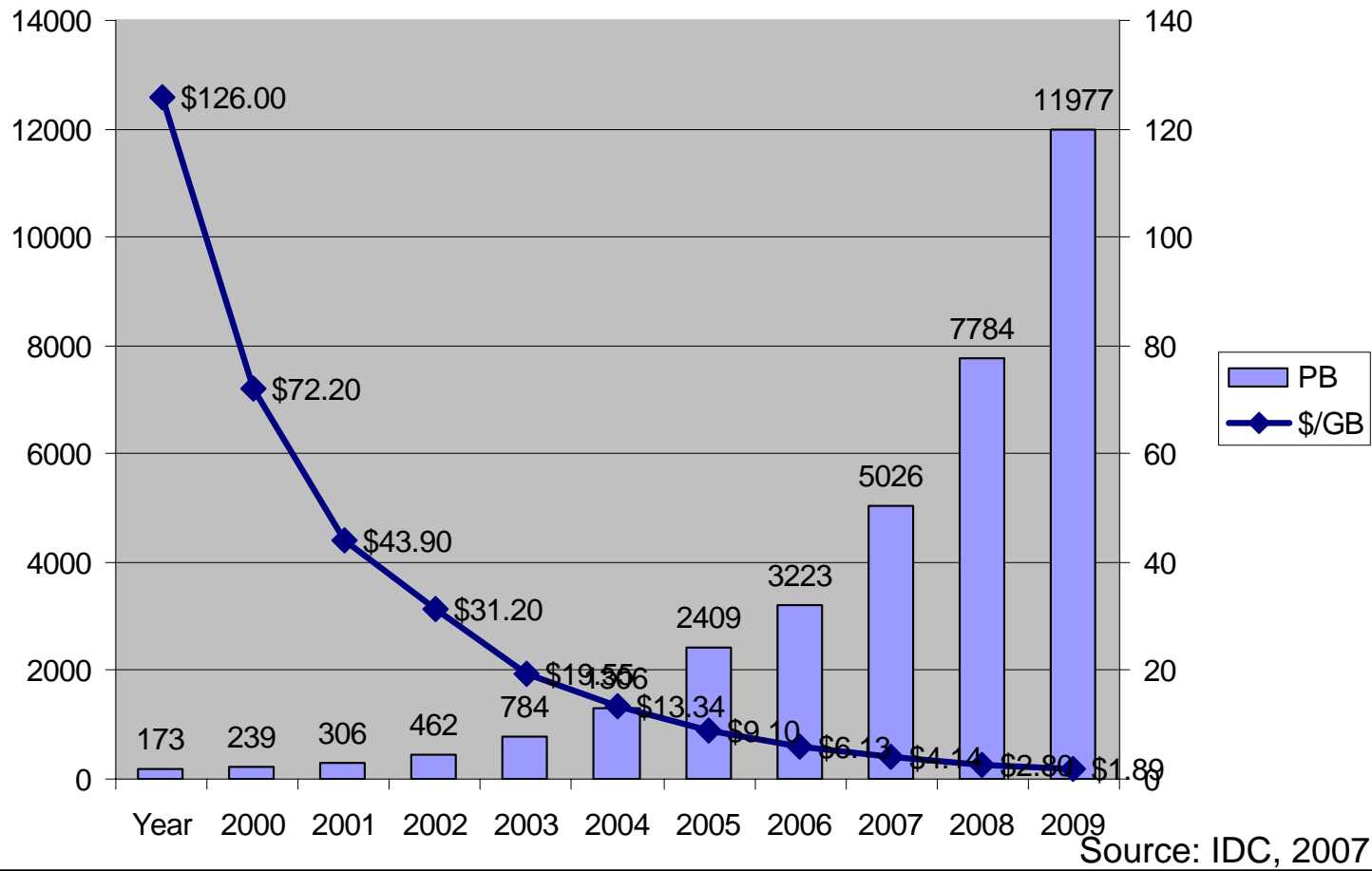
54%
Storage growth

By 2010 . . .

