HP Business Critical Systems Technology Update

Mathew Sherman
Solution Architect
HP Enterprise Business, Business Critical Systems

V1

Common Modular Infrastructure

Mission-Critical Customer Challenges

Financial Services
Every minute of downtime = a minute of lost revenue!

Manufacturing and Distribution
Production comes to grinding halt

Healthcare
Patient outcomes depend on 24x7 access to data

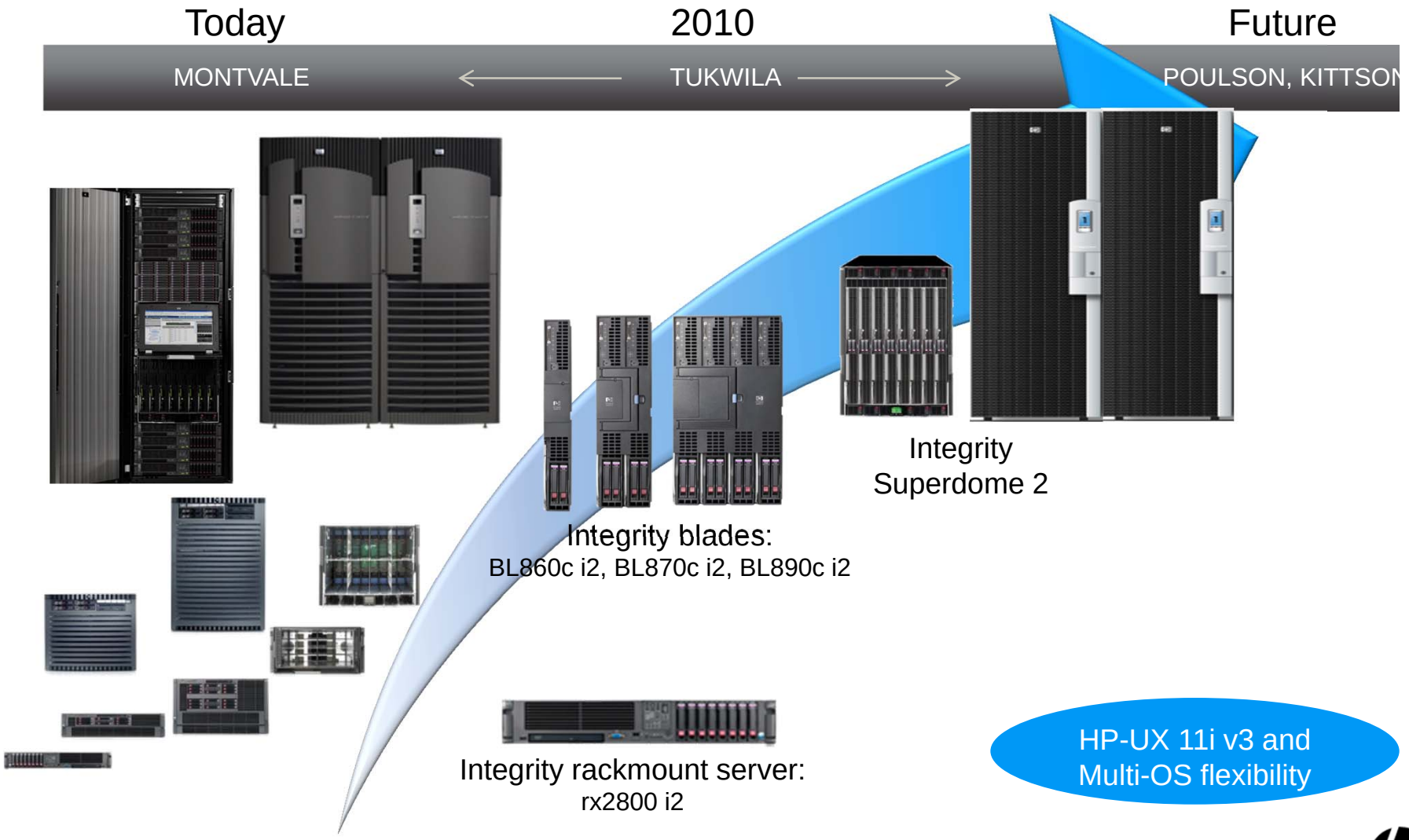
Public Sector and CME
Customer retention and fraud detection at risk

