System x
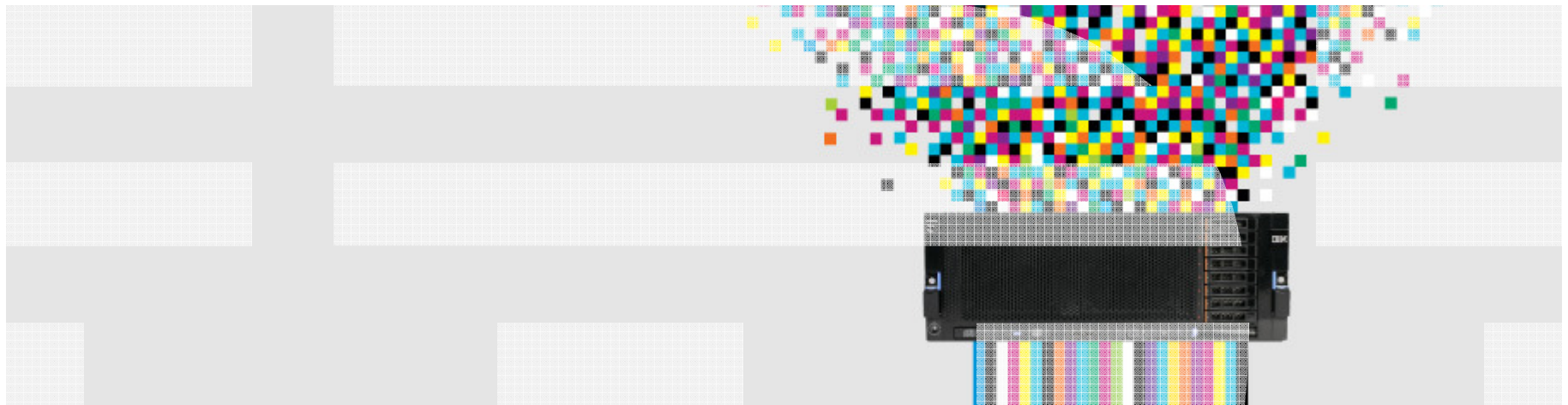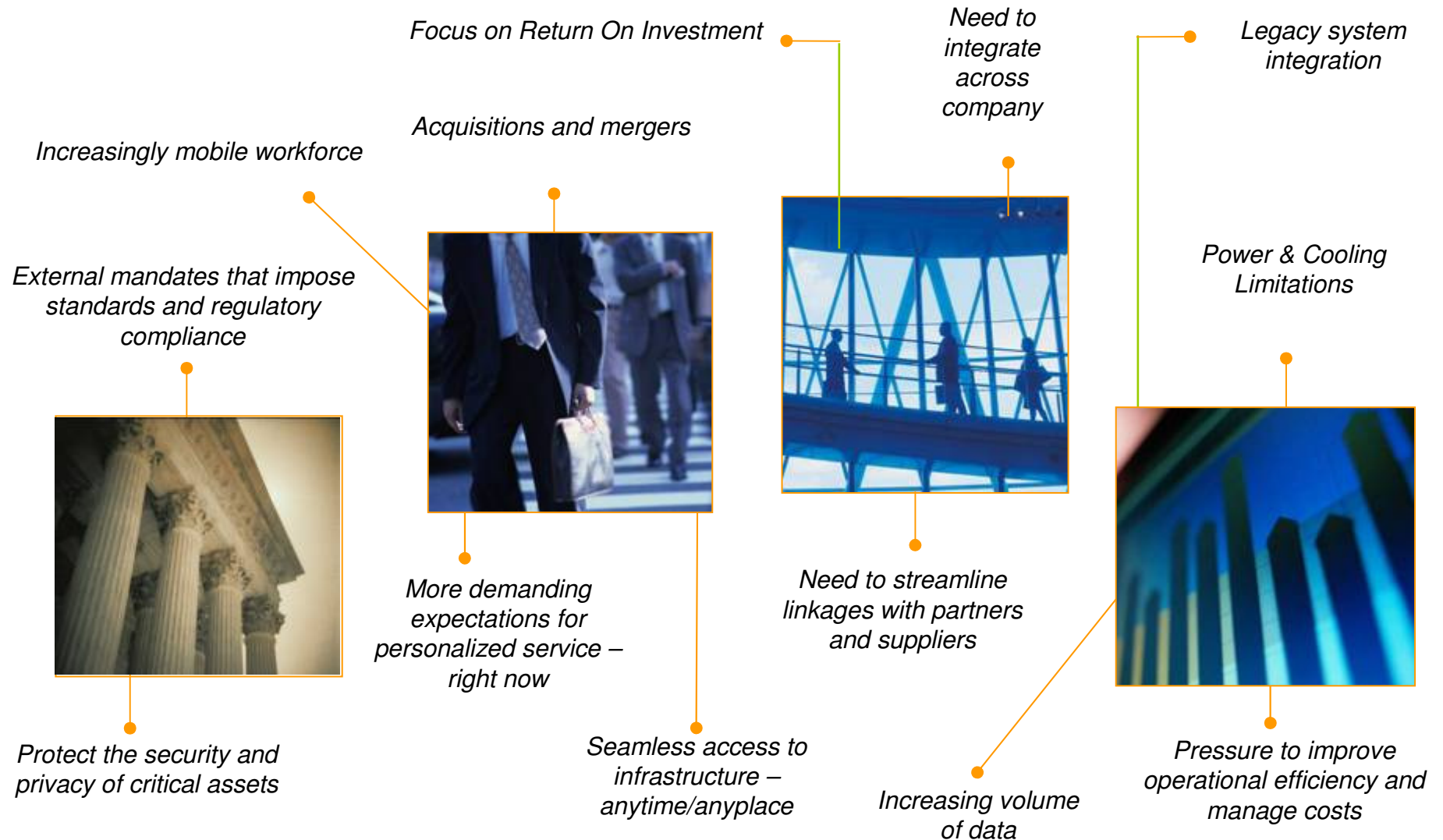Redefining the x86 server landscape

