HP Integrity Server

The Next Generation of Montecito Based Systems

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Agenda

• HPs Server Strategie
• Montecito Architecture
• zx2 und sx2000 Chipsets
• HP Integrity Serverfamilie
Adaptive Enterprise

New Model of Computing:

**Silos**
- Quick to build
- Solid and predictable
- Continuous and secure operations
- Resources are bound

**Efficient & Effective**
- Run IT like a business
- Increase utilization and service
- Principles:
  - Simplify
  - Standardize
  - Modularize
  - Integrate

**Adaptive Enterprise**
- Supply aligned with demand
- Processes span the enterprise and beyond
- Resources flow transparently to where they are needed
- Operations, dynamic, automated with high return

Silos of technology: inflexible to change, over provisioned
Adaptive computing: shared, optimized, heterogeneous
Most reports put average utilization at approx 30%
HP Integrity Systems: build value on top of standards based processor

Intel investment in Itanium
HP to invest above the chip

Itanium® Momentum

"Global 100" Deployments

- 76 of the world’s 100 largest companies committed to IPF

Price / Performance Leadership

Lower is better

Platforms based on Itanium®

Source: Itanium Solutions Alliance


www.hp-user-society.de
Linux and HP Integrity Server

- Customers have spent $1.4B on Intel Itanium based servers running Linux and are forecast to spend another $4B by the end of 2010

- Intel Itanium is the leading processor for scaling up with Linux based on customer spend in the mid-range and high-end server categories

- 100% of all Oracle Database 10g on Linux TPC-C results are on Intel Itanium 2-based servers, and that HP Integrity servers hold:
  - #1 4-processor Linux TPC-C result for Oracle Database 10g [1]
  - #1 price/performance Linux TPC-C result for Oracle Database [2]
  - The only Oracle RAC on Linux TPC-C result [3]

- Gartner ranks HP Integrity the #1 Linux server for Oracle DBMS amongst Intel and AMD-based servers

TPC-C is a trademark of the Transaction Performance Processing Council. Results are per www.tpc.org as at 01/9/07:


[3] 16-node HP Integrity rx6670 cluster: 1,184,893 tpmC, $5.52/tpmC, availability 04/30/04.
Dual Core Intel Itanium 2 Processors
The leadership architecture for the Enterprise

• “Dual core Intel Itanium 2 processor” or Montecito
  - Fifth-generation Itanium processor with 1.72 billion transistors and fabricated in Intel’s 90-nm technology
  - Several new features to improve performance, reliability, & availability
    - Intel Cache Safe Technology enhances the (larger) cache reliability, formerly known as Pellston
    - Hyper Threading Technology increases the number of threads per processor to 4
    - Virtualization Technology with OS support reduces the overhead of virtualizing applications & workloads
  - Up to 2.5x times server performance with dual core Montecito vs. Mad9M in the same server

• Available in six SKUs (frequency/cache)
  - Performance 1.6 GHz/24MB
  - Price/Performance 1.6 GHz/18MB
  - Price 1.4 GHz/12 MB

Montecito overview

- Technology
  - 1.6 GHz core speed
  - 104 W
  - 90 nm
- Cache (26.5MB total)
  - Maximum 12 MB L3 cache per core (24MB total, non-shared)
  - Maximum L3 associativity of 12
  - Minimum L3 access time of 14 cycles
  - The L2 cache has been split into separate L2I (1MB) and L2D (256KB) caches per core
  - 16 KB L1I, 16KB L1D per core
- RAS + Manageability features
  - Additional ECC and parity for structures
  - ECC add in L2, and parity added to L1I TLB
  - First die with over 1 billion transistors (1.72B total)
### Intel® Itanium® Processor Family Roadmap

#### Optimized for **Enterprise**
- **Itanium® 2** Processor (Madison 9M)
  - 1.6 GHz, 9M, faster FSB
- **Montecito**
  - Dual core, 2MB, HT Technology
- **Montvale**
  - Dual core, HT Technology
- **Tukwila**
  - Multicore
- **Poulson**
  - Multicore

