

IBM PureSystems

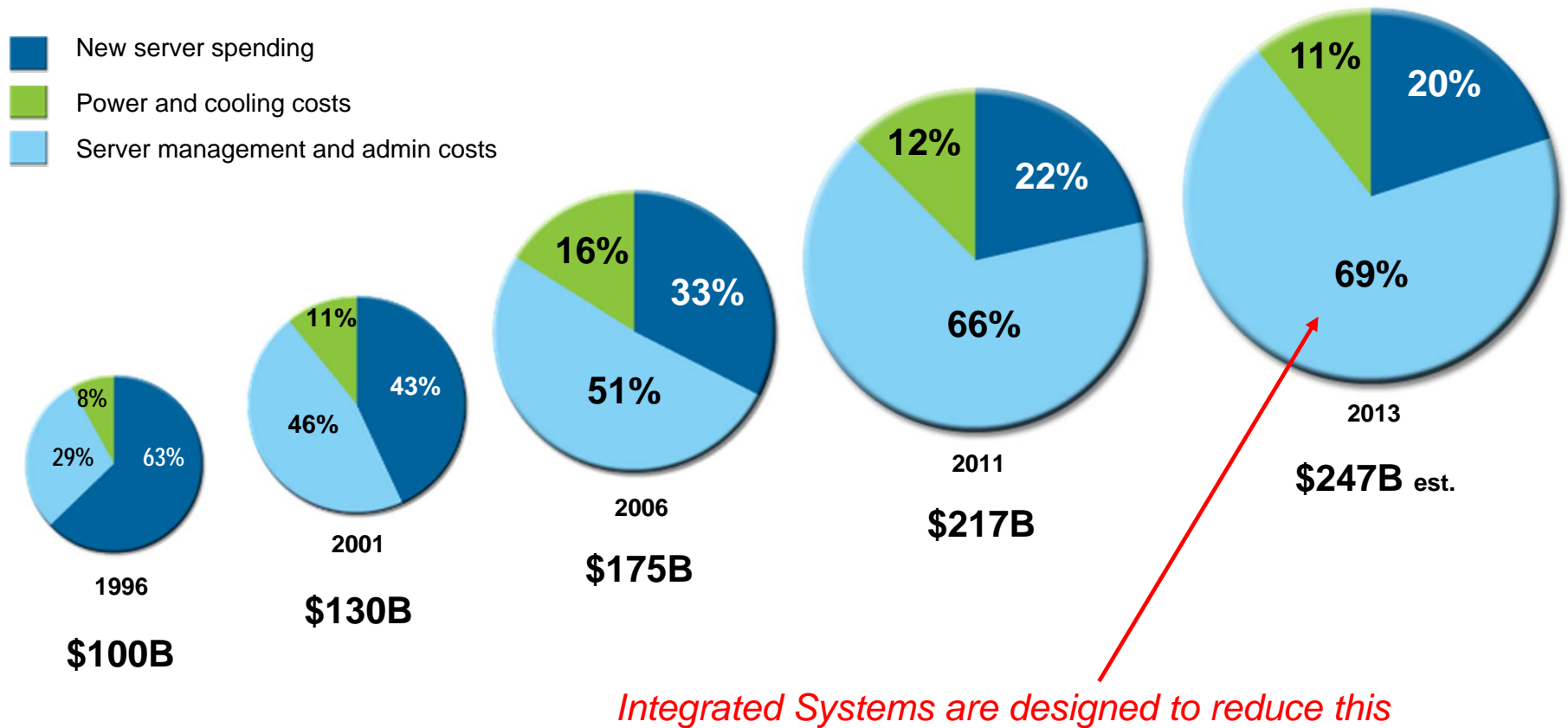
A new family of expert integrated systems

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Version 1.4



Worldwide IT Spending on Servers, Power, Cooling and Management Administration



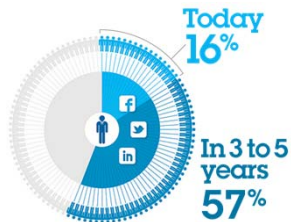
Source: IDC, 2012

Four forces are driving business need for IT consolidation choice and cost reduction



Mobile

90% of mobile users keep their device within arm's reach **100%** of the time¹



Social

% of **CEOs using Social** to Connect with Customers²



Big Data & Analytics

8 zettabytes of digital content created by 2015³



Delivered via the Cloud

62% of workloads in existing datacenters will be **cloud based** by 2014⁴

Improve IT efficiency through consolidation

- Explosion of virtual machine sprawl drives continued need for consolidation
- Opportunities to consolidate heterogeneous environments for facilities and energy savings
- Consolidate all infrastructure – not just servers

New workloads drive need to integrate new capabilities with choice

- Exploding data driving new analytics requirements
- Mobile access driving more application access and security requirements
- MSPs serving more small and midmarket clients with cloud services

Invest in innovation and reduce operational expense

- Realize new revenue streams created by new services
- Integrate management control across resource silos
- Improve resource utilization and staff productivity

*Reference Appendix for Footnotes

Clients need to address critical imperatives in this environment

Accelerate new applications, big data and analytics



34% of new IT Projects deploy late

From a commissioned study conducted by Forrester Consulting on behalf of IBM

Improve IT efficiency by simplifying the IT lifecycle



Only 1 in 5

Can allocate 50% or more of their IT budget to new projects¹

IBM, *Data center operational efficiency best practices*, April 2012.

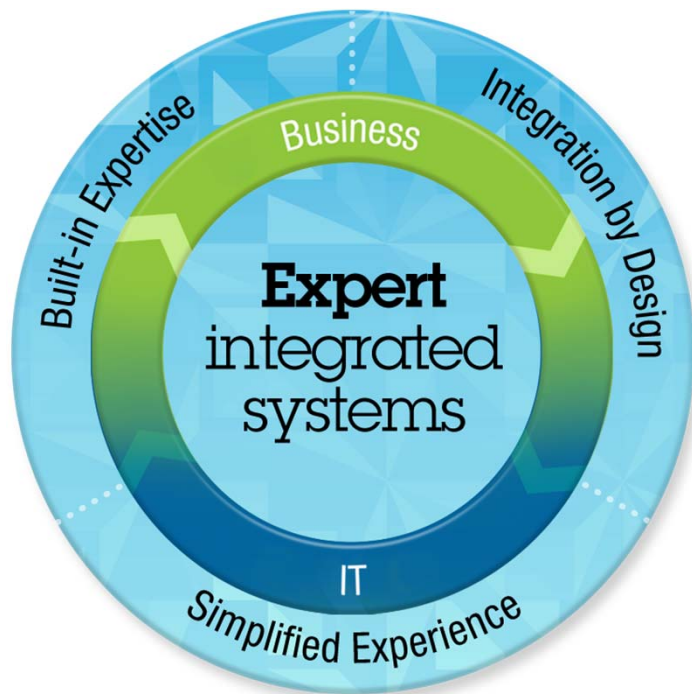
Simplify cloud application platforms and infrastructure



90% plan to implement cloud by 2015

* IBM GBS 2011 IBV Study, "The power of cloud: driving business model innovation"

The Time has Come for a New Breed of Systems



Built-in Expertise

Capturing and automating what experts do

Integration by Design

Deeply integrating and tuning hardware and software

Simplified Experience

Making every part of the IT lifecycle easier
Integrated management of the entire system
A broad open ecosystem of optimized solutions

Flex System: Beyond Blades



Compute

Multi architecture:
POWER & x86
Flexible choice of nodes to
meet workload requirements



Chassis / Networking

Highest performance I/O -
40Gb Ethernet, 16Gb SAN,
56Gb Infiniband FDR
Designed for multiple
generations of technology for
investment protection

Flex System



Management

Single point of management
control for all resources
Reduce complexity by
automating everyday
management tasks



Storage

Optimize data between Flash
and HDDs with tiering
Connect to or virtualize
existing storage

**Infrastructure that goes beyond blades for
Consolidation, Choice and Cost Reduction**

PureSystems Momentum Continues to Grow



6,000+

systems shipped
in more than 100
countries as of 2Q

300

references & case
studies demonstrating
success

500

optimized solutions
from 330 leading
partners

1,300+

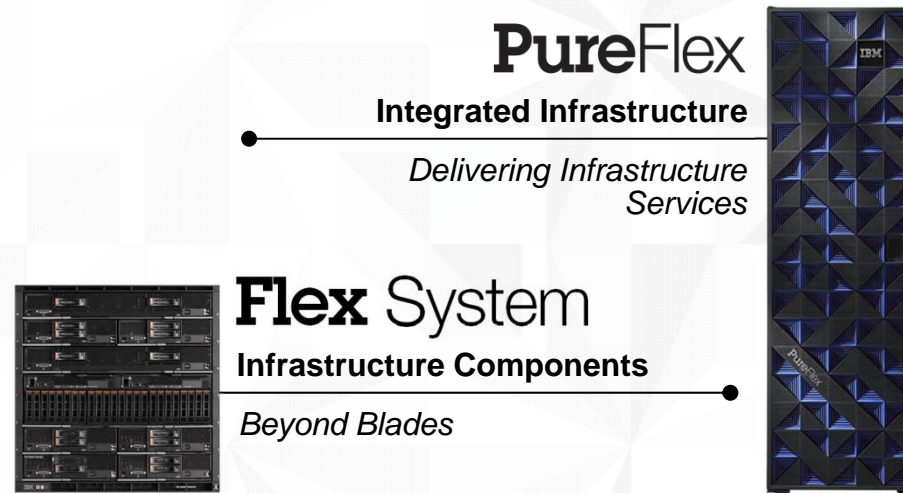
authorized resellers
worldwide

6,500

Business Partners
seller and technical
certifications

Products: Build on momentum

2012 – 2013 PureFlex and Flex System launches



2012			2013		
<p>April</p> <p>Expert Integrated Systems</p> <ul style="list-style-type: none"> ▪ PureFlex ▪ PureApp. ▪ Expert Integrated Systems 	<p>August</p> <p>IBM Flex System</p> <ul style="list-style-type: none"> ▪ Flex System (Blade to Flex) ▪ Extensive sales and Partner briefings 	<p>November</p> <p>More Choice – PureFlex & Flex System</p> <ul style="list-style-type: none"> ▪ Flex system V7000 ▪ Compute 	<p>February</p> <p>Solutions Initial launch</p> <ul style="list-style-type: none"> ▪ MSPs ▪ VDI 	<p>June</p> <p>PureFlex and Flex System Solutions</p> <ul style="list-style-type: none"> ▪ SAP, HANA ▪ Cloud B/DR ▪ IBM i Solution 	<p>August</p> <p>Flex System Expanded Portfolio</p> <ul style="list-style-type: none"> ▪ 3 POWER Nodes ▪ 1 x86 Node ▪ 3 Network options ▪ FSM 1.3

The Flex System Portfolio Continues to Grow

x86



 New x222	 x220	 x240	 x440	 Storage Expansion	 PCIe Expansion	 New Flex System Manager
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Management

POWER

 p24L	 New p260	 New p270	 New p460
--	---	---	--

Storage

 Flex System V7000	 Storwize V7000
---	--

Networking

 New SI4093	 New EN4093R	 New EN6131	 CN4093	 EN2092	 FC5022	 FC3171
---	--	---	---	--	--	--

IBM PureSystems Family

Flex System



PureFlex



PureApplication



PureData



Infrastructure Components

Beyond Blades

Integrated Infrastructure

*Delivering Cloud
Infrastructure Services*

Application Platform

*Delivering Cloud Application
Platform Services*

Data Platform

*Delivering Big Data
Platform Services*

Flex System Elements

Integrated Infrastructure



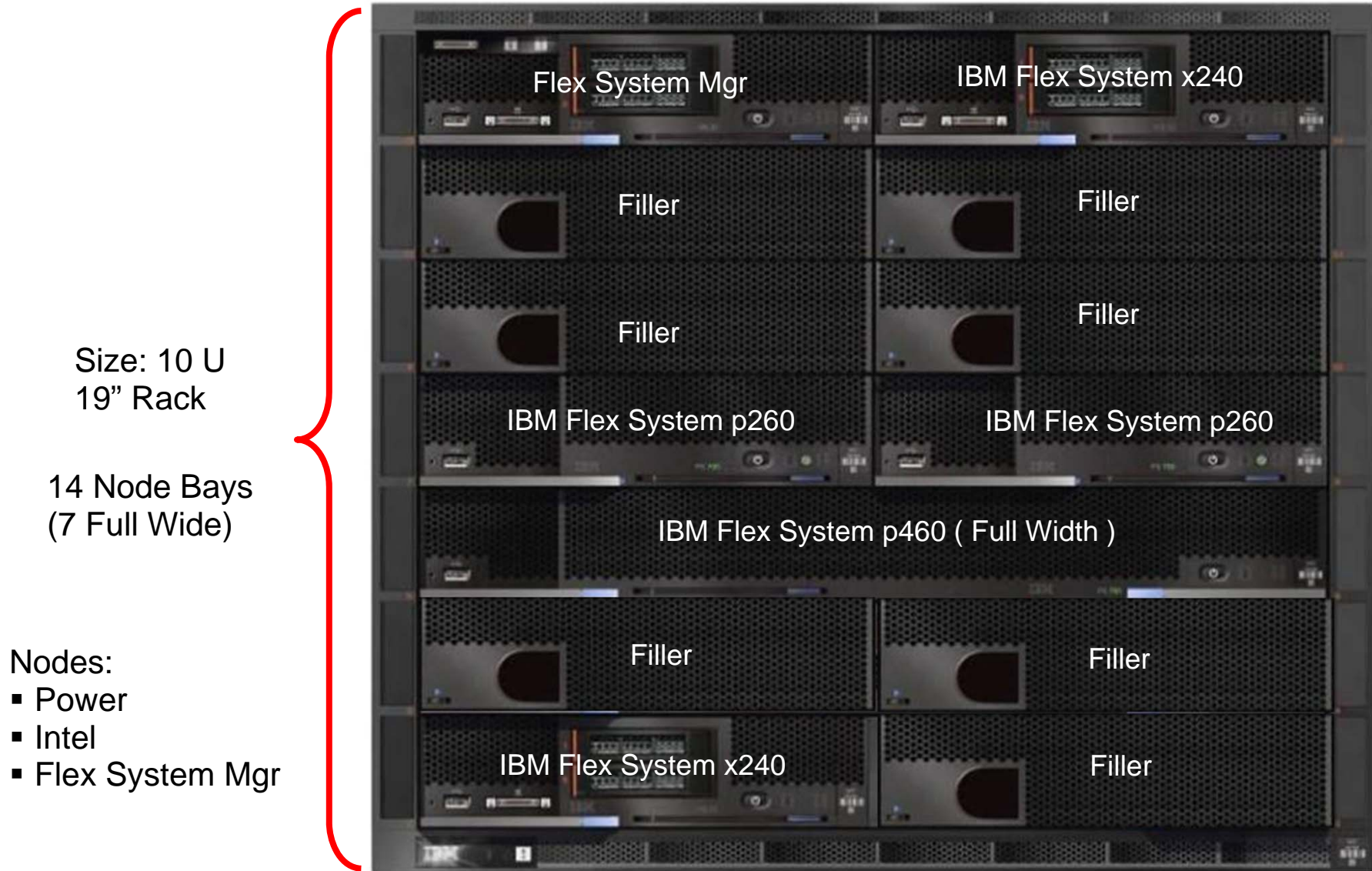
1 system for compute,
storage and systems networking

Up to 1344 cores power, 1792 cores x86, 43
TB memory, 480 TB storage and 26M IO
operations per second, per rack

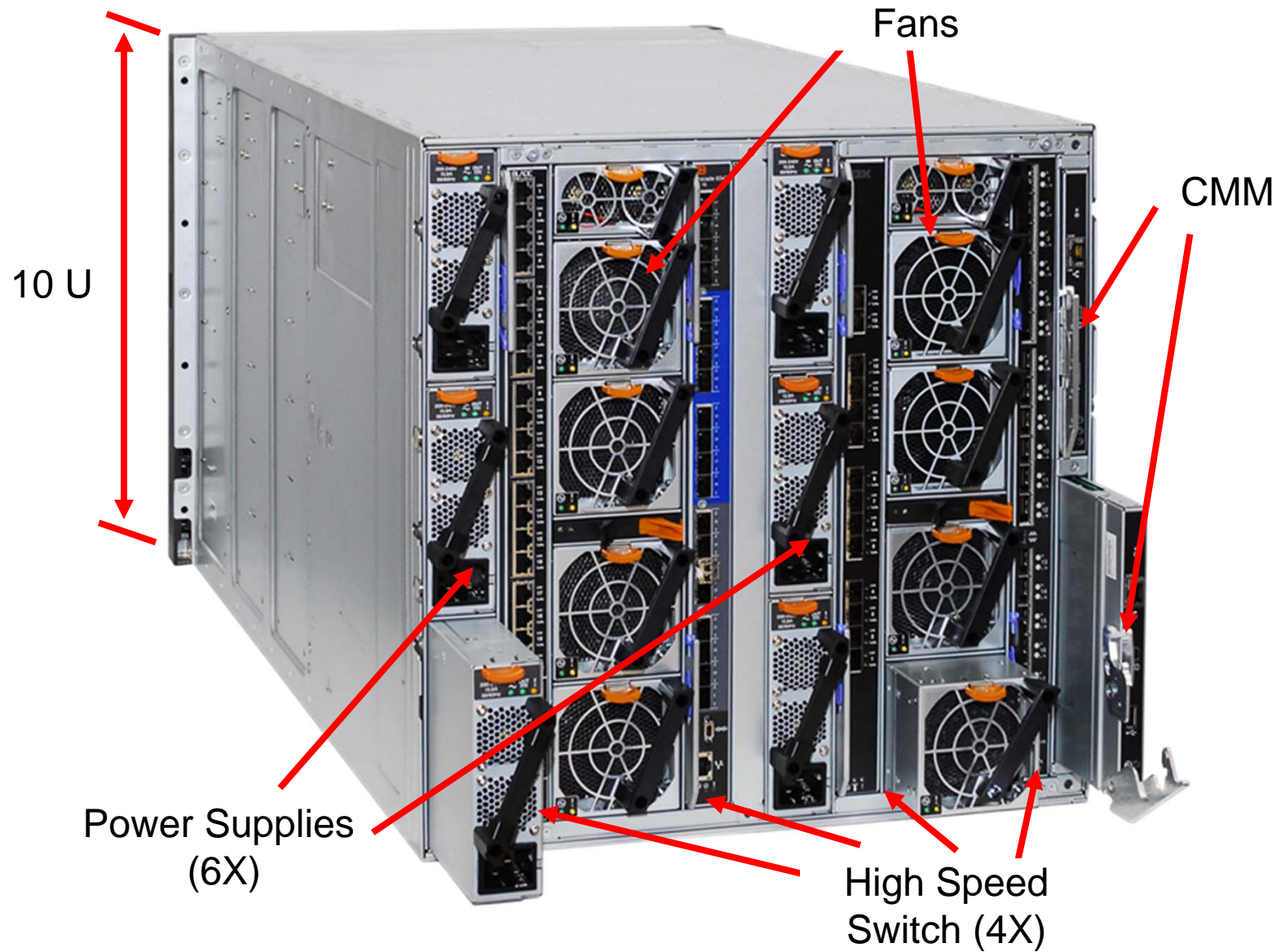
Up to 4 chassis per rack scalable up to 4
racks

10U Chassis
14 Node
Bays

IBM Flex System Enterprise Chassis Front View



IBM Flex System Enterprise Chassis Rear View





Compute

POWER 7/7+ & x86

No compromise design for the next decade

Diverse offerings to match the diverse workloads

System infrastructure

Compute

System Portfolio tuned to workloads

◇

Reduce acquisition costs through virtualization consolidation

◇

Maximum platform capability provides deployment flexibility



IBM Flex System x220



IBM Flex System x240



IBM Flex System x222



IBM Flex System x440



IBM Flex System p24L



IBM Flex System p260



IBM Flex System p270



IBM Flex System p460

IBM Flex System x240 – 2S EP Compute Node

Compute



Standard Width compute node



2-socket Intel E5 2600 Sandy Bridge-EP



24 LP DDR3 DIMMs / 1333MHz / 1600MHz



10Gb Converged LOM



2 hot swap 2.5" SAS/SATA SSDs or HDDs



Dual Enabled Hypervisor – ESXi on Flash Key Option

System infrastructure



IBM Flex System x240

Uncompromised Compute, IO, and Storage performance, designed for mainstream virtualization, and a broad range of workloads

