

Unleash Your Potential New HP Integrity Servers

Ray Turner
OpenVMS Ambassador
Hewlett Packard
April 2010



Agenda

- HP Converged Infrastructure
- HP Next Generation Integrity Servers:
Addressing Mission Critical IT Needs
- The new HP Integrity Server Family - Product
Details
- Summary
- Questions



HP Converged Infrastructure



IT sprawl has business at the breaking point



70% captive in operations and maintenance

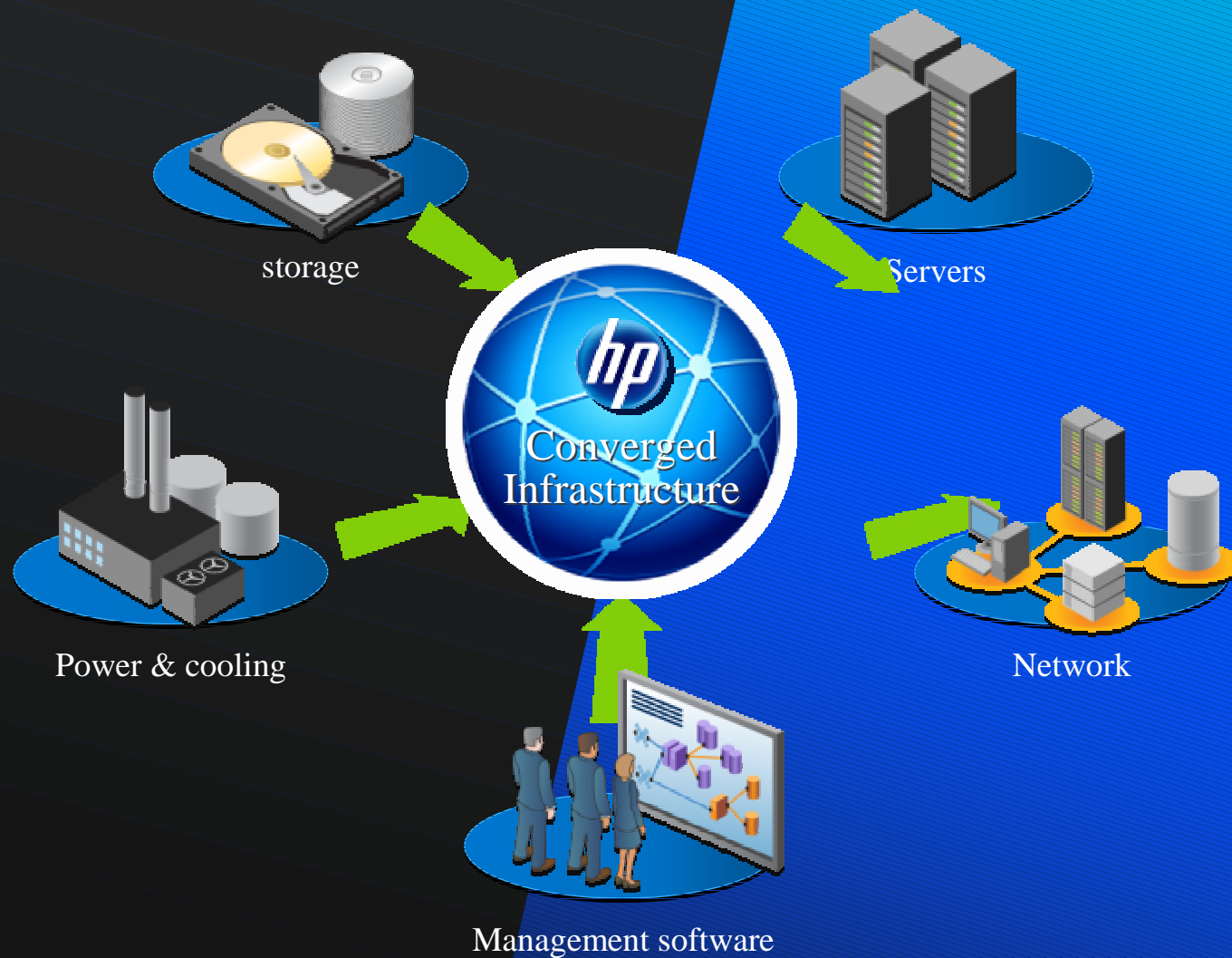
- Complex and inefficient
- Over-provisioned, underutilized
- Low productivity

Business innovation throttled to 30%

- Long delay to business value
- Unpredictable service levels
- Business agility constrained



Tomorrow's business will be built on a converged infrastructure



Requirements to build a converged infrastructure



- Virtualized
- Resilient
- Orchestrated
- Optimized
- Modular

The converged infrastructure architecture

Infrastructure operating environment

Enables shared-service management

FlexFabric

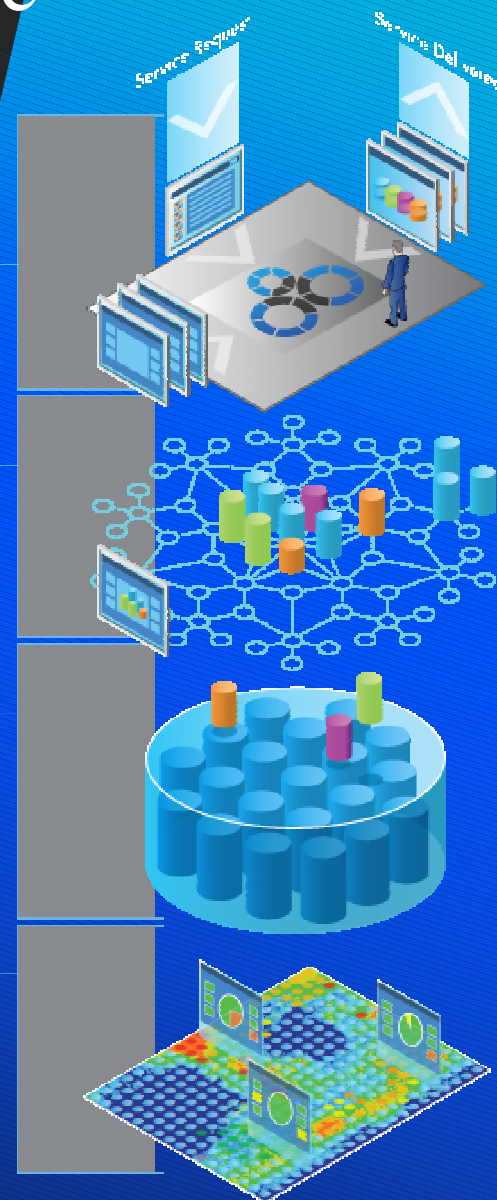
Wire-once, dynamic assembly,
always predictable

Virtual resource pools

Adaptive compute, memory,
storage & network resources

Data center smart grid

Intelligent energy management
across systems and facilities



Accelerate your business

Make 70/30 about innovation again with HP Converged Infrastructure

Converged infrastructure



Weeks
to min

Improved productivity

2x

Utilization infrastructure
capacity

3x

Reclaimed facility
energy capacity

Accelerate your business



Faster time to business value



Improve service-levels



Support business
transformation

HP Next Generation Integrity Servers

Addressing Mission Critical IT Needs



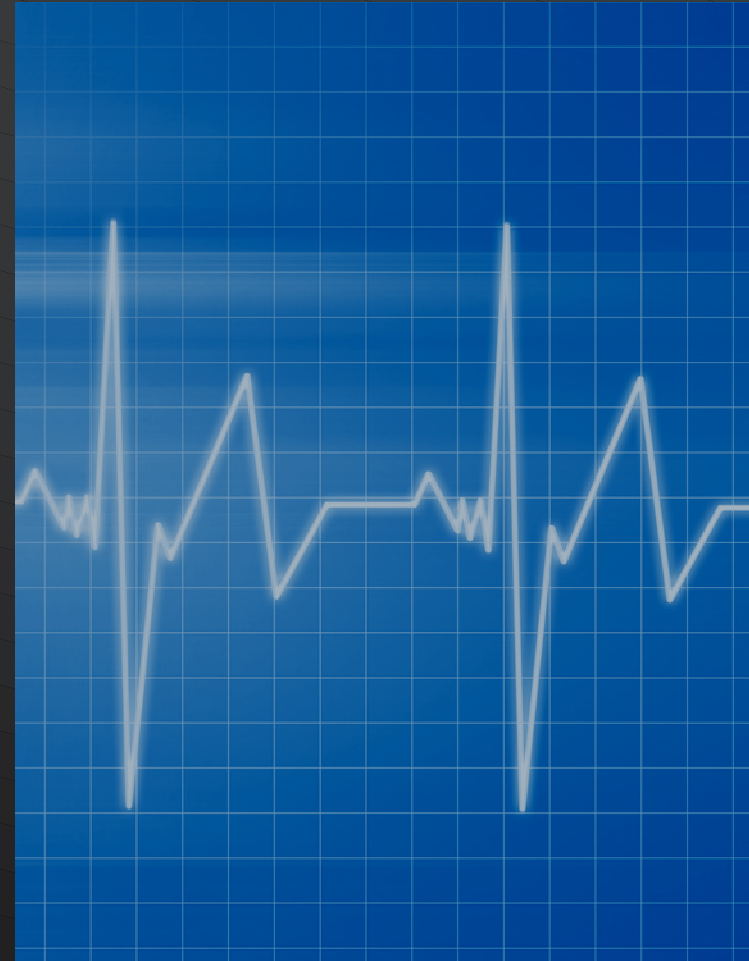
Mission critical needs are evolving

Today's mission-critical environments require:

- Reliability and predictability for the most challenging workloads
- Flexibility to contain costs while meeting increasingly demanding SLAs

HP delivers with:

- Greater virtualization flexibility
- Simplicity through standardization
- Greener IT
- No compromise on RAS
- Dynamic scalability



Next Generation Integrity Servers

Building on a proven track record of mission-critical leadership

Converged Infrastructure

- Virtualized
- Resilient
- Orchestrated
- Optimized
- Modular

Today's Integrity Solutions

Mission Critical Virtualization
with integrated & automated
management

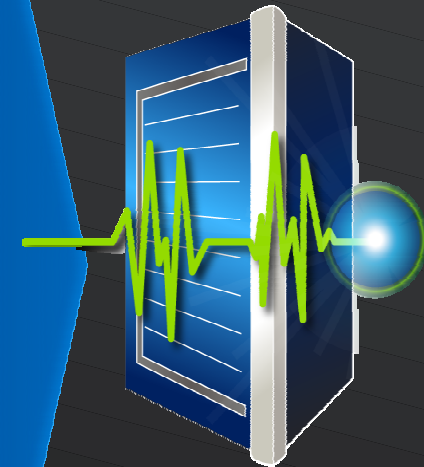
Resilient operating environments
and high availability software

Utility computing for capacity on
demand

Energy-efficient Integrity servers
and server blades

Modular form factors for
demanding workloads

Next-Generation Integrity Servers



HP Next Generation Integrity Servers

Designed for the next generation of mission-critical needs



- Virtualized
- Resilient
- Orchestrated
- Optimized
- Modular

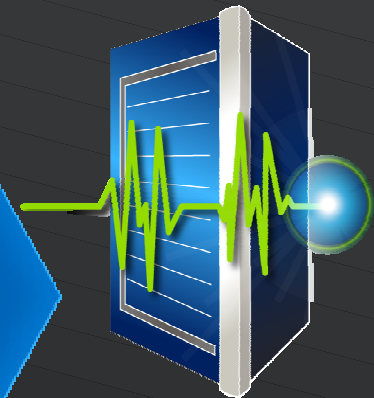
Converged design for extreme flexibility to virtualize

Continued innovation in RAS for the highest level of availability

Simplicity through standardization - commonality throughout the data center

Unparalleled energy efficient design for ultimate utilization

Modular building blocks for dynamic scalability



Next-Generation Integrity Servers



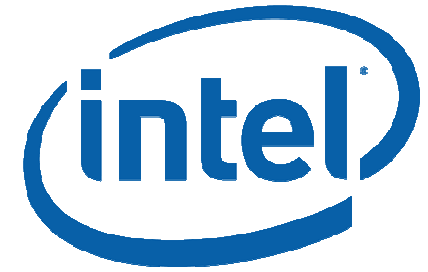
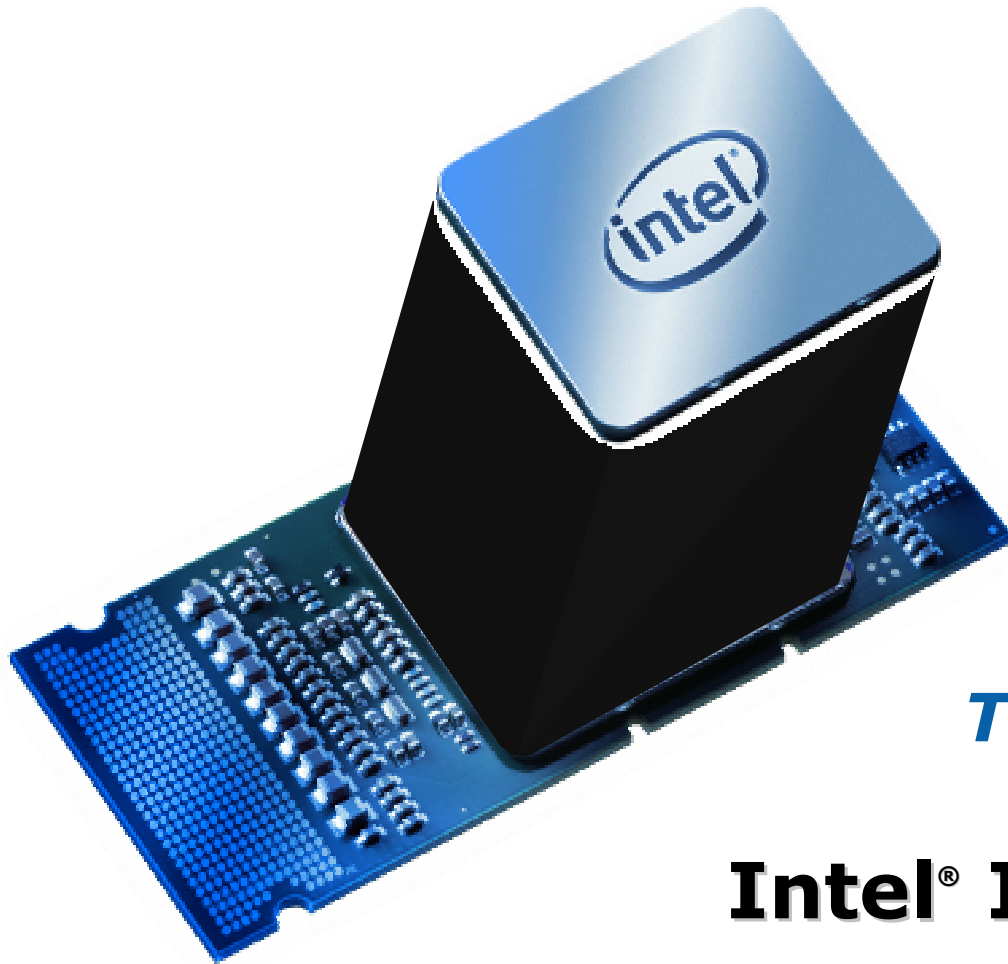
Why Next Generation Integrity Servers for mission-critical computing?

- ✓ HP Next Generation Integrity Servers are mission-critical by design, with added simplicity and efficiency.
- ✓ By converging Integrity server modularity and BladeSystem modularity, HP redefines what enterprise IT can expect from mission critical computing
- ✓ HP is uniquely positioned with IP in servers, storage, networking and management software to address the evolving needs of mission-critical computing.