#### Optimized for **High Performance Computing**
- **Itanium® 2** Processor (Fanwood)
  - 1.6 GHz, 3M, faster FSB
- **Montecito**
  - HPC Optimized
- **Montvale**
  - HPC Optimized
- **Tukwila Dimona**
  - HPC Optimized
- **Future**
  - HPC Optimized

#### Optimized for **Low Power/ High Density**
- **LV Itanium® 2** Processor (LV Fanwood)
  - 1.2 GHz, 3M
- **LV Montecito**
  - Low Voltage
- **LV Montvale**
  - Low Voltage
- **LV Dimona**
  - Low Voltage
- **Future**
  - Low Voltage

#### New Technologies
- Dual core
- Hyper-Threading Technology
- Intel® Virtualization Technology
- Cache reliability (Pellston)
- Enhanced data integrity (Lockstep)

All products, dates, comparisons, and information are preliminary and subject to change without notice.

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**zx2 & sx2000 Chipsets**

www.hp-user-society.de
Server Architekturen

ccNUMA

Crossbar

Cell Board
4 CPU's
64 GB RAM

Cell Board
4 CPU's
64 GB RAM

Cell Board
4 CPU's
64 GB RAM

Cell Board
4 CPU's
64 GB RAM

PCI
I/O Chassis

PCI
I/O Chassis

PCI
I/O Chassis

PCI
I/O Chassis

SMP

16

zx2 chipset & Entry Level systems

zx2 Chipset

- Increased Scalability and Performance
- Higher levels of reliability and availability
- Takes full advantage of dual-core, multi-threading of Itanium 2

Memory

- DDR2
- Double Chip Spare
- 2x transactions/second
- Lower power consumption

I/O

- Choice of PCIX, PCI-Express
- PCI-Express: High-speed, switched architecture

Hard Disk Drives

- Serial Attached SCSI (SAS)
- Small Form Factor (2.5")
- Better performance with ½ the power consumption
- Point to point interface for better HA

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www.hp-user-society.de
Comparison: HP zx1 and zx2 chipsets

<table>
<thead>
<tr>
<th>Feature</th>
<th>zx1</th>
<th>zx2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSB BW – 3 load</td>
<td>6.4 GB/s</td>
<td>10.6 GB/s</td>
</tr>
<tr>
<td>FSB BW – 5 load</td>
<td>6.4 GB/s</td>
<td>8.5 GB/s</td>
</tr>
<tr>
<td>Memory technology</td>
<td>DDR 266</td>
<td>DDR-II 444/533</td>
</tr>
<tr>
<td>Memory BW (total)</td>
<td>Direct Attach: 8.5 GB/s</td>
<td>Direct Attach: 14.2 – 17.0 GB/s</td>
</tr>
<tr>
<td></td>
<td>w/expander: 12.8 GB/s</td>
<td>w/expander: 12.8 – 17.0 GB/s</td>
</tr>
<tr>
<td>Latency (pin to pin)</td>
<td>Direct Attach: 95ns</td>
<td>Direct Attach: 60ns</td>
</tr>
<tr>
<td></td>
<td>w/expander: 115ns</td>
<td>w/expander: 78ns</td>
</tr>
<tr>
<td>Max # DIMMs</td>
<td>16 direct attach</td>
<td>12 direct attach</td>
</tr>
<tr>
<td></td>
<td>64 w/expander</td>
<td>48 w/expander</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>256GB</td>
<td>768GB (capable)</td>
</tr>
<tr>
<td>Memory scrubber</td>
<td>Software</td>
<td>Hardware</td>
</tr>
<tr>
<td>DRAM chip sparing</td>
<td>Single</td>
<td>Double</td>
</tr>
<tr>
<td>IO technology</td>
<td>PCI, PCI-X, AGP 8X</td>
<td>(add) PCI-X 2.0, PCI-Express</td>
</tr>
<tr>
<td>IO bandwidth (total)</td>
<td>4 GB/s</td>
<td>8-10 GB/s</td>
</tr>
<tr>
<td>Read latency</td>
<td>700ns</td>
<td>400ns</td>
</tr>
</tbody>
</table>

zx2 Summary

**Increased Performance**
- 1.3X CPU bus bandwidth increase
- 35% reduction in memory latency
- 2X memory bandwidth increase
- 3X memory capacity
- 2X aggregate I/O bandwidth increase