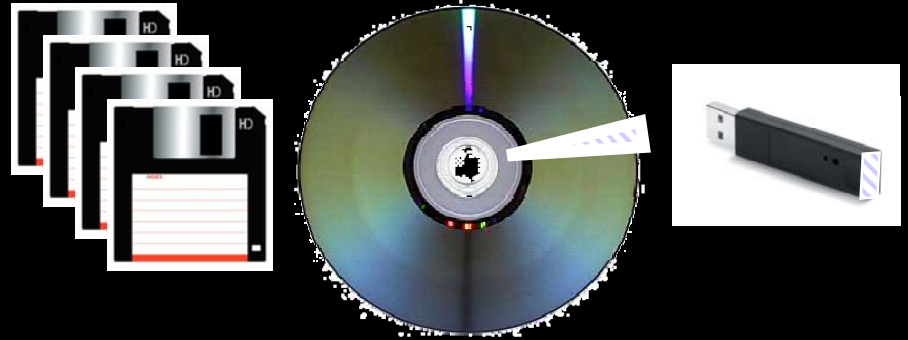
1000x
Storage per image

External storage capacity growth trend

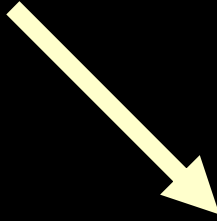
External disk shipments & price
(History & Forecast)



Technology development



4.77MB



1,000,000 MB



Capacity x 200,000

Volumetric density x 100,000,000

“Ye canna change the laws of physics Cap’n”



IBM System Storage – Six Product Families

Disk Systems

- SAN Volume Controller
- DS family
- N series
- DCS99xx
- XiV Nextra

Tape Systems

- TS family of drives, libraries
- VTL
- Diligent

Services

- Consulting
- Assessments
- Design
- Migration
- Deployment
- Outsourcing
- Hosting

Storage Networking

- Switches
- Directors
- Routers

Availability Management

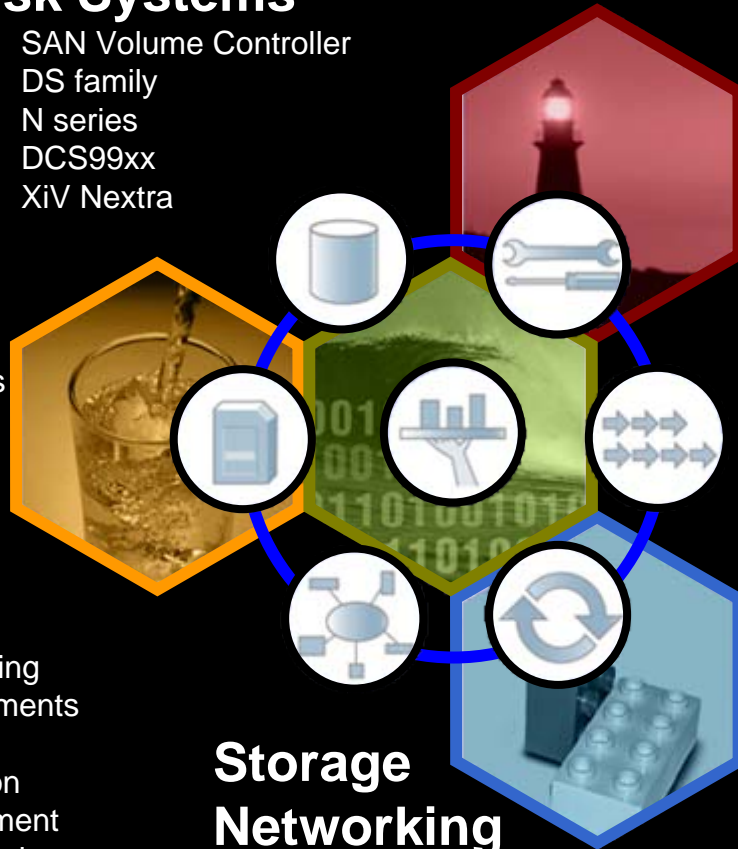
- TotalStorage Productivity Center, SSPC
- SAN Fabric Management software
- Tivoli Provisioning Manager
- Tivoli Storage Process Manager
- IBM Systems Director family

Business Continuity

- Productivity Center for Replication
- Advanced copy services
- Tivoli Storage Manager (TSM) family
- Tivoli Continuous Data Protection (CDP)
- Tape cluster grids and Peer-to-Peer
- GDOC, GDPS

Lifecycle and Retention

- DR550, DR550 Express, FS gateway
- Grid Archive Manager, GMAS
- TSM Space Management for Unix/Windows
- GPFS, DFSMS
- N series with SnapLock™
- WORM tape support