The new HP Integrity Server family – Product details





Technical Update

Intel® Itanium® Processor

Intel® Itanium® Platform Roadmap



Processor Generation	Intel® Itanium® Processor 9100 Series	Tukwila	Poulson	Kittson (In Planning)
Chipset	870/OEM	Boxboro/OEM		
New Technologies/Capabilities	<ul style="list-style-type: none"> • Dual Core • 24MB Shared Cache • Hyper-Threading Technology • Intel Virtualization Technology • Intel Cache Safe Technology • Lock-step Data Integrity Technology • DBS Power Management Technology 	<ul style="list-style-type: none"> • Quad Core, 30MB Total Cache, Hyper-Threading Technology • Intel QuickPath Interconnect • Dual Integrated Memory Controllers, 4 Channels • Next Gen IO (PCIe Gen 2) • Mainframe-Class RAS • Enhanced Virtualization • Common Chipset w/ Next Gen Intel® Xeon® Processor MP • Voltage Frequency Mgmt • Scalable Buffered Memory 	<ul style="list-style-type: none"> • Advanced Multi-Core Architecture • Hyper-Threading Enhancements • Instruction-Level Advancements • 32nm Process Technology • Large On-Die Cache • New RAS Features • Compatible with Tukwila Platforms • Scalable Buffered Memory 	<ul style="list-style-type: none"> • 9th Itanium® Product • Compatible with Tukwila Platforms • Scalable Buffered Memory
Targeted Segments	Enterprise Business (Database, Business Intelligence, ERP, HPC, ...)			
Platform Launch Target	2007	2010	Future	Future

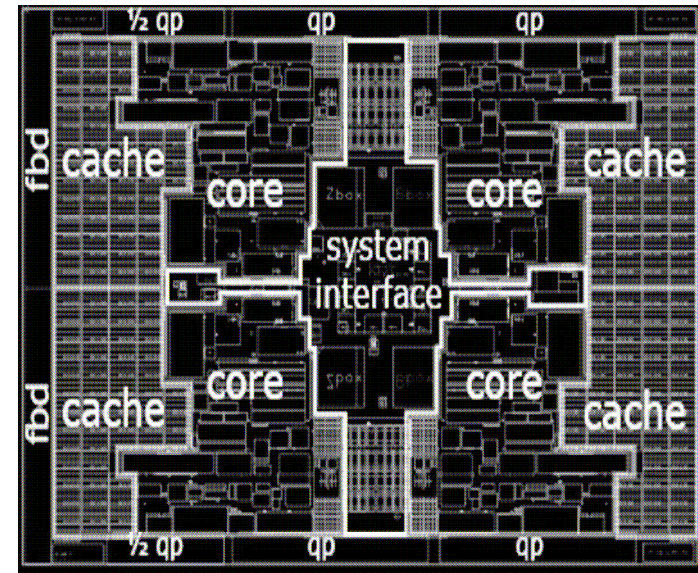
Tukwila: New Quad-Core Itanium® Processor

Worlds first 2 Billion Transistor Microprocessor



“A 65nm 2-Billion-Transistor Quad-Core Itanium® Processor”

- Quad Core w/ Multi-Threading (8T)
- >2x* performance vs Dual-Core Itanium® Processor 9100 series
- 30MB on-die cache
- QuickPath interconnect and dual integrated memory controllers
- Advanced RAS
- Energy Efficiency



Tukwila Micrograph

Performance → This is based on comparison between Intel’s performance projections (1/15/08) on 4-socket benchmarks (TPC-C, SpecintRate, and SpecfpRate) for Tukwila Vs measurements on Intel Itanium® Processor 9100 Series (Montvale)

Hewlett-Packard Company L.P. All Rights Reserved. HP Company Confidential
Information subject to change at any time Copyright © Intel Corporation, 2008. All rights reserved. Third-party marks and brands are the property of their respective owners. All products, dates, and figures are preliminary and subject to change without notice.

Streams benchmark

FW: BL870c i2 test results, and Power p7 results too! - Message (HTML)

Message

Reply Reply to All Forward Delete Move to Folder Create Rule Other Actions Block Sender Not Junk Safe Lists Junk E-mail Categorize Follow Up Mark as Unread Options Find Related Select Find Send to OneNote OneNote

This message was sent with High importance.

From: McMaster, Euan
To: McMaster, Euan
Cc:
Subject: FW: BL870c i2 test results, and Power p7 results too!

Sent: Mon 29/03/2010 14:40

Benchmark	System	Processor	Sockets	Cores	Memory	Result	X Factor per socket
STREAM Triad	BL870c	1.6GHz/18MB Dual-Core Intel Itanium 2	4	8	48 GB	5440	9.1
	BL870c i2	Itanium(R) Processor 9350s (1.73 GHz, 24 MB)	4	16	256 GB	49533	

But is it technically correct to compare the above two & conclude 9.1 "X factor per socket" ?

Because, if there was a BL860c with 256GB ram, the X factor per core would not be more than 1.6-1.7

If you see Streams triad figures of Superdome 16 core server, it literally doubles with doubling RAM on same 16 core (128GB→256GB→512GB)

Benchmark	System	Processor	Sockets	Cores	Memory	Result	Per Core Triad	X Factor per socket
STREAM Triad	HP_Integrity_SuperDome_4cell	1.6GHz/24MB Dual-Core Intel Itanium 2	16	32	256GB	64715	2022	
	HP_Integrity_SuperDome_4cell	1.6GHz/24MB Dual-Core Intel Itanium 2	16	32	512GB	128686	4021	

SpecFP benchmark

The screenshot shows a PDF document titled 'cpu2006-20071015-02291.pdf' in Adobe Reader. The document content is a SPEC CFP2006 benchmark result. The title is 'SPEC® CFP2006 Result' with a copyright notice for 2006-2009. The test was performed by Hewlett-Packard Company on an HP Integrity rx3600 (1.66GHz/18MB Dual-Core Intel Itanium). The results show a SPECfp®_rate2006 of 54.8 and a SPECfp_rate_base2006 of 53.4. The test date is Sep-2007, hardware availability is Nov-2007, and software availability is Sep-2007. The CPU2006 license is 03.

SPEC® CFP2006 Result	
Copyright 2006-2009 Standard Performance Evaluation Corporation	
Hewlett-Packard Company	SPECfp®_rate2006 = 54.8
HP Integrity rx3600 (1.66GHz/18MB Dual-Core Intel Itanium)	SPECfp_rate_base2006 = 53.4
CPU2006 license: 03	Test date: Sep-2007
Test sponsor: Hewlett-Packard Company	Hardware Availability: Nov-2007
Tested by: Hewlett-Packard Company	Software Availability: Sep-2007

The screenshot shows a PDF document titled 'cpu2006-20100208-09617.pdf' in Adobe Reader. The document content is a SPEC CFP2006 benchmark result. The title is 'SPEC® CFP2006 Result' with a copyright notice for 2006-2009. The test was performed by Hewlett-Packard Company on an HP Integrity bl860c i2 (1.73 GHz/24MB Quad-Core Intel Itanium 9350). The results show a SPECfp®_rate2006 of 136 and a SPECfp_rate_base2006 of 132. The test date is Jan-2010, hardware availability is May-2010, and software availability is Mar-2010. The CPU2006 license is 03.

SPEC® CFP2006 Result	
Copyright 2006-2009 Standard Performance Evaluation Corporation	
Hewlett-Packard Company	SPECfp®_rate2006 = 136
HP Integrity bl860c i2 (1.73 GHz/24MB Quad-Core Intel Itanium 9350)	SPECfp_rate_base2006 = 132
CPU2006 license: 03	Test date: Jan-2010
Test sponsor: Hewlett-Packard Company	Hardware Availability: May-2010
Tested by: Hewlett-Packard Company	Software Availability: Mar-2010