**Increased Reliability and Availability**
- Double DRAM chip sparing (tolerate failure of 2 DRAMs on a DIMM)
- Defective memory can be isolated to the failing DIMM/DRAM(s)
- Hardware-based proactive memory scrubber
What’s new in sx2000 systems

- **Memory**
  - DDR2 memory technology
  - Increased memory address space
  - Enhanced DRAM ECC

- **I/O**
  - PCI-X Mode 2
  - PCI Express in future release

- **System Interconnect**
  - New link technology for fabric and I/O
  - Upgraded crossbar topology

- **Performance improvements**
  - Increased bandwidths, reduced latencies

- **I/O Write coalescing**

- **Fail-over system clock for high reliability**

sx2000

Maximizes application performance from 4 to 128 processors

- DDRII
- Cell Board
- Itanium® 2 Buses
- CPU Socket*
- CPU Socket*
- CPU Socket*

- Mem Buffer
- 2X Mem Buffer
- 2X Mem Buffer
- 3-4x Fabric BW
- Crossbar *

- 1.33x CPU BW
- 2-3x IO BW
- PCI/PCI-X Buses
- PCI/PCI-X Buses

- Cell Controller

- Plus:
  - Link level retry
  - Reduced SPOFs
  - Reduced Latency (25%)
  - Double DRAM Erasure

Note: Futures listed are not commitments, can change any time
HP Integrity servers: The broadest line of Itanium® 2 based systems

- **HP Integrity rx7640 Server**
  - 16p/32c scalability and hard-partitioning capability for leading consolidation
- **HP Integrity rx8640 Server with Server Expansion Unit 2 (SEU2)**
  - 16p/32c scalability and hard-partitioning capability for consolidation
- **HP Integrity rx6600 Server**
  - 8p/16c flexibility with high-performance, density, and hard-partitioning capabilities
- **HP Integrity rx3600 Server**
  - 4p/8c highly expandable entry-class platform for workload consolidation and virtualization
- **HP Integrity Superdome Server**
  - 4p/8c versatile application and database server
- **HP Integrity rx4640 Server**
  - 2p/4c powerful entry-class workhorse for database & application environments
- **HP Integrity rx2660 Server**
  - 2p/4c flexible server for multi-purpose entry-level computing
- **BL860c BladeSystem c-Class Integrity Server**
  - 2p/4c brings Integrity and HP-UX value to BladeSystem c-Class
Integrity BL860c Server Blade

Processors and Chipset
- 1 or 2 Intel® Montecito processor
- DC 1.6GHz 18MB FS8533
- DC 1.4GHz 12MB FS8400
- SC 1.6GHz 6MB FS8533
- HP zx2 Chipset

I/O Subsystem
- 3 mezzanine expansion I/O slots
- 2 SAS (Serial Attached SCSI) Channels
- 4 each 1 Gigabit Ethernet ports (incl.)
- Mgmt LAN, 100Base-T, USB, VGA, RS232 serial port

Memory
- 1 GB to 48 GB
- PC4200 ECC DDR2
- 128-bit, 267 MHz DDR

Management
- Integrated Lights Out (Integrity iLO 2)
- iLO Advanced Pack firmware standard

Peripherals
- 2 hot-plug SFF SAS HDDs
- External USB DVD or DVD/CD-RW

Form Factor
- 1 Full height c-Class Blade
- 8 BL860c’s in a 10U Enclosure
- 32 BL860c’s in a 42U rack
- Designed for data center and utility closet operation (5–35°C)
- Integrity, ProLiant & Storage Works in one enclosure

High Availability
- Redundant, hot-plug, modular, pooled power & fans for HA and efficiency
- RAID 1 for embedded HDDs
- Optional redundant enclosure manager
- Dual SAS channels
- CPU de-allocation on failure
- Dynamic processor resilience
- Double Chip Sparing
- Trusted Platform Module