IBM eX5 and IBM External Storage
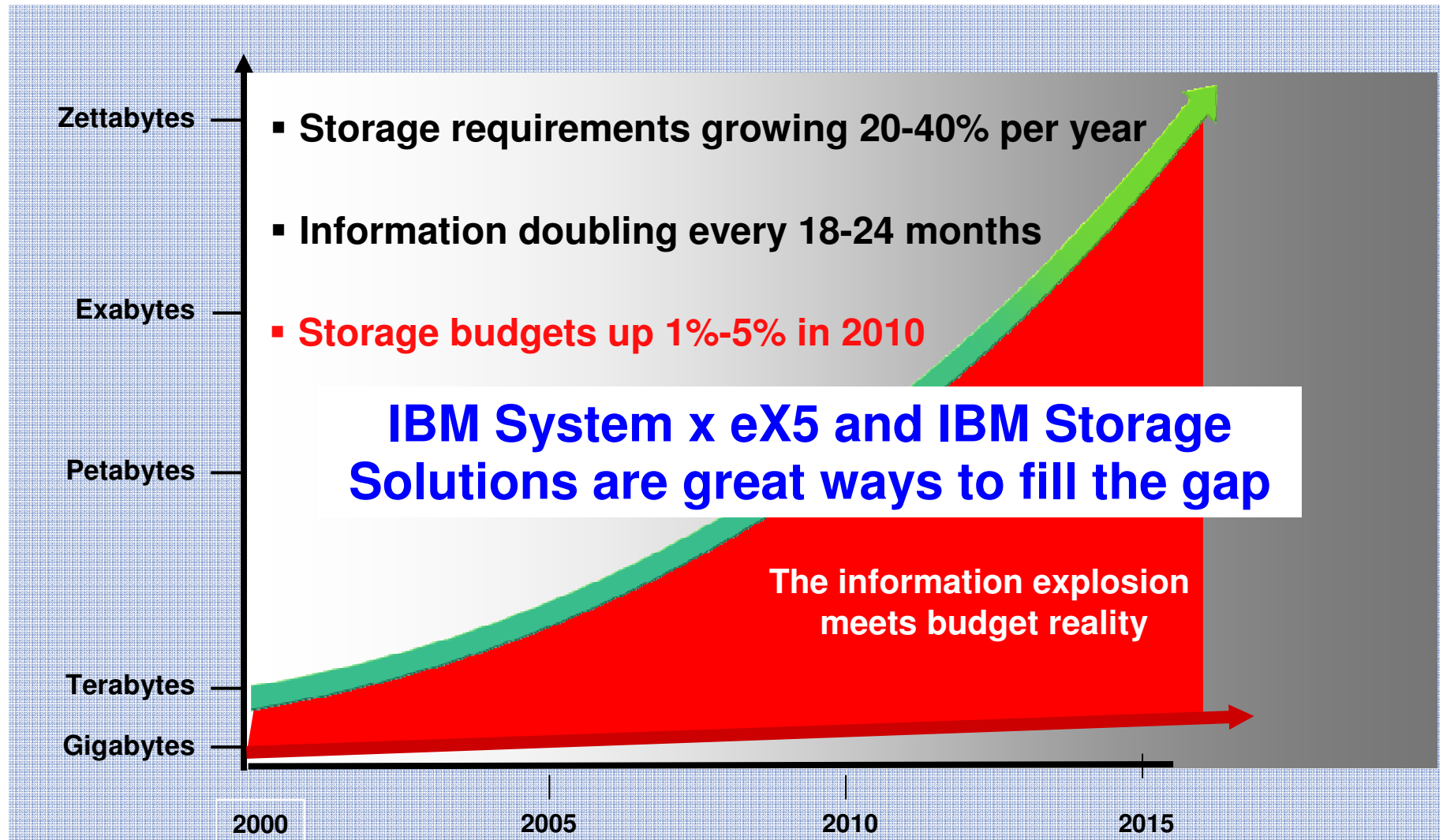
Woo Kai Sum,
Systems Architect, IBM Malaysia
November 25, 2010

Smarter Systems for a Smarter Planet

Trends stressing Enterprise Workloads and IT Environments

Focus on Return On Investment

Need to integrate across company

Legacy system integration

Acquisitions and mergers

Increasingly mobile workforce

External mandates that impose standards and regulatory compliance

Power & Cooling Limitations

More demanding expectations for personalized service – right now

Need to streamline linkages with partners and suppliers

Pressure to improve operational efficiency and manage costs

Protect the security and privacy of critical assets

Seamless access to infrastructure – anytime/anyplace

Increasing volume of data

IBM

Technology and the demand for data create an Information Explosion

Zettabytes

Exabytes

Petabytes

Terabytes

Gigabytes

- **Storage requirements growing 20-40% per year**

- **Information doubling every 18-24 months**

- **Storage budgets up 1%-5% in 2010**

IBM System x eX5 and IBM Storage Solutions are great ways to fill the gap

The information explosion meets budget reality

2000   2005   2010   2015

3

eX5 addresses Enterprise Workloads

eX5 portfolio: more workload capability, new entry point, more choices

The fifth generation extends Enterprise X-Architecture

IBM System x3850 X5

➔ Delivering more workload capability than ever.

IBM BladeCenter HX5

➔ Extending the value of the Enterprise X-Architecture to a blade server.
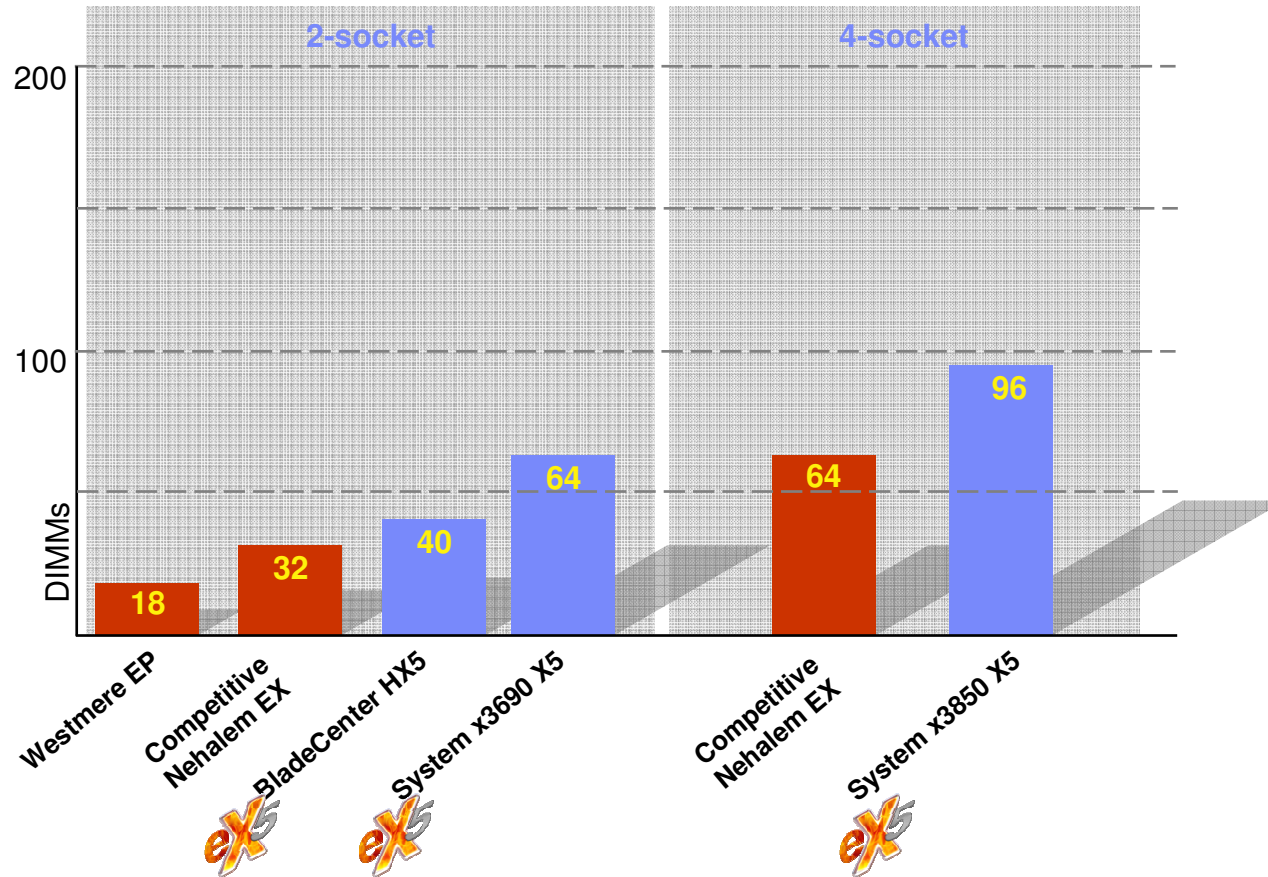
IBM System x3690 X5