New HP Integrity Servers

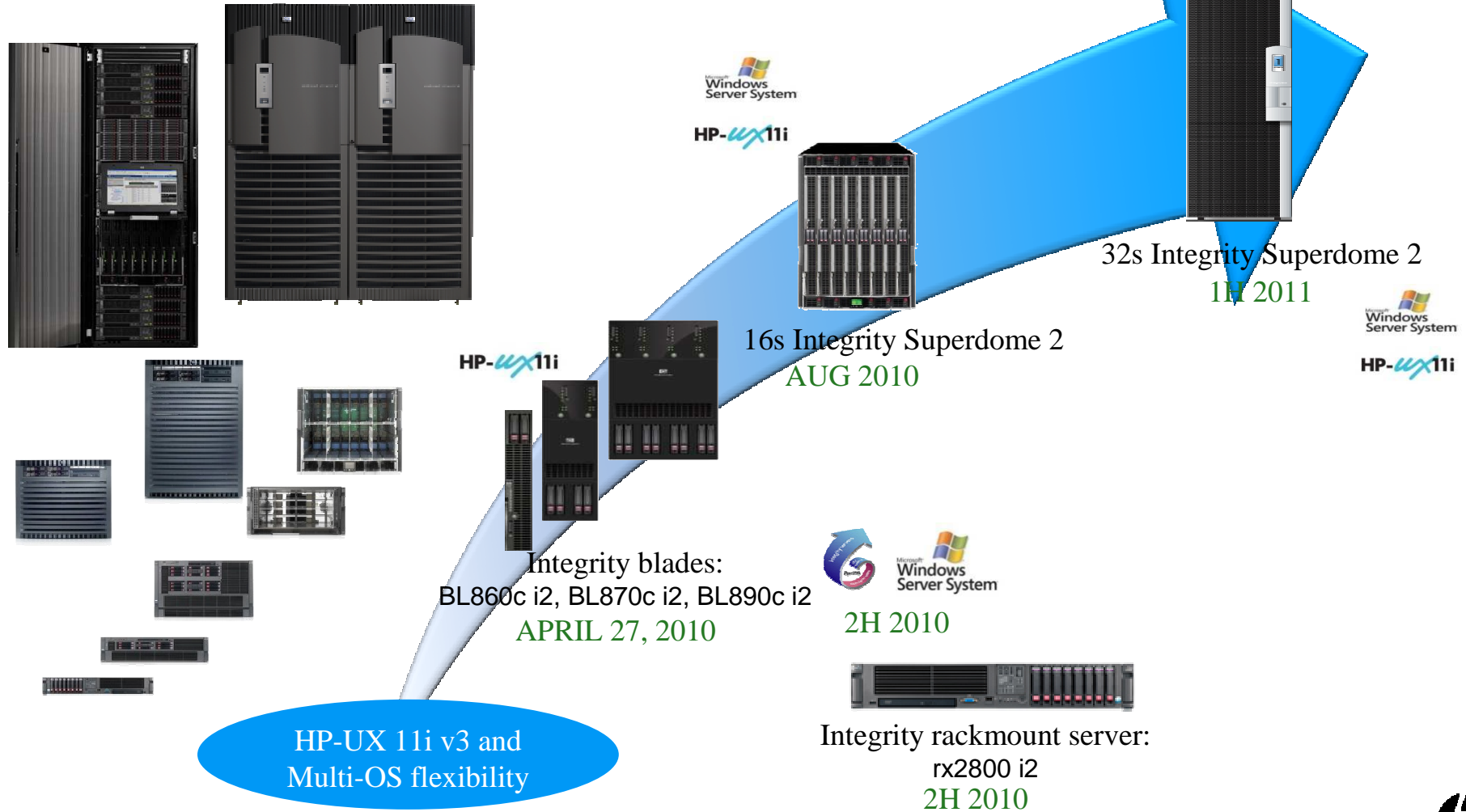
Today

2010

2011

MONTVALE

TUKWILA



rx2800 i2 Overview

Management

- Integrated Lights Out (iLO 3)
- Integrated VGA console
- iLO 3 Advanced Pack firmware license option
- System Insight Display

Processors and chipset

- 2 Intel® Itanium processors
 - Three SKUs
 - 2 quad-core
 - 1 dual-core
- Intel® Boxboro Chipset

Form factor

- 2 EIA units (U)/3.5" height
- 20 servers per 42U rack
- Designed for data center and utility closet operation (5–35°C)
- Standalone, pedestal and 'Office Friendly' options

I/O subsystem

- 6 'public' PCI-e IO slots :
 - 2 x8 slots
 - 4 x4 slots
- Integrated HP 8 Port SAS host bus adapter
- Integrated 4 Port 1000Base-TX LAN
- 1000Base-T, USB, serial ports

Memory

- 24 PC3-8500 DIMM sockets
- 192 GB capacity with 8GB DIMMs

High availability

- Memory double chip spare
- Redundant hot-plug power
- Redundant hot-swappable fans
- Internal SAS RAID
- Processor de-allocation on failure

Internal peripherals

- 8 hot-plug SFF SAS 6Gbps HDDs
- DVD-ROM or DVD+RW
- Integrated RAID support

**3-year Next day,
on-site Warranty**



Intel® Itanium® (Tukwila) Platform Overview

Connectivity

- Fully-connected Intel® Quick Path Interconnect (QPI) links
- Boxboro IO Hubs (IOH)

Memory

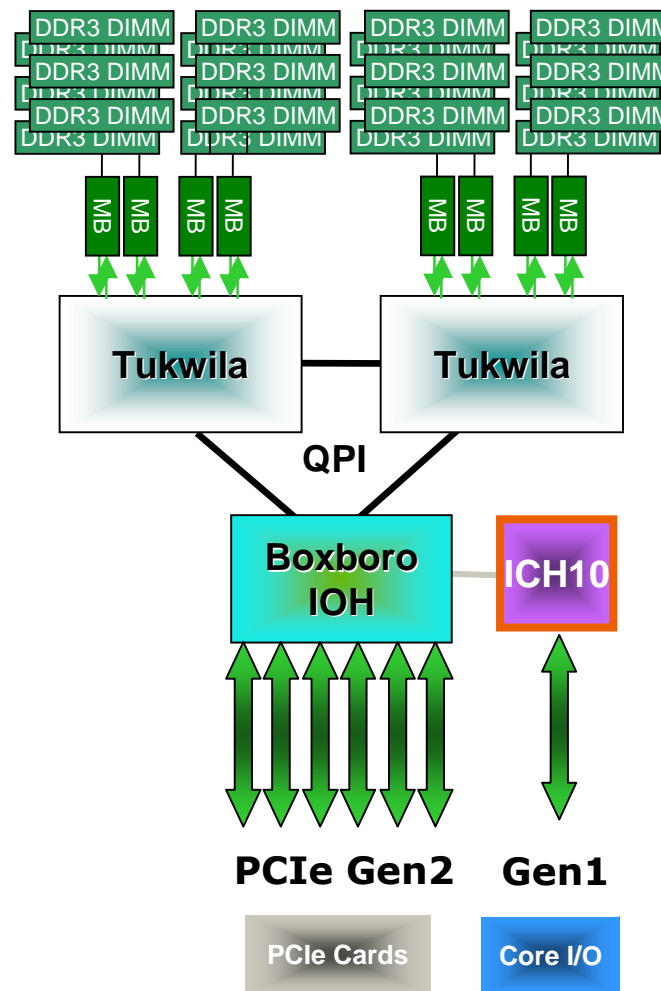
- CPU-integrated Memory Controller
- MillBrook Memory Expanders
- DDR3-RDIMMs

Enabling Technologies

- Power Management
- Intel® Virtualization Technology

Advanced RAS

- New Si reliability features
- New Interconnect Reliability features
- Memory RAS (Sparing, migration...)



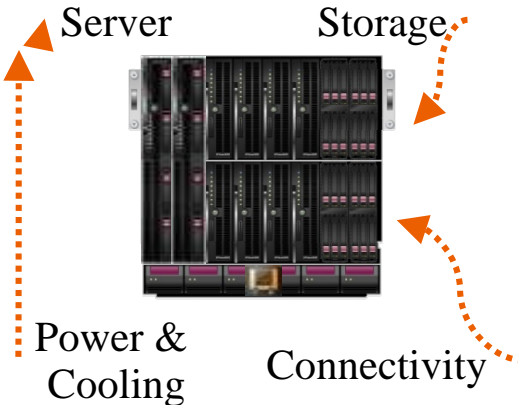


Power & Cooling

- Fully N+N redundant, high-efficiency power supplies, which support:
 - 1200W at 220V or 800W at 110V
 - Brookline (Intelligent PDU) compatible
 - Power Metering
 - Power Cap
 - Power Throttling (Similar to E-Brake)
- Fully redundant system fans, which support:
 - “Data center aware” with rotation speed based on environmental factors including temperature of air inside and outside of chassis
- “Sea of Sensors”
 - Same as ProLiant G6 & G7 products
 - Thermal Sensors on every DIMM, IOH, MillBrook, Processor
 - Inlet and Outlet air temperature
 - Altitude sensor (unique to the rx2800 i2)
- Office Friendly Server option will maintain the acoustics of the current rx2660 Office Friendly option
 - May limit configurations (i.e., fewer DIMMs, processors, cores, etc.)