2x IO Mezzanine Cards

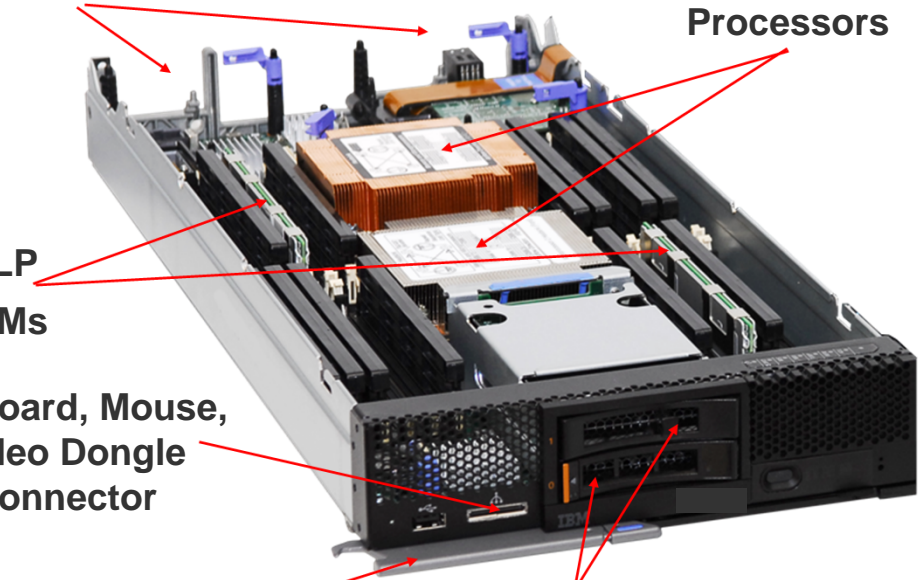
2x Intel E5 2600 Processors

24 LP DIMMs

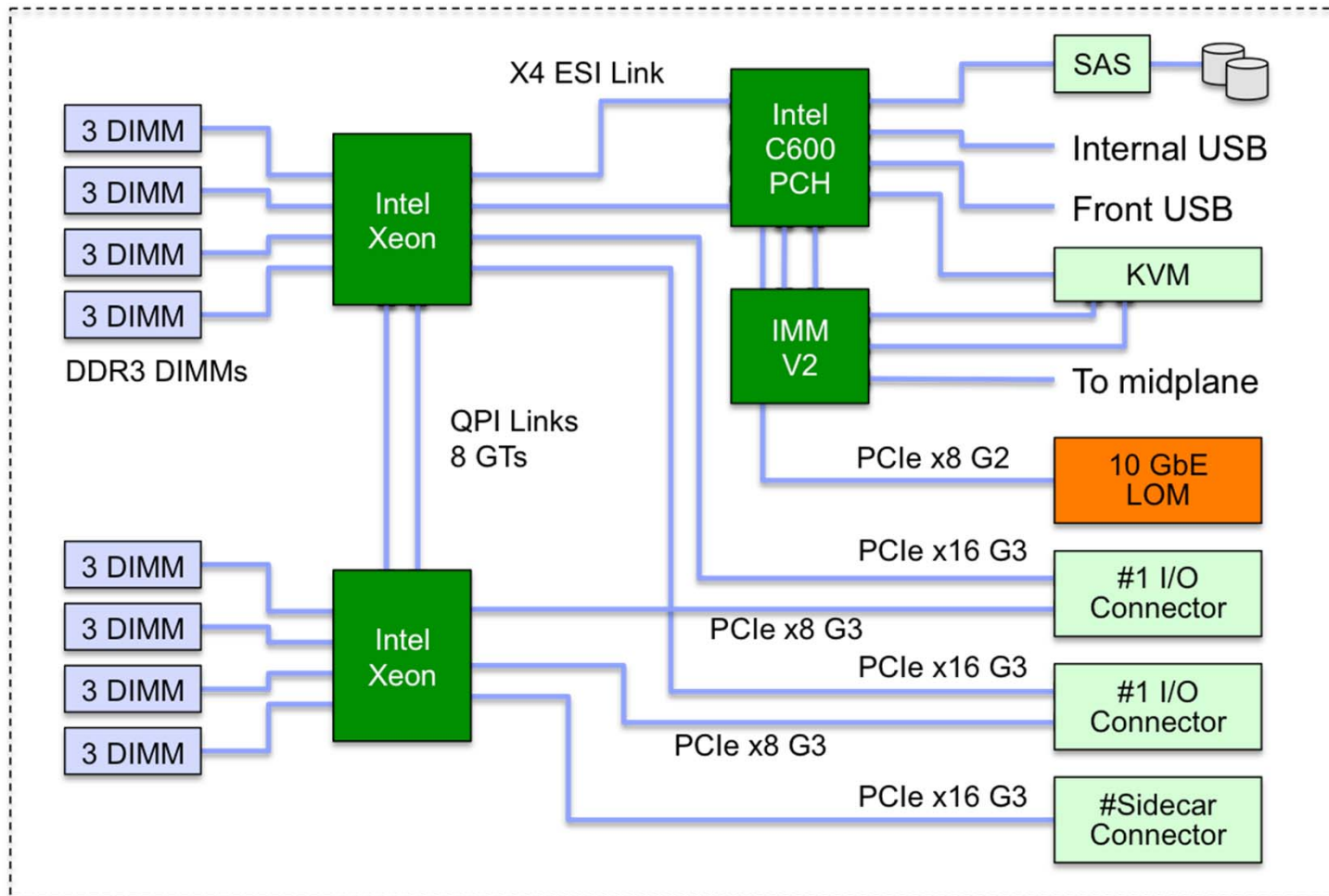
Keyboard, Mouse, Video Dongle connector

Release latch

2x Hot Swap, Small Form Factor HDDs



Flex System x240 Compute Node



IBM Flex System PCIe Expansion Node

Compute



Utilize high-capacity, flash based storage to significantly boost transaction based workloads

Utilize high performance GPUs to boost computationally capabilities

Enable attachment of external drive enclosures

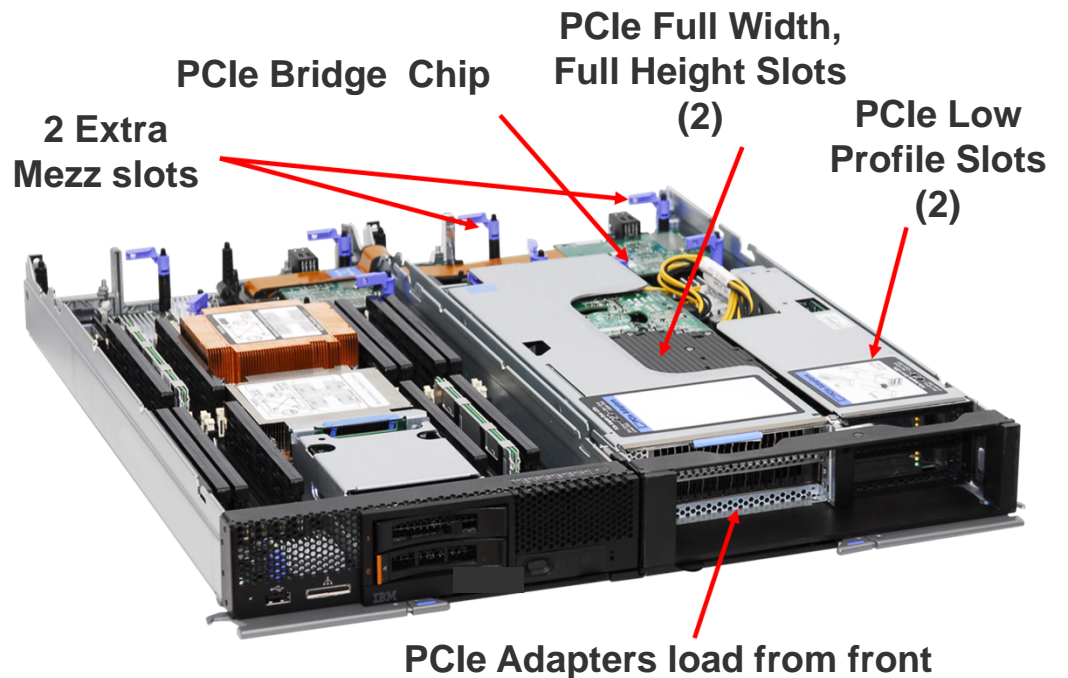
Tap all available I/O of modern CPU architectures



System infrastructure




- A new I/O expansion Compute sidecar
- Industry standard PCIe cards
- Additional Next Generation Platform fabric I/O
- Graphics, Storage, and I/O adapters
- **Attaches to 2-socket x240 and x220 nodes**



Direct Attach Storage Options

Storage



System infrastructure

Dedicated storage “side-car” that attaches to single width compute node

◇

12 x HS 2.5” hot swap HDDs or SSDs

◇

Integrated RAID function

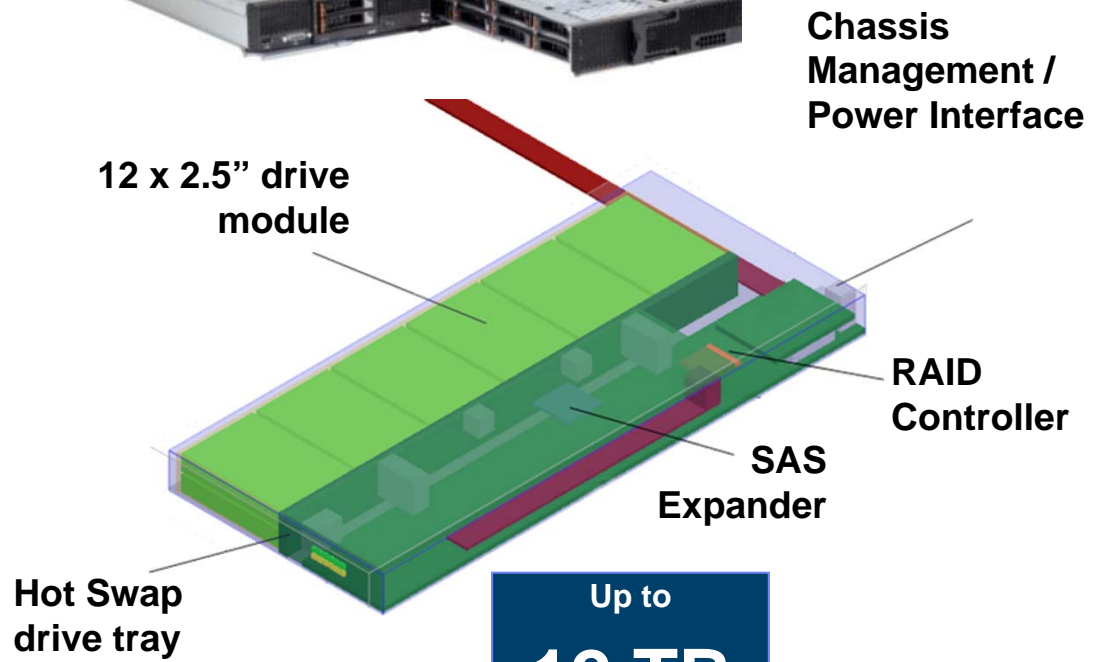
◇

1 GB RAID Cache (optional)

IBM Storage Expansion Node

Provides cost optimized, high capacity, direct attached storage to meet today's needs data intensive workloads

IBM Flex System x220 / x240 With Storage Expansion Node



Up to
12 TB
of storage

Direct Attach Storage Options

Storage



Supports 8 1.8" SSDs



4 drives over DIMMs and 4 in the drive bays

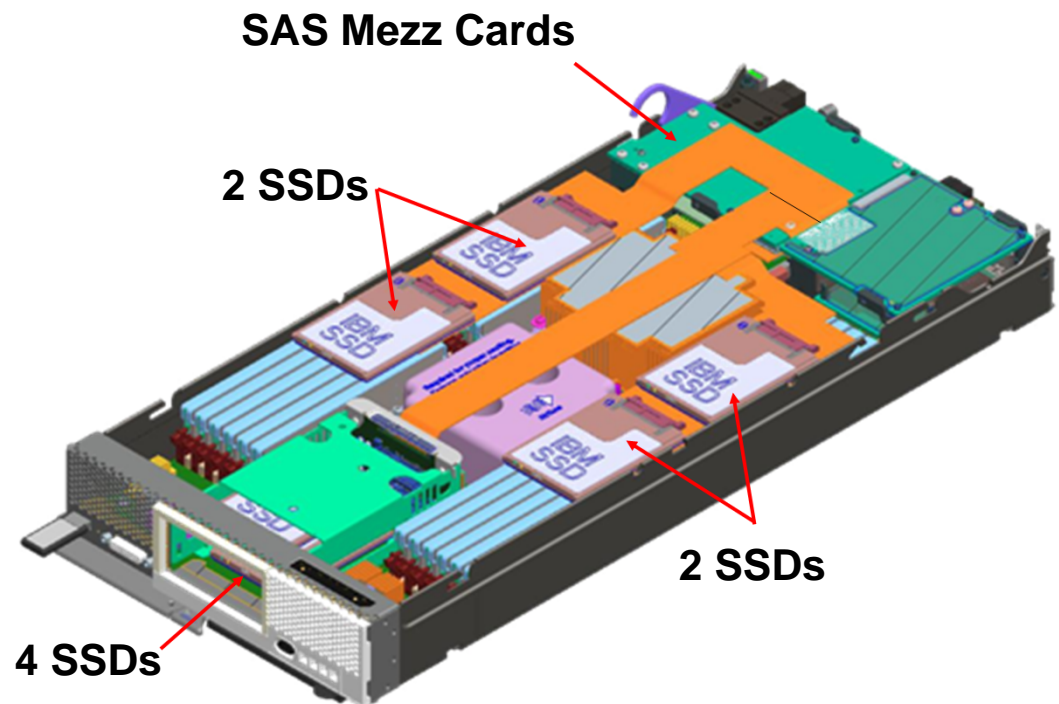


1.6 TB - 3.2 TB Total Capacity
(200GB/400GB SSD Drives)

System infrastructure

IBM eX Flash for high IOPS storage expansion

Low cost IOPS performance, optimized for transaction processing, media streaming, and business intelligence applications



IBM Flex System x222 Compute Node



System infrastructure

Compute



Double the density:
28 nodes per 10U chassis



2-socket Xeon E5-2400 per
twin



12 LP DDR3 DIMMs /
1333MHz / 1600MHz per twin



2x 10Gb ports standard per
twin, optional
8Gb/16Gb Fibre Channel
or QDR/FDR Infiniband



1x 2.5" SATA HDD
or 2x Hot swap 1.8" SSD per
twin

Reduce operational costs with x222

- Double-dense design that can support 28 twin nodes per IBM® Flex System™ Enterprise Chassis
- Optimized for Virtual Desktop Infrastructure, Virtualization, Cloud Computing and Infrastructure Consolidation
- In a real-world deployment example, the Flex System x222 was able to reduce 56U of 2 socket rack servers into 10U
- Reduce cost and complexity by
 - Fewer chassis & switches
 - Power and cooling
 - Reduce managed devices.



Competitive Use Case: 3,000 user VDI deployment (2.5GB per user)

Real world scenario compared IBM Flex System to HP's BladeSystem for a 3,000 VDI user deployment. Results showed that Flex System x222 required half the infrastructure compared to HP BladeSystem.



3,000 User Configuration

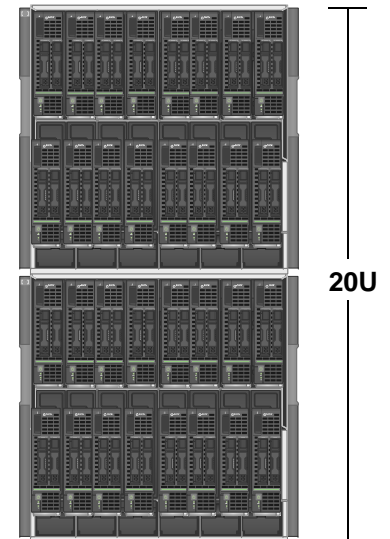
- **10** x Flex System x222
 - 192GB memory per twin node
 - 2x E5-2470 per twin node
- **1** x chassis
 - 2x 10Gb Converged Networking switch



Hewlett Packard

3,000 User Configuration

- **20** x HP BL420c G8
 - 192GB memory per node
 - 2x E5-2470
- **2** x chassis
 - 4 x HP Flex Fabric 10Gb Converged Networking switch

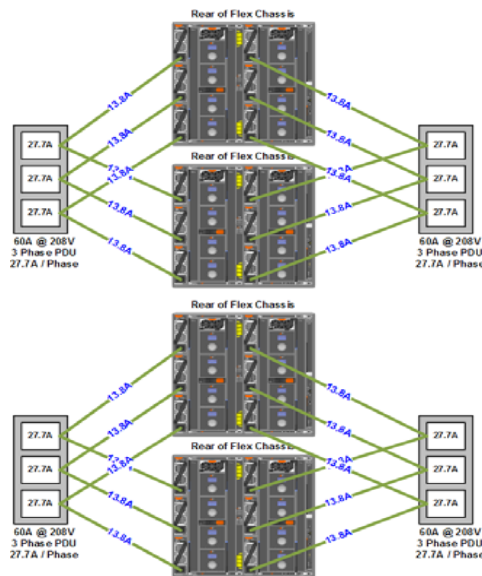


Flex System x222 achieve 71% chassis consolidation (112 Server Example)

x222 infrastructure vs. Cisco UCS – equivalent workload and capacity

Flex System with x222
224 Processor Sockets
 Requires **4x** circuits
24 Power Supplies
4 Chassis taking up **40U**

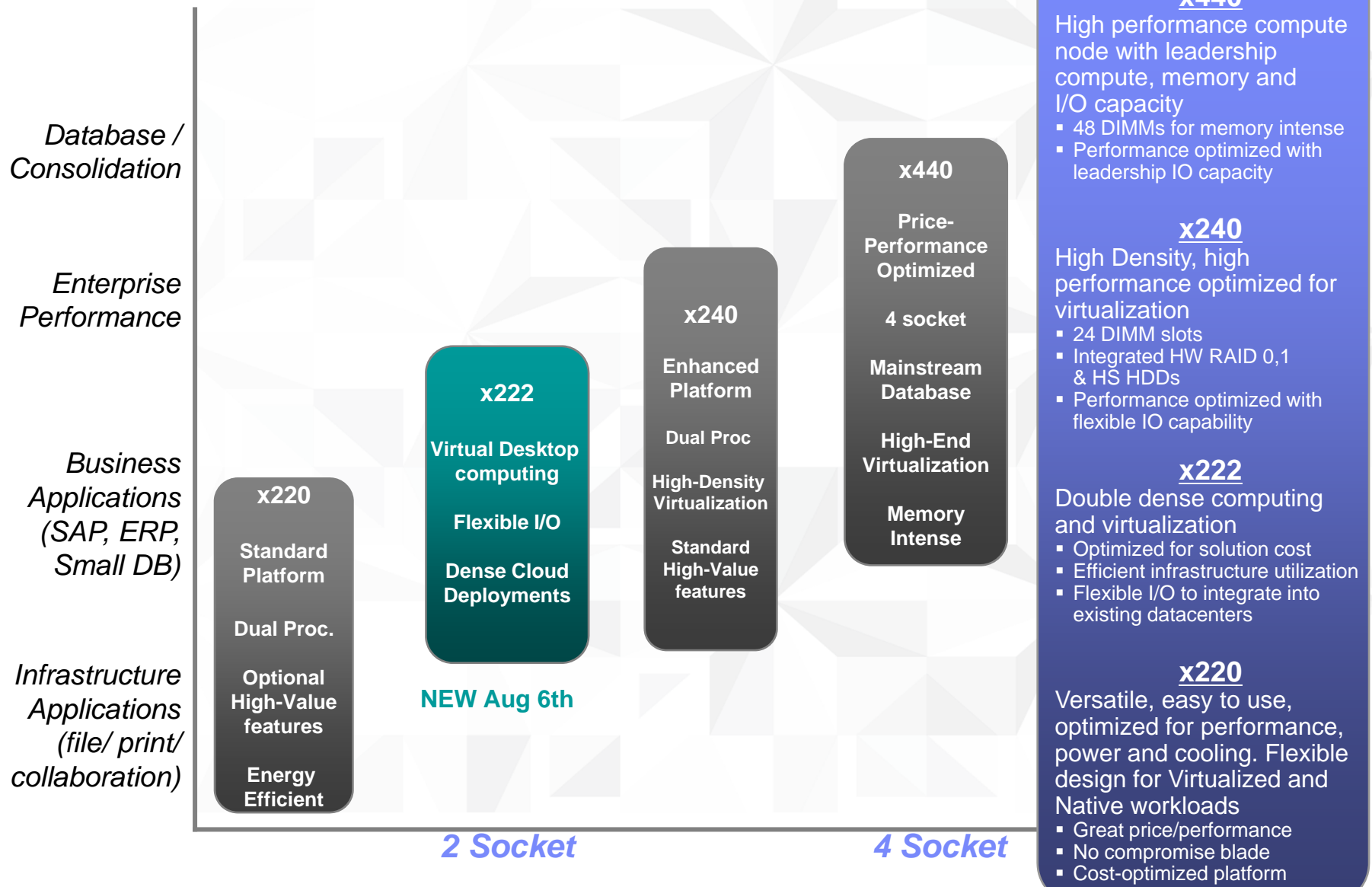
Cisco UCS
224 Processor Sockets
 Requires **20x** circuits
56 Power Supplies
14 Chassis taking 84U



x222 Compute Node – Double density advantage

	Competitor Limitations	X222 Advantages
HP	No double dense compute node Requires two chassis for 28 nodes	Double dense compute nodes - up to 28 per chassis Multiple high performance networking options Flex System highly resilient architecture Delivers more memory and processor cores
Cisco	No double dense compute node Requires four chassis for 28 nodes Does not support Fibre Channel Does not support Infiniband	
DELL	Dense node limited memory expansion – 6 DIMM slots	

Flex System: x86 Compute Nodes Positioning



Best in Class RAS

Mainframe Inspired Redundancy with Hot Swap and PFA

■ Mainframe Inspired Redundancy with Hot Swap



■ Mainframe Inspired Predictive Failure Analysis (PFA)

PFA	Cisco	DELL	HP	IBM
Hardware				
▪ Disk	Yes	Yes	Yes	Yes
▪ Memory	Yes	Yes	Yes	Yes
▪ CPU	No	No	Yes	Yes
▪ Fan	No	No	No	Yes
▪ VRM	No	No	No	Yes
▪ Pwr Supply	No	No	No	Yes

2013 Intel® Xeon® Processor Families

Intel® Xeon® Processor E7 Family

Highest reliability & scalability
8-way Scalability
MAX5 Memory
Mission-Critical RAS

E7-8800/ 4800/ 2800

x3950 X5, x3850 X5, x3690 X5



Intel® Xeon® Processor E5 Family

Most flexible & efficient

E5-4600

Dense 4S

E5-2600

Mainstream
Leadership

E5-2400

Entry 2S

Intel® Xeon® Processor E3 Family

Highest density, lowest cost

E3-1200v2

Dependable & Economical 1S

Delivering a new breed of platforms & capabilities to address growing demands

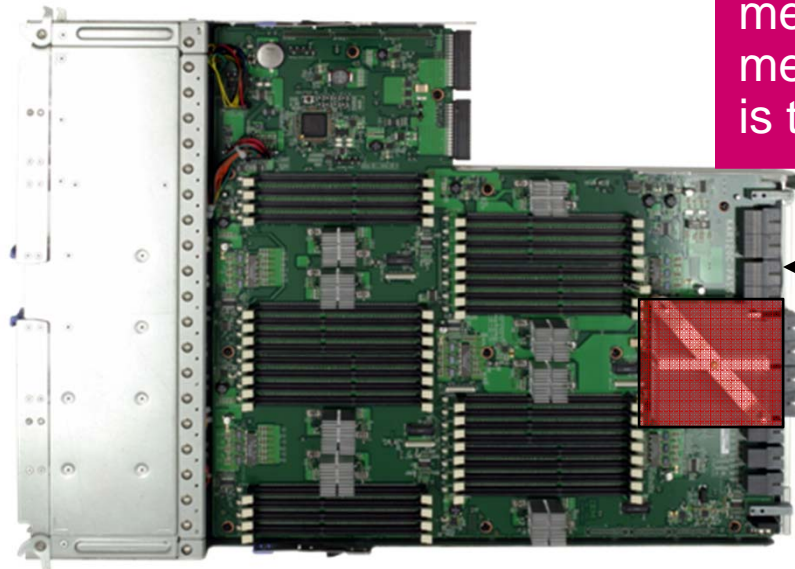
MAX5 Value Proposition for eX5 systems



The IBM advantage...