Operating Systems
- HP-UX
- Red Hat and SUSE
- Windows Server (2HCY07)
- OpenVMS (2HCY07)

IO Mezzanine Cards
- Dual port QLOGIC 4Gbps FC
  - PCIe 4x speeds
- Single port Mellanox Infiniband 4x DDR 20 Gbps
  - PCIe 8x speeds
- PCIe Pass-Through
  - Enables direct attached storage blade

Core/Embedded IO
- 3 mezzanine expansion I/O slots
  - 1 PCIe x4 slot
  - 2 PCIe x8 slots
- 2 Serial Attached SCSI Channels (LSI 1068)
  - One for each drive
- 4 each 1 Gigabit Ethernet ports (Broadcom 5704)
- USB 2.0 port
- VGA port for Windows console

HDDs
- Small Form Factor SAS (Serial Attached SCSI)
- 36GB/10k, 36GB/15k, 73GB/10k, 73GB/15k, 146GB/10k

Integrity BL860c Shares Common Options Across c-Class Servers

World’s First 20Gbps, 3usec Latency Capable Network interface for Blades

Mezzanine card fits all c-Class server blades

www.hp-user-society.de
Integrity rx2660 Server overview

Management
- Integrated Lights Out (iLO2) standard
- iLO 2 Advanced Pack firmware license option
- System Insight Display

I/O subsystem
- 3 “public” IO slots (2 cage options)
  - 1 @ PCIX-133
  - 2 @ 8x PCI-e; 1 @ PCIX-133
- 2 SAS (Serial Attached SCSI) channels
- 2 x 1 Gigabit ports
- USB, VGA, serial ports

Internal peripherals
- 8 hot-plug SFF SAS HDDs
- DVD-ROM or DVD-RW
- Integrated RAID 1

Processors and chipset
- 1 or 2 Intel Montecito dual-core processors
  - Dual core 1.6GHz/18MB
  - Dual core 1.4GHz/12MB
  - Single core 1.6GHz/6MB
- HP zx2 chipset
- Upgrade to Montvale FY07

Memory
- 1GB to 32GB
- PC4200 ECC chip spare DDR2

Form factor
- 2 EIA units (U) or 3.5” height
- 21 servers per 42U (2m) rack
- Standalone, pedestal option*
- Office-friendly version*

High availability
- Memory double chip spare
- Redundant hot-plug power
- Redundant hot-plug fans
- Dual SAS channels
- Internal SAS RAID option
- CPU de-allocation on failure
- Dynamic processor resilience

Operating environments
- HP-UX 11i v2 and v3**
- Linux Red Hat EL 4 and SuSE 10
- OpenVMS 8.3

* Pedestal and office-friendly version available in Q207
** HP-UX 11i v3 not factory integrated at SR

3-year next day, on-site warranty

Integrity rx2660 Server
Front view

DVD-ROM/RW  VGA  1x USB  8 x 2.5” SAS HDD Hot-Pluggable
System Insight Display
Locater LED (UID)
Power
Integrity rx2660 Server
Office friendly or Pedestal form factor

- Two distinct possibilities for branch office installations or workstation replacements
  - **Office friendly**
    - Pedestal form factor
    - with reduced acoustics
    - (NO fan redundancy)
  - **Pedestal form factor**
    - (not acoustically reduced)
- Both available Q2 calendar year 2007

Memory Block Diagram with Optional All PCI-X I/O Card Cage

- Montecito Processor
- Dynamic Processor Resiliency (DPR)
- ECC Protection on FSB
- 533MT/s FSB
  - 8.5 GB/s²
- 400 MT/s
  - 6.4 GB/s³

- PCI-X 266 (2.1 GB/s)
- 400 MT/s
  - 6.4 GB/s³
- 7.0 GB/s
  - 400ns DMA read

- PCI-X 266 (2.1 GB/s)
- PCI-X 133 (1.1 GB/s)
- (1.1 GB/s) Dedicated slot for
  - Optional RAID Enablement Board
- (0.5 MB/s) 8-port SAS Controller,
  - 2-port 1GB LAN
- (133 MB/s) 3 USB ports – 1 front, 2 rear;
  - RN50 Graphics;
  - 2 serial ports – 1 for core management, 1 other