The HP BladeSystem approach to simplify infrastructure

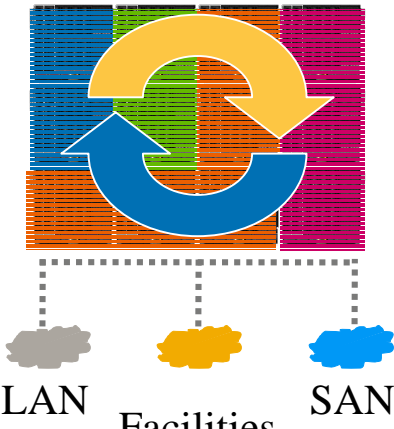
Consolidate



- Modularize and integrate components
- Surround with intelligence
- Manage as one

Reduce time and cost to buy, build and maintain

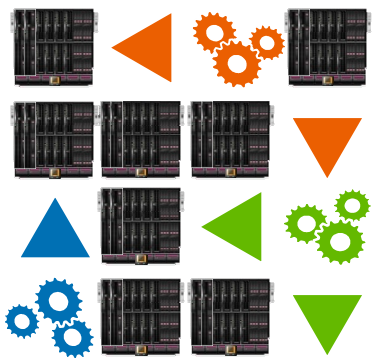
Virtualize



- Create logical, abstracted connection to LAN/SAN
- Pool and share server, storage, network, and power

Greater resource efficiency and flexibility

Automate



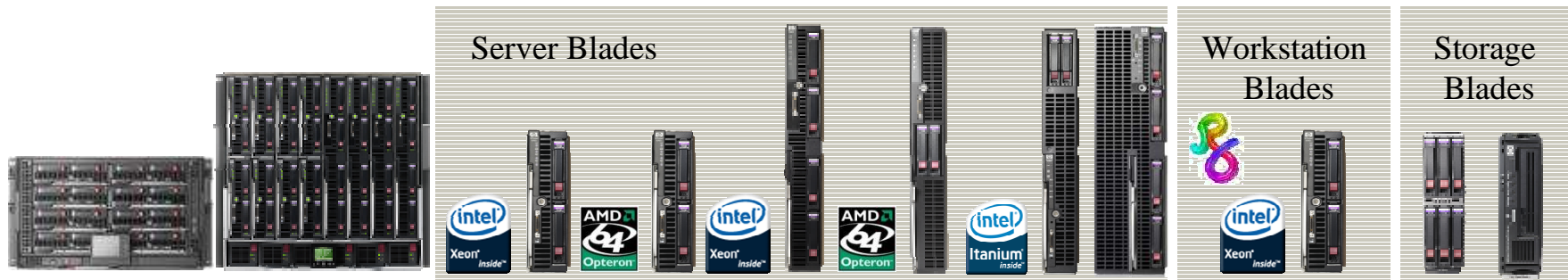
- Simplify routine tasks and processes to save time
- Keep control

Free IT resources for revenue bearing projects

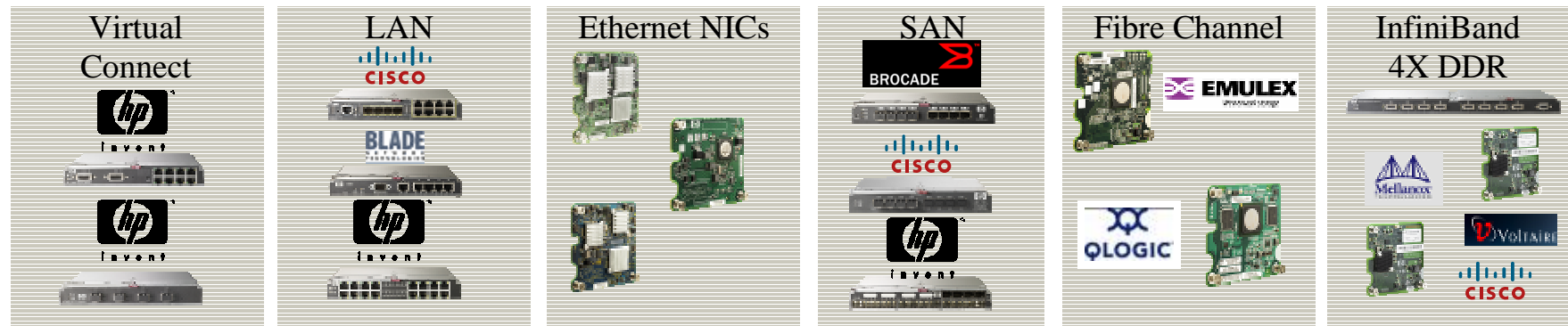
Greater choice with a robust blade ecosystem



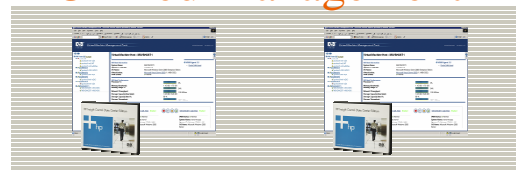
A Full Range of 2P and 4P Blades



Interconnect choices for LAN, SAN, and Scale-Out Clusters



Unified Management



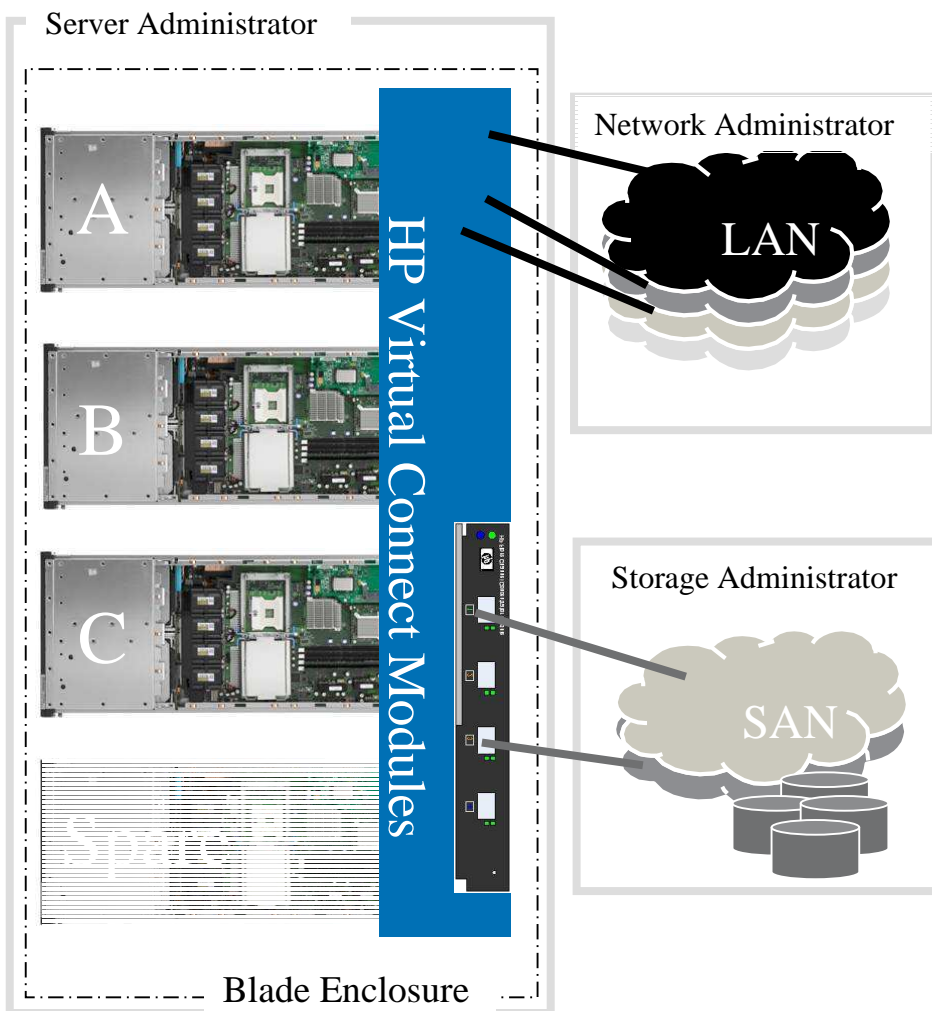
Choice of Power



Complete Services

Assessment
Implementation
Support

Virtual Connect solves these & makes *IT change-ready!*



Cable Reduction w/out adding switches

Maintains end-to-end connections
of your favorite brands
(Cisco, Nortel, Brocade, McData, etc.)