With embedded memory controllers, memory capacity is tied to processors

But not with MAX5...



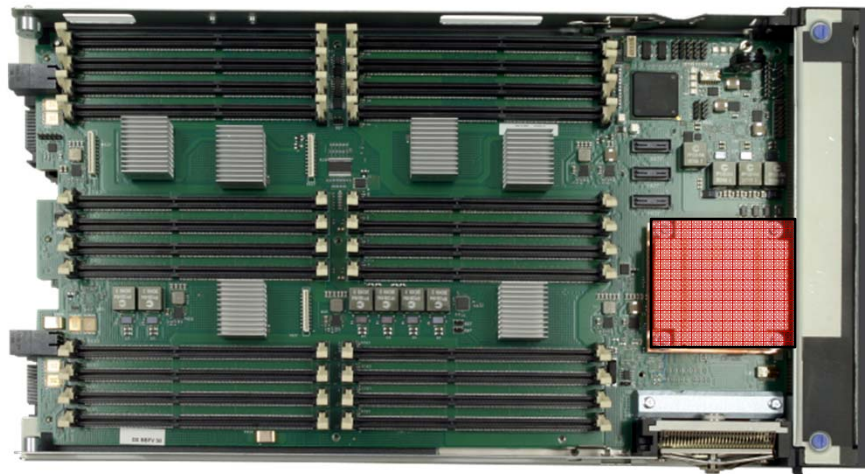
MAX5 1U Drawer

QPI Ports attach to Systems



IBM Chipset (Firehawk)

EXA Ports Scale to other memory Drawers



MAX5 Expansion Blade

- Expand memory capacity
- Up to double the number of memory DIMMs compared to competitors
- Excellent loaded latency performance
- Over five times the memory capacity in two sockets vs. today's leading two-socket systems
- MAX5 memory may be partitioned to CPUs or pooled

eX5 for your workloads today and tomorrow

Memory Expansion
and Scaling with MAX5



8P, 192DIMM

Native (QPI) Scaling

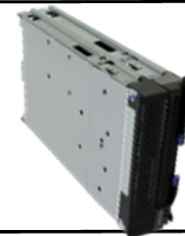
4P, 32D



8P, 128DIMM

Memory Expansion
with MAX5

2P, 40D



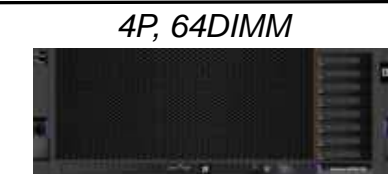
4P, 96DIMM



2P, 64DIMM

Base System

2P, 16D



4P, 64DIMM



2P, 32DIMM

HX5

x3850 X5

x3690 X5

IBM eXFlash

Extreme internal storage capacity and performance



Same performance as

800
spinning
disks

- Up to 200x performance increase for local databases
- 99% better performance per watt for database-type workloads

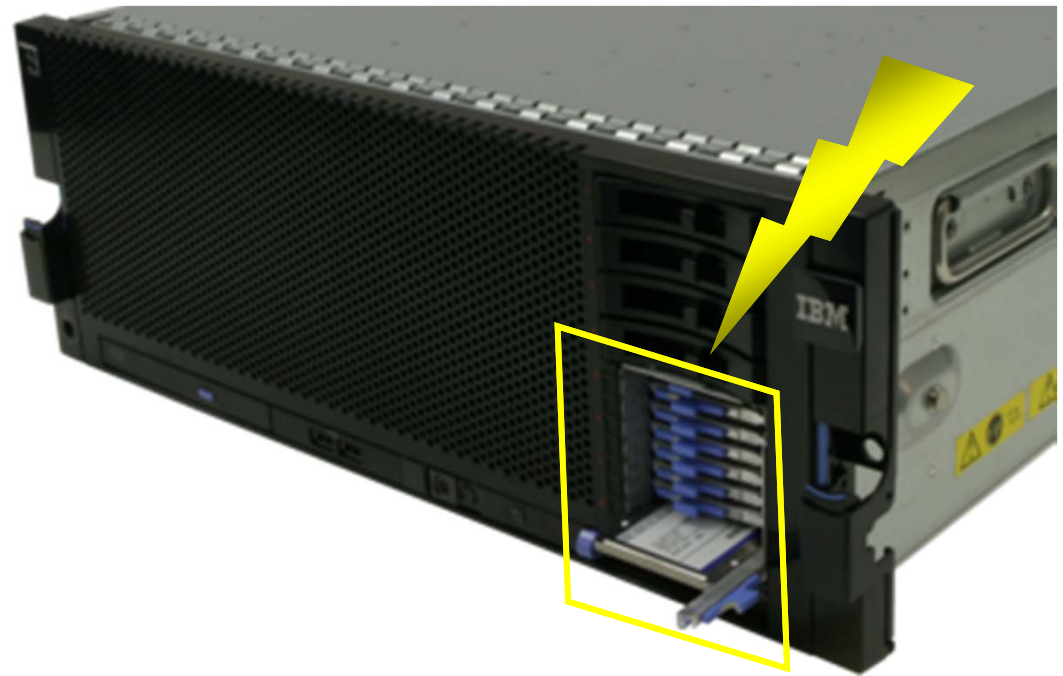
97%
less
expensive

For same 1,000 user
database
performance

- 100 to 1 replacement ratio of traditional drives, replacing thousands of drives and cables
- \$670,000 hardware savings per FlashPack over equal IOPs HDDs
- Up to 40x greater solution density over traditional HDD solution

Power reduced to

1%
of spinning
disks



eXFlash features

- Up to 3 eXFlash packs in x3690 X5 or 2 in x3850 X5
- Up to 240,000 IOPs read-only per eXFlash pack
- Up to 87,000 IOPs RAID 5/6 read/write mix per eXFlash
- Up to 1.6TB per eXFlash
- Hot swappable, front accessible, modules

eX5 has the richest capability and RAS features

Feature		x3650 M4	x3750 M4	x3690 X5	x3850 X5
CPU Sockets		2	4	2	4 to 8
CPU Specs Cores/threads/cache		8/16/20MB	8/16/20MB	10/20/30MB	10/20/30MB
Max memory capacity		768GB	1.5TB	1TB base 2TB w/MAX5	2TB base 3TB w/MAX5
System RAS	VMControl	✓	✓	✓	✓
	PFA	✓	✓	✓	✓
Enhanced CPU RAS	MCA-R			✓	✓
	DDDC+1			✓	✓
	Advanced QPI RAS			✓	✓
HW Differentiation	MAX5			✓	✓
	eXFlash	✓	✓	✓	✓
	Scalability				✓

Power Flex POWER7+ Node Offerings.....



**p460
7895-43X**



**Cores: 16 / 32
Max Memory: 1 TB**

**p270
7954-24X**



**Cores: 24
Max Memory: 512 GB**

**p260
7895-23X**



**Cores: 8 / 16
Max Memory: 512 GB**

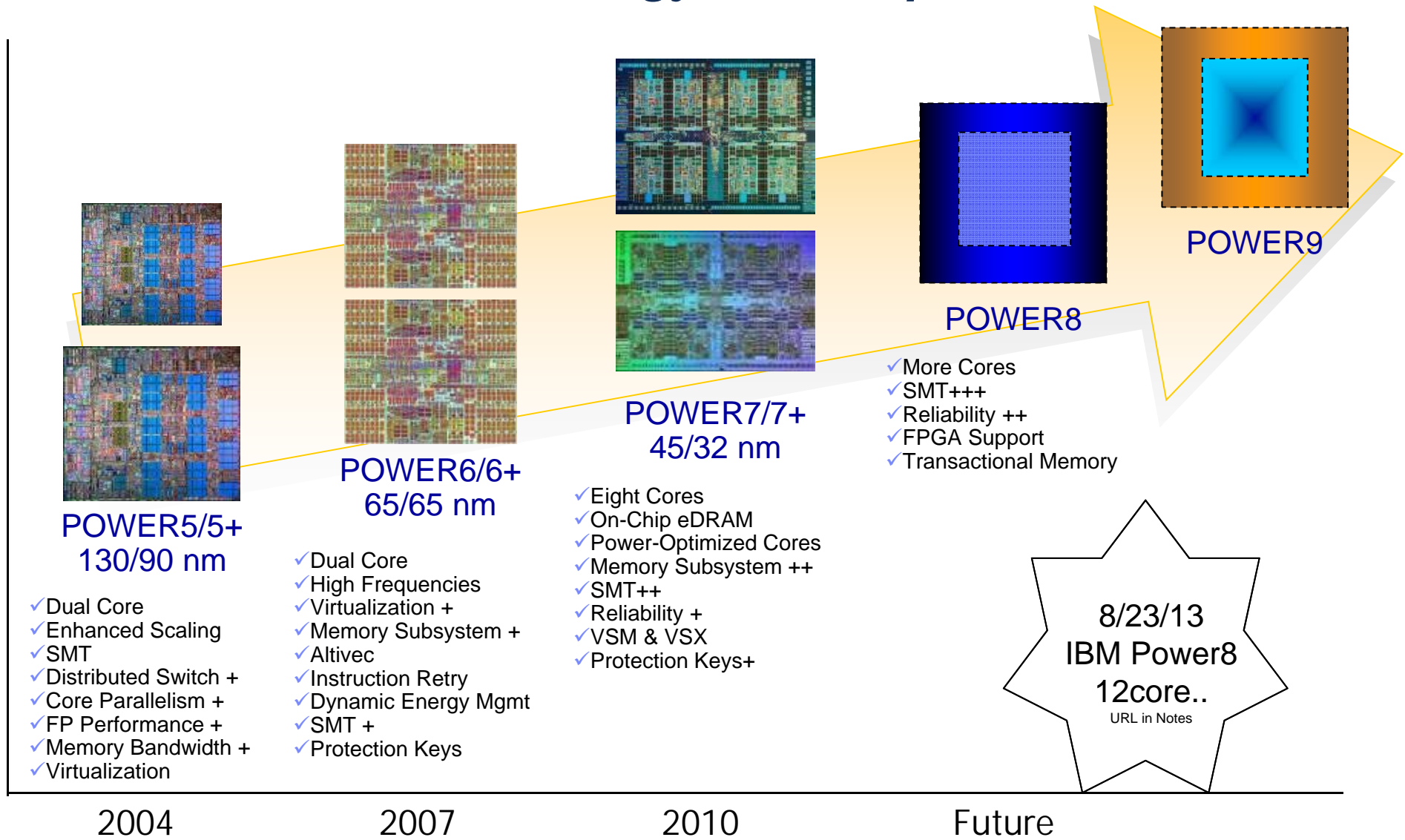
**p260
7895-23A**



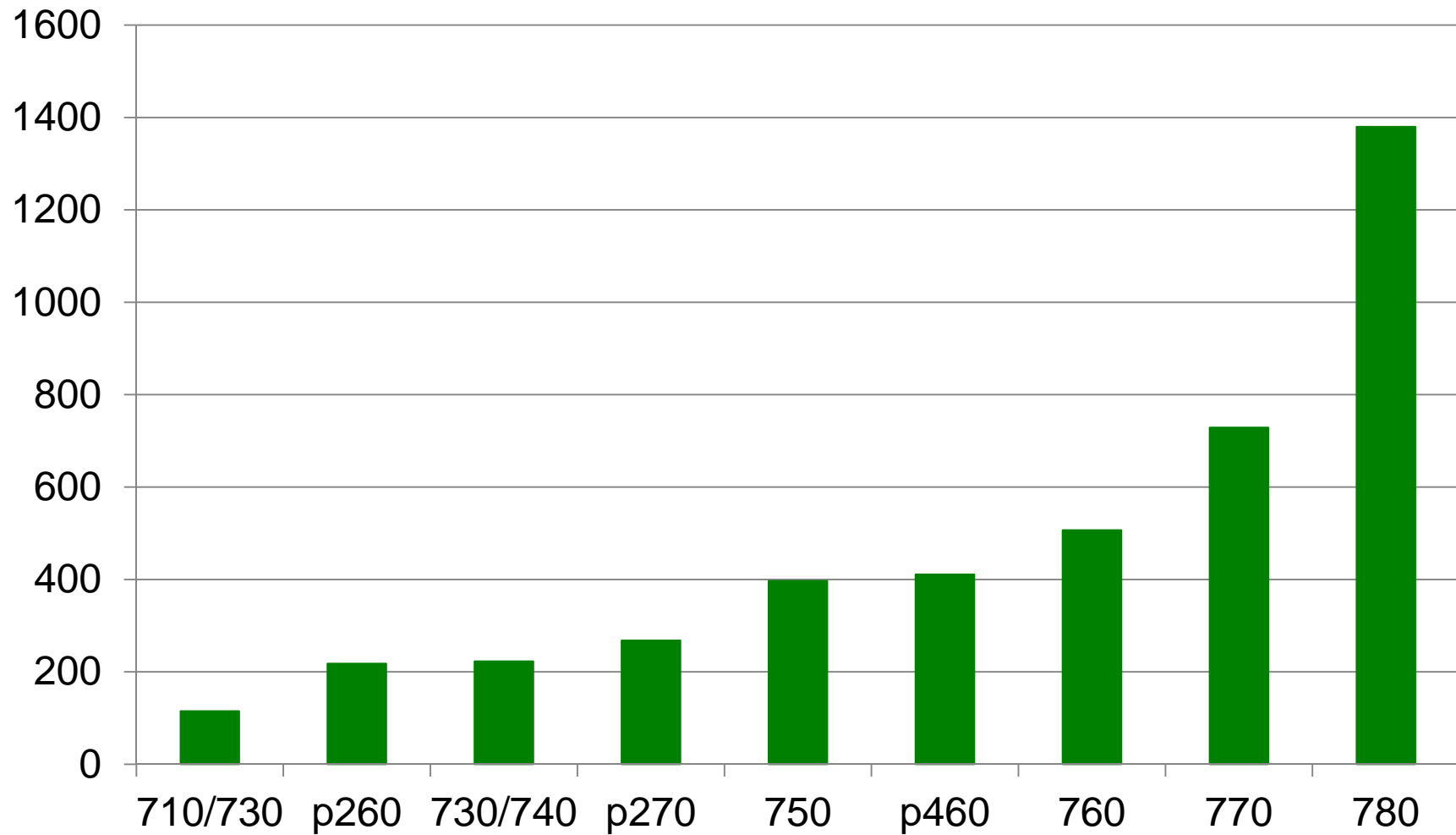
**Cores: 4
Max Memory: 512 GB**



Power Processor Technology Roadmap



POWER7+ Performance



rPerf ratings charted. If CPW ratings charted, the bars show the same scaling.



POWER7 RAS Feature Overview

- Standard
- Optional
- Not Available

RAS Item	PureFlex	Power Blades	Power 710 / 730	Power 720 / 740	Power 750
Redundant / Hot Swap Fans & Blowers	● (Chassis)	● (BC)	●	●	●
Hot Swap DASD & Media / PCI Adapters	—	—	● —	● —	● ●
Concurrent Firmware Update	●	●	●	●	●
Redundant / Hot Swap Power Supplies	● (Chassis)	● (BC)	●	●	■
Dual disk controllers (split backplane)	■ (p270)	—	—	■	■
Processor Instruction Retry	●	●	●	●	●
Alternate Processor Recovery	●	●	●	●	●
Storage Keys	●	●	●	●	●
PowerVM™/Live Part. Mobility/Live App Mobility	■	■	■	■	■
Redundant Service Processors	—	—	—	—	—
Redundant System Clocks	—	—	—	—	—
Redundant / Hot Swap Power Regulators	—	—	—	—	—
Dynamic Processor Sparing	—	—	—	—	—
Memory Sparing	—	—	—	—	—
Hot GX Adapter Add and Cold Repair	—	—	—	—	—
Hot-node Add / Cold-node Repair	—	—	—	—	—
Hot-node Repair / Hot-memory Add	—	—	—	—	—
Dynamic Service Processor & System Clock Failover	—	—	—	—	—
Hot-node Repair / Hot-memory Add for all nodes**	—	—	—	—	—
Enterprise Memory	—	—	—	—	—
Hot GX Adapter Repair	—	—	—	—	—
Midplane connection for inter-nodal communication	—	—	—	—	—
Active Memory Mirroring for Hypervisor	—	—	—	—	—



Requires two or more nodes

●	Standard
■	Optional
—	Not Available

POWER7 RAS Feature Overview (cont'd)

RAS Item	Power 750	Power 770	Power 780	Power 795
Redundant / Hot Swap Fans & Blowers	●	●	●	●
Hot Swap DASD / Media / PCI Adapters	●	●	●	●
Concurrent Firmware Update	●	●	●	●
Redundant / Hot Swap Power Supplies	■	●	●	●
Dual disk controllers (split backplane)	■	●	●	●
Processor Instruction Retry	●	●	●	●
Alternate Processor Recovery	●	●	●	●
Storage Keys	●	●	●	●
PowerVM™/Live Part. Mobility/Live App Mobility	■	■	■	■
Redundant Service Processors	—	●*	●*	●
Redundant System Clocks	—	●*	●*	●
Redundant / Hot Swap Power Regulators	—	●	●	●
Dynamic Processor Sparing	—	■	■	■
Memory Sparing	—	■	■	■
Hot GX Adapter Add and Cold Repair	—	●	●	●
Hot-node Add / Cold-node Repair	—	●*	●*	●*
Hot-node Repair / Hot-memory Add	—	●*	●*	●*
Dynamic Service Processor & System Clock Failover	—	●*	●*	●
Hot-node Repair / Hot-memory Add for all nodes**	—	●*	●*	●*
Enterprise Memory	—	●	●	●
Hot GX Adapter Repair	—	●	●	●
Active Memory Mirroring for Hypervisor	—	■	●	●
Power Pools	—	—	●	●

* Requires two or more nodes

Ideal for Highly Virtualized Application Environments

IBM Flex System p270 compute node

Compute



Standard compute node



2-socket POWER7+



24 core : 2 Socket x 12 cores



16 DIMMs 512GB Max



Built-in support for Dual VIOS (with optional adapter)