No tolerance for downtime

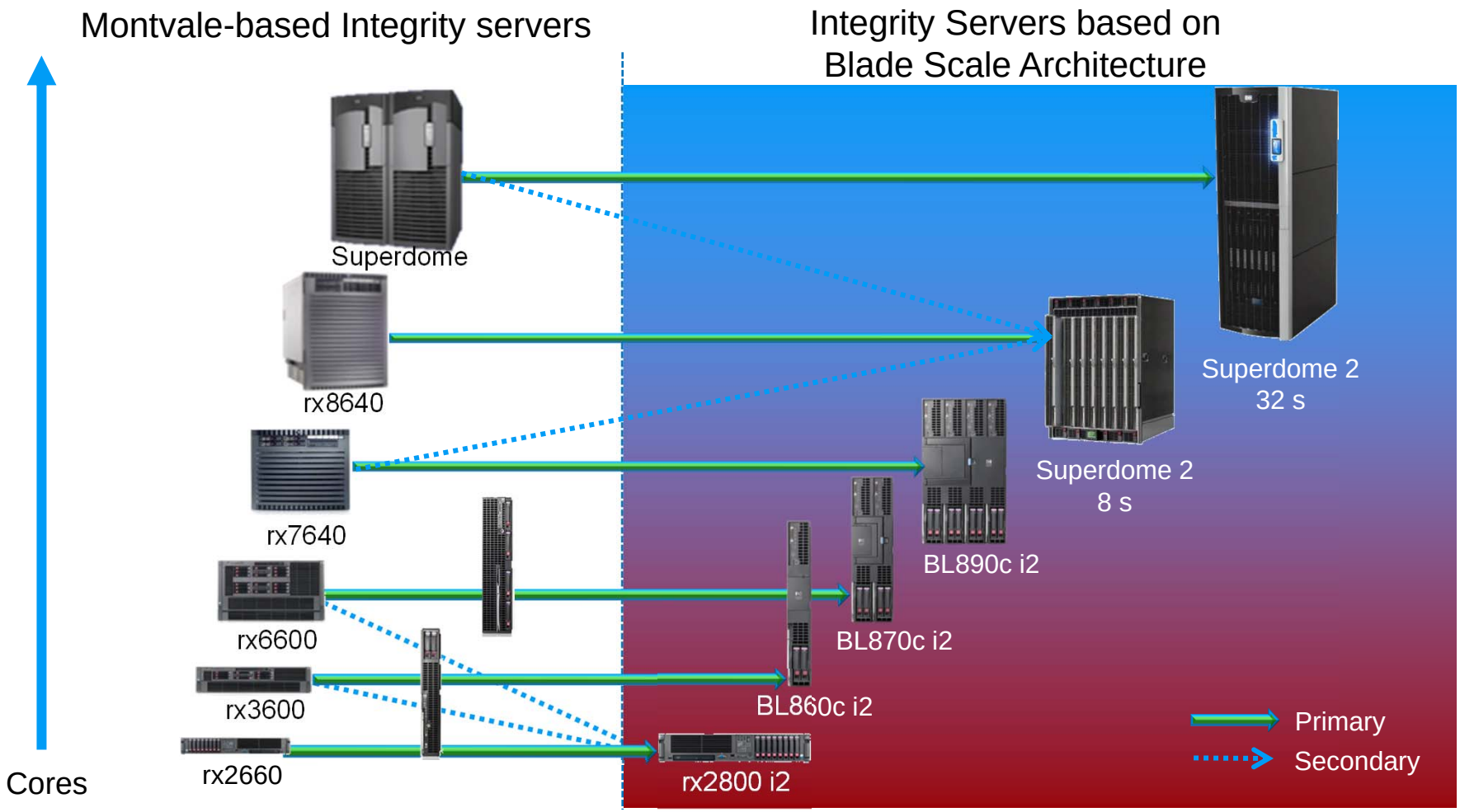
Increasing SLAs with decreasing budgets

Islands of legacy apps and monolithic systems

HP Next Generation Integrity Servers



Positioning the New vs. Current Servers

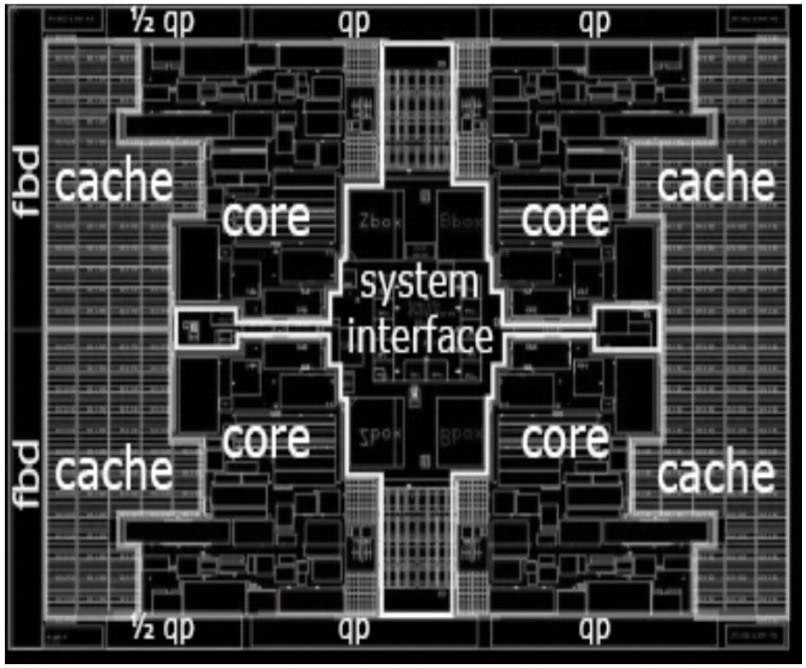


>2x performance per socket and much better price/performance

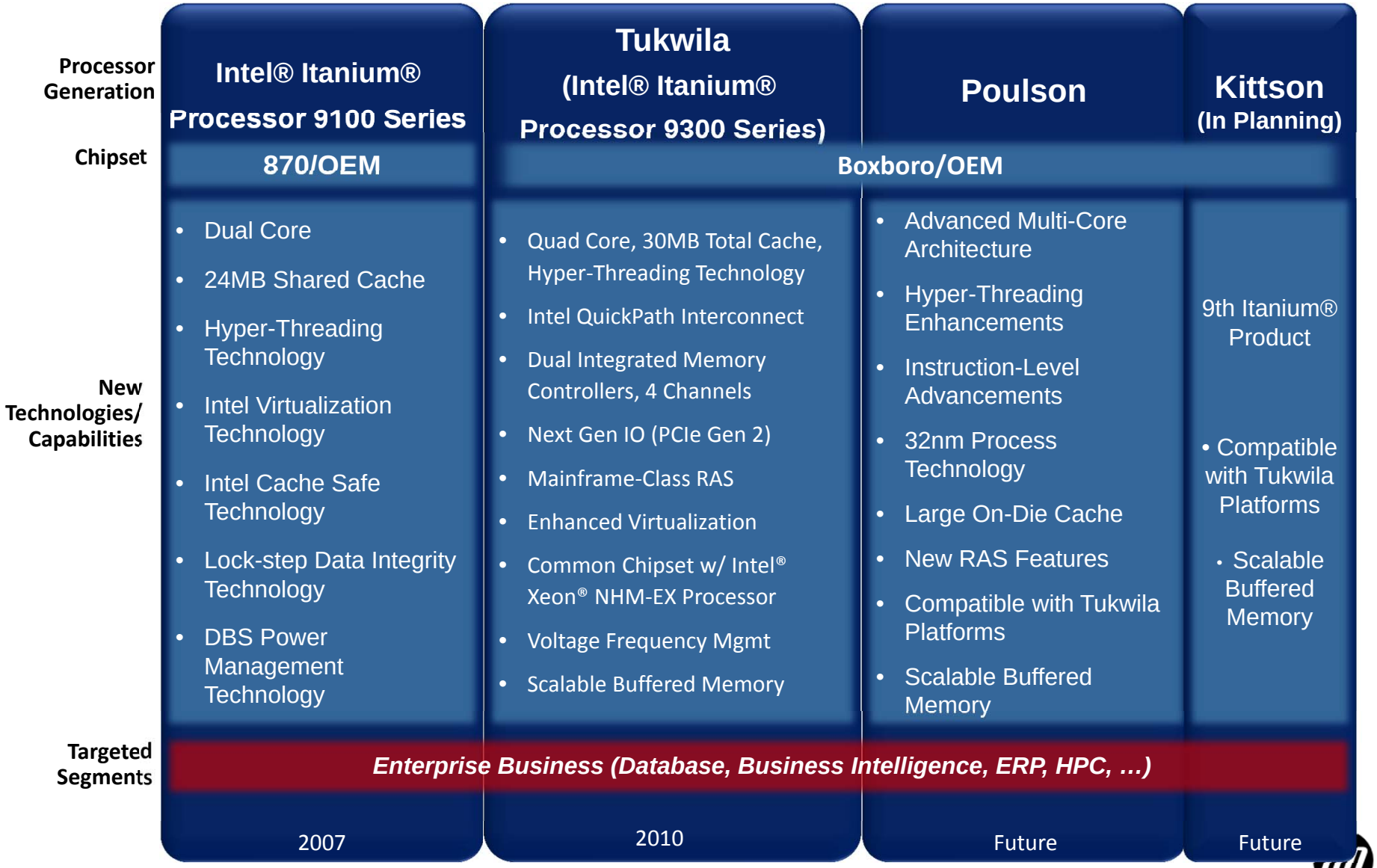
Intel ® Itanium® Processor 9300 Series (Tukwila)

World's First 2 Billion Transistor Processor Is Here

- Four CPU cores with enhanced multi-threading (8 threads per processor)
- >2x performance per socket vs. dual-core Itanium® Processor 9100 series
- 30MB on-die cache
- Intel® QuickPath Interconnect point-to-point bidirectional links for CPU-CPU and CPU-IO communication
- Dual integrated memory controllers with Scalable Memory Interconnect
- Advanced RAS (hardened latches, enhanced error detection/correction and error handling capabilities)
- Energy management features (enhanced demand-based switching, Intel ® Turbo Boost Technology)



Intel ® Itanium ® Platform Roadmap



Common Modular Building Blocks

Simplicity through standardization

Common management