➔ New entry point for enterprise x86 technology.

- **Maximize memory**
- **Increase Flexibility**
- **Simplify deployment**
- **Minimize cost**
- **Enhance Reliability**

5

IBM

Maximize memory -> MAX5
Enables eX5 to support twice the DIMMs per system -> exceeding x86 limitations

It's not just about the processors...it's about the system.

# Increase Flexibility -> FlexNode Partitioning
Dynamic transformation of a single system into 2 distinct systems - and back

- **Optimize workloads:** Run interactive applications by day on a 2S system and batch jobs by night on 4S system

- **Help reduce software licensing costs:** Execute partitions to optimize software licensing costs when priced per system core.

- **Boost security:** Isolate workloads to help improve security and assure quality of service.

One 4S System

Two 2S Systems

7

IBM
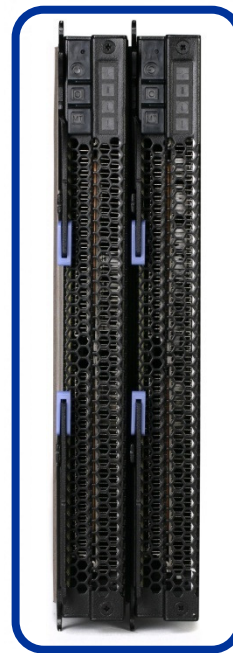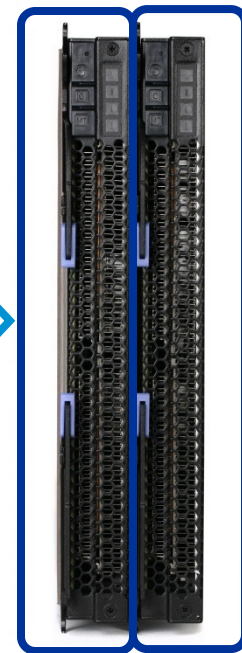
Simplify deployment -> Systems Director
Leverage automated image deployment and pre-configured server identities

- **Deploy virtual or physical systems easily**: Automated Server Image Deployment with Tivoli Provisioning Manager (TPM)
- **Pre-configure server identity** for BladeCenter with Open Fabric Manager
- **Remotely re-purpose eX5 systems** using the node partitioning feature
- **Set up automatic recovery** parameters for an eX5 system
- **Utilize the system guardian** with the new Integrated Service Advisor "call home" feature
- **Minimize security-related** downtime with eX5 hardware security, plus available IBM Tivoli software and IBM Virtual Server Security for VMware
- **Take advantage of IBM Services** for skills transfer and hands-on training

IBM® Systems Director

* IBM Systems Director 6.1 software can help cut administrative costs by more than 30 percent.
"Challenges of Operational Management for Enterprise Server Installations," International Technology Group, © 2008

IBM

Simplify Deployment -> Virtual Fabric
Allows multiple virtual ports to share bandwidth using a single 10GbE port

- **Avoid complex LAN vs. SAN capacity planning:** Virtual Fabric can become Ethernet, FCoE, and iSCSI

- **Allocate bandwidth where needed:** Mission critical workloads get most, while test projects get appropriate share of bandwidth

- **Deploy less hardware:** Fewer adapters and switches needed to support the same workload with IBM Virtual Fabric technology

Any	**Networking technology, Networking speed**
50%	**Fewer adapters**
75%	**Fewer switch modules**

9

IBM

Minimize cost -> example HX5+MAX5 is 22% less than HP DP servers
Support 2x or larger VMs vs. HP with half the servers and half the SW license cost

1x HX5+MAX5

2S, 40x8G (320GB)
$34K Server Hardware (1 2S server)
$10K VMWare license cost
$1K/yr Datacenter power cost
$5K/yr Maintenance cost
**$50K First year TCO**