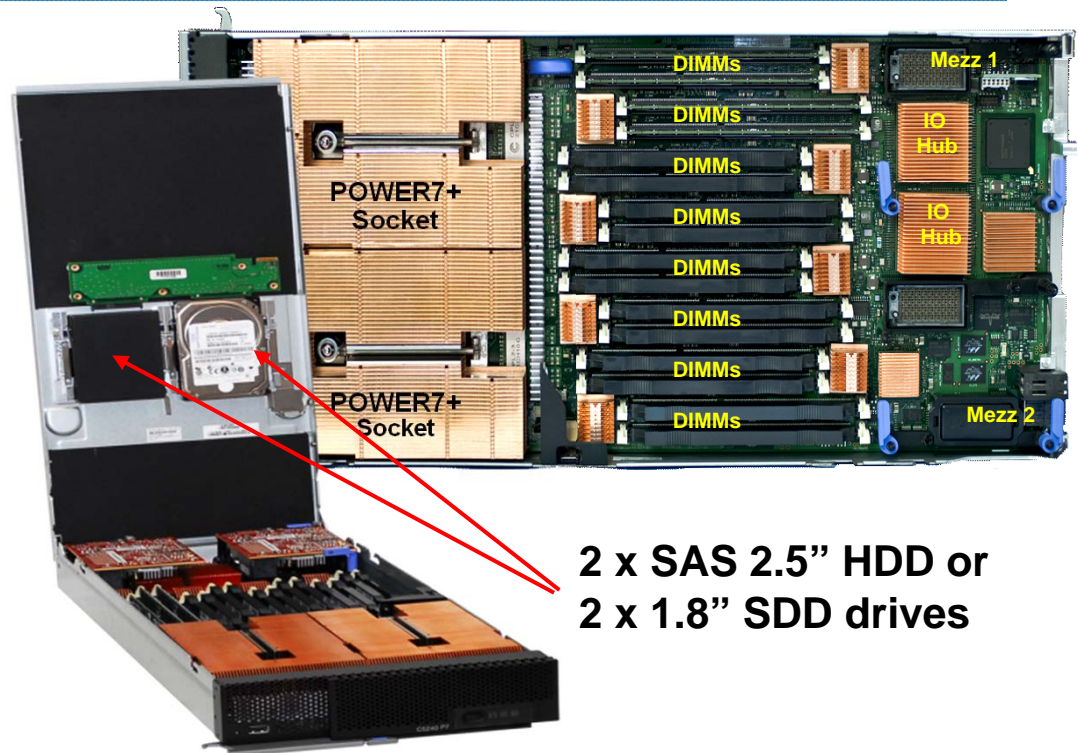
Double the number of VM' s per core

System infrastructure



IBM p270 compute node

Enables over 6,000 POWER Virtual Machines per chassis¹²

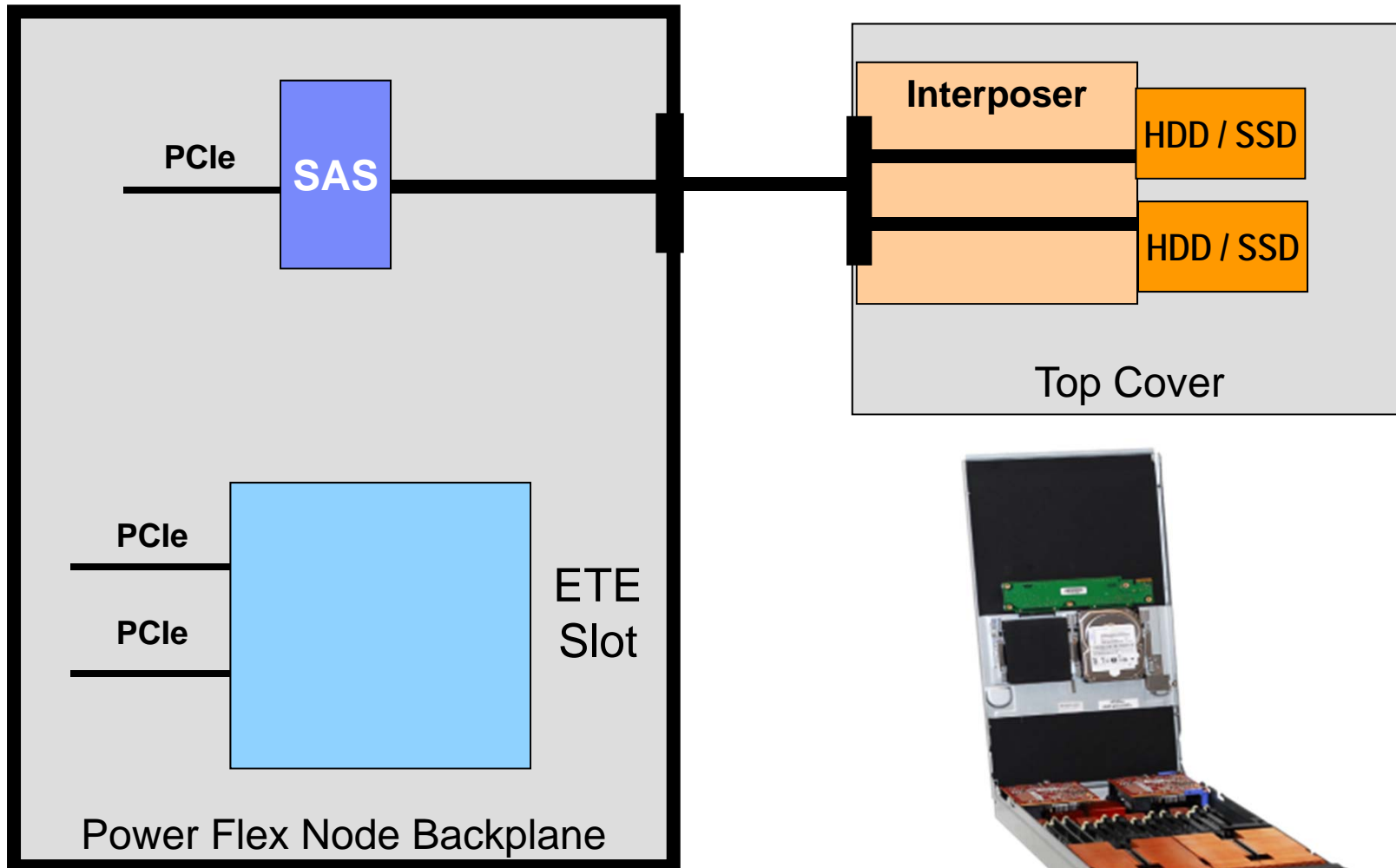


2 x SAS 2.5" HDD or
2 x 1.8" SDD drives

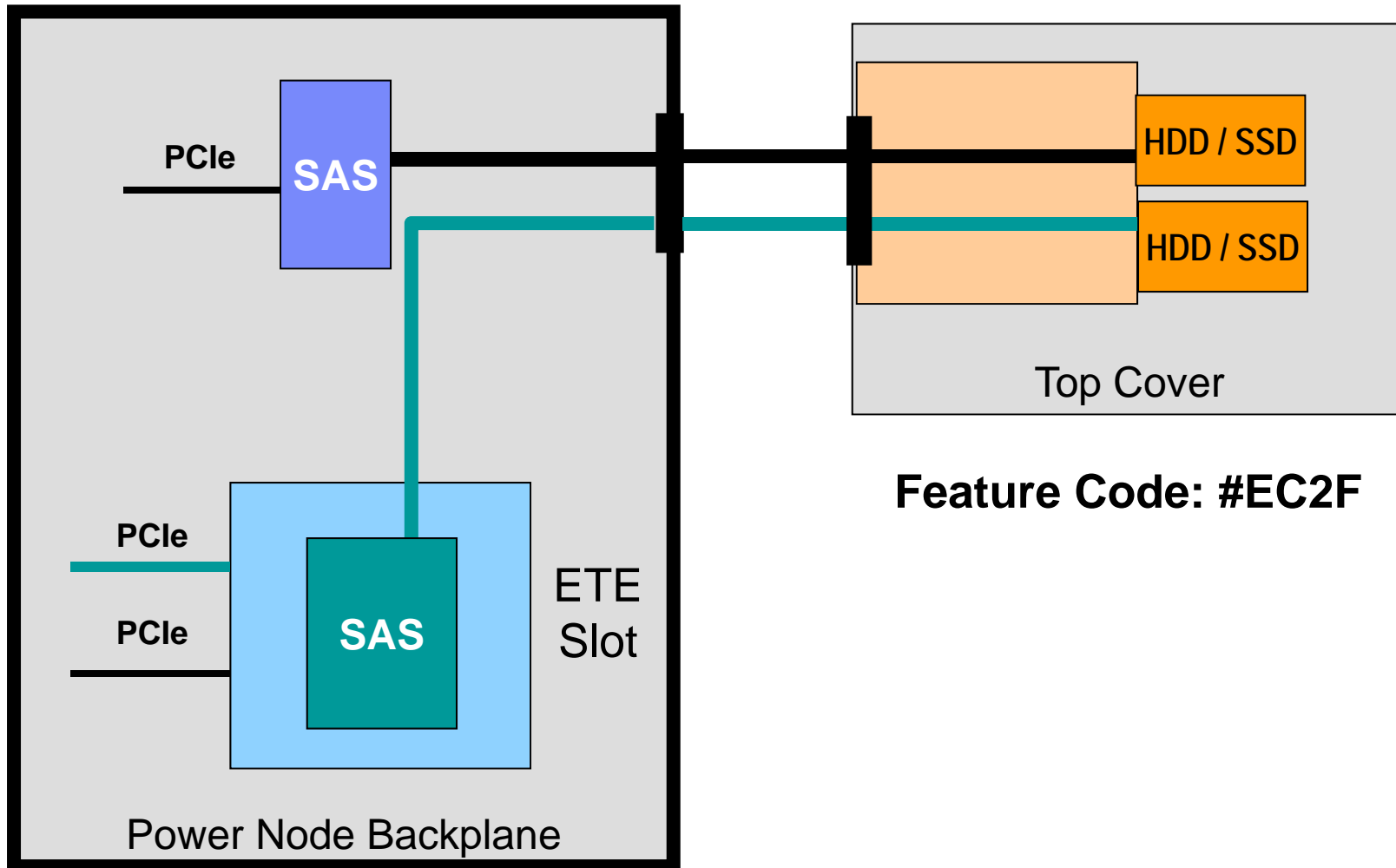
IBM Flex System Dual VIOS Adapter

- Feature Code: #EC2F
- Splits the 2 internal hard drives so that each hard drive is driven by its own SAS controller.
- This allows the compute node to boot Dual VIOS partitions internally. Without the adapter, both hard drives are driven by a the same SAS controller, which prevents the end user from booting the drives separately
- Supported system: p270

IBM Flex System Internal Storage Support

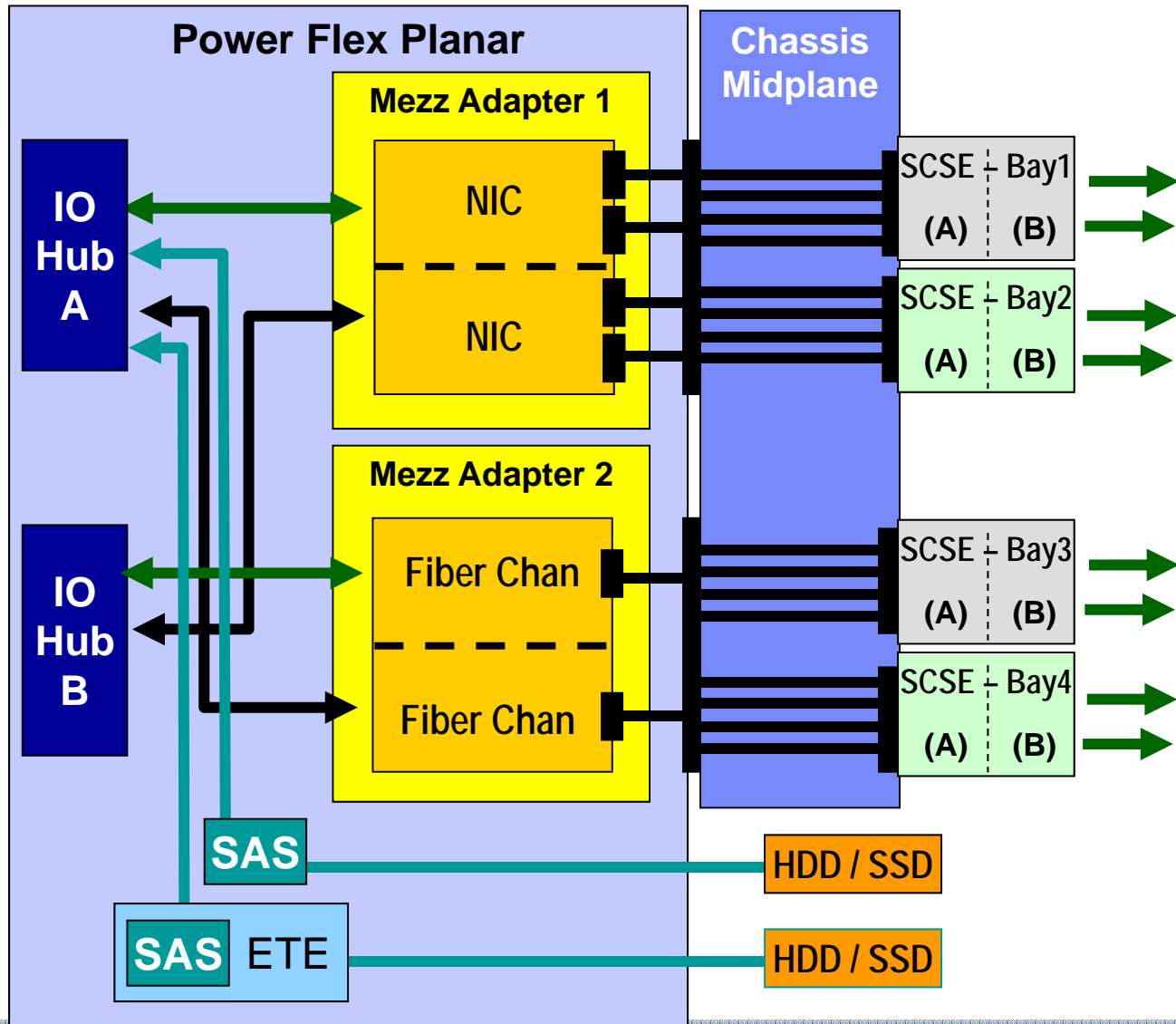


IBM Flex System p270 Dual VIOS Adapter

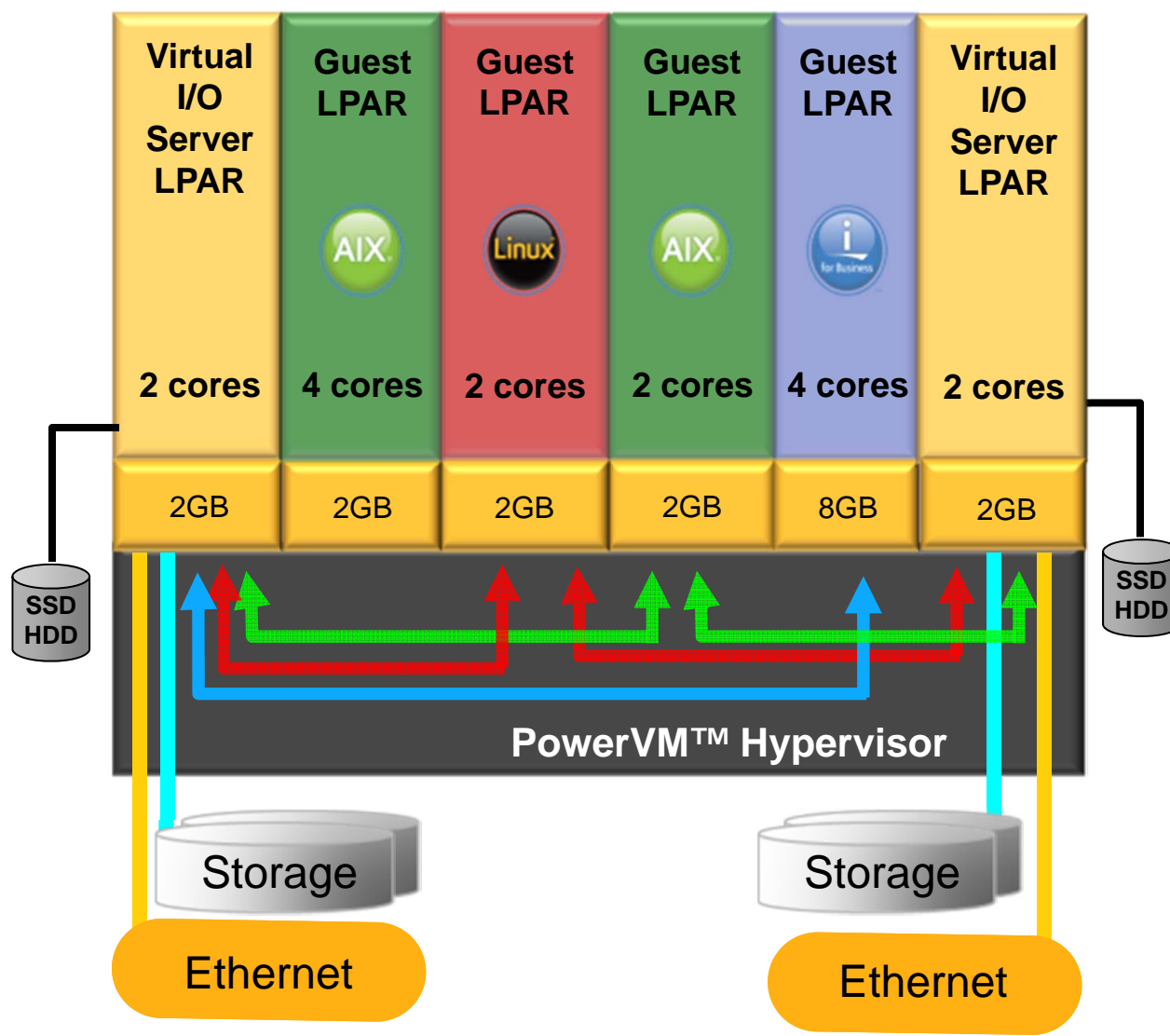


Feature Code: #EC2F

Mezzanine Layout with FC #EC2E & #EC2F



IBM PowerVM™ Architecture for Flex System p270



- Dual VIOS support for:
 - Ethernet
 - Fibre Channel
- Dual VIOS boot
- Adapters:
 - FC # EC2E
 - FC # EC2F
- VIOS partitions booted from single controller
- HMC and FSM support



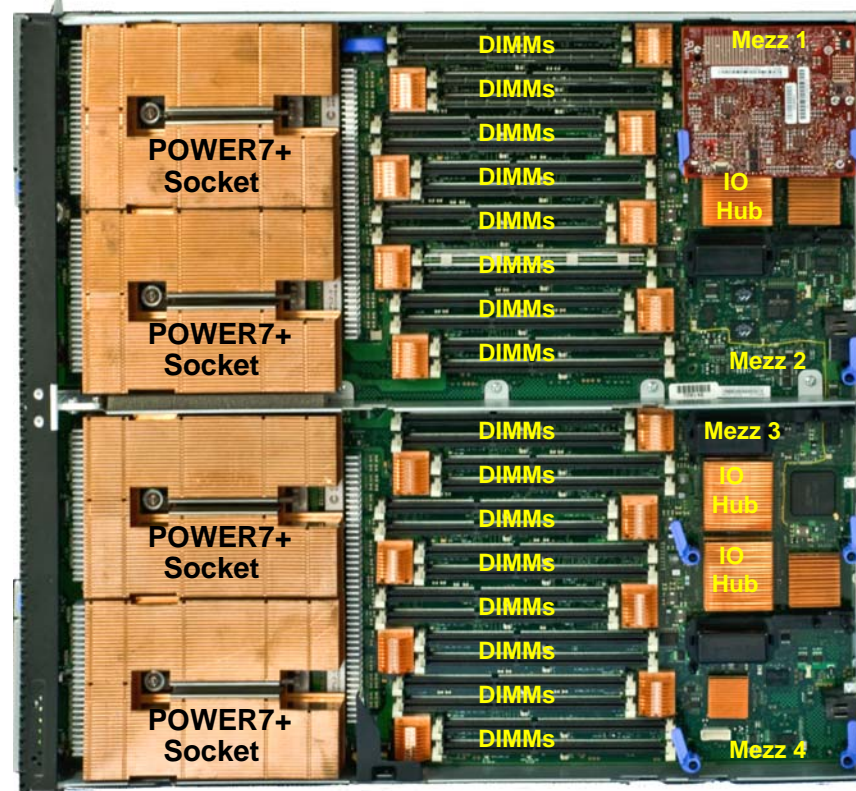
Ideal for demanding Database and Analytics Workloads

Flex System p460 compute node – Featuring POWER 7+

Flex System p460 compute node



Delivers 39% better 32-core SPECint Rate performance versus the HP DL560 G8¹¹



*HDD or SSD – Mounted on cover (located over memory)