IBM System Storage

Leverage Information

- ✓ Capitalise on data sharing for collaboration
- ✓ Align storage investment, information value



Mitigate Risk

- ✓ Comply with regulatory, security requirements
- ✓ Keep your business running continuously

Optimize IT

- ✓ Automate and Simplify IT operations
- ✓ Optimise Performance, Functionality



Enable Business Flexibility

- ✓ Flexible, On Demand IT infrastructure
- ✓ Protect your IT investment

IBM Information Infrastructure

... the storage, software, servers and networks, integrated and optimized to deliver information from the storage media to the business applications

Resilient

Dynamic

Energy efficient

Future-proof

Proven

Trusted

Integrated compliance solutions



Information Compliance

Massive scalability, better reliability



Information Availability

De-duplication for large and small sites



Information Retention

Built-in, automated encryption



Information Security

IBM Information Infrastructure:

... a resilient infrastructure for securely storing information and mitigating business risks.

- **IBM and IBM Business Partners bring a strategic, end-to-end approach to evaluate our client's information objectives**
- **IBM Information Infrastructure provides a foundation for clients to unlock the business value of information**
- **IBM has a comprehensive portfolio of solutions and services designed specifically for:**
 - **The New Enterprise Data Center**
 - **Mid-size firms**



Information Compliance

Reduce reputation risks and audit deficiencies



Information Retention

Support your information retention policies



Information Availability

Deliver continuous and reliable access to information



Information Security

Protect and enable secure sharing of information

Announcing: New Scalability, Performance, Efficiency

New and
Enhanced!

1. Break-through solutions deliver massive scalability and performance
 - Scale Up storage uses up to 80% less power¹: XIV
 - Unprecedented Information Storage optimization: Novus
 - Scale Out NAS solution could store every file ever created: Up to 512 billion files in one Scale Out NAS cluster: SOFS
 - Highest performance for mainframe and mixed workloads: DS8000
 - More than 2x better performance for MS Exchange: DS5000
 - Real time large file data transmission with IBM Data Mobility Services - Softek

- XIV Storage System
 - Scale Out File Services
- Solid State Storage POCs
 - San Volume Controller v4.3
- New Novus Services
- New Softek Services
 - ProtecTier Data de-Duplication Appliance (Diligent)
- DS8000 Enterprise Disk
- DS5000 Mid-Range Disk
 - Tivoli Storage Manager 6.1

2. Unique data de-duplication enables significant efficiency gains

Announcing: New Security and Integration

3. Enhanced, patented technologies simplify information security
 - Unified encryption built into the infrastructure (not on top of it)
 - New Encrypted Tape – 3rd tape drive with encryption: TS1130
 - Preview: Encrypted Disk Roadmap for DS8000 and DS5000
 - New Security Service – safely decommission older disks
 - Enhanced Data Security Services with ISS
 - New Security Key Lifecycle Management from Tivoli

4. Flexible compliance solutions enable business growth

New and
Enhanced!

- IBM Data Security Services with ISS
 - Tivoli Key Lifecycle Management
- TS1130 Tape Drive
 - Disk Encryption Roadmap
 - Compliance Warehouse for Legal Control
- eDiscovery Manager
 - Content Collector Preload Edition for E-Mail
- CommonStore for SAP
 - DR550 v4.6