VS

2x HP BL490c G6

2S, 18x8G (144GB)
$33K Server Hardware (2 2S servers)
$20K VMWare license cost
$1.5K/yr Datacenter power cost
$10K/yr Maintenance cost
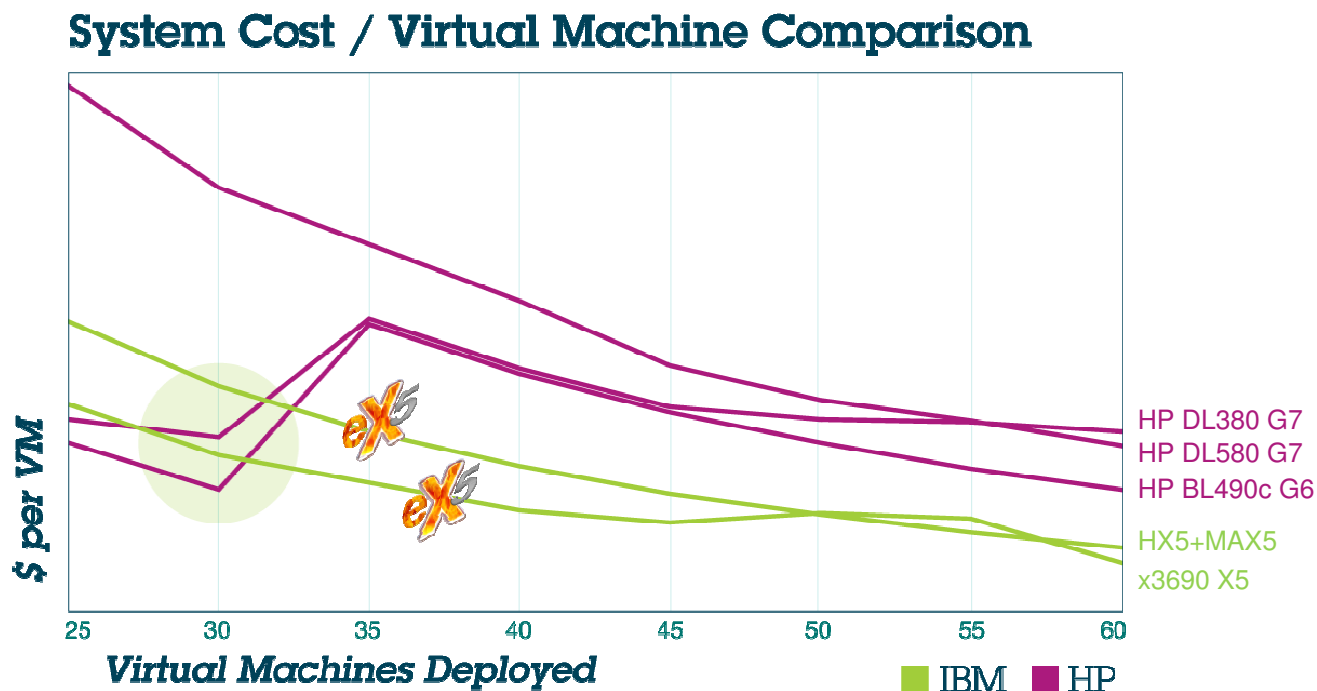**$64.5K First year TCO**

IBM Advantage

2x memory, more & larger VMs per server,
drastically reduced SW licensing costs

▼

HP requires 2 WSM-EP based blades to match 1 HX5

▼

$14.5K savings

vmware

60 VM environment

All systems @ max memory w/ 8G DIMMs

10
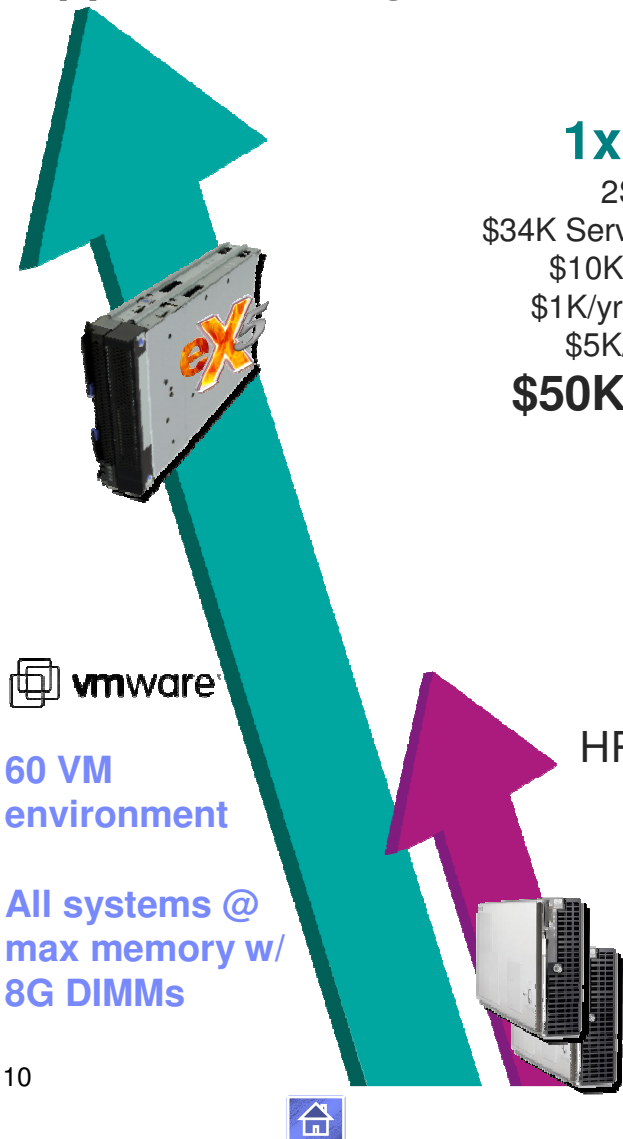
Minimize Costs -> eX5 saves in virtual machines per server

System Cost / Virtual Machine Comparison

eX5 is the optimal x86 platform for virtualization starting at 30 VMs

Lower price per virtual machine

eX5 system does the work of 2 or more HP systems

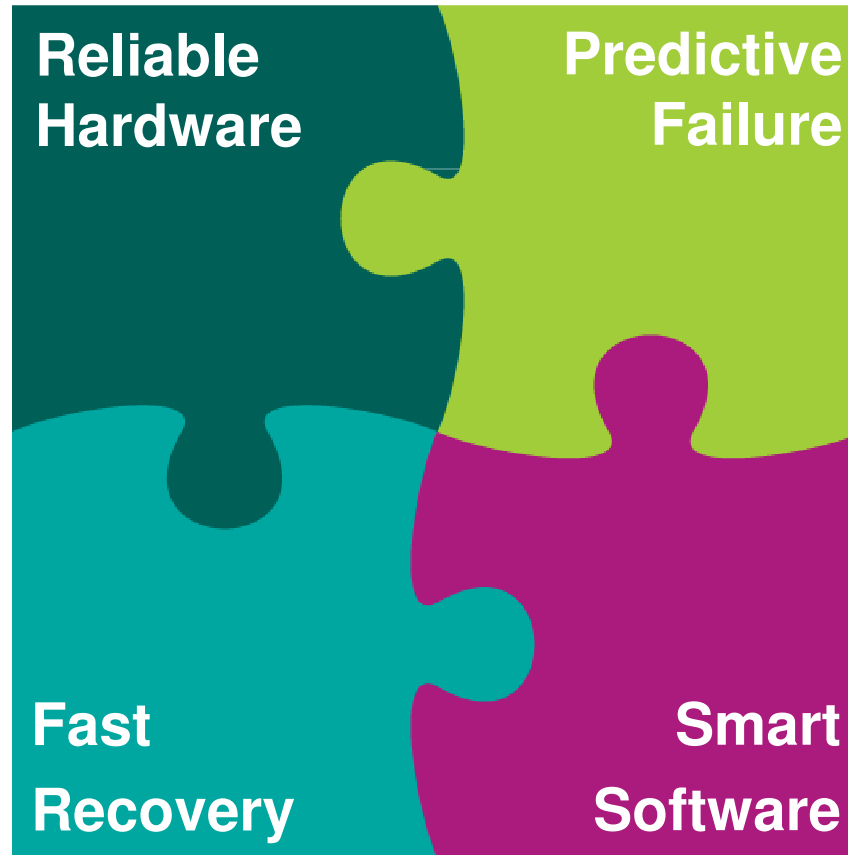50% fewer servers →50% lower software licensing cost