Compute



Double Width compute node

4-socket POWER7+ processor

Supports AIX, IBM i, Linux

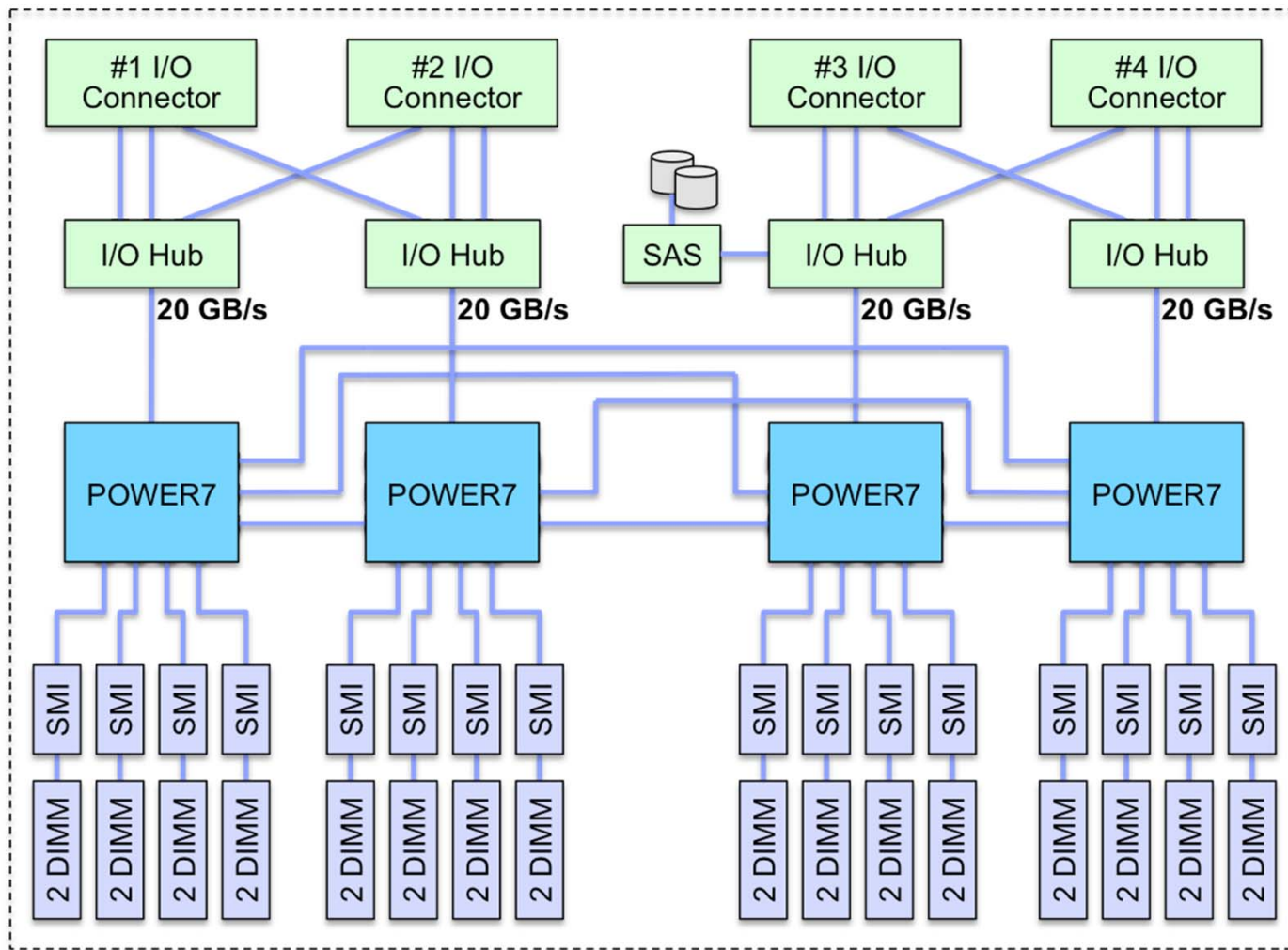
32core : 4 Socket x 8core
 New 3.6 and 4.1GHz speed
 16 core : 4 Socket x 4core
 New 4.0GHz speed

32 DIMMs 1TB Max

Double the number of VM's per core

System infrastructure

Flex System p460 POWER7 Compute Node



Node Comparisons

	p260 Entry	p260	p270	p460
POWER7+ Sockets	2	2	2	4
Cores	4	8 or 16	24	16 or 32
Frequency GHz	4.0	3.6 / 4.1 / 4.0	3.1 / 3.4	3.6 / 4.1 / 4.0
Max Memory / # DIMMs	512 GB / 16	512 GB / 16	512 GB / 16	1 TB / 32
DIMMs	2, 4, 8, 16 32 GB	2, 4, 8, 16 32 GB	4, 8, 16 32 GB	2, 4, 8, 16 32 GB
Mezzanine Slots	2	2	2	4
Dual VIOS Adapter	No	No	Yes	No
Processor Group	P05	P10	P10	P10
HDD (GB)	300 / 600 / 900	300 / 600 / 900	300 / 600 / 900	300 / 600 / 900
SSD	Yes	Yes	Yes	Yes
RAID	0, 1, 10	0, 1, 10	0, 1, 10	0, 1, 10

POWER7 IBM i Offering Portfolio



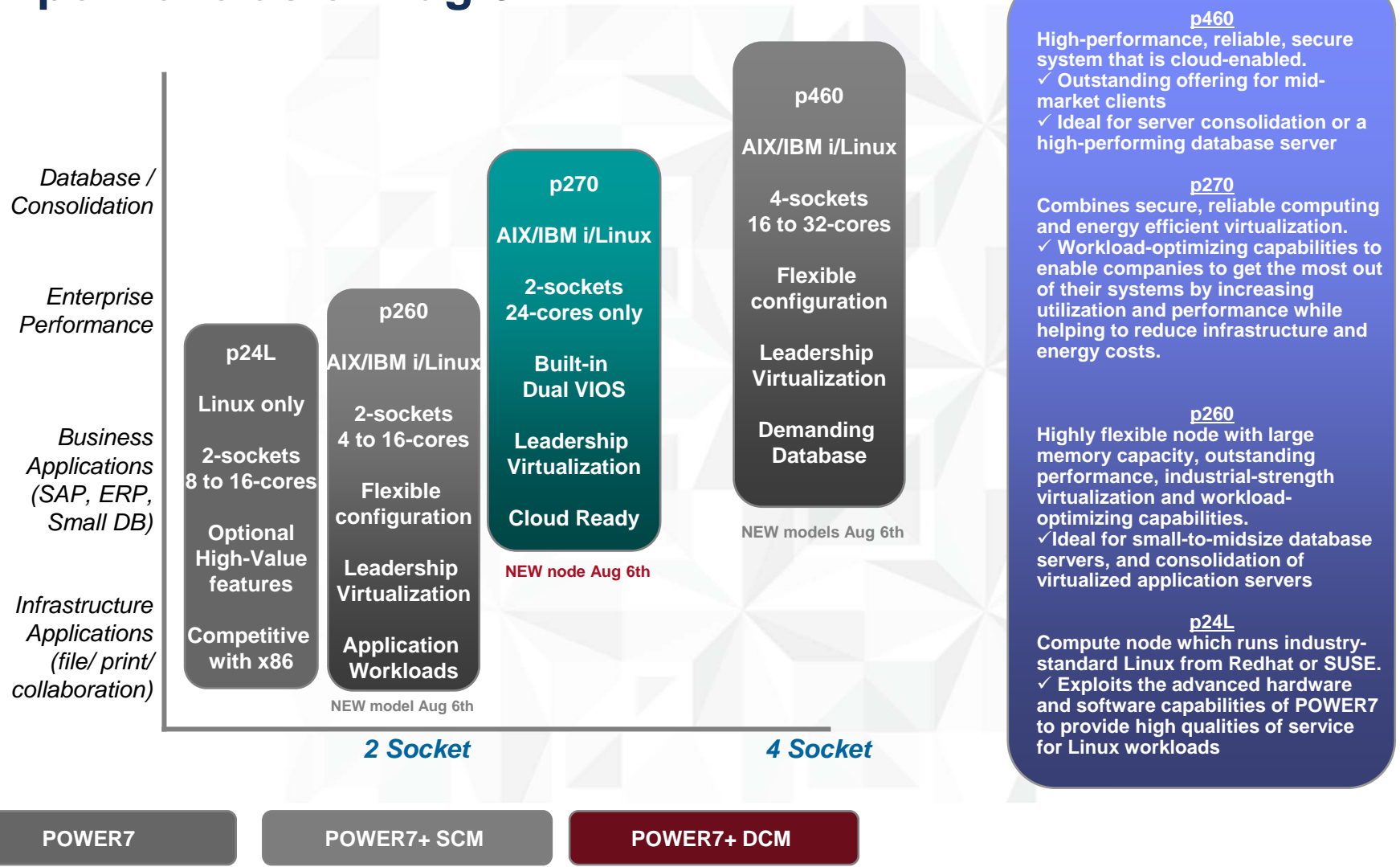
Tier	Model	Processor Group	User Entitlements	Core Entitlements	Application Server (core)	Enterprise Enablement (core)
Large	795	P50		\$59,000	\$9,000	\$50,000
	780					
Medium	770	P30		\$59,000	\$9,000	\$50,000
Small	750	P20		\$44,000	\$9,000	\$15,000
	740					
	730					
Small	720 6/8-core 710 6/8-core PS701/702	P10	\$250 per user Unlimited - \$50,000	\$14,995		
	720 4-core 710 4-core PS700	P05	\$250 per user Unlimited - \$18,750	\$2995		

← p460 (16-32c) and p260 (8-16c)

← p260 (4c)

Flex System: POWER compute node Positioning

New portfolio as of Aug 6th





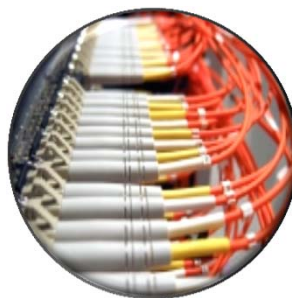
Networking

Choice in Connectivity



Ethernet

- 2, 4, 8 port 10 Gb
- FCoE and RoCE
- 2, 4 port 1 Gb
- Pass-thru



Fibre Channel

- 2 port 8 Gb
- 2 & 4 port 16 Gb
- Pass-thru



InfiniBand

- 2 port 56 Gb FDR
- 2 port 40 Gb QDR

IO Adapter Options

- (#1761) -IBM Flex System IB6132 2-port QDR InfiniBand Adapter
- (#1762) -IBM Flex System EN4054 4-port 10Gb Ethernet Adapter
- (#1763) -IBM Flex System EN2024 4-port 1Gb Ethernet Adapter
- (#1764) -IBM Flex System FC3172 2-port 8Gb Fibre Channel Adapter
- **(#EC23) -IBM Flex System FC5052 2-port 16Gb Fibre Channel Adapter**
- **(#EC24) -IBM Flex System CN4058 8-port 10Gb Converged Adapter**
- (#EC26) -IBM Flex System EN4132 2-port 10Gb RoCE Adapter
- **(#EC2E) -IBM Flex System FC5054 4-port 16Gb Fibre Channel Adapter**

Flex System Fabric Naming Conventions

EN4093			
EN	4	09	3
Protocol	Max Gbps	Vendor	Max Ports per ITE
Ethernet	10	IBM	3

ID	Protocol
FC	Fibre Channel
EN	Ethernet
CN	Converged Ethernet
IB	InfiniBand

ID	Gbps
2	1
3	8
4	10
5	16
6	40, 56

ID	Vendor
02	Brocade
05	Emulex
09	IBM
13	Mellanox
17	QLogic

IBM Flex System Name	Protocol	Midplane Gbps	Vendor	Midplane Ports	External Ports
EN4093 10Gb Scalable Switch	Ethernet	10	IBM	3x14	14x10Gb, 2x40Gb

Flex System Fabric Naming - Ethernet

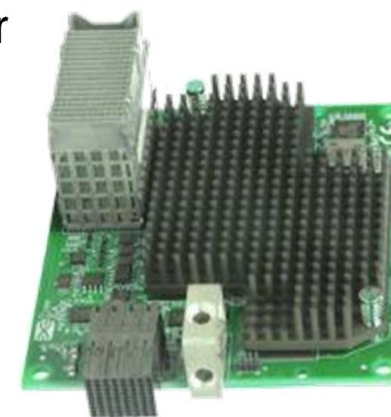
IBM Flex System Name	Protocol	Midplane Gbps	Vendor	Midplane Ports	External Ports
EN4093 10Gb Scalable Switch	Ethernet	10	IBM	3x14	14x10Gb, 2x40Gb
EN4093R 10Gb Scalable Switch	Ethernet	10	IBM	3x14	14x10Gb, 2x40Gb
CN4093 10Gb Converged Scalable Switch	Converged	10	IBM	3x14	2x10GbE, 2x40GbE, 12xOmni (10GbE or 8Gb FC)
EN4091 10Gb Ethernet Pass-Thru Module	Ethernet	10	IBM	1x14	1x14x10Gb
EN2092 1Gb Ethernet Scalable Switch	Ethernet	1	IBM	2x14	2x14x1Gb
CN4054 10Gb Virtual Fabric Adapter	Converged	10	Emulex	4	-
CN4058 10Gb Converged Network Adapter	Converged	10	Emulex	8	-
EN4054 4-port 10Gb Ethernet Adapter	Ethernet	10	Emulex	4	-
EN4132 2-port 10Gb Ethernet Adapter	Ethernet	10	Mellanox	2	-
EN4132 2-Port 10Gb RoCE Adapter	Ethernet	10	Mellanox	2	-
EN2024 4-port 1Gb Ethernet Adapter	Ethernet	1	Brocade	4	-

Flex System Fabric Naming – Fibre Channel and InfiniBand

IBM Flex System Name	Protocol	Midplane Gbps	Vendor	Midplane Ports	External Ports
FC5022 8/16Gb SAN Scalable Switch	Fibre Channel	16	Brocade	2x14	20x16Gb
FC3171 8Gb SAN Switch	Fibre Channel	8	QLogic	1x14	6x8Gb
FC3171 8Gb SAN Pass-Thru Module	Fibre Channel	8	QLogic	1x14	6x8Gb
FC5022 2-port 16Gb Fibre Channel Adapter	Fibre Channel	16	Brocade	2	-
FC3052 2-port 8Gb Fibre Channel Adapter	Fibre Channel	8	Emulex	2	-
FC3172 2-port 8Gb Fibre Channel Adapter	Fibre Channel	8	QLogic	2	-
IB6131 InfiniBand Switch	Infiniband	40,56	Mellanox	1x14	18x56Gb
IB6132 2-port FDR InfiniBand Adapter	Infiniband	56	Mellanox	2	-
IB6132 2-port QDR InfiniBand Adapter	Infiniband	40	Mellanox	2	-

IBM Flex System CN4058 8-port 10Gb Converged Adapter

- **Feature Code # EC24**
- **8 ports: 10 Gb KR ports**
 - CNA (Converged Network Adapter) – FCoE & NIC
 - Max of 6 ports with EN4093 or CN4093 switches
- **Supported in POWER ITEs p260, p460, p24L & p270**
- **NPIV support through VIOS for FCoE**
- **Dual ASIC design enables Dual VIOS for p260, p24L, and p270**
- **AIX, IBM i, Linux, VIOS support**
 - AIX Version 7.1 with TL 7100-02 and Service Pack 2, or later
 - AIX Version 6.1 with TL 6100-08 and Service Pack 2, or later
 - IBM i 6.1 and IBMi 7.1 -- VIOS required.
 - SUSE Linux Enterprise 11 Service Pack 2, or later
 - VIOS requires VIOS 2.2.2.2, or later



New Mezzanine Dual & Quad port 16 Gbt FC Adapter

- Dual port Mezzanine card
 - FC #EC23
 - Single PHB
 - Similar to FC # 1764 (8 Gbt Fibre)
- Quad port Mezzanine card
 - FC #EC2E
 - Dual PHB
 - Dual VIOS Fiber Channel Support
 - p260 / p270 nodes
- 16 Gbt Fiber Channel
- Dual FC ports per PHB
- Support for all FC topologies



Intelligent, integrated and flexible network architecture that can fit with your existing or future environment



- “Pay as you grow” scalability
- Performance:
 - Support 40Gb
 - < 1ms latency
- Designed for future:
 - Hypervisor Virtual Switch optimized
 - Built for VM Workload migration
 - Full Convergence

Optimized

- Virtual Machine Mgmt./Virtual Switching
- Automate network & server provisioning and failover (FSM)
- VM-aware networking for easy management and tracking (VMready)
- Software Defined Networking (SDN)

Automated

- Manage as one system
- Multiple switches within a POD managed as a single entity
- Seamless interoperability
- Standards based (Qbg, DCB, DOVE)
- Easy interoperability with existing networking environments*

Integrated



***Flexible, Integrated, Standard-based
No Compromise Networking***

*Based on data sheets http://www.cisco.com/en/US/prod/collateral/ps10265/ps10280/b22m3_specsheet.pdf <http://www.redbooks.ibm.com/redbooks/pdfs/sg247984.pdf> **System Storage Interoperation Center (SSIC), 2012 Tolly Group: Nexus and Catalyst Interoperability report

IBM Flex System Fabric EN4093R with OpenFlow Support

Software Defined Network Option



- Support virtualized, dynamic workloads with an OpenFlow-based infrastructure
- Reduce complexity by building the underlying network once
- Intelligent and dynamic multipath routing based on business policy
- Supports both Ethernet and OpenFlow network traffic
- Increase flexibility by rerouting networking traffic based on source, destination, ports, etc.
- Centrally configure and enforce multi-tenant networks
- Combine with IBM Programmable Network Controller on an x240 compute node* for a complete OpenFlow based SDN solution

New Flex System Ethernet Options

IBM Flex System EN6131 40Gb Switch



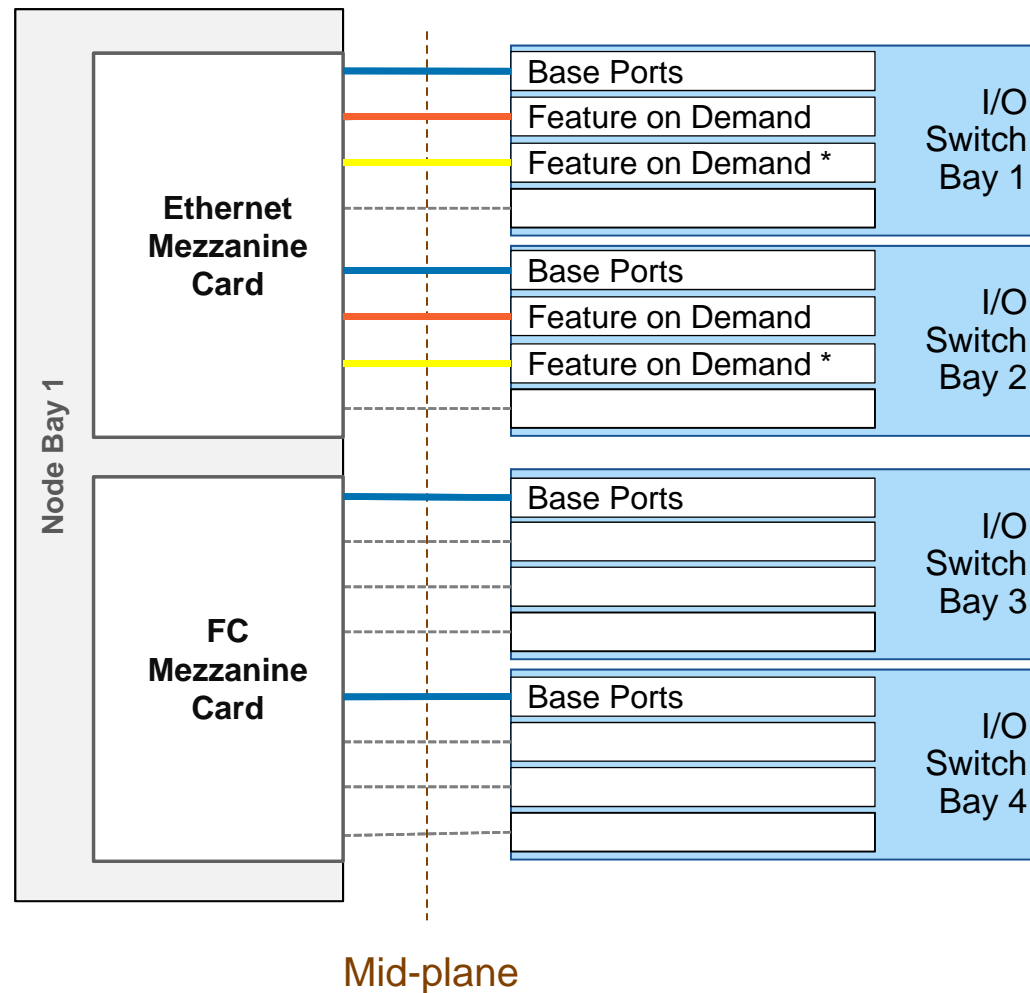
- Full Featured 40Gb switch module
- Up to 4 switches per 10U chassis
- Speed up transactions with up to 4X the networking speed of 10Gb switches available today
- Reduce cost of operations and accelerate time to completion for:
 - clustered databases, parallel processing,
 - transactional services and
 - high-performance embedded I/O applications

IBM Flex System Fabric SI4093 System Interconnect Module



- Designed for simple connectivity & management
- **Transparent Mode and VLAN Aware Mode**
- **Default profile** protects against network mis-configurations
 - Loop free design (no Spanning tree)
- **Reduce cost** by up to **42 percent** with ‘Pay as you Grow’ scalability compared to HP¹
- Reduce risk of deployment with **seamless interoperability** with Cisco, Juniper switches
- Continued access to premium features such as intra-chassis switching for vMotion
- Supports both Ethernet and FCoE traffic