Matrix operating environment delivered by Insight Dynamics

Onboard Administrator, iLO3

Common Networking and Storage

Virtual Connect for LAN and SAN

Storage Blades HP Storage Works

Common enclosure

c7000

Superdome 2

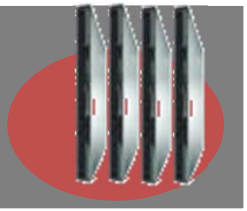
Common spares

Common server architecture

ProLiant blades

Integrity blades

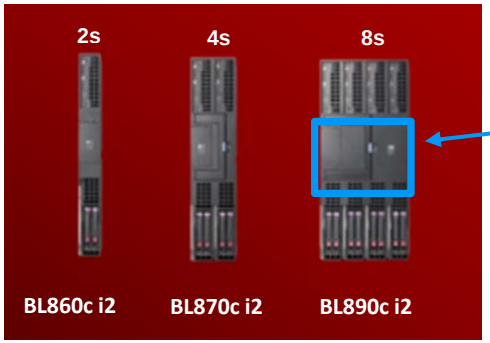
Cell blades



Unified Blade Architecture from x86 to Superdome

Introducing BL8x0c i2 Server Blades

World's first scale-up blades built on the industry's #1 blade infrastructure



– Up to 8 socket/32 cores Intel® Itanium® processor 9300 series
– Up to 384GB DIMMs
– Up to 16 x 10 GbE (Flex-10) NICs

Common architecture from x86 to Superdome

– Mix and match new and existing Integrity, ProLiant and StorageWorks storage blades within the same enclosure
– 2.5x compute density compared to traditional rack mount servers

Blade link

– Scale up, out and within; scale more and scale linear
– Combine multiple blades to create 2-, 4- and 8-socket systems

HP Virtual Connect Flex-10

– Network scalability and configuration flexibility
– Up to 20x increase in networking bandwidth
– Virtually connect LAN, SAN, facilities, etc.