Note 1: Can be upgraded to Montvale
Note 2: At Montvale, FSB increases to 667 MT/s, 10.4GB/s.
Note 3: With Montvale, increases to 444MT/s, 7.1 GB/s.
HP Integrity rx2660 SPECjAppserver2004 Benchmark

**List price**
- **HP rx2660**
  - Itanium 2 18M 1.6 GHz
  - $18,995
- **Sun Fire T2000**
  - UltraSPARC T1 1.4 GHz
  - $85,725

**Performance**
(SPECjAppServer2004)
- **HP rx2660**
  - 802.6 JOPS
  - $23.7
- **Sun Fire T2000**
  - 801.7 JOPS
  - $107

**Price Performance**
($$/JOPS - lower is better)
- HP the same for way less $'

SPECjAppServer2004:
HP rx2660, 1.6 GHz 18M Itanium2, 2 chips/4cores/2 core per chip, 1 Node, 802.6 JOPS
Sun T2000, 1.4 GHz UST1, 1 chips/8cores/8 core per chip, 1 Nodes 801.7 JOPS.
Results as of 2/14/07 see: www.spec.org (Results pending)

Ref: www.spec.org, as of 2/14/07
SPECjAppServer2004, is a trademark of the Standard Performance Evaluation Corp. (SPEC).
System watts: Sun: http://www.sun.com/servers/coolthreads/t1000/benchmarks.jsp
HP measured powered consumption during benchmark
List price as tested: Ref wo spec.com
HP the same for way less $

Benchmark data: See the slide labeled "Benchmark Details"

rx3600 Overview

**Management**
- Integrated Lights Out (ILO)
- ILO 2 Advanced Pack firmware license option

**I/O subsystem**
- 8 public IO slots:
  - 2 @ PCIX-133
  - 2 @ PCIX-266 (mode2)
  - 4 @ PCI-66
- Upgrade to PCI-E 2H06 (4 PCI-X/4 PCIE Express slots)
- 2 SAS (Serial Attached SCSI) Channels
- 2 x 1 Gigabit ports
- 100Base-T USB, VGA, serial ports

**Processors and chipset**
- 1 or 2 Intel ® Montecito dual-core processors
  - 1.6GHz/18MB*
  - 1.4GHz/12MB
- HP 2x2 Chipset
- Upgrade to Montvale FY07

**Memory**
- 2GB to 96GB**
- PC2100 ECC chip spare DDR2
- 128-bit, 400 MHz DDR2
- 2x12 DIMM card carriers max

**Internal peripherals**
- 8 hot-plug SFF SAS HDDs
- DVD or DVD/CD-RW
- integrated RAID 0/1

**Operating Environments**
- HP-UX
- Linux Red Hat and SuSE
- OpenVMS

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

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*1.6GHz/18MB available in Q406
**48GB until full capacity available in Q406
*** pedestal version available in Q107
rx6600 Overview

Management
- Integrated Lights Out (iLO)
- iLO 2 Advanced Pack firmware license option

I/O subsystem
- 8 public IO slots:
  - 2 @ PCIX-133
  - 2 @ PCIX-266 (mode2)
  - 4 @ PCI-66
- Upgrade to PCIe 2H06 (4 PCI-X/4 PCIX slots)
- 2 SAS (Serial Attached SCSI) Channels
- 2 x 1 Gigabit ports
- 100Base-T USB, VGA, serial ports

Memory
- 2GB to 192GB*
- PC2100 ECC chip spare DDR2
- 128-bit, 533 MHz DDR2
- 2x24 DIMM card carriers max
- Memory double chip spare
- Upgrade to Montvale FY07

Form factor
- 7 EIA units (U) or 12.25” height
- 6 servers per 42U (2m) rack
- Designed for data center and utility closet operation (5–35°C)
- Standalone, pedestal option**