The Full Breadth of IBM Information Infrastructure Announcements



40+ new and enhanced IBM storage solutions and services

- Storage Optimization and Integration Services
- New Proof of Concepts: IBM Solid State Storage Virtualization
- IBM Virtual Infrastructure Access Services
- IBM System Storage™ SAN DCFM (Brocade) and Cisco MDS 9200 & 9500
- IBM Enterprise Archive Services
- IBM Information Protection Services - Onsite / Remote Data Protection
- IBM eDiscovery Analyzer (EDA) (OmniFind Analytics upgrade)
- Archive bundles for Email and SAP™
- IBM System Storage™ DR550 (v4.6)
- IBM ISS Threat Mitigation services and PCI scanning portal
- IBM XIV Storage System
- IBM System Storage™ DS5000
- IBM System Storage™ DS8000 R4.0/4.1
- IBM® System Storage™ SAN Volume Controller Version 4.3
- IBM Scale Out File Services (SOFS)
- IBM System Storage™ N6000 and N series SnapManager™ for Virtual Infrastructures
- IBM System Storage™ TS7650G ProtecTIER Data Deduplication
- IBM System Storage™ TS3500
- Compliance Warehouse for Legal Control, v2
- IBM System Storage™ TS2900 Half-High LTO Autoloader
- IBM System Storage™ TS1130 Encrypted Tape Drive and Disk Encryption Preview
- Tivoli Key Lifecycle Management
- IBM Tivoli Storage Productivity Center (TPC) Single Sign-On
- IBM Tivoli Storage Manager (TSM) FastBack (FilesX)
- IBM Tivoli Storage Manager 6.1
- IBM Data Mobility Services (Softek)
- IBM Remote Managed Infrastructure Services (RMIS)
- IBM Content Collector v2.1 (Symphony) (new Email archiving)
- IBM Classification Module, v.8.6
- IBM Information Protection Services - Email Management Express (Arsenal)
- IBM System Storage™ N series Protection Manager™
- IBM Tivoli Security Information and Event Manager
- IBM Tivoli zSecure Suite 1.10

Systems Resource Virtualisation Offerings

Server virtualisation

- System z LPARs & workload management
- POWER Systems
 - PowerVM (Formally Advanced POWER Virtualisation)
 - Live partition mobility, live application mobility, workload partitions
- Modular Systems
 - BladeCenter
 - VMware, Xen virtual machines
- Virtually consolidate workloads on servers



Storage & File virtualisation

- File virtualisation
 - IBM General Parallel File System
 - Virtually consolidate files in one namespace
- File system virtualisation
 - IBM System Storage N series Virtual File Manager
 - Virtually consolidate file systems into one namespace
- Block storage virtualisation
 - IBM System Storage SAN Volume Controller



Complementary benefits of virtualisation throughout IT infrastructure

- Consolidation, better management efficiency, improved flexibility & responsiveness, reduced cost, nondisruptive changes



Why IBM

- Broadest, integrated portfolio
- Leading innovator of encryption, secure key management, and access control technologies
- First major vendor to virtualize storage across multiple vendor technologies.
- Over 12,000 SAN Volume Controller engines sold!
- First major vendor to ship 1 million LTO tapes
- Industry leading information infrastructure for mainframe environments
- Best Practice based services; thousands of client engagements

- **IDC market share reports show IBM is:**
 - #1 in combined Disk and Tape
 - #1 in total Disk
 - #1 in Branded Tape
 - 2nd fastest growing Storage Software
 - #1 in Storage Services
 - #1 in Identity and Access Management software