PLUS, save on management & energy costs

Look beyond base server price, and consider total solution cost for your workload

eX5 systems plus software cost is less expensive for virtualization than industry standard alternatives

eX5 enhances industry standard reliability

Reliable Hardware

Predictive Failure

Fast Recovery

Smart Software

IBM ☀

Memory ProteXion^{TM}

Reliable Hardware | **Predictive Failure**

Fast Recovery | Smart Software

Why it is important
✓ Memory reliability is critical, as more memory is in high-end systems

Benefits
✓ Up to 4x the memory protection over industry standard
✓ Superior memory reliability
✓ MAX5 with 8G DIMMs is more reliable than industry standard servers with 16GB base server filled with 16GB DIMMs

How it works
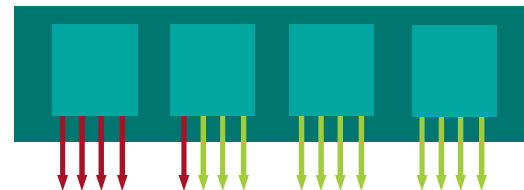✓ Integrated into eX5 and works with off-the-shelf DIMMs
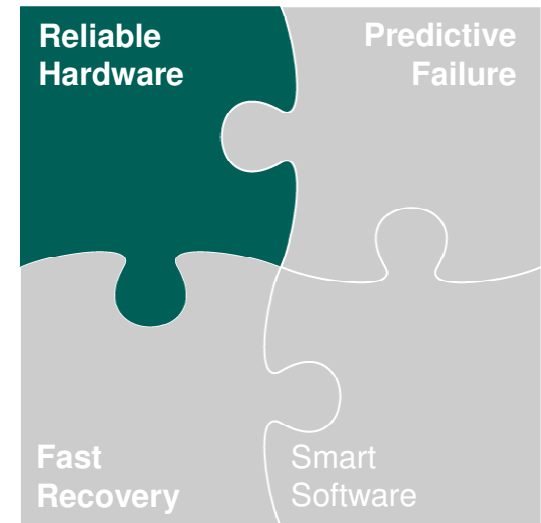
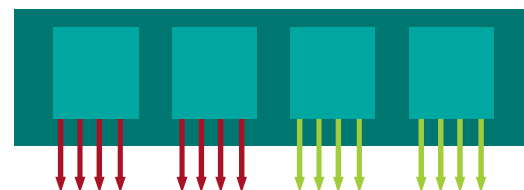Nehalem EP fails with only two bad bits from different DRAMs
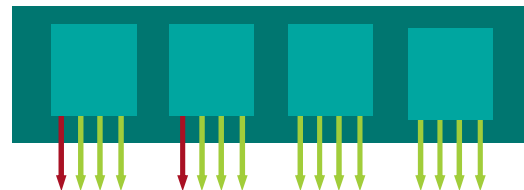
Intel EP

Nehalem EX supports SDDC+1 on both x8 and x4 DIMMs. System continues to run with one bad DRAM chip and another error corrected

Intel EX

eX5 with Memory ProteXion^{TM} continues to run and detect errors with two completely bad DRAMS!
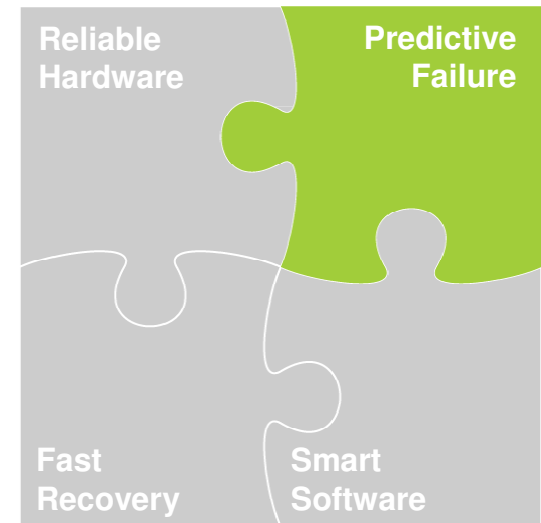
eX5 (MAX5)

IBM

High availability features such as IBM Predictive Failure Alerts maximize application uptime

Reliable Hardware

Predictive Failure

Predictive Failure:

✓ Warns ahead of potential hardware failures
✓ Triggers preemptive action
✓ Maintains application availability

Fast Recovery

Smart Software

Only eX5 monitors vital system components for maximum availability

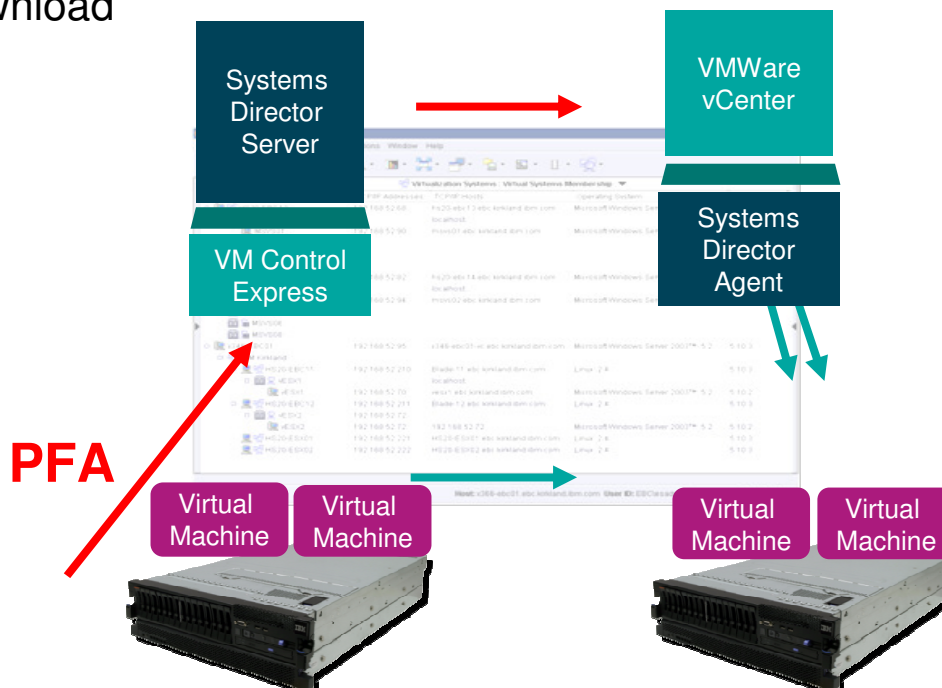| PFA	DELL	HP	IBM
Hardware	Yes	Yes	**Yes**
Disk	Yes	Yes	**Yes**
Memory	**No**	Yes	**Yes**
CPU	**No**	**No**	**Yes**
Fan	**No**	**No**	**Yes**
VRM	**No**	**No**	**Yes**
Power supply	**No**	**No**	**Yes**