High availability
- Memory double chip spare
- Redundant hot-plug power
- Redundant hot-plug fans
- Hot-plug PCI-X slots
- Dual SAS channels
- Internal SAS RAID option
- CPU de-allocation on failure
- Dynamic processor resilience

Internal peripherals
- 16 hot-plug SFF SAS HDDs
- DVD or DVD/CD-RW
- integrated RAID 0/1

Processors and chipset
- 1 to 4 Intel® Montecito dual-core processors
  - 1.6GHz/24MB
  - 1.6GHz/18MB
  - 1.4GHz/12MB
  - HP zx2 Chipset
- Upgrade to Montvale FY07

Operating Environments
- HP-UX
- Linux Red Hat and SuSE
- OpenVMS

rx6600/Montecito on HP-UX with HP StorageWorks Arrays

World record performance
and best 4c Unix and non-HP x86 price/performance

- World Record 2p/4c performance result at 230,569 tpmC
  - 13% improvement over IBM’s 2p/4c TPC-C result on Power5.
  - 43% improvement over previous generation Itanium 2 servers (rx4640)
  - 15% improvement over previous generation dual core Itanium 2 servers (rx4640)

- Outstanding price:performance of $2.63/tpmC
  - 2/3 the price:perf of 2p/4c Power 5

Data as of 7/31/06. See complete results at www.tpc.org.
HP Integrity 7640 Server
8-socket – High-end functionality in the Midrange

Partitioning
- Upto 2 hard partitions per server (nPARs)
- Support Virtual Partitions (vPARs) & Integrity Virtual Machine

Manageability
- Management Processor for local & remote manageability
- Integration with HP System Insight Manager & HP OpenView

I/O subsystem
- 15 public IO slots:
  - 8 @ PCI-X 266
  - 6 @ PCI-X 133
  - 1 @ PCI-X 66
- Upgrade to PCI-Express 2H06
- 2 SCSI Channels
- 2 x 1 Gb Gigabit ports
- 100Base-T Manageability, Local Console

Internal peripherals
- 4 hot-plug U320 SCSI HDDs
- 2 DVD+RW or DVD/CD-RW
- Double the peripherals with SEU-2

NDA required– subject to change without notice

Processors and chipset
- Up to 8 Intel® Montecito dual-core processors (16 Processor Cores/server)
  - 1.6GHz/18MB
  - 1.4GHz/12MB
  - HP sx2000 Chipset
  - Upgrade to Montvale in 2007

Memory
- 2 GB to 128 GB
  - PC2100 ECC DDR2
  - 2x 128-bit, 533 MT/s DDR2
  - 16 DIMMs/cell board or 32 DIMMs / server

Form factor
- 10 EIA units (U) or 17.5” height
- 4 servers per 42U (2m) rack
- Designed for data center and utility closet operation
- Rack mount kit

High availability
- Double Chip Spare Memory
- Redundant hot-plug power & fans
- Hot-plug PCI-X slots
- Dual SCSI channels with Internal RAID option
- CPU de-allocation on failure
- Dynamic processor resilience
- Redundant cross bar links with link level retry

Operating Environments
- HP-UX
- Windows Server 2003 – DC & EE
- Linux - Red Hat and SuSE
- OVMS
- Virtual Server Environment
  - vPARs
  - Integrity Virtual Machine

HP Integrity rx8640 Server
16-socket – Ideal low-cost platform for consolidation

Partitioning
- Upto 4 hard partitions per server (nPARs)
- Support Virtual Partitions (vPARs) & Integrity Virtual Machine

Manageability
- Management Processor for local & remote manageability
- Integration with HP System Insight Manager & HP OpenView

I/O subsystem
- 16 (32 with SEU-2) IO slots:
  - 8 (16 w/ SEU-2) @ PCI-X 266
  - 6 (12 w/ SEU-2) @ PCI-X 133
  - 2 (4 w/ SEU-2) @ PCI-X 66
- Upgrade to PCI-Express 2H06
- 2 (4 w/ SEU-2) SCSI Channels
- 2 (4 w/ SEU-2) 1 GbE ports
- 100 Base-T Manageability, Local Console