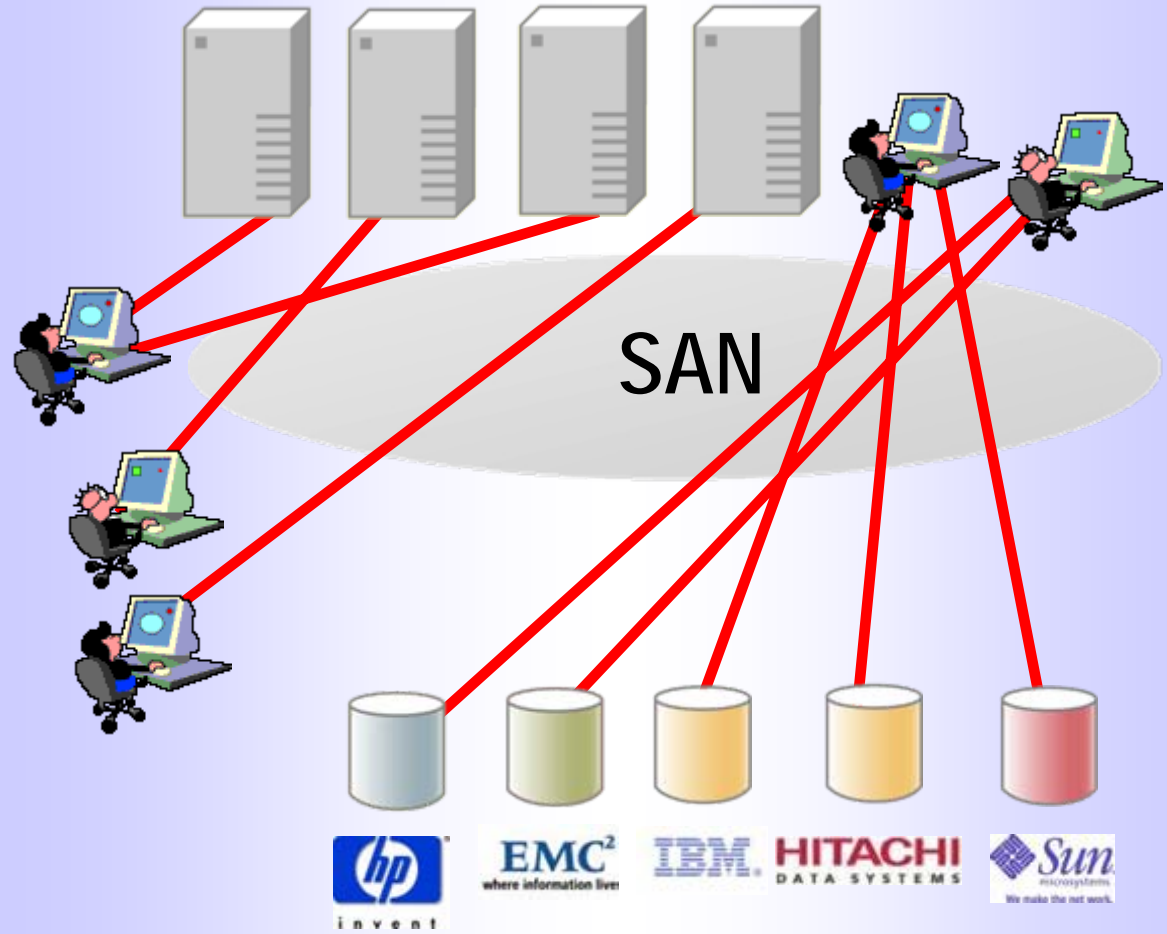
IBM



Today's Storage management

In a typical IT environment, infrastructure management is

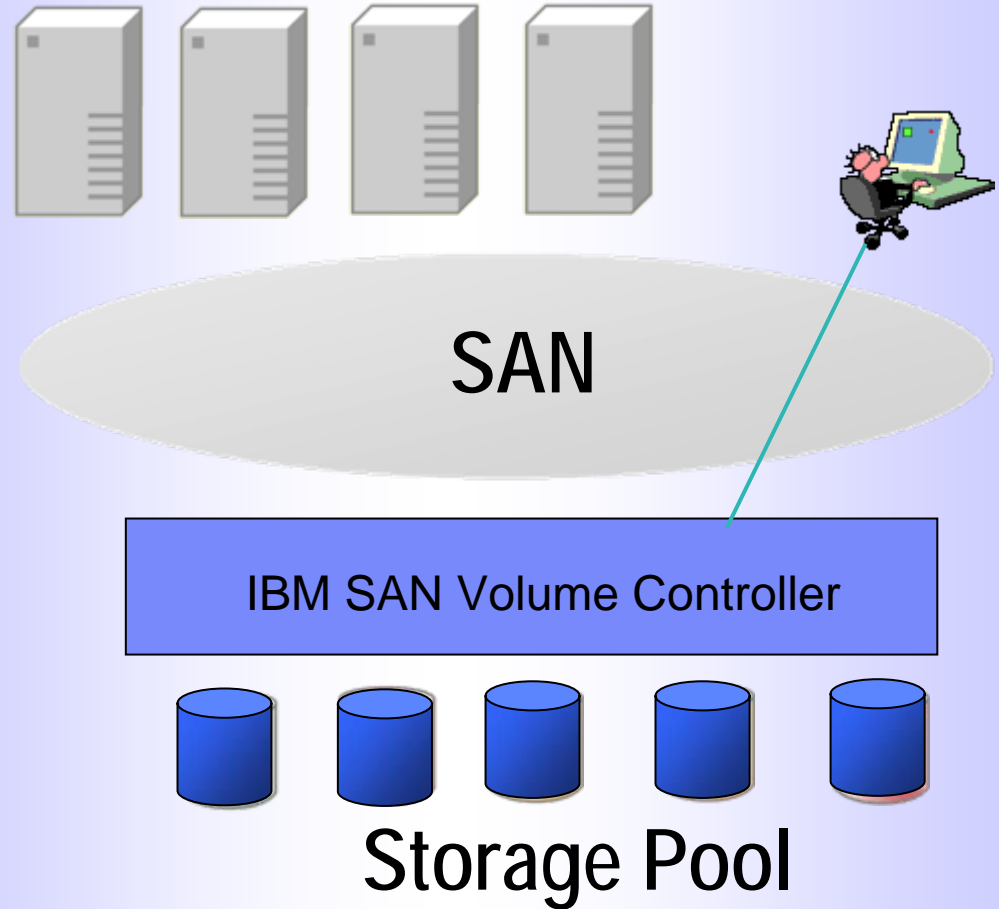
- Complex
- Inefficient
- Insufficient



Virtualisation = Openness

Virtualization
Enables:

- Vendor Choice
- Tiered Storage
- Migration
- Application Uptime



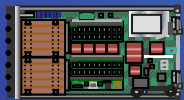
IBM Power Systems

Consistency

- Binary compatibility
- Mainframe-inspired reliability
- Support for virtualisation
- AIX, Linux and IBM i OS