IBM's VMControl:

Monitors HW and automates smart movement of workloads ahead of potential HW failure

IBM's VMControl delivers:

✓ A single tool to manage both physical and virtual servers

✓ System Director automation to link physical alerts to VMwareVMotion™

✓ IBM's VMControl Express, a free Systems Director plug-in available for download

Reliable Hardware	Predictive Failure
Fast Recovery	Smart Software

Systems Director Server

VMWare vCenter

VM Control Express

Systems Director Agent

PFA

Virtual Machine | Virtual Machine

Virtual Machine | Virtual Machine

15

IBM
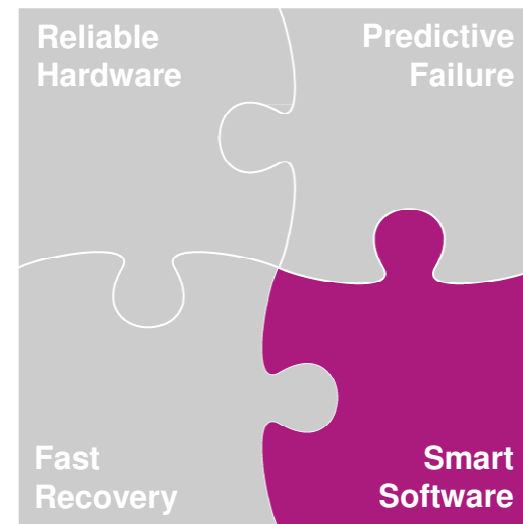
Automatic node failover makes eX5 multi-node systems the most reliable in the industry

Reliable Hardware

Predictive Failure

Situation: Unrecoverable failure in an MP server

Fast Recovery

Smart Software
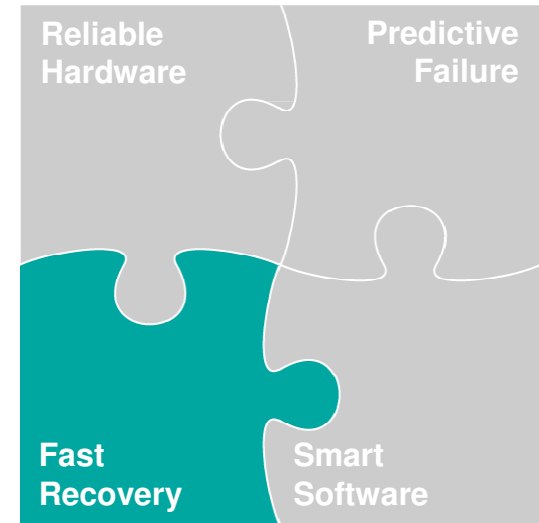
Industry Standard

Down until help arrives

THE PROBLEM

Industry standard

✗ Monolithic multi-socket systems down until the fatal error resolved
✗ No automatic reboot

Back up and running

THE SOLUTION

FlexNode Failover with BladeCenter HX5

✓ Automatic error detection
✓ System reboots as a single-node, and brings the eX5 system back online faster
✓ System continues to operate without the failed node

16

IBM

eX5 provides more reliability with fewer components

Customer requirement: Reliable hardware platform to deploy 250 VMs
Challenge: Cost, management complexity, datacenter space

2 high-reliability x3850 X5	**VS**	**7 less-reliable HP DL 380 G7**

Lower risk with more RAS features:
✓54% more memory reliability features
✓60% more CPU reliability features

Higher risk with more components that can fail:
✓10 more power supplies
✓95 more HDD, no reliable SSD
✓30 more fans

IBM Advantage

Consolidating with eX5 lowers cost and increases reliability

▼

Fewer servers to buy and manage
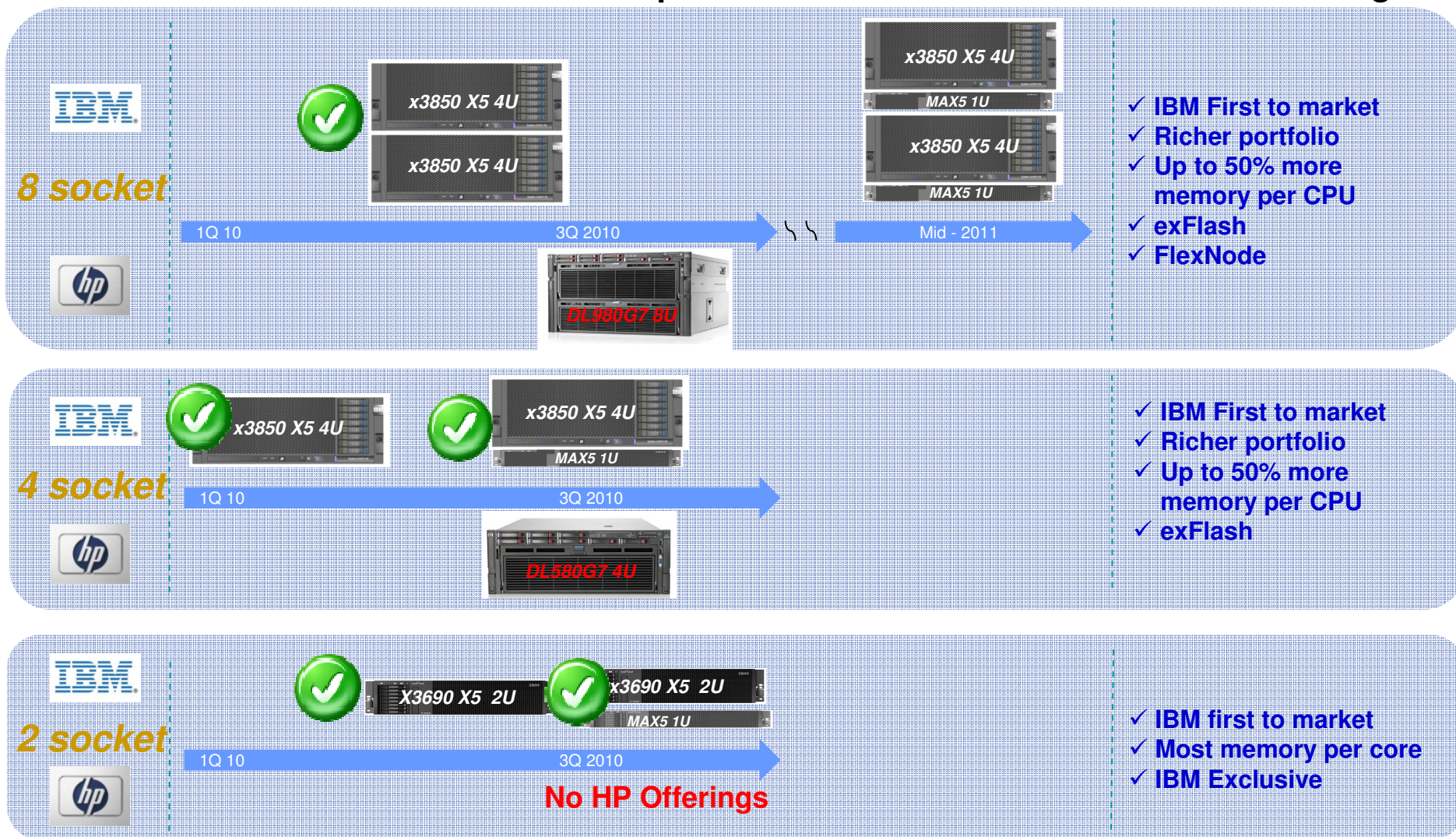**More reliable hardware**
Fewer components that can fail