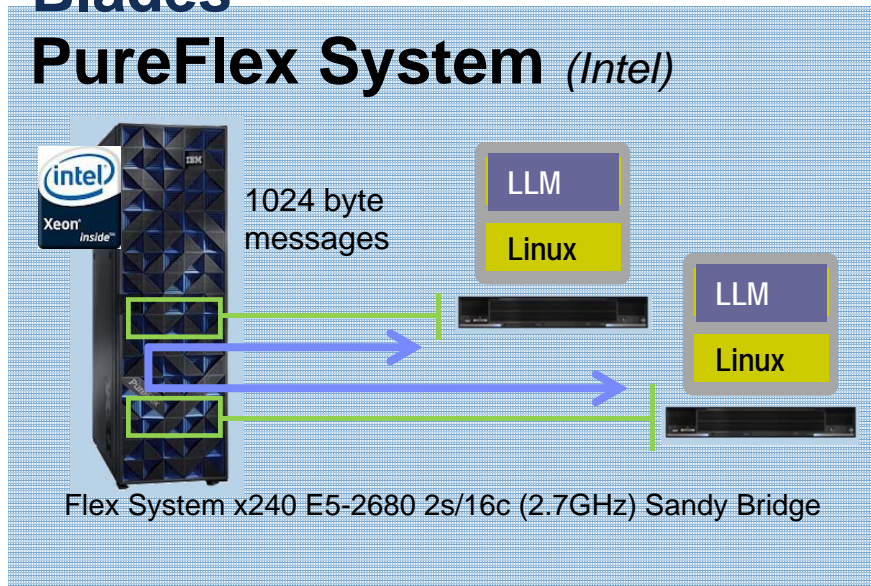
High Bandwidth Mid-plane That is Ready for the Future



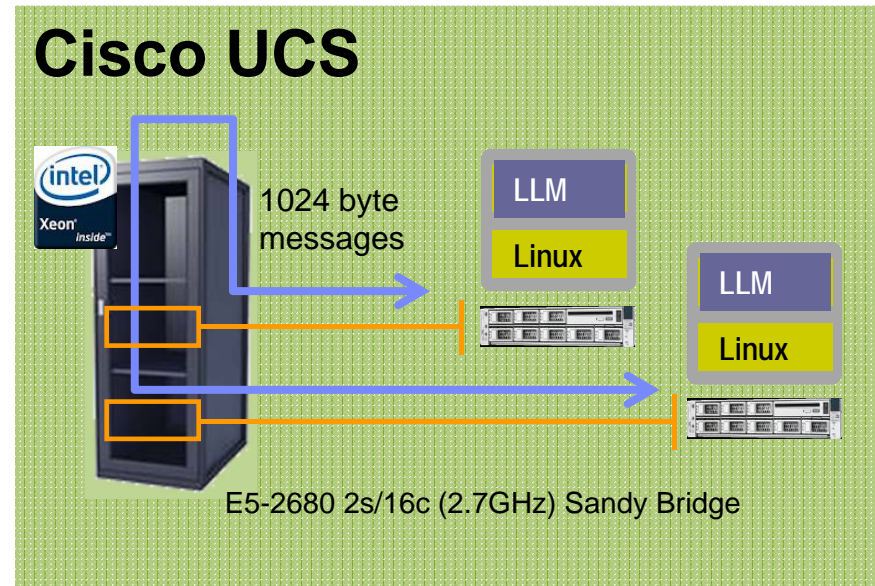
* The 8 port adapter is currently announced for Power only and is limited to 6 active switch ports with the EN4093

Intra-Chassis Network Fabric Reduces Latency Between Blades

PureFlex System (Intel)



Cisco UCS

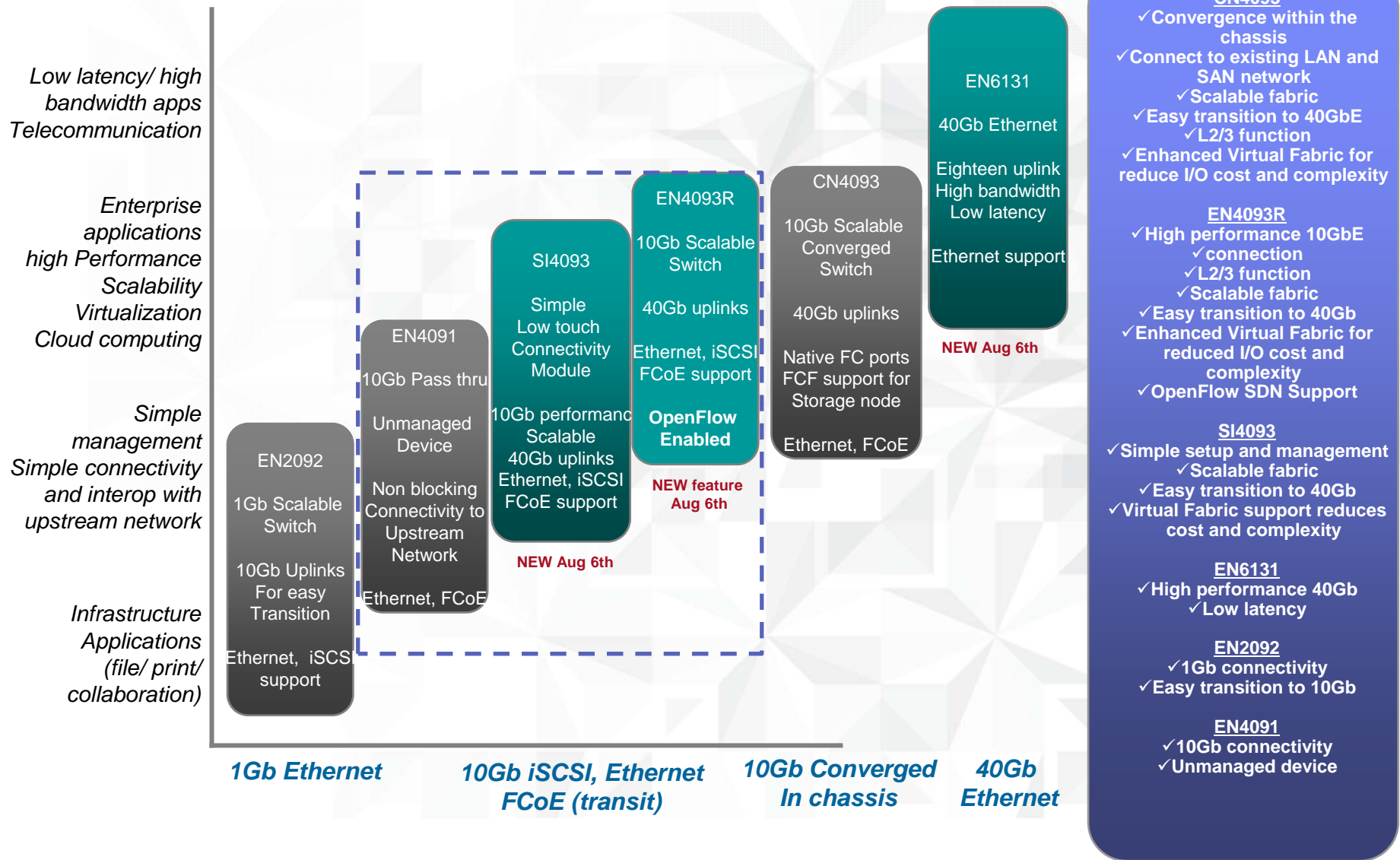


<div style="background-color: #0056b3; color: white; border-radius: 50%; width: 60px; height: 60px; display: flex; flex-direction: column; align-items: center; justify-content: center;"> <div style="font-size: 24px; font-weight: bold; margin-bottom: 5px;">2.3X</div> <div style="font-size: 10px; margin-bottom: 5px;">Higher throughput</div> <div style="font-size: 24px; font-weight: bold; margin-bottom: 5px;">77%</div> <div style="font-size: 10px;">Lower Latency</div> </div>	27.5	Microseconds latency per message	63.0
	9.4	Microseconds latency due to network	40.0
	18,803	Messages per second	7,920

“A 1-millisecond advantage in trading applications can be worth \$100 million a year to a major brokerage firm ...”

This is an IBM internal study of IBM PureFlex System solution designed to replicate a typical IBM customer workload usage in the marketplace. The results were obtained under laboratory conditions, and not in an actual customer environment. IBM's internal workload studies are not benchmark applications, nor are they based on any benchmark standard. As such, customer applications, differences in the stack deployed, and other systems variations or testing conditions may produce different results and may vary based on actual configuration, applications, specific queries and other variables in a production environment. Prices, where applicable, are based on published US list prices for both IBM and competitor, and the cost calculation compares the cost per request for the 3yr life of the machine. 3 year total cost of acquisition comparisons are based on similar expected hardware, software, service & support offerings

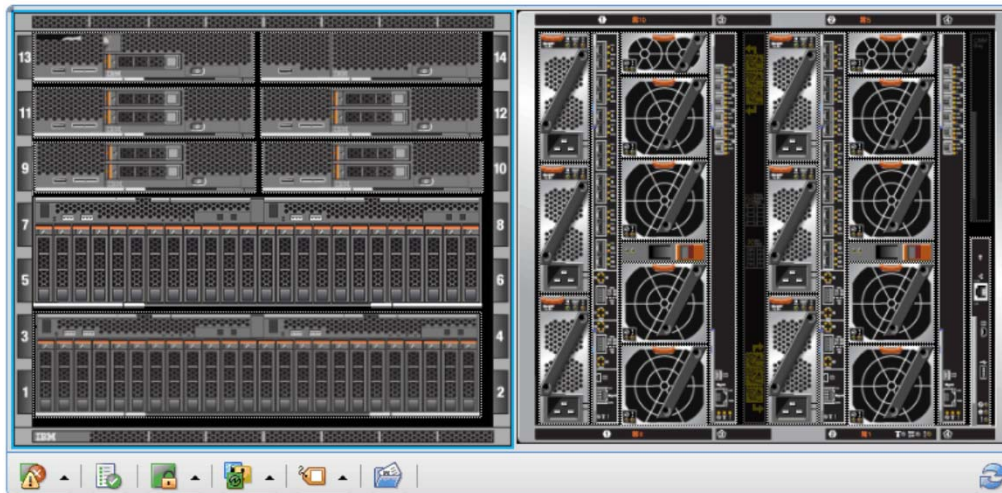
Flex System Ethernet Module Positioning





Storage

Flex System Storage Choice



Flex System V7000 Storage Node

- Automatic discovery and credentials
- Automated firmware updates
- Call home support
- Integrated into FSM chassis map
- LUN creation and host mapping
- FC, FCoE, and iSCSI

SAN attach external storage

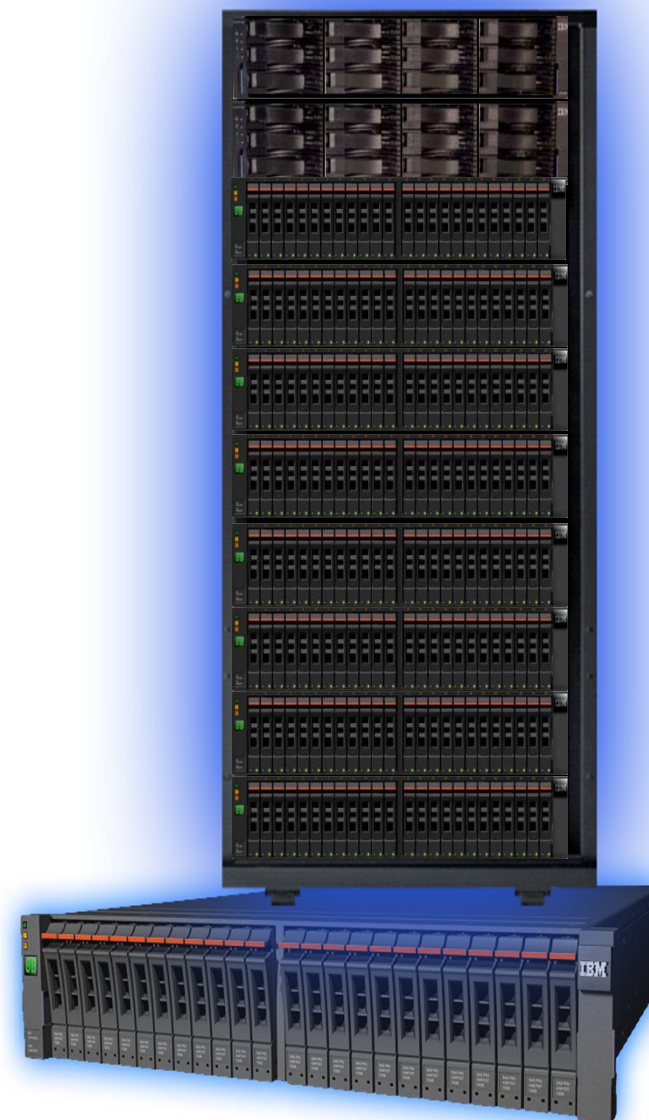
- DS8000, XIV, Storwize V7000 and V3700, DS5000, DS4000, DS3000, N Series

Virtualize external storage

- Flex System V7000, Storwize V7000, SAN Volume Controller

A new era in midrange storage...

- IBM's first organic offering for mid-range requirements
- Combines the best characteristics of IBM storage technology:
 - DS8 – **Easy Tier**, Raid Code
 - SVC – **External Storage Virtualization**
 - XIV – **Industry-leading GUI and Ease of Management**
 - Tivoli Software – **FlashCopy, FlashCopy Manager, Remote Copy**
- More than 3000 deployed worldwide in first 8 months



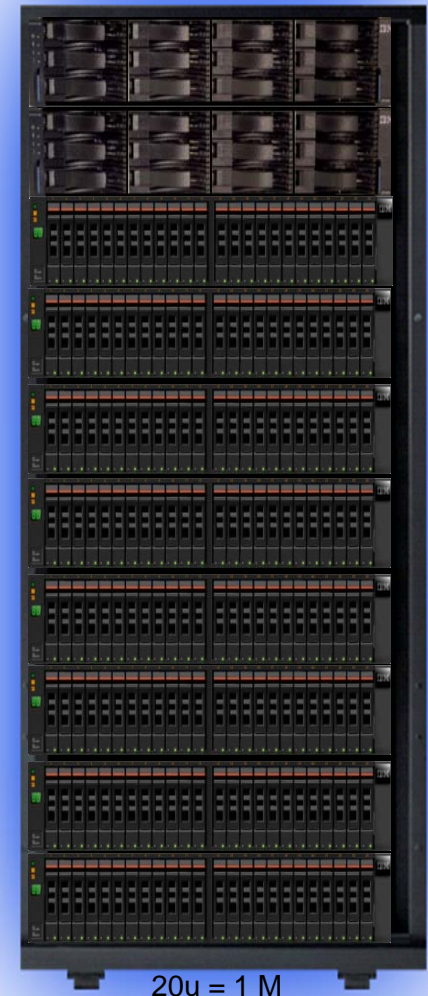
Scalability and Flexibility

Start small. Expand easily.

- **Start with 1** enclosure
 - Dual controllers built in – no extra rack space needed
 - Up to 12 - 3.5" or 24 - 2.5" drives per enclosure
- **Add up to 9** expansion enclosures
 - Expand up to 240 drives
 - Can intermix 3.5" and 2.5" drive enclosures
- **Intermix** drive type and capacity
 - 2.5" SSD and SAS drives
 - 3.5" 2TB Nearline SAS drive
- Now Available:
 - 15K 146gb & 15K 300gb SFF drives
 - 7200K 1TB SFF

0 – 960TB!

Expand
Easily

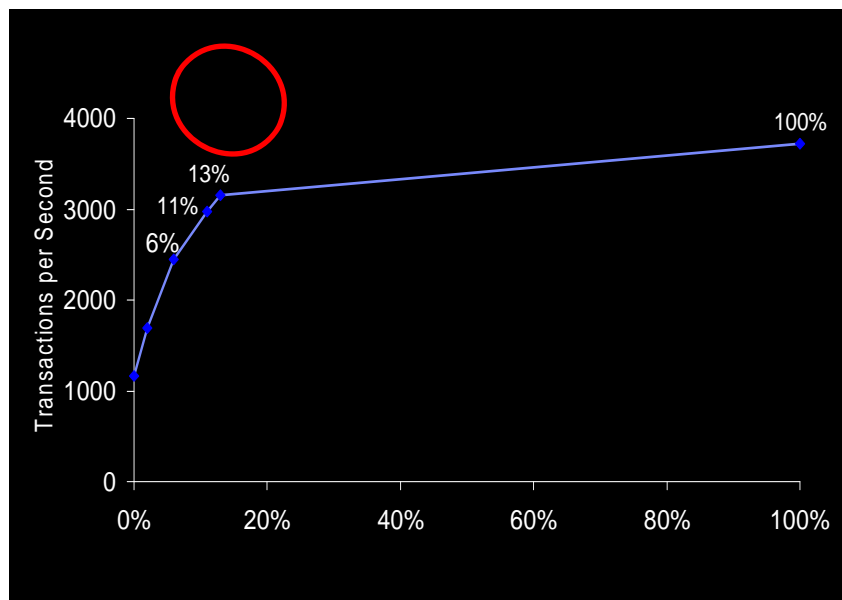


Easy Tier: Squeezing the Costs from SSD Technology

Small Amounts Of Optimally Managed SSD Can Improve Storage Price/Performance

Just 13% blend of SSD to HDD achieves
171% performance gain

Transactional Database Performance
as Blend of SSD is increased



**Performance
costs less
on the V7000!!**

Source: IBM Internal Study of Benchmark Factory transactional database workload performance as Easy Tier migrates data to SSD. The performance data contained herein was obtained in a controlled, isolated environment. Actual results that may be obtained in other operating environments may vary.



Management

IBM Flex System Manager v1.3

Scalable: Manage up to **16 chassis, 224 compute nodes or 5000 end points** with a single Flex System Manager instance.

Intelligent: Rapidly assess management capacity with **Flex System Manager Fuel Gauge**.

Unified: **Create, zone and present storage volumes** in just five clicks.

Flexible: Monitor and control infrastructure from anywhere using iOS, Android and Blackberry Mobile devices.

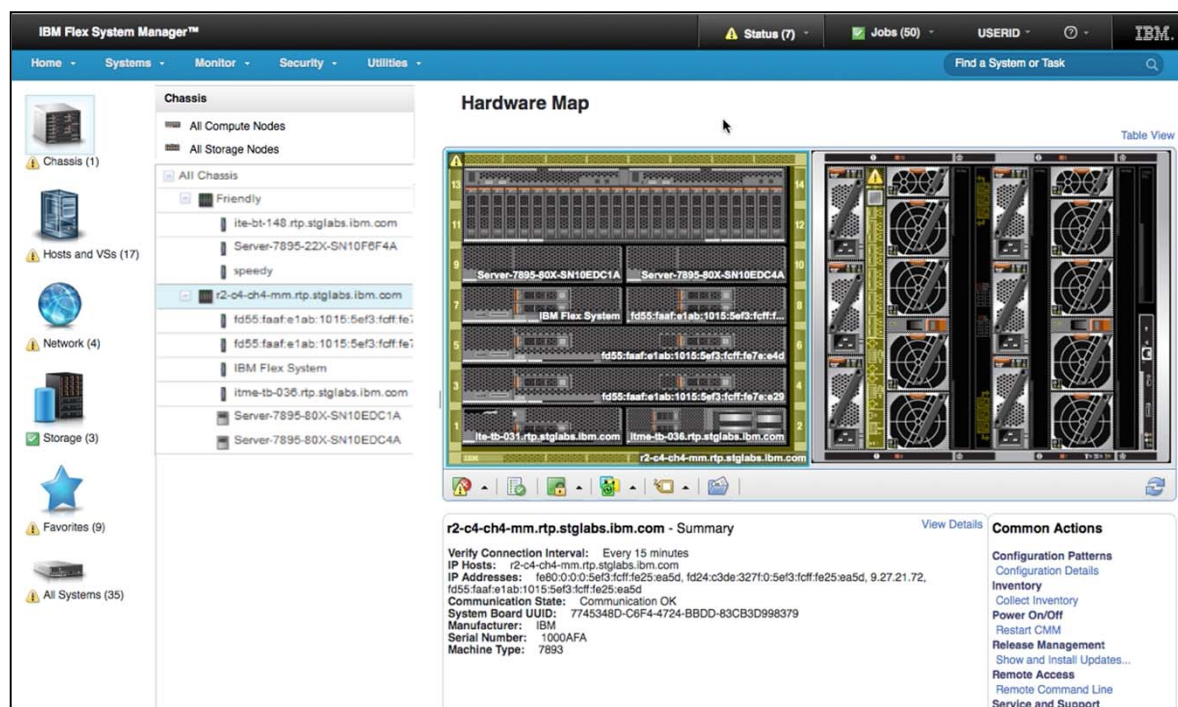
Integrated: Manage Flex System infrastructure within the context of VMware vCenter and Microsoft System Center.