Flexible mission-critical server blades combined with the efficiency of HP BladeSystem to accelerate IT effectiveness

Introducing New Integrity Server Blades

BL860c i2, BL870c i2 and BL890c i2



	BL860c i2	BL870c i2	BL890c i2
Processor	Intel® Itanium® processor 9300 series (quad-core)		
Processors/Cores	Up to 2 Processors/8 cores	Up to 4 Processors/16 cores	Up to 8 Processors/32 cores
Chipset	Intel Boxboro Chipset (I/O Hub)		
Memory Industry Std. DDR3 technology	24 DIMM Sockets 96GB max (with 4GB DIMMs)	48 DIMM Sockets 192GB max (with 4GB DIMMs)	96 DIMM Sockets 384GB max (with 4GB DIMMs)
Internal Storage	2 Hot-Plug SFF SAS HDDs HW RAID 0/1 controller (standard)	4 Hot-Plug SFF SAS HDDs HW RAID 0/1 controller (standard)	8 Hot-Plug SFF SAS HDDs HW RAID 0/1 controller (standard)
Networking (integrated)	4 x 10 GbE (Flex-10) NICs	8 x 10 GbE (Flex-10) NICs	16 x 10 GbE (Flex-10) NICs
Mezzanine Slots	3 PCIe slots	6 PCIe slots	12 PCIe slots
Management	Integrity Integrated-Lights Out 3 (iLO 3) Advanced Pack (standard)		
Density	8 server blades in c7000 4 server blades in c3000	4 server blades in c7000 2 server blades in c3000	2 server blades in c7000 1 server blade in c3000
Warranty	3 Year (Next Business Day, 9x5)		

Unique HP Integrity Blade Link Technology

Simplified scalability with industry's first 2, 4, 8-socket HP-UX server blades

Combines multiple blades into a single, scalable system

CPU: 2s/8c X 2 = 4s/16c X 2 = 8s/32c

Scale Up, out and within

Scale More

Scale Simply

8-socket system at 2x the performance in half the footprint

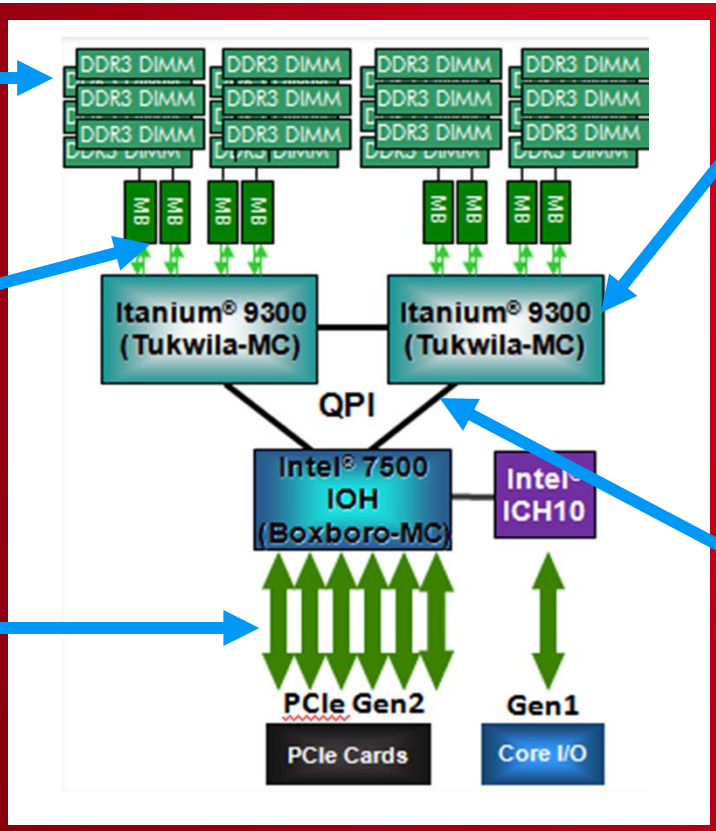
Closer look at Integrity Server Resiliency

Always-on Platform Design

Memory RAS
- Double-Chip Sparing
- Pro-active memory scrubbing
- Addr/Ctrl Parity checking

SMI RAS
- Retry on CRC error
- Lane failover

IO RAS
- PCIe Advanced Error Reporting
- PCIe LCRC



Processor RAS
- ECC, parity protection
- Soft Error hardened latches
- Cache Safe technology for L2I, L2D, Directory, L3
- Recoverable MCA
- Correctable Machine Check Interrupt (CMCI)

QPI RAS
- Link recovery on CRC error
- Self-healing by mapping out bad data/clock lanes
- Poison forwarding

Double-chip sparing
Provides **17x** better reliability than Single-Chip Sparing

Itanium processor
Provides **2x** better reliability than industry volume CPUs

Introducing Superdome 2

The ultimate mission-critical consolidation platform

- Up to eight 2s cell blades (16s/enclosure)
- 32 DIMM sockets (2TB with 8GB DIMMS)
- Up to 24 mezz. & 96 stand up I/O slots
- 18U in standard HP Rack
  - 64s capable with 4 base enclosures
  - Programmable active door display

Common architecture from x86 to Superdome

- Common spares: power supplies, fans & I/O
- Modular, front-back serviceable racks
- Common management for entire infrastructure
- Zero-to-managed in minutes

Superdome 2 Crossbar Fabric for extreme scalability and reliability

- Independent I/O scaling to meet any workload
- Only Unix system with end-to-end multi-pathing
- Boosts infrastructure reliability by up to 450%

Power-on-once technology

- Superdome 2 analysis engine: proactive error detection and prescriptive recommendations
- End-to-end transaction retry: transactions tracked, retried and rerouted to completion
- Online optimization and repair: tool-free serviceability + single-click firmware upgrades