Competitive Roadmaps

Rack Portfolio Comparison

Portfolio & start-ship date   **IBM Advantages**

8 socket

x3850 X5 4U

x3850 X5 4U

x3850 X5 4U

MAX5 1U

x3850 X5 4U

MAX5 1U

1Q 10   3Q 2010   Mid - 2011

DL980G7 8U

- ✓ **IBM First to market**
- ✓ **Richer portfolio**
- ✓ **Up to 50% more**
  memory per CPU
- ✓ **exFlash**
- ✓ **FlexNode**

4 socket

x3850 X5 4U

x3850 X5 4U

MAX5 1U

1Q 10   3Q 2010

DL580G7 4U

- ✓ **IBM First to market**
- ✓ **Richer portfolio**
- ✓ **Up to 50% more**
  memory per CPU
- ✓ **exFlash**

2 socket

X3690 X5 2U

x3690 X5 2U

MAX5 1U

1Q 10   3Q 2010

No HP Offerings

- ✓ **IBM first to market**
- ✓ **Most memory per core**
- ✓ **IBM Exclusive**

19

✓ Shipping today

Blade Portfolio Comparison

| **Portfolio & start-ship date** | **IBM Advantages** |

4 socket

4 socket HX5, 60mm

3Q 10　　　　　　　　4Q10

HP 4S BL680 G7

✓ **IBM First to market**
✓ **2x Density per chassis**
✓ **Greater performance per chassis**
✓ **Virtual Fabric**
✓ *No product details available from HP*

2 socket

2S HX5, 30mm　　　2S, HX5 + MAX5, 60mm

3Q 10　　　　　　　　4Q10

HP 2S BL620 G7

✓ **IBM first to market**
✓ **Independent memory expansion with MAX5**
✓ **2x Density per chassis**
✓ **Greater performance per chassis**
✓ **Virtual Fabric**
✓ *No product details available from HP*
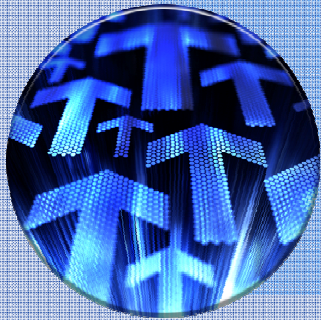
20

Shipping today

© 2010 IBM Corporation

IBM offer more than servers…
    IBM External Storage with eX5

Critical Success Factors for External Storage

Managing Information Growth without Complexity

Storage Efficiency

Reduce cost, improve performance, increase flexibility

Service Delivery

Understand what you have, improve service, beat expectations

Data Protection

Maintain access to information throughout its useful life

IBM Storage aligns with the eX5 portfolio

IBM Entry-level and Mid-range Storage for the fifth generation Enterprise X-Architecture

IBM DS3500

→ Affordable entry-point with midrange performance, scalability and features

IBM Storwize V7000

→ High-end capabilities and modular scalability packaged in one box

- **Better performance for virtualized server environments**
- **Ease of use and implementation**
- **Efficient disk utilization and management**
- **Affordable Solutions**
- **Integrated administration**

IBM

IBM System Storage DS3500

Entry-level disk and distributed enterprises requiring affordable performance and flexibility

- Excellent for applications with interactive database workloads
- Performance at lower price for reduced TCO
- Affordable and easy to use with mid-range reliability
- Concurrent iSCSI/SAS or FC/SAS host connectivity
- Increased scalability that grows as your needs grow
- Green efficiencies for reduced energy expenditures
- Ease-of-use built into powerful and intuitive management software
- Enhanced security features provides relentless data protection

DS3500 with 2.5" drives

DS3500 with 3.5" drives

IBM

IBM Storwize V7000

A new era in midrange storage begins today…

- **Modular** midrange storage that grows as your needs grow

- **High performance** storage that is **Easy** to set up and manage

- Breakthrough **GUI management** increases storage administrator efficiency

- **Advanced** storage efficiency and data protection capabilities built in:

  – Thin provisioning

  – Non-disruptive data migration

  – External storage virtualization

  – SSD support with Automated tiering

  – FlashCopy™ makes data protection faster and more efficient

IBM

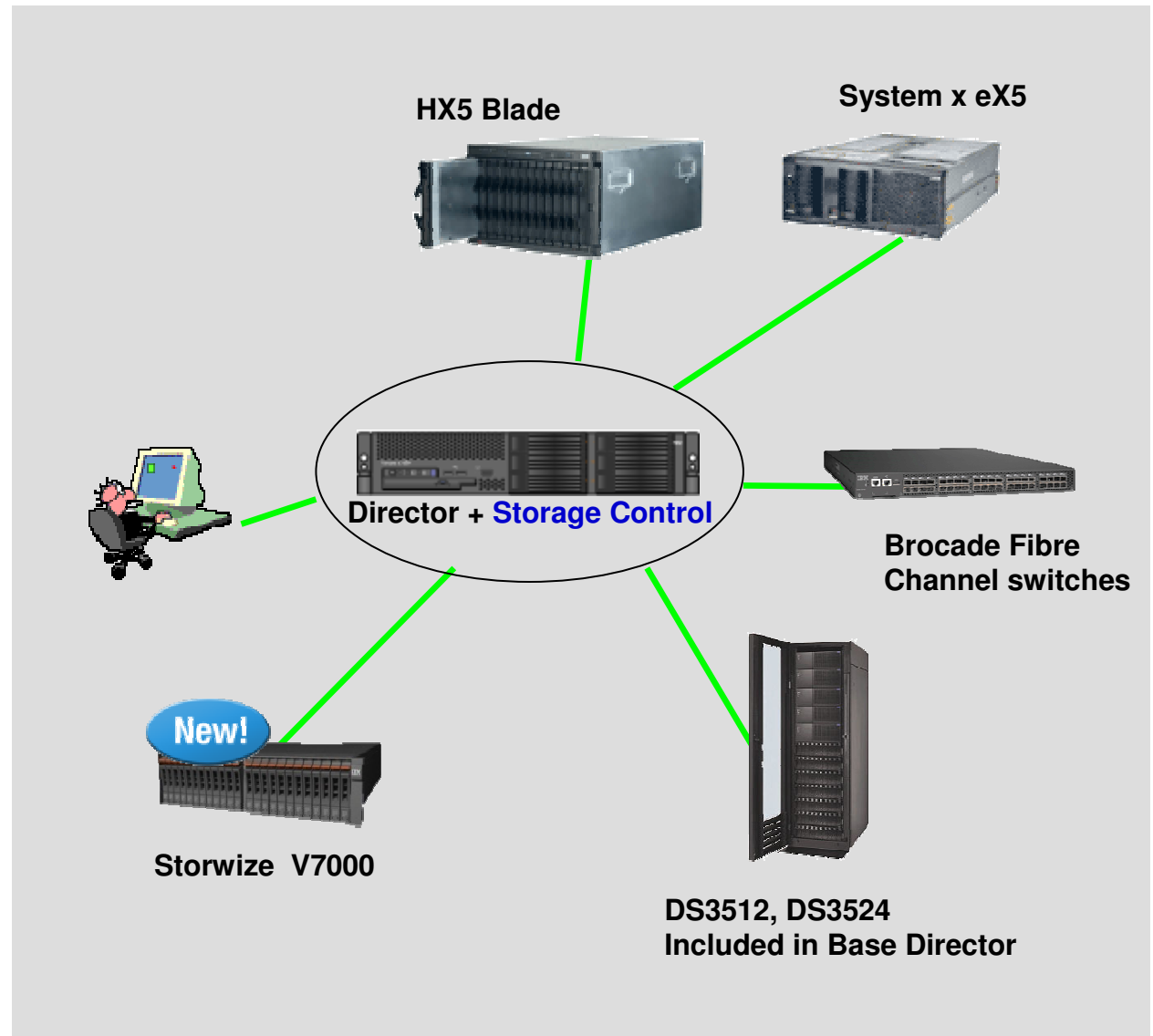# IBM System x and IBM Storage Integration through Systems Director

Centralized management to reduces costs and complexity across server and storage

Integrated:
- ✓ Discovery
- ✓ Inventory
- ✓ Alerts
- ✓ Monitoring
- ✓ Configuration
- ✓ Provisioning

With VMControl:
- ✓ Integrated virtualization management across server, storage, network
- ✓ Image repository and management: Storage provisioning for image creation, deployment, and cloning
- ✓ Storage System Pools: Manage storage system pool lifecycle, take group actions across pool and policy based storage placement, provisioning, and cloning actions within the pool

HX5 Blade

System x eX5

Director + Storage Control

Brocade Fibre Channel switches

New!

Storwize V7000

DS3512, DS3524 Included in Base Director

IBM

Strength of IBM eX5 and IBM Storage

Combining eX5 and IBM Storage provides more value…


DS3500

V7000

An
Unbeatable
Combination

- **Integration of eX5 servers to the latest IBM external storage**

- **Single SW management for servers through external storage**

- **Entire solution and support from a single vendor**

- **Enhanced IBM financing when utilizing eX5 and IBM Storage**

IBM

Moving forward: IBM eX5 and IBM Storage:

Getting Started

- **Assess your current storage system**
  - Assets on the floor and environmental considerations
  - Device Utilization / Administrative costs
  - Critical application data / lower priority data
  - Compliance and Disaster Recovery policy implications

- **Find opportunities for early success**
  - Underutilized devices / Opportunities for consolidation
  - Backup window challenges
  - Solid State or other speed boosts

- **Lay in a plan for the long term**
  - Start now but continue to improve over time
  - Virtualization for flexibility and increased utilization
  - Enable new delivery models – Cloud, Managed Infrastructure Services

- **Maximize cash flow**
  - Check with your local IBM Seller or Business Partner about financing
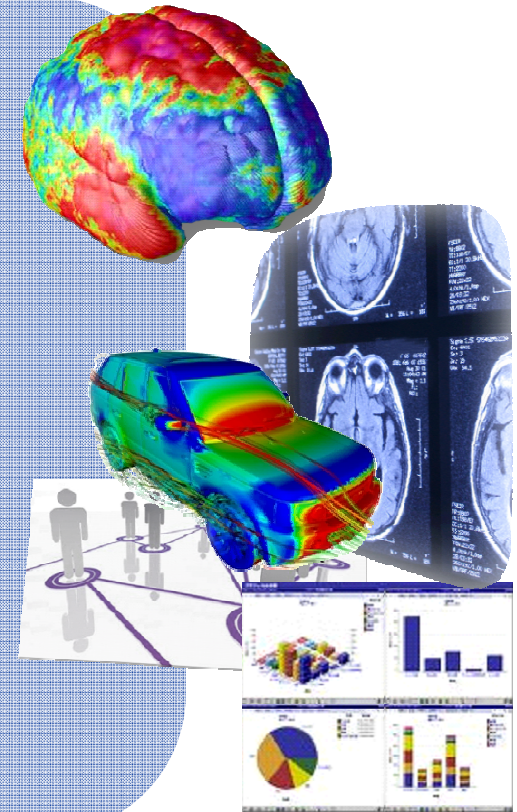
Whether you want to do it all yourself or have it all done for you,
IBM can help!

THANK YOU FOR YOUR TIME

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