Complete flexibility for workload deployment

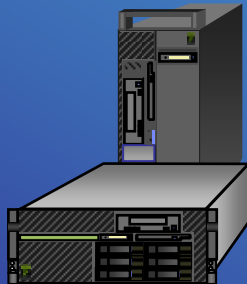
Blades / Entry



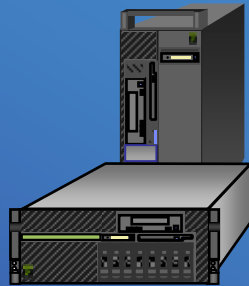
JS22



JS12

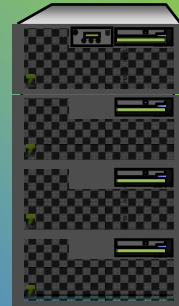


520



550

Mid-range



570

Enterprise



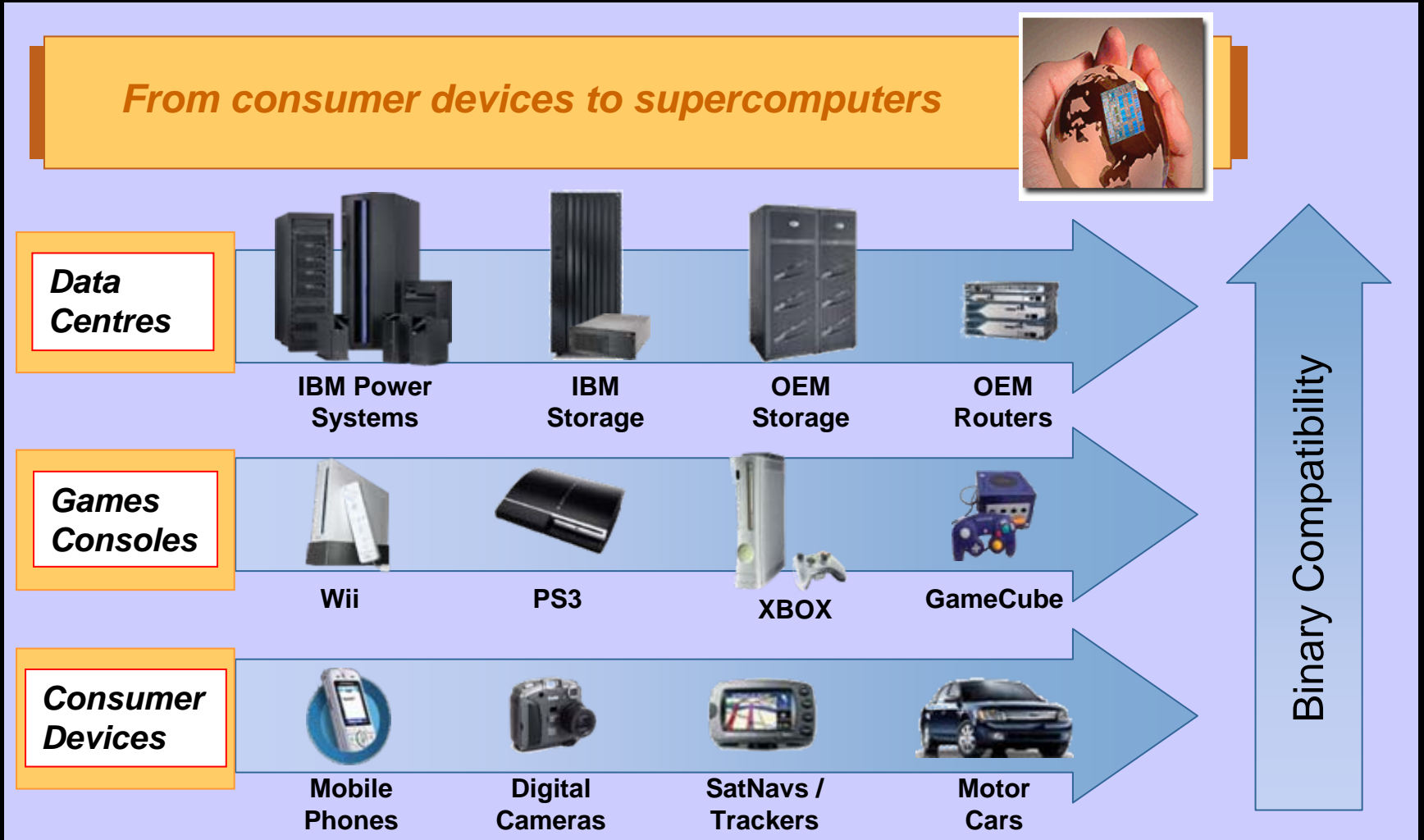
595



575



POWER – a \$6 Billion Investment



IBM shipped over 40M POWER processors in 2006

Planned IBM PowerVM Roadmap

**AIX & Linux
POWER6 only**

**Integrated
Virtual
Ethernet**

**Shared
Dedicated