Extreme scalability, on-demand modularity, unquestioned reliability

Superdome 2 Cell Blades

Value and Key Features

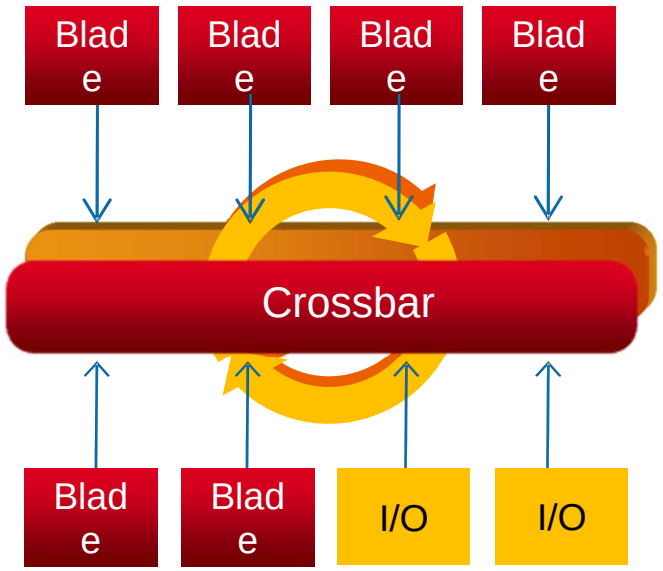
Processor/ Chipset	1-2 Quad-Core Intel® Itanium® Tukwila processors HP sx3000 chipset 2-256 core SMP capable
Memory	– Industry standard DDR3 technology – 32 DIMM Sockets – 256GB max (with 8GB DIMMs)
Form Factor	~23.0“H x 2.0“W x 19.6“D
Networking	Four integrated 10GE NICs
I/O	Three embedded PCI-E (x8) Mezz. Slots
Management	Management Processor with iLO3 (Integrated Lights Out functionality)

Key Points:

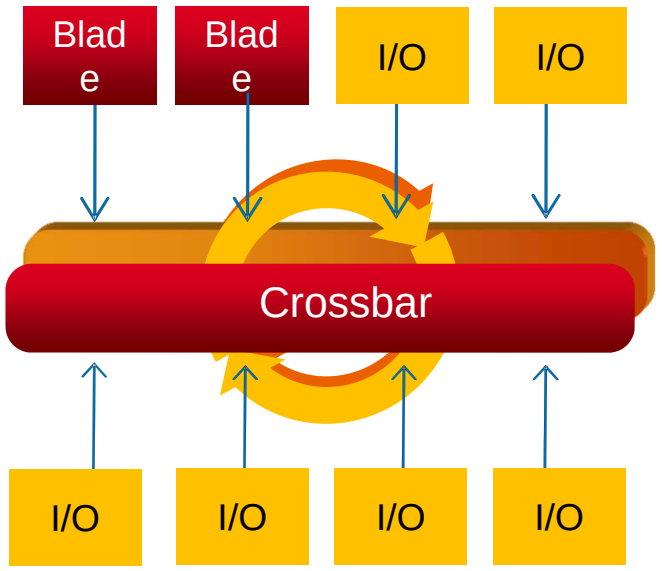
- Fault-tolerant Fabric for breakthrough levels of reliability and availability
- Modular, cell-blade design for simplified management and ease of scalability
- HP sx3000 chipset

Superdome 2 Crossbar Fabric

Fault tolerant reliability + flexible and cost effective scaling



Compute Intensive



I/O Intensive

- Only Unix server to scale I/O independently from CPU
- Only Unix server with end-to-end redundant data paths

Superdome 2

Value and Key Features

Cell Blades/ Processors	Up to Eight 2S Superdome Cell Blades per enclosure 2-64 socket capable (1-4 enclosures)
Memory	2TB memory capacity (per enclosure, 8GB DIMMS)
Form Factor	18U in standard HP rack
Networking	32 integrated 10Gigabit Ethernet NICs 8 switch bays 1GE Manageability LAN
I/O Slots	24 Mezzanine slots Up to 96 stand-up I/O slots with IO expansion
Management	Onboard Administrator: HP Insight display
Partitioning	8 nPars (up to 32 with 4 enclosures) vPars (16 per nPar), HPvm

Key Points

- Mission-critical value, with breakthrough levels of reliability and availability
- Dynamic scalability + virtualization of widest range of IT resources
- “Power-on-Once” robustness
- Simplified, common management environment
- Efficient and green, from chip to chiller
- Modular, infrastructure building blocks

Superdome 2

Adaptive Cell Infrastructure

4 max
IOX

8S
8 Blades
(18U+4U,19” rack)

Tukwila	
16	Sockets
64	Cores
128	Threads
4 TB	Memory
32 LOM NICs 10 GbE	
24 Mezzanine PCI-E	
96 IOX	PCI-E

8 max
IOX (4U)

16S
8 Blades
(18U+4U,19” rack)

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16	Sockets
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4 TB	Memory
32 LOM NICs 10 GbE	
24 Mezzanine PCI-E	
96 IOX	PCI-E

8 max
IOX (4U)

32S
Cabled (2xB16)
16 Blades
(36U, 19” racks)

Tukwila	
32	Sockets
128	Cores
256	Threads
8 TB	Memory
64 LOM NICs 10 GbE	
48 Mezzanine PCI-E	
96 IOX	PCI-E

8 max
IOX (4U)

64S
Cabled (4xB16)
32 Blades
(36U, dual 19” racks)

Tukwila	
64	Sockets
256	Cores
512	Threads
16 TB	Memory
128 LOM NICs 10 GbE	
96 Mezzanine PCI-E	
96 IOX	PCI-E

Introducing rx2800 i2

Superdome-inspired 2U rackmount platform

- Up to 2 socket/8 cores Intel® Itanium® processor 9300 series
- Up to 192GB DIMMs
- 6 I/O slots, 4 integrated 1GbE LAN and 8 internal HDDs

Do more for less

- Expanded memory, I/O, and disk capacity in 2U footprint
- Compared to rx2600, double the capacity in the same footprint

Leverage existing infrastructure

- Easily deploys into racked environments with familiarity in design and skills

Ideal for smaller or more remote deployments

- Branch office applications
- State and local governments
- Educational institutions

8-core scalability in 3x less compute density without sacrificing RAS

rx2800 i2 – 2p Rackmount

Value and Key Features

rx2800 i2	
Processor	Up to two Dual-Core or Quad-Core Intel® Itanium® (Tukwila) processors
Memory	Industry standard DDR3 technology 24 PC3-8500 DIMM sockets 192GB max (with 8GB DIMMs)
Internal Storage	8 Hot-Plug SFF Serial Attached SCSI HDDs 1 CD+RW or DVD+RW
Networking	Dual Integrated Gigabit Ethernet ports Manageability LAN
I/O Slots	6 PCI-E slots
Management	Management Processor with iLO3 (Integrated Lights Out functionality)
Form Factor	2U Rack Mount Server (office tower conversion kit available)