Servers are Change-Ready

- add, move, replace, upgrade w/o affecting LAN or SAN

Cleanly separates Server from LAN & SAN

Adds Flexibility

- Wire-Once including LAN & SAN;
then add Servers whenever &
wherever you need (up to 1 enclosure)
- N+1 Sparring – Fast Recovery
- Switch among Dev, Test, & Prod environments
- Easy workload migration
- No new FC domains

Consistency with HP BladeSystem Integrity, ProLiant and StorageWorks



- Server Blade Feature Consistency
 - IO Mezzanine Card Consistency
 - LAN, FC, Flex, IB
 - Core IO Support
 - SAS, LAN, Serial, USB, VGA
 - Common DDR3 memory DIMM technology
- Side-by-side support of ProLiant, Integrity and StorageWorks in the same c-Class enclosure
- Common Manageability Strategy for hardware manageability including partial support for same tools, UIs, views and processes





BL860c



BL870c



BL890c

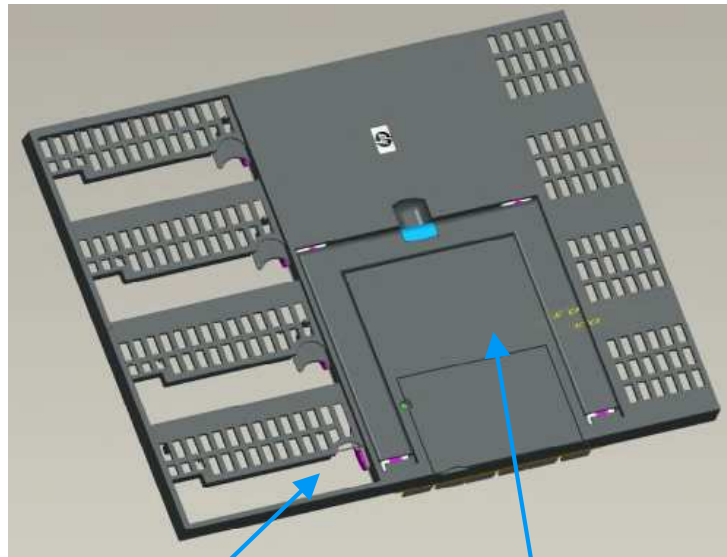




Integrity	BL860c i2	BL870c i2	BL890c i2
Base Server	AD399A for c7000 and c3000	AH383A for c7000 AM329A for c3000	AH384A for c7000 AM330A for c3000
Processor Sockets	2	4	8
DIMM Sockets	24	48	96
HDD Slots	2	4	8
Embedded Controller	1 HP p410i SAS RAID	2 HP p410i SAS RAID	4 HP p410i SAS RAID
Embedded NICs	4 10GbE w/Flex-10	8 10GbE w/Flex-10	16 10GbE w/Flex-10
IO Mezz Slots	3 Gen2 PCIe	6 Gen2 PCIe	12 Gen2 PCIe
Management	Integrity iLO3 Advanced Pack	Integrity iLO3 Advanced Pack	Integrity iLO3 Advanced Pack
ICH Module	1	1 in "Monarch Blade"	1 in "Monarch Blade"
Warranty	3 Yr, Next Day 9x5	3 Yr, Next Day 9x5	3 Yr, Next Day 9x5

bl890c i2 “Scalable Blade Link” Overview

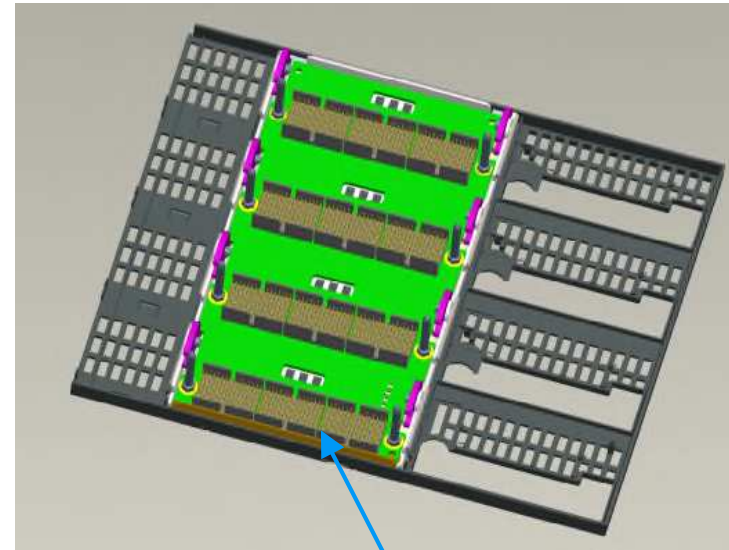
Front View



Access to hot plug HDDs

Latch Mechanism

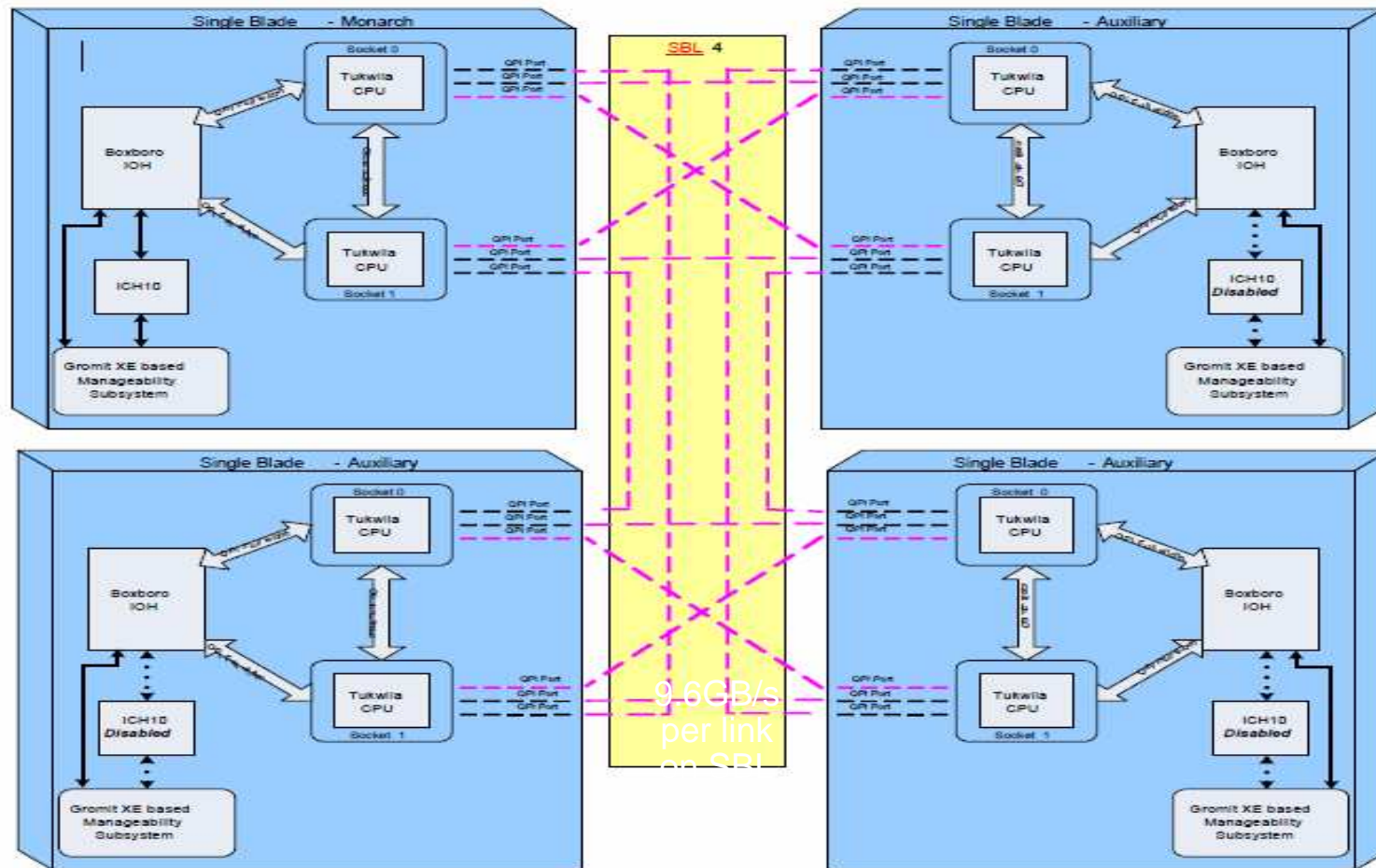
Back View



Connection to four base blades

The bl890 i2 scalable blade link carries coherent CPU traffic (QPI) between all four base blades