Processors**

**Partition
Pooling**

**Live
Partition
Mobility**

NPIV

**Memory
Virtualization**

**Partition
Hibernation**

2007

Futures

**AIX 6 only
POWER4/5/6**

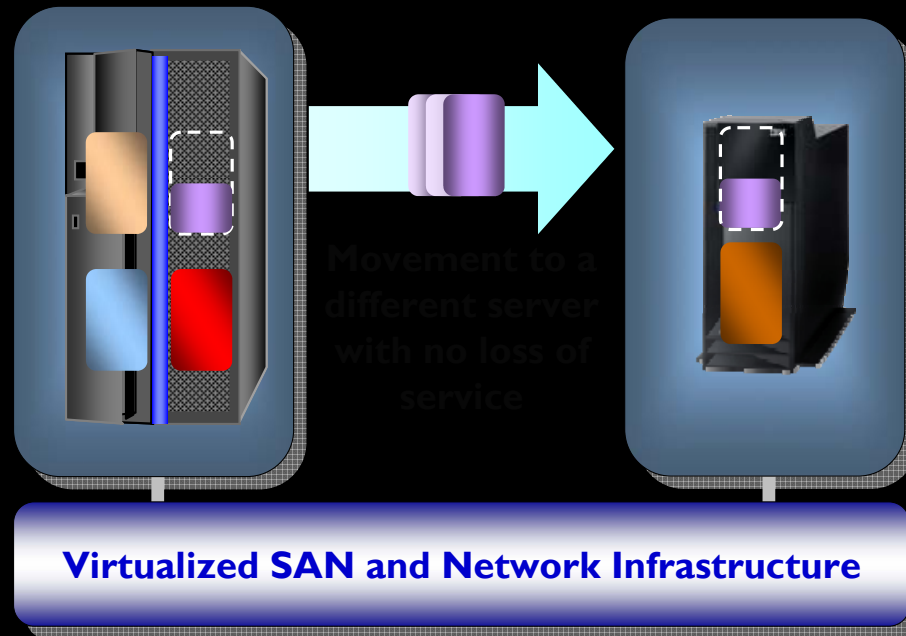
**Workload
Partitions**

**AIX
Application
Mobility**

**AIX
Application
Mobility+**

Live Partition Mobility

Move a running partition from one POWER6 server to another with no application downtime



Reduce planned downtime by moving workloads to another server during system maintenance