Flex System Manager:

Managing the foundation for Cloud

- **Reduce** unplanned downtime by with proactive monitoring with interactive chassis maps to speed problem identification and resolution.
- **Decrease** IT cost by monitoring servers, network, and storage devices from a integrated graphical view.
- **Launch** powerful remote management to manage, monitor, and troubleshoot from any corner of the world.
- **Monitor** from anywhere using Mobile apps for iPhone, Android, and Blackberry.
- **Integrate** into customers existing management infrastructure with Upward integration into VMware vCenter or Microsoft System Center.

Visual Management is More Intuitive



- Single management entry point
- Visualize front and rear of chassis
- Component drill downs
- Context sensitive overlays

Overlays Allow Easy Access to Commonly Needed Information

Component Names and Properties

Flex GA1 - Summary
 Problems: ⚠ 5 ([View All Status](#), [View Event Log](#))
 Verify Connection Interval: Every 15 minutes
 IP Hosts: flex-ga-1-0.atsxlab.com

Component Properties:
 x240-ga1.atsxlab.com
 Type: Server
 Problems: ✔ OK
 Model and machine type: 10X (Type 7863)
 Serial number: 102205B

Chassis Slot: Slots Occupied
 Verify Connection Interval: Every 15 minutes
 Operating System: VMware ESXi
 IP Hosts: flex-ga-imm2.atsxlab.com
 IPv4 Addresses: 169.254.95.101, 172.23.18.102, 172.23.19.101, 127.0.0.1, 169.254.95.118
 IPv6 Addresses: fe80:0:0:3640:b5ff:febf:97c, fe80:0:0:3640:b5ff:febf:97d
 MAC Addresses: 00-00-c9-f5-53-7e, 00-00-c9-f5-53-86, 34-40-b5-bf-09-7c, 34-40-b5-bf-09-7d, 34-40-b5-bf-09-7e, 00-00-c9-f5-53-8a, 00-00-c9-f5-53-82, 36-40-b5-bf-09-7f
 System Board UUID: 517F49EB-A9B9-11E1-A4B8-0000C9F5537E
 Architecture: x86_64
 Manufacturer: IBM
 System FRU: 81Y5208

Six available
 More to come

Compliance and Firmware

Flex GA1 - Summary
 Problems: ⚠ 5 ([View All Status](#), [View Event Log](#))
 Verify Connection Interval: Every 15 minutes

Compliance and Firmware:
 x240-ga1.atsxlab.com
 Type: Server
 Problems: ✔ OK
 Model and machine type: 10X (Type 7863)
 Serial number: 102205B

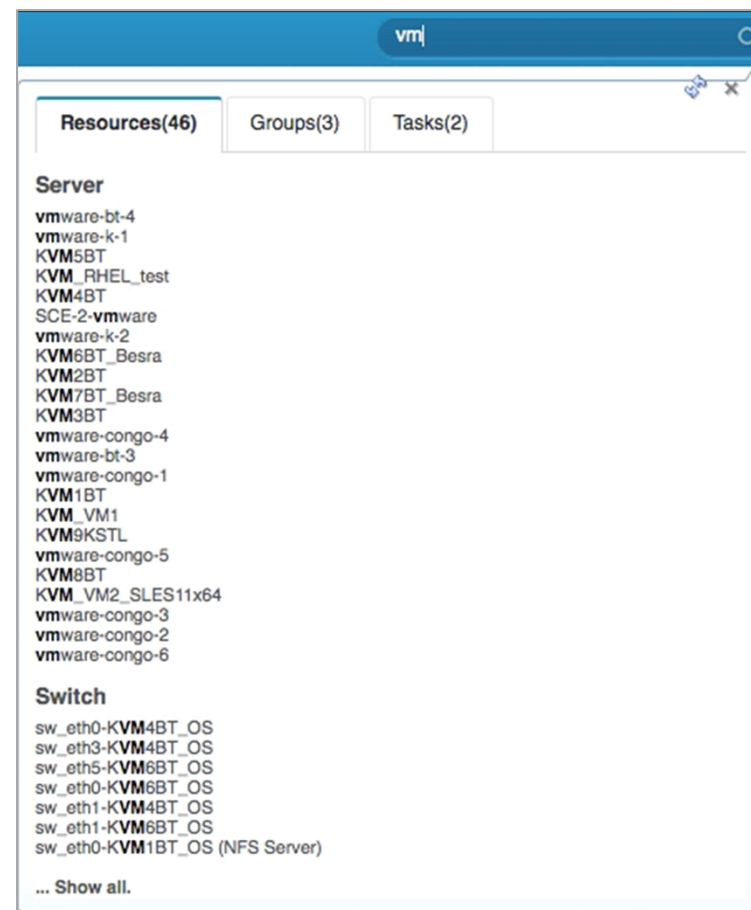
Firmware : UEFI	1.20	Mar 7, 2013
Firmware : Diagnostics	9.29	Mar 7, 2013
Firmware : IMM2	1.88	Mar 7, 2013

Compliance Status: ✔ Healthy

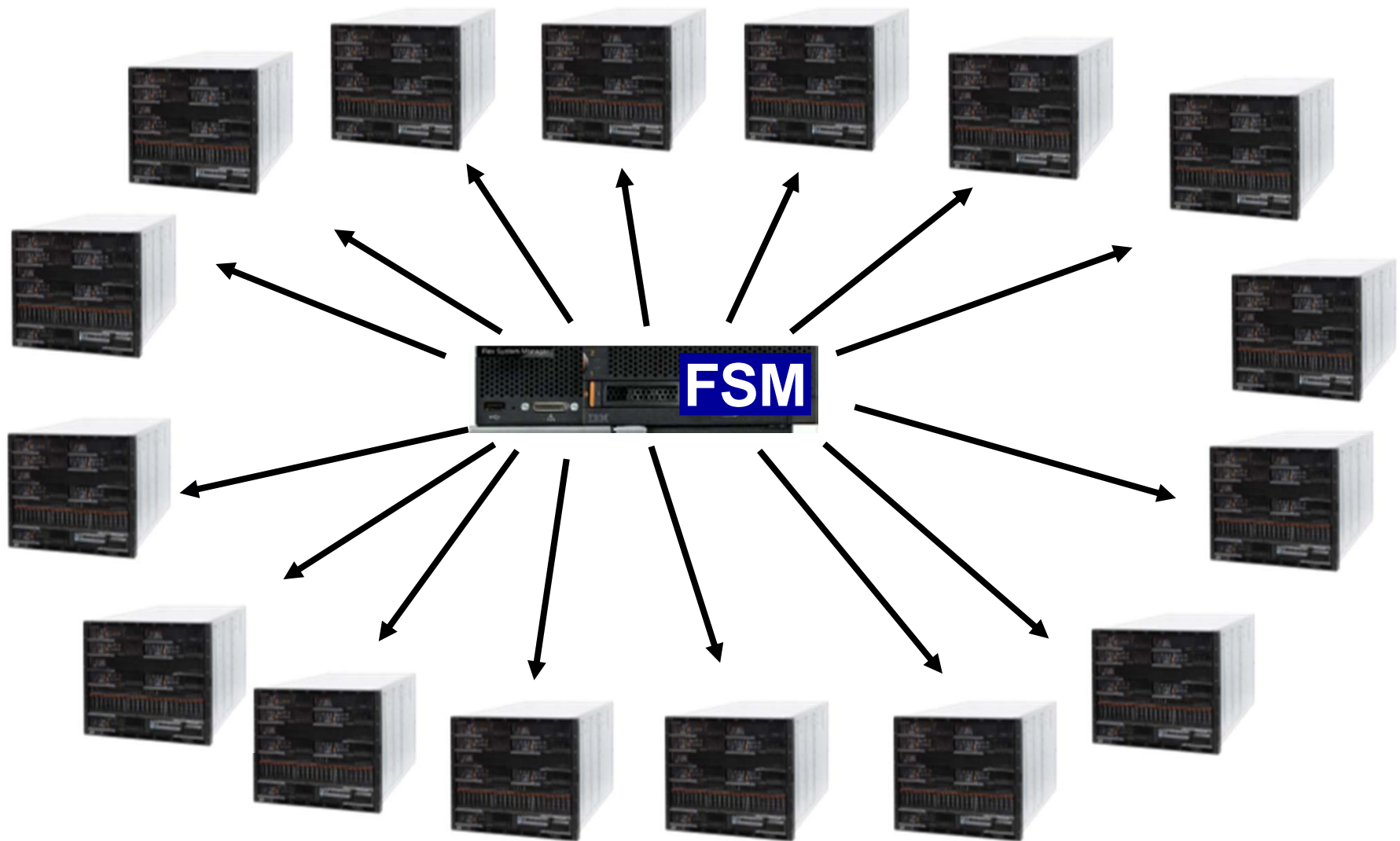
Actions:
[Configuration Patterns](#)
[Configuration Details](#)

Tools Designed to Help Busy Administrators

- Global find to simplify locating resources, groups, and tasks
- iPhone, Android, Blackberry support

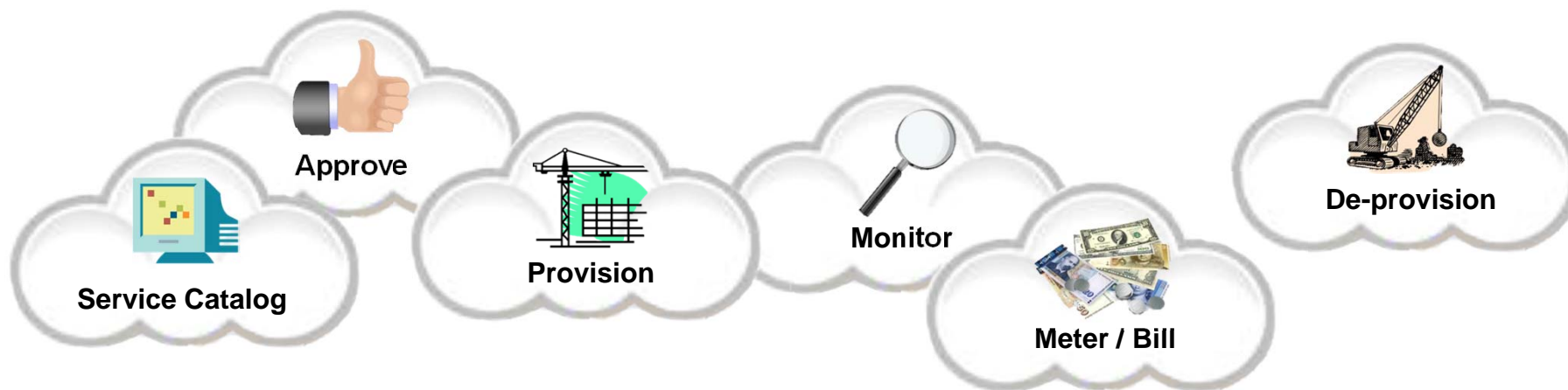


16 Chassis....



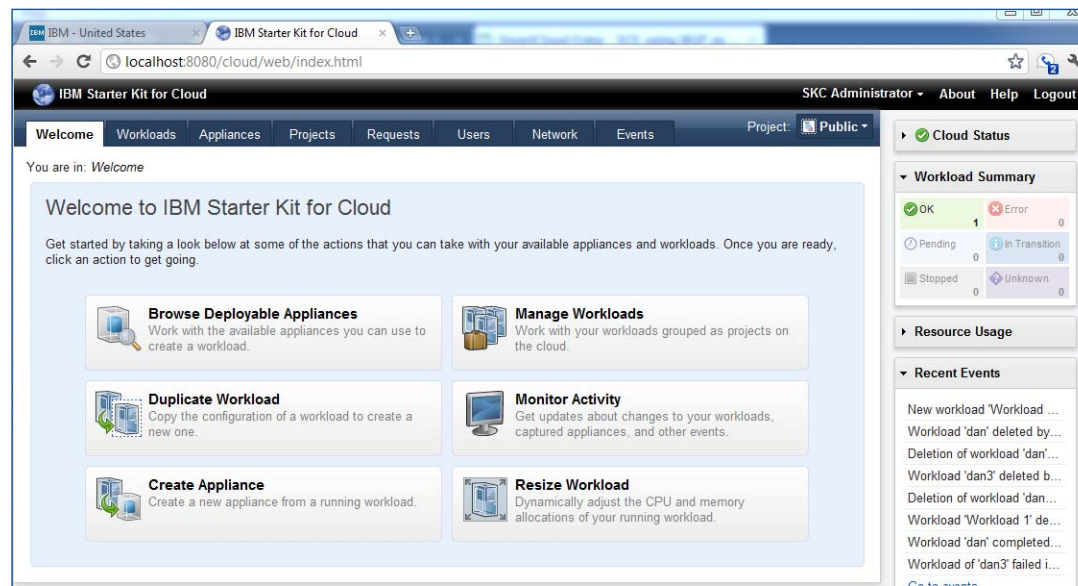
Requires: IBM Flex System Manager v1.3

Deploy New Workloads with as Few as Four Clicks



SmartCloud Entry

- All essential cloud functions
- Mix x86 and Power
- Part of PureFlex Standard and Enterprise foundations



Something New



IVM / HMC Power Flex Node support.....

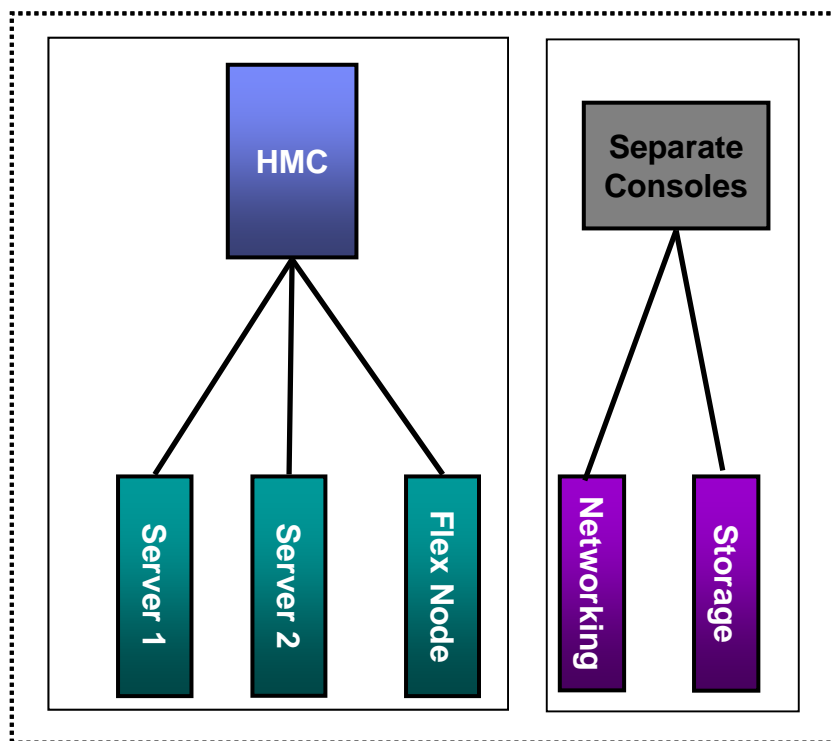


- HMC Power Flex Node Management
- Chassis: Controls only Power Nodes
 - Intel & Storage nodes can be installed
 - No FSM presence
- Nodes appear as stand alone servers
- Virtualization / Configuration Management
- Energy Management
- 7.7.0 Firmware is required

New support for Managing POWER-based Flex System compute nodes

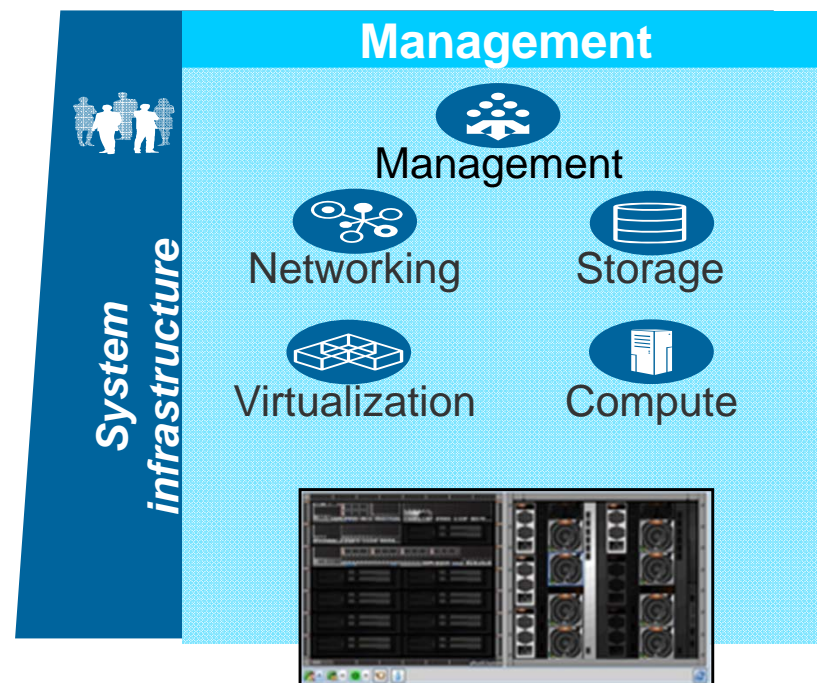
Manage POWER compute nodes using the IBM POWER Hardware Management Console (HMC) and the IBM Integrated Virtualization Manager (IVM)⁷

Use existing Power Systems HMC Management for Flex POWER nodes



OR

Integrate resource management with Flex System Manager



IBM PureSystems Family

Flex System



PureFlex



PureApplication



PureData



Infrastructure Components

Beyond Blades

Integrated Infrastructure

*Delivering Cloud
Infrastructure Services*

Application Platform

*Delivering Cloud Application
Platform Services*

Data Platform

*Delivering Big Data
Platform Services*

IBM PureFlex System



Integrated hardware

- x86 and/or Power servers
- Storage
- Networking
- Management

Integration services

- Base hardware integrated at factory
- On-site installation services

Choice


- x86 and/or Power servers
- Windows, Linux, AIX, IBM i
- VMware, KVM, Hyper-V, PowerVM

SmartCloud Entry

- Software included with Standard & Enterprise foundations

PureFlex – Infrastructure System

Configurations that ease acquisition experience and match your needs



**Choice of
POWER and/or x86**

Express	Standard	Enterprise
<p>Starting point: 1 x Chassis 1 x 10Gb switch 1 x 8Gb or 16Gb FC switch 2 x Chassis Mgt Modules 1 x Flex System Manager (Standard License) 1 x Flex System V7000 (2 SSD, 8 HDD) 1 x 42U Rack * Lab Services (3 days)</p>	<p>Starting point: 1 x Chassis 1 x 10Gb switch 2 x 8Gb or 16Gb FC switch 2 x Chassis Mgt Modules 1 x Flex System Manager (Advanced License) (SmartCloud Entry) 1 x Flex System V7000 (2 SSD, 16 HDD, 4 HDD used for SCE) 1 x 42U Rack * Lab Services (5 days)</p>	<p>Starting point: 1 x Chassis 2 x 10Gb switch 2 x 8Gb or 16Gb FC switch 2 x Chassis Mgt Modules 1 x Flex System Manager (Advanced License) (SmartCloud Entry) 1 x Flex System V7000 (4 SSD, 16 HDD, 4 HDD used for SCE) 1 x 42U Rack 1 x TOR (POWER only) * Lab Services (7 days)</p>

*defaulted – can be de-selected

- Designed for Cloud - SmartCloud Entry included on Standard and Enterprise
- Designed for choice of architectures: IBM POWER7 and/or Intel x86 processors within the same systems
- Designed for choice of OS: AIX, IBM i, Microsoft Windows®, and Linux from Red Hat, SUSE
- Designed for choice of hypervisors: PowerVM, KVM, VMware, or Microsoft HyperV

New PureFlex offerings simplify and expand options for

(Simplified Offering Structure

- Consolidates three PureFlex offerings to two
- New Express starting point with full integration
- Simplifies software structure with the flexibility to configure based on client requirements
- Restructured services offerings



Delivers more robust integration capabilities

- Redundant switches available in Express and Enterprise
- Easier to scale Enterprise offering
- Improved Flex System Manager integration

Expanded functional capabilities

- Supports full portfolio of POWER and x86 compute nodes
- Enables FCoE networking and improved storage flexibility
- Robust starting point to build solutions

PureFlex



New Express

*Infrastructure
for Small and midsize businesses.*

Most affordable entry point

Choice and Flexibility

Easy Upgrade to higher function

New Enterprise

*Infrastructure for scalable cloud
deployments.*

More availability

Higher level of resiliency

More performance

New PureFlex System Offerings *Delivers simplicity and flexibility.*

PureFlex



Flexibility

- **Choice of POWER or x86**
- **Choice of Operating System**
- **Choice of Virtualization**
- **Choice of Networking**
- **Choice of Storage**