Key Points:

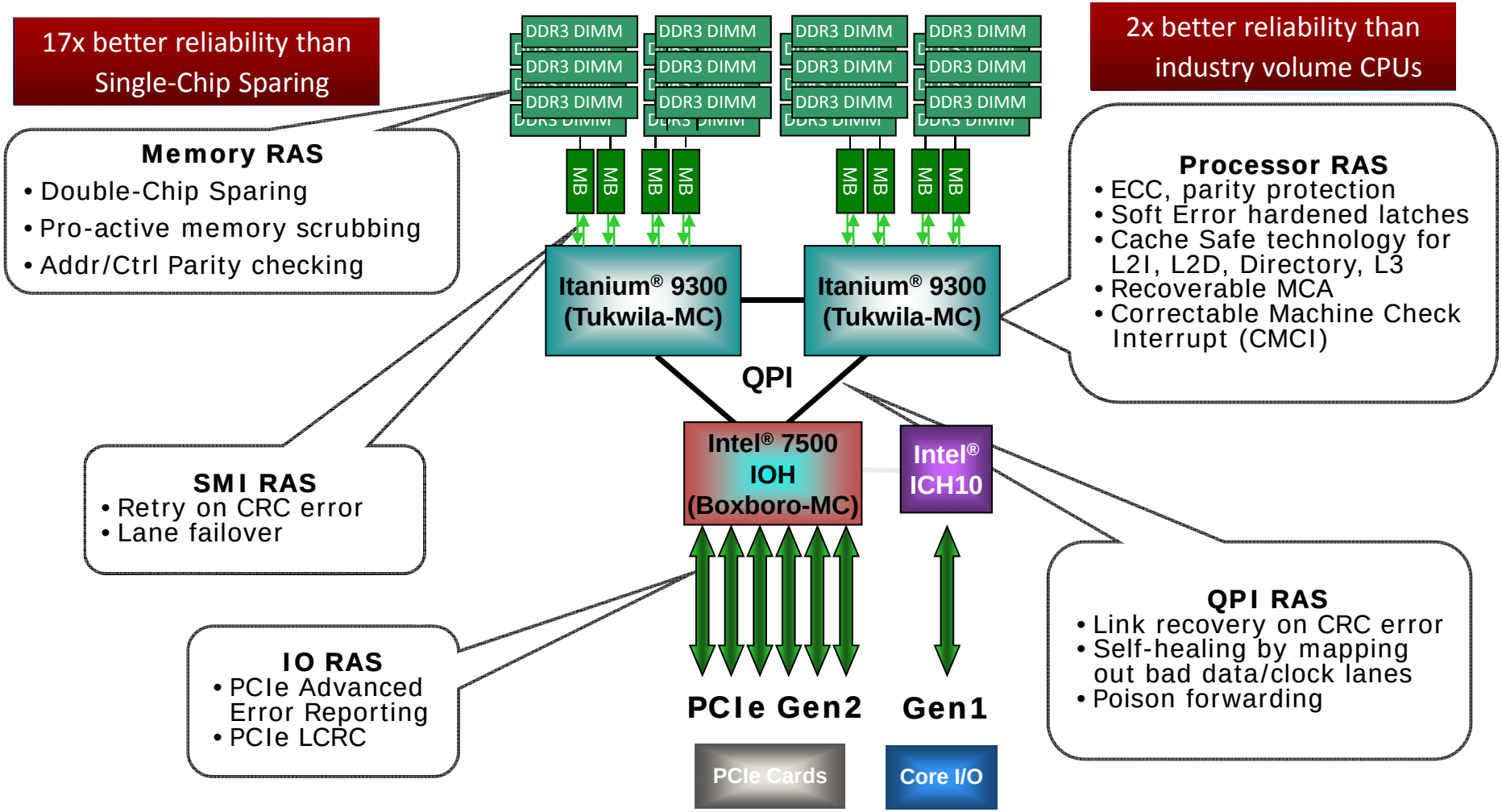
- Affordable, 8-core scalable entry-level non-x86 server
- High Density Compute Server (2U footprint)
- Excellent memory capacity
- Continued innovations in RAS
- Ease to deploy into today's racked environments

rx2800 i2 Platform RAS

Always-On Resiliency

17x better reliability than Single-Chip Sparing

2x better reliability than industry volume CPUs



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- Double-Chip Sparing
- Pro-active memory scrubbing
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IO RAS
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- PCIe LCRC

QPI RAS
- Link recovery on CRC error
- Self-healing by mapping out bad data/clock lanes
- Poison forwarding

The HP ProLiant DL980 G7

HP PREMA Architecture to scale up with confidence

PREMA Architecture

Self-healing Resiliency

- 200% boost in server availability
- Redundant system fabric to maximize uptime

Balanced Scaling

- World record performance enabled by HP Smart CPU caching
- Up to 8 Intel® Xeon® 7500 series processors
- Up to 8 cores and 24MB L3 cache per processor
- Up to 128 DDR3 DIMM slots; 2.0TB max memory!
- Up to 16 slots, PCI-E 2.0 or PCI-X
- Quad-Port 1GbE embedded NIC upgradable to Dual Port 10GbE

Breakthrough Efficiency

- Consolidate up to 197 legacy servers on to a single system
- HP-only innovations like Thermal Logic, Sea of Sensors, and Dynamic Power Capping for ROI that competitors can't touch
- iLO3 & Insight Control for tomorrow's datacenter capabilities today