Rebalance processing power across servers when and where you need it

Partition Mobility: Active and Inactive LPARs

Active Partition Mobility

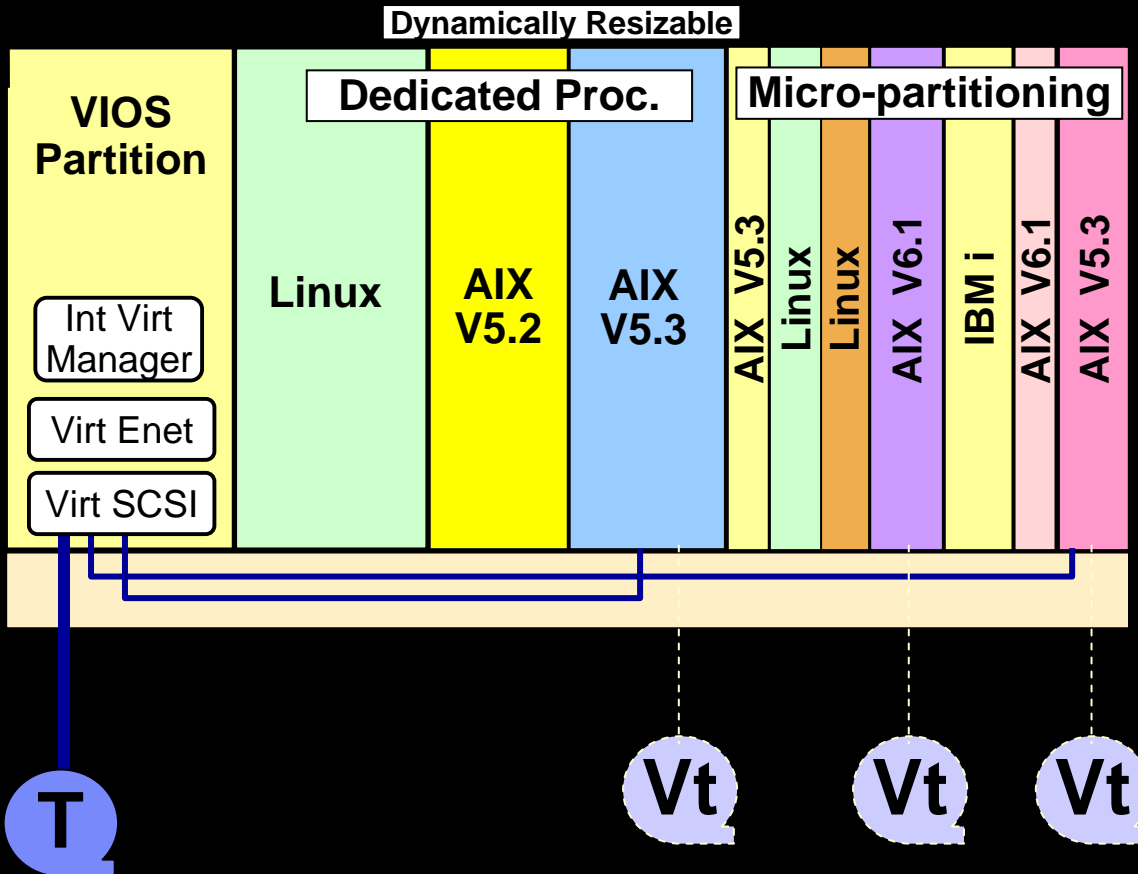
- Active Partition Migration is the actual movement of a running LPAR from one physical machine to another without disrupting* the operation of the OS and applications running in that LPAR.
- Applicability
 - Workload consolidation (e.g. many to one)
 - Workload balancing (e.g. move to larger system)
 - Planned CEC outages for maintenance/upgrades
 - Impending CEC outages (e.g. hardware warning received)

Inactive Partition Mobility

- Inactive Partition Migration transfers a partition that is logically 'powered off' (not running) from one system to another.

***Partition Mobility supported on POWER6™
AIX 5.3, AIX 6.1 and Linux***

PowerVM Virtual Tape Support



Low function SAS Tape devices

- SCSI (SAS) interface
- No support for Tape robotics

Features / Functions

- Only one partition has control of tape device
- Tape handling is provide by the OS of the partition
 - ❖ Tape eject, etc.
 - ❖ Linux

VIOS 2.1

- Shared SCSI

Operating Systems

- AIX
- IBM i
- Linux