<h3>Express</h3> <p><i>Infrastructure for Small and midsize businesses. Most affordable entry point</i></p>	<h3>Enterprise</h3> <p><i>Infrastructure for scalable cloud deployments. Redundancy for resilient operation</i></p>
<p>Flex System Chassis (Single Chassis only)</p>	<p>Flex System Chassis (Multi Chassis Support)</p>
<p>Rack Select ability (42U Rack, 25U Rack or None)</p>	<p>42U Flex Enterprise Rack only</p>
<p>Flex System Manager (+ Standard SW)</p>	<p>Flex System Manager (+ Advanced SW)</p>
<p>SmartCloud Entry</p>	<p>SmartCloud Entry</p>
<p>Selectable Base Networking 1GbE or 10GB Ethernet and 16GB Fibre or Converged (FCoE)</p>	<p>Selectable Base Networking 10GB Ethernet and 16GB Fibre or Converged (FCoE)</p>
<p>Selectable Storage (Flex System V7000 or Storwize V7000)</p>	<p>Selectable Storage (Flex System V7000 or Storwize V7000)</p>
<p>Base HW warranty 3yr 9 x 5 <i>Plus</i> Microcode Analysis 3yr/1x, Account Advocate 9 x 5 and WSU upgrade to 24 x7 (Selectable)</p>	<p>Base HW warranty 3yr 9 x 5 <i>Plus</i> Microcode Analysis 3yr/2x, Account Advocate 9 x 5 and WSU upgrade to 24 x7 (Account Advocate Mandatory others selectable)</p>

PureFlex Systems Hardware Overview

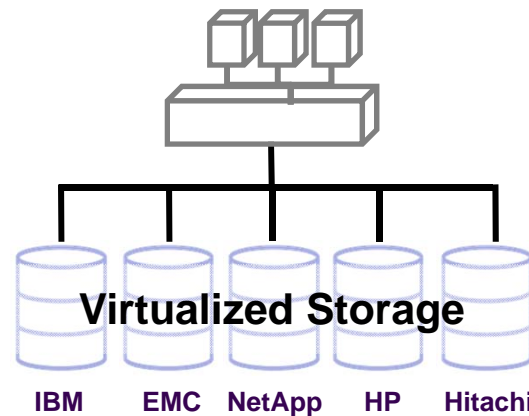
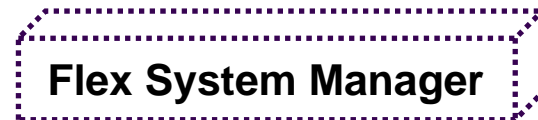
	PureFlex Express	PureFlex Enterprise
Flex Enterprise Chassis	Required (single chassis only)	Required (multi-chassis)
POWER Supplies / Fans	2 / 6	4 / 8
Flex System Manager (HW and SW)	Required	Required
Integrated 1GB Switch	Selectable (Redundant)	Not available
Integrated 10GB Switch	Selectable (Redundant)	Selectable (Redundant)
Integrated 16GB Fibre Switch	Selectable (Redundant)	Selectable (Redundant)
Converged Network Switch (FCoE)	Selectable (Redundant or non-redundant)	Selectable (Redundant)
IBM Storwize V7000 Disk System or Flex System V7000	Required / Selectable	Required / Selectable
Top of Rack Switches	Optional – integrated by Client	Integrated from IBM
Media Enclosure	Selectable DVD / DVD and Tape	Selectable DVD / DVD and Tape
Compute Nodes (Selectable – requires 1 minimum)	<p><u>POWER</u></p> <p>P260, p270, p460</p> <p><u>x86</u></p> <p>x220, x222, x240, x440</p>	<p><u>POWER</u></p> <p>P260, p270, p460</p> <p><u>X86</u></p> <p>x220, x222, x240, x440</p>
ESXi USB Key	Selectable x86 only	Selectable x86 only
Flex Rack	Optional 42U, 25U, no rack	Required 42U only
<p><u>Expansion Components:</u></p> <p>- POWER or x86 compute nodes, Chassis, FSM, Switches, I/O, Disks, TOR's, etc....</p>	Selectable	Selectable

IBM PureFlex Systems Software Overview

	Software Defaults	
	Express Single Chassis Redundant or Non-redundant	Enterprise 1, 2 or 3 Chassis Fully Redundant
Storage SW	Storwize V7000 or Flex System V7000 Base Real Time Compression (optional)	Storwize V7000 or Flex System V7000 Base Real Time Compression (optional)
Management SW	FSM Standard Upgradeable to Advanced	FSM Advanced Selectable to Standard
Virtualization	POWERVM Standard Upgradeable to Enterprise <i>Customer installed</i> VMware, HyperV, KVM Red Hat & SUSE	PowerVM Enterprise Selectable to Standard <i>Customer installed</i> VMware, HyperV, KVM Red Hat & SUSE
Operating Systems	AIX Standard (V6 & V7) IBM i (7.1, 6.1) RHEL (6) SUSE (SLES 11) <i>Customer installed</i> MS Server, RedHat Enterprise, SUSE LINUX Enterprise	
Security	Power SC Standard (AIX only) TPM (x86 only)	
Cloud	Smart Cloud Entry (optional)	Smart Cloud Entry (optional)
Software Maintenance	1 year Upgradeable to 3yr	1 year Upgradeable to 3yr

PureFlex can virtualize your internal & external storage, making overall storage management more efficient, and boosting performance

PureFlex



Client Value

- Flex System Manager manages the integrated PureFlex environment
- Leverage existing external Storage
- Optimize external Storage with Tiering, disk compression leveraging storage virtualization controller

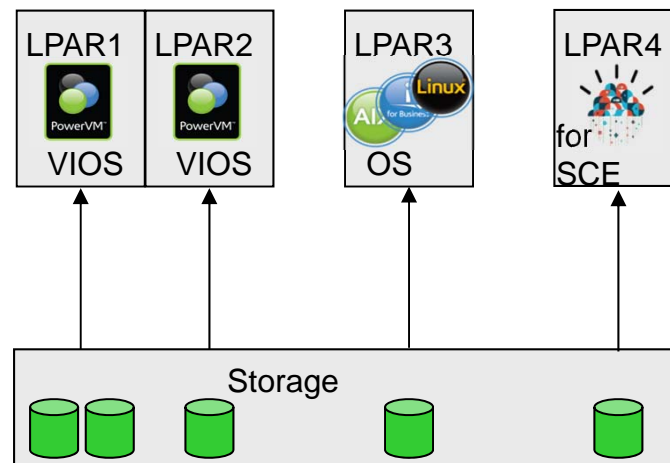
Software Integration for Power

Media Images preloaded, Software Installed & Configured



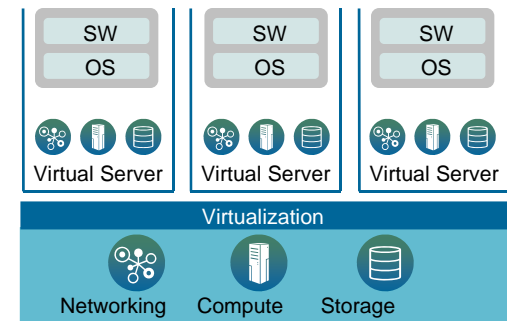
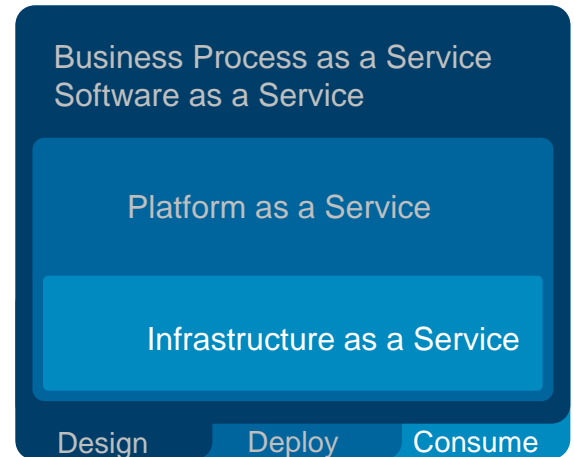
Software components integrated in our factory before system arrives at customer site

- ✓ Media images provided
- ✓ Operating System installed
- ✓ Virtualization Configured
- ✓ Ready for Cloud



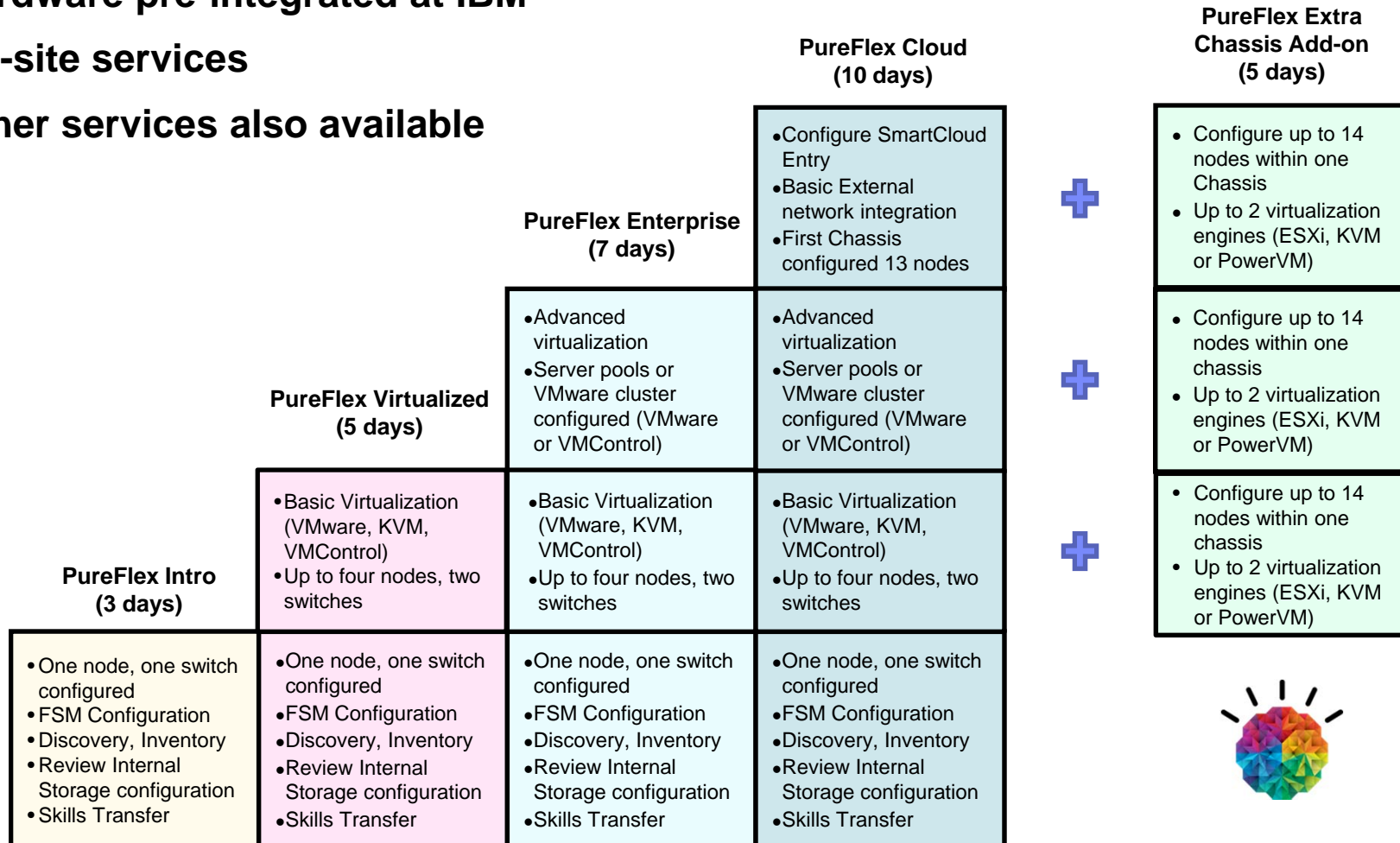
p460 example

IBM SmartCloud



PureFlex Installation Services

- Hardware pre-integrated at IBM
- On-site services
- Other services also available



IBM PureSystems Family

Flex System



PureFlex



PureApplication



PureData



Infrastructure Components

Beyond Blades

Integrated Infrastructure

*Delivering Cloud
Infrastructure Services*

Application Platform

*Delivering Cloud Application
Platform Services*

Data Platform

*Delivering Big Data
Platform Services*

IBM PureApplication System



Transactional workloads

- WebSphere and DB2 workloads
- x86 or Power models

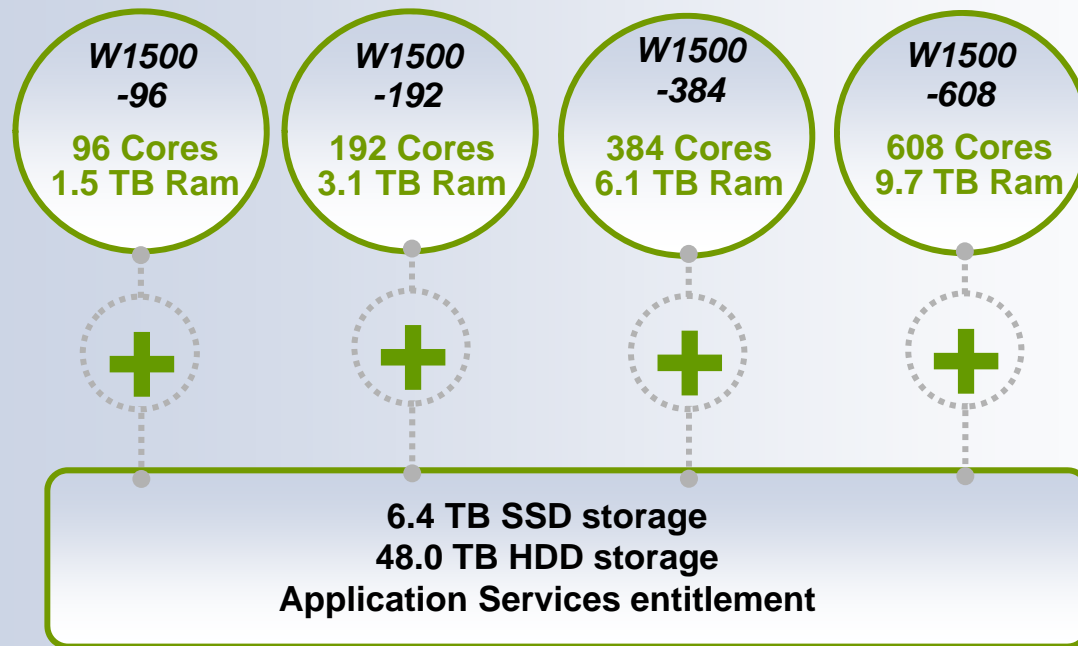
Pre-Integrated by IBM

- Pre-integrated hardware
- Pre-configured and tuned
- Pre-configured monitoring
- Pre-configured security
- Pre-integrated cloud

Pattern based deployments

- Policy based scaling
- Middleware-aware management
- Virtual appliance, system, and application patterns

IBM PureApplication System configurations

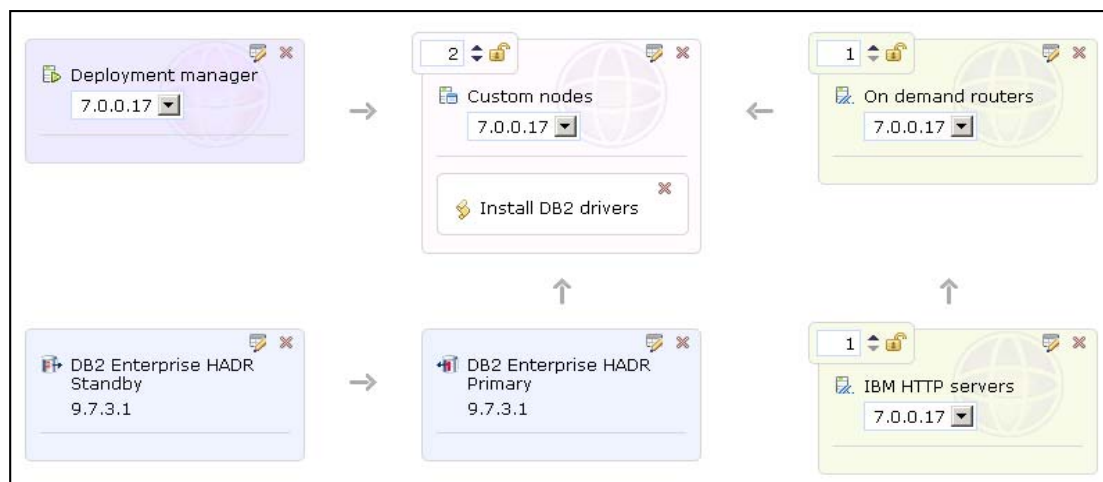


Upgrade to larger systems *without taking an outage!*

Virtual Systems

- Virtual Systems patterns are a logical representation of a recurring topology for a given set of deployment requirements
 - For example: WebSphere Application Server Cluster pattern containing Deployment Manager, one or more Custom Nodes, IBM Http Server and configuration scripts for installing applications to the topology
- PureApplication System includes pre-loaded Virtual System patterns based on years of best practices

Virtual System Diagram



PureExperience: IBM' s investment to *prove it*

IBM PureExperience Offers the following at no charge:

- On-site installation of PureApplication System and guided demonstration of business value
- Execution of a 10 day on-site service engagement
- Use of the PureApplication System for 30 days
- Lab advocate for usage questions and advice
- Single point of IBM support and maintenance



IBM PureSystems Family

Flex System



PureFlex



PureApplication



PureData



Infrastructure Components

Beyond Blades

Integrated Infrastructure

Delivering Cloud Infrastructure Services

Application Platform

Delivering Cloud Application Platform Services

Data Platform

Delivering Big Data Platform Services

IBM PureData System

Meeting Big Data Challenges – Fast and Easy!



PureData

System for Transactions

Powered by DB2 pureScale

For apps like E-commerce...

Database cluster services optimized for transactional throughput and scalability

Similar to DB2 Data Sharing on the mainframe

PureData

System for Analytics

*Next generation
Netezza appliance*

For apps like Customer Analysis...

Data warehouse services optimized for high-speed, peta-scale analytics and simplicity

PureData

System for Operational Analytics

*Next generation
ISAS 7700 and 7710*

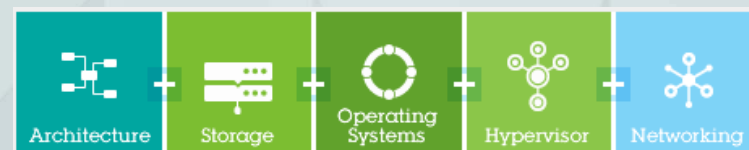
For apps like Real-time Fraud Detection...

Operational data warehouse services optimized to balance high performance analytics and real-time operational throughput

Additional Information

1. New announcement videos

- [IBM PureFlex System - announcement](#)
- [IBM Flex System - announcement](#)



2. Flex System Manager Demo

- [The Value of IBM Flex System Manager](#)

Flex System **PureFlex**

3. Open Choice Video series

- Architecture - [IBM PureFlex System Open Choice : VDI](#)
- Storage - [IBM PureFlex System Open Choice : Storage](#)
- Operating Systems
 - [IBM PureFlex System Open Choice : AIX](#)
 - [IBM PureFlex System Open Choice : IBM i](#)
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 - [IBM PureFlex System Open Choice : Microsoft Hyper-V](#)
 - [IBM PureFlex System Open Choice : VMware](#)
 - [IBM PureFlex System Open Choice : KVM](#)
- Networking - [IBM PureFlex System Open Choice : Networking](#)



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Appendix

Footnotes:

1. IBM Forum 2012, Smarter Commerce Prague
2. IBM GBS 2011 IBV Study, "The power of cloud: driving business model innovation"
3. IDC, IDC Predictions 2012: Competing for 2020, Doc #231720, December 2011
4. Morgan Stanley Cloud perspective: http://www.morganstanley.com/views/perspectives/cloud_computing.pdf
5. Consolidation efficiency based on comparison rPef. 411 for IBM Flex System P460. 39 for Power 520, consolidates 10.5. Space consolidation based on 10 4U POWER6+ 520's = 40U, 1 p460 POWER node = just over 1U of rack space, 1/28th, 4% 96% saved.
6. Based on IBM performance testing of the x222 compute node
7. The use of the IBM POWER Hardware Management Console (HMC) and the IBM Integrated Virtualization Manager (IVM) are only supported as part of a Flex System configuration with POWER compute nodes and cannot be used in the same configuration with the IBM Flex System Management node.
8. IBM analysis of virtual machine performance on P270 node, full chassis of P270s. 14 p270's = 14 x 24-cores x 20VM per core = 6720 VM's 6700 vms
9. 80% per core savings is based on the difference of IBM i p10 per core license price versus IBM i p05 per core license price which equates to 80% savings per core
10. SI4093 data sheet 64x10Gb ports (640Gb) vs HP data sheet 26x10Gb ports (260Gb) => 2.46x more BW. - HP Link - <http://h30094.www3.hp.com/product/sku/1044012142>% based on SI4093 base plus upgrade 1 and 2 list price x 2 = \$53,194, HP Virtual Connect Flex-10/10D x 6 = \$75,450 => 41.8% less expensive.
11. Based on published results as of 8/6/2013 comparison of IBM Flex System p460 compute node with 32-cores versus the HP D560 G8 with 32-cores
12. Based on VM capacity of a full chassis of P270 compute nodes. 14 x 24-cores x 20 VMs per core = 6720 VMs.

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