The HP ProLiant DL980 G7

How the platform delivers performance & availability

Scale-up Performance

- 128 logical CPUs
  - 8 x 8 x 2 (Hyper Threading)
  - 24MB shared L3 cache
- Up to 2 TB DDR3 RAM
  - At 1066 GHz
- Expandable PCIe v2 capacity
- Improved scalability
  - QPI and HP developed Node Controller
  - QPI Perf: 25.6 GB/s per link pair
- Error recovery thresholds

Scale-up Availability

- Spare wires for signal & data paths
- Spare wire failover for clock
- Self-healing data paths
- Memory Mirroring
- Memory Sparing
- Memory scrubbing
  - Demand scrubbing
  - Patrol scrubbing*
- Poison data discovery and containment
- Machine Check Architecture
  - Containment & Recovery
- PCI AER Recovery*

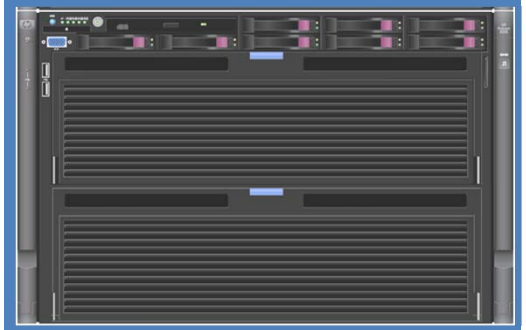
Scale-up Behavior

- Retry during transient errors
- CRC & ECC protection for links
- Error logging (fast problem resolution)
  - MCAs
  - CRC errors
  - ECC errors
  - Parity errors
  - PCI AERs
  - Thresholds reached
- Configurable error recovery thresholds

* = Post release capability

HP ProLiant DL980 G7

Overview



ProLiant DL980 G7	
Processor	• 4p or 8p, up to 8-core Nehalem EX processors • Drop-in upgrade to Westmere EX
Memory	• 128 DDR3 DIMM slots • 2TB max memory (w/ 16GB DIMMs)
Internal Storage	• 8 SFF SAS drive bays • Embedded RAID support • 1 DVD removable drive bay
Networking	• Four embedded Gbit NICs

I/O	• 5 - pci-e Gen 2 I/O slots standard, (2 - x8 & 3 - x4)
	• Optional I/O expander for up to 11 additional slots
	  ◦ One full length option with 6 slots
	  ◦ One low profile option with 5 slots

Management	• iLO 3
Form Factor	• 8U Rack Mount Server
OS	• Windows, Linux, Sun Solaris
Virtualization	• VMWare ESX, Microsoft HyperV, Linux Virtualization, Oracle VM

Integrity Integrated Lights-Out 3 (iLO 3)

Embedded remote management built into every system

Basic Features:

- "Always on" remote access to server health, status, and event log
- Command line and web GUI interfaces
- Private management LAN interface with Secure Shell (SSH)
- Virtual serial port console
- Virtual power on/off/reset control

Advanced Features (no license key required, factory enabled in all Integrity systems)

- Virtual Media CD/DVD-ROM
- iLO Power Regulation (OS controlled)
- Integration with Insight power management
- LDAP authentication services

Scalable Integrity iLO 3 architecture grows with your system

An iLO 3 physically on every Integrity server blade, automatically grows with multi-bladed modular servers

Everything you need is built-in

iLO 3 Advanced Pack license is built into every Integrity server, no additional licensing is needed

Everything you need is built-in

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For more information see www.hp.com/go/integrityilo