Internal peripherals
- 4 hot-plug U320 SCSI HDDs
- 2 DVD+RW or DVD/CD-RW
- Double the peripherals with SEU-2

NDA required– subject to change without notice

Processors and chipset
- Up to 16 Intel® Montecito dual-core processors (32 Processor Cores/server)
  - 1.6GHz/24MB
  - 1.6GHz/18MB
  - 1.4GHz/12MB
  - HP sx2000 Chipset
  - Upgrade to Montvale 2007

Memory
- 2 GB to 256 GB
  - PC2100 ECC DDR2
  - 2x 128-bit, 533 MT/s DDR2
  - 16 DIMMs/cell board or 64 DIMMs / server

Form factor
- 17 EIA units (U) or 29.7” height
- 2 servers per 42U (2m) rack
- Designed for data center and utility closet operation
- Rack mount

High availability
- Double Chip Spare Memory
- Redundant hot-plug power & fans
- Hot-plug PCI-X slots
- Dual SCSI channels with Internal RAID option
- CPU de-allocation on failure
- Dynamic processor resilience
- Redundant cross bar links with link level retry

Operating Environments
- HP-UX
- Windows Server 2003 – DC & EE
- Linux - Red Hat and SuSE
- OVMS
- Virtual Server Environment
  - vPARs
  - Integrity Virtual Machine
HP Integrity Superdome

- 2 and 4 processor cell boards can be mixed within the system
- 512 MB, 1 GB, 2 GB and 4 GB DIMMs can be mixed within the system
- Operating systems:
  - HP-UX 11i version 2
  - Windows Server 2003
  - Linux and OpenVMS are supported on sx2000 with dual-core Itanium 2 processors “Montecito”
Superdome with Intel® Itanium® 2 architecture: hardware configurations

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<tr>
<th></th>
<th>Integrity Superdomes</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>16 processor</td>
</tr>
<tr>
<td># of 2-way or 4-way cell boards</td>
<td>1–4</td>
</tr>
<tr>
<td>Dual-core Intel Itanium 2 1.6 GHz processors</td>
<td>2p/4c–16p/32c</td>
</tr>
<tr>
<td>Intel Itanium 2 1.6 GHz processors</td>
<td>2–16</td>
</tr>
<tr>
<td>Memory (with 512 MB, 1 GB, or 2 GB DIMMs)</td>
<td>8–256 GB</td>
</tr>
<tr>
<td>nPartitions (nPars)</td>
<td>4</td>
</tr>
</tbody>
</table>

* Limit depends on Operating System support

Superdome with Intel® Itanium® 2 architecture

- **Performance**
  - Crossbar throughput per cell: 27.3 GB/s
  - I/O bandwidth: 32 GB/s per system
  - Memory bandwidth: 256 GB/s (16 GB/s per cell)
  - Max latency: 395 ns

- **Hardware reliability**
  - ECC on all CPU and memory paths
  - Parity-protected I/O data paths
  - Full SDRAM correction (chipkill)
  - Double chip spare
  - Online power and fan replacement
  - N+1 power and fan
  - Dual power sources
HP Integrity Superdome with HP-UX Delivers #1 2-tier SAP® SD Standard Application Benchmark running mySAP™ ERP 2005!

World record two-tier SAP SD performance running mySAP™ ERP 2005

- 152,530 SAPS and 30,000 SAP® Sales and Distribution (SD) Standard Application Benchmark User with mySAP ERP 2005
- Beats all other results on competitive high-end systems
  - #1 2-tier SAP SD result across all operating systems and database environments
  - 3X better than Sun’s 72p result
  - 30% better than IBM’s 64p result

Data as of 12/18/06. See complete results at www.sap.com.

Why choose HP Integrity servers

- Industry-leading price/performance
- Virtualization tools (VSE)
- Reliability, Availability & Serviceability
- Manageability Tools
- Multiple Operating Environments
- Wide range of applications available
- Options for Pricing
- Investment Protection

www.hp-user-society.de