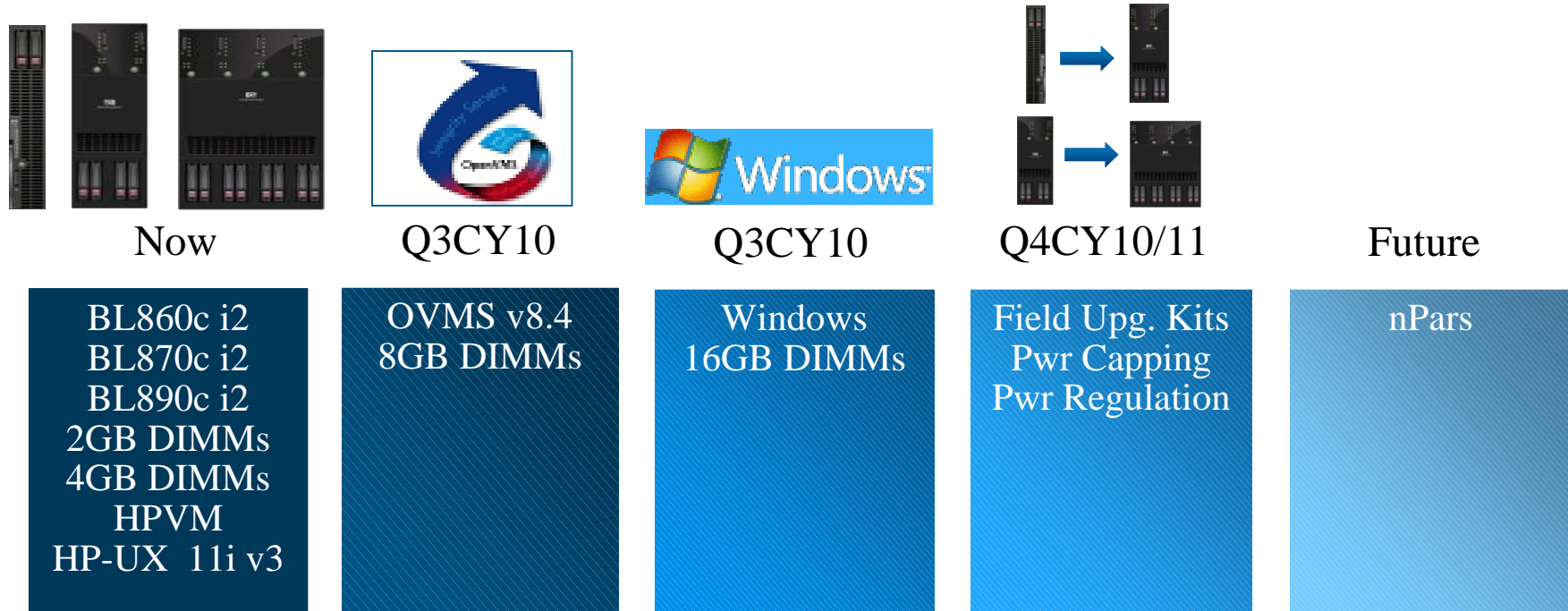
Scalable BladeLink Connectivity



Tukwila's directory-based memory coherence architecture and 4 CPU-CPU QPI links per CPU module enable excellent system scaling



BladeSystem Feature Roadmap



Superdome 2

Taking the Superdome into the Next Decade



- Availability – Superdome to the next level
 - Power-on-once architecture
 - Fault Tolerant Xfabric results in > 1000yr MTBF
 - “all hot-swap” design
- Performance
 - 2x to 4x performance - in the same footprint
 - 55% better price performance per watt
- Designed for Converged Infrastructure
 - “Pay as you grow” – mid-range to high-end
 - Modular building blocks
- Extending Blades Innovation:
 - Superdome 2 Onboard Administrator
 - Insight Dynamics – VSE & SIM
 - Virtual Connect
 - Power efficient computing



Building Block Superdome Bladesystem Enclosure

“Right Sized” for Mission Critical Environments

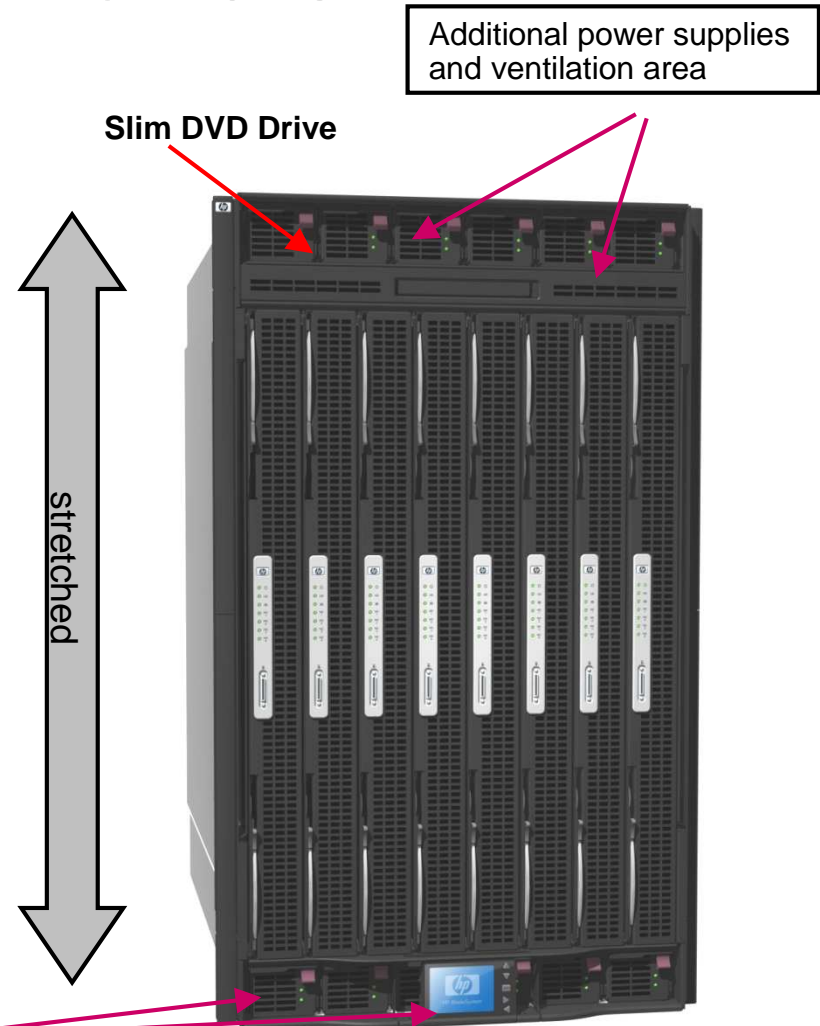
“Superdome 2” chassis is very similar to its smaller cousin – the c7000

18U: Perfect! 64c, 2TB (w/ 8Gb DIMMS)

The larger size accommodates:

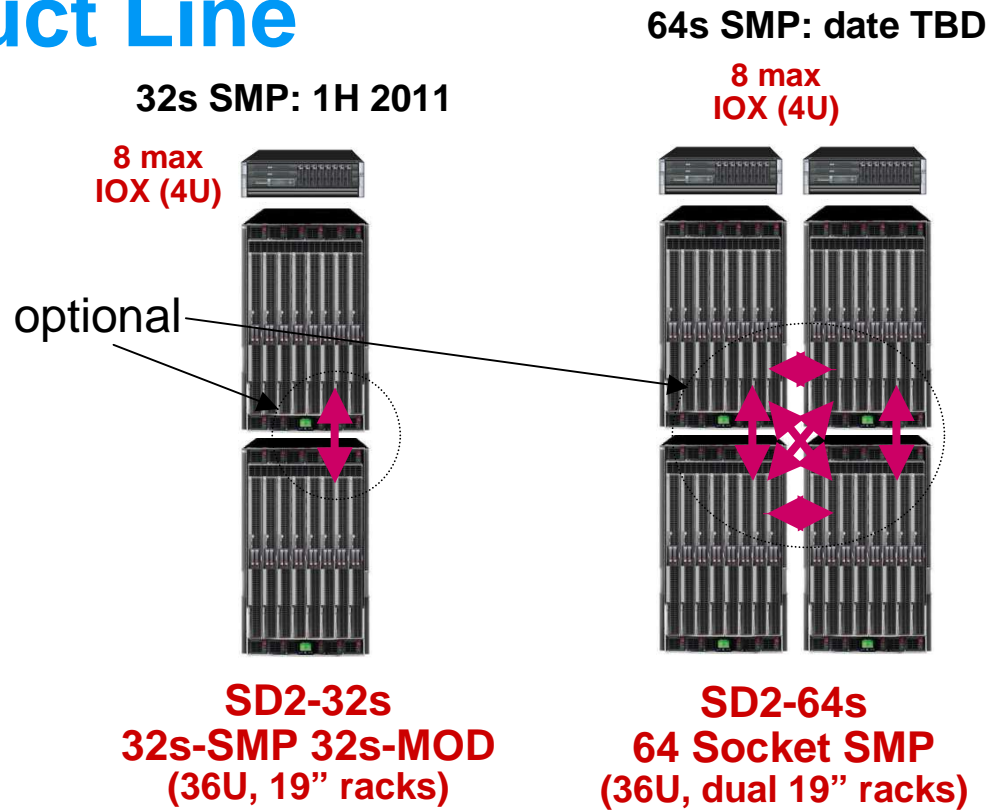
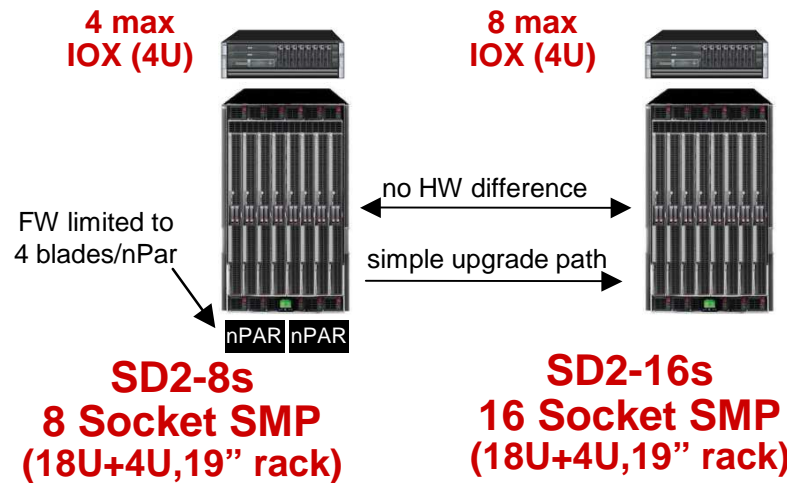
- Much greater memory capacity
- HP sx3000 chipset
- 2N power for any and all configurations
- Fits into standard 19” rack
- Clean “data center in a rack” design

Same power supplies (and power inputs) and status display as C7000



Superdome 2 Product Line

SD2-8s = entry point.
SD door not supported with the SD2-8S



<u>Tukwila</u>	
16 (8 per nPAR)	Sockets
64	Cores
128	Threads
2TB*	Memory
32 Internal	10 GbE
24 Internal	PCIe
48 IOX	PCIe

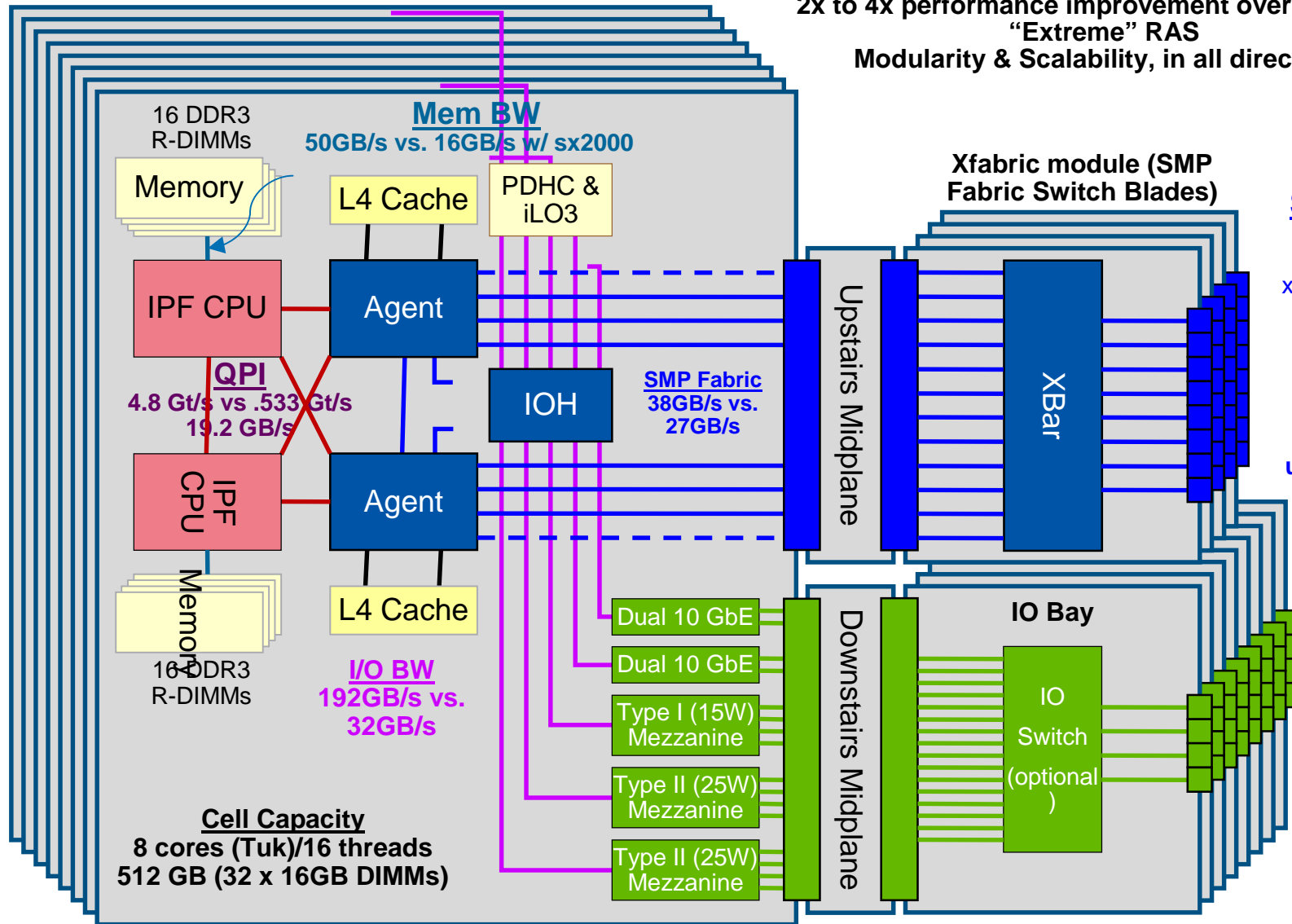
<u>Tukwila</u>	
16	Sockets
64	Cores
128	Threads
2TB*	Memory
32 Internal	10 GbE
24 Internal	PCIe
96 IOX	PCIe

<u>Tukwila</u>	
32	Sockets
1	Cores
256	Threads
4TB*	Memory
64 Internal	10 GbE
48 Internal	PCIe
96 IOX	PCIe 2

<u>Tukwila</u>	
64	Sockets
256	Cores
512	Threads
8TB*	Memory
128 Internal	10 GbE
96 Internal	PCIe
96 IOX	PCIe

Superdome 2 Architecture – Overview

Based on the sx3000 chipset from HP



Results:
2x to 4x performance improvement over Montvale
“Extreme” RAS
Modularity & Scalability, in all directions

SMP Fabric
8 GB/s
per connect
x 32 connects for
massive
bandwidth
capability

Completely
Fault tolerant
using E2E retry



Comparison – BL890c i2 and SD2

BL890c i2



Key features

- HP-VM only (nPARs later)
- 12 I/O slots
- 96 DIMMs
- Perf = X
- Scalable Blade Link
- Std Rack Door

SD2-8s



Key features

- nPARs, vPARs, HP-VM, iCAP
- 48 I/O slots (+ Mezz)
- 128 DIMMs
- Perf = X * (1.15)
- Fault Tolerant XFabric
- Std Rack Door

SD2-16s



Key features

- nPARs, vPARs, HP-VM, iCAP
- 96 I/O slots (+ Mezz)
- 128 DIMMs
- Perf = X * (1.15)
- Fault Tolerant Xfabric
- SD2 Rack Door

8 sockets, 3 different ways!

Summary

- HP's Converged Infrastructure addresses IT Sprawl
- CI can accelerate the realisation of IT transformation projects
- New Integrity Servers are a core part of HP's CI for mission critical applications
- New Integrity servers build on the benefits of HP's experience of Blades
- Customers benefit from scale up, scale out, mix and match as desired.
- New SD2 platform takes this to next level
- Feature and performance rich today, with more to come.....
- OpenVMS support on Blades in Q3 (8.4 + Patch kit)





Thank You