HP-UX 11i v3

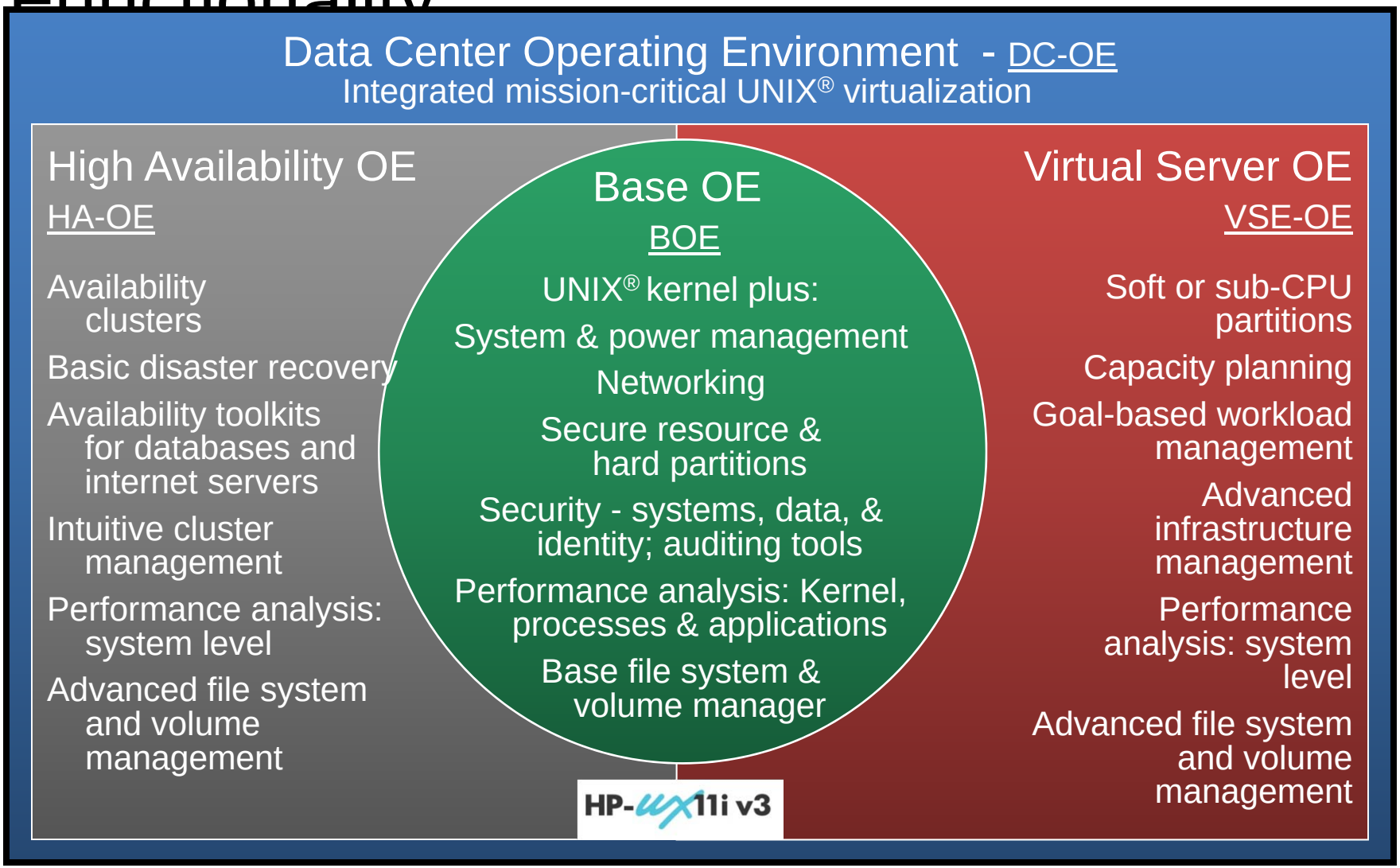
HP-UX 11i v3

Ensure availability | accelerate innovation | simplify operations

Integrated Operating Environments	Complete integrated data center, high availability and virtual server environments
Comprehensive Security	Industry validated UNIX ® security that meets the most stringent of standards
Mission Critical Virtualization	Rich portfolio of virtualization capabilities, Insight Dynamics-VSE and Utility pricing

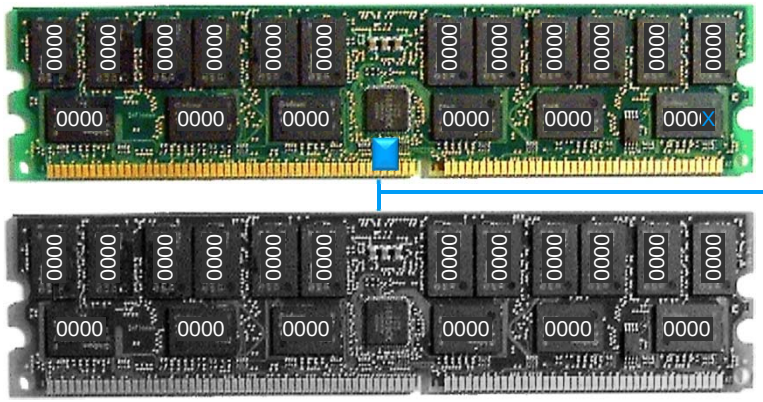
#1 rated by Unix users for availability, performance, and management

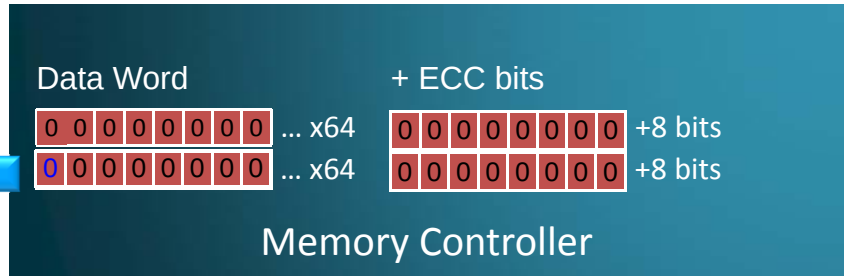
HP-UX 11i v3: High-Level OE Functionality



Outcomes that matter.

Proactive Scrubbing and ECC Explained





128-bit data word + 16-bit ECC is stored

Soft Error (SER) occurs in the word

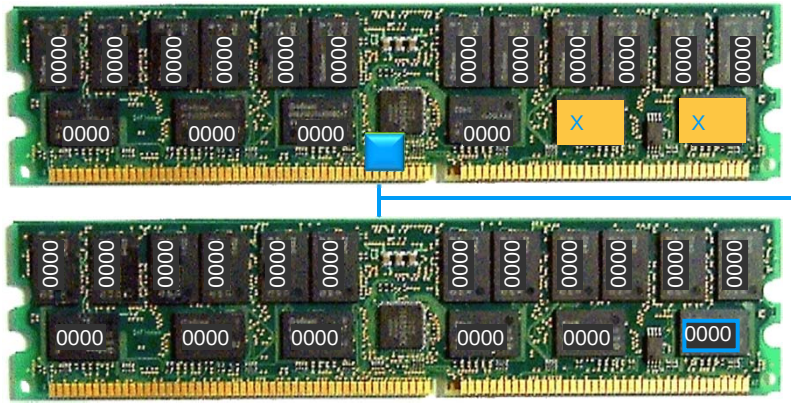
Memory controller walks through memory and finds invalid word

Clever ECC algorithm corrects up to one erroneous bit

Corrected word written back into memory

Scrubbing and basic ECC protect the memory system from all single-bit errors and protect the system from multiple errors accumulating.

Double-Chip Sparing Explained



Data Word

0 0 0 0 0 0 0 0 ... x64

0 0 0 0 0 0 0 0 ... x64

+ ECC bits

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

Memory Controller

128-bit data words + 16-bit ECC stored so

Entire chip fails, memory controller reads it

Memory controller ECC corrects it on read

Writes the failed chip contents to spare bits

Another chip in the rank fails, not necessarily on the same DIMM, and the memory controller reads it

Memory controller ECC corrects it on read

Double-chip sparing provides 1/17th the repair rate, and 1/3rd less memory downtime compared to single-chip sparing.