POWER7 and IBM i 7.1 Deep Dive
Agenda....

POWER7 Processor

POWER7 Servers
- Power 750
- Power 755
- Power 770
- Power 780

I/O Update

IBM i 7.1

Final Q&A
Processor Technology Roadmap

- **2001**
  - Dual Core
  - Chip Multi Processing
  - Distributed Switch
  - Shared L2
  - Dynamic LPARs (32)

- **2004**
  - Dual Core
  - Enhanced Scaling
  - SMT
  - Distributed Switch +
  - Core Parallelism +
  - FP Performance +
  - Memory bandwidth +
  - Virtualization

- **2007**
  - Dual Core
  - High Frequencies
  - Virtualization +
  - Memory Subsystem +
  - Altivec
  - Instruction Retry
  - Dyn Energy Mgmt
  - SMT +
  - Protection Keys

- **2010**
  - Multi Core
  - On-Chip eDRAM
  - Power Optimized Cores
  - Mem Subsystem ++
  - SMT++
  - Reliability +
  - VSM & VSX (Altivec)
  - Protection Keys+

**POWER8**

- **POWER7**
  - 45 nm

- **POWER6**
  - 65 nm

- **POWER5**
  - 130 nm

- **POWER4**
  - 180 nm

**POWER8 Concept Phase**
eDRAM (Embedded Dynamic RAM)
- L3 — 6:1 latency improvement (vs. external) and 2x BW improvements
- 1/3 space, 1/5 standby power of standard SRAM
- Soft error rate 250x lower than SRAM
- Savings of ~ 1.5B transistors over other RAM
POWER7 Processor Chip

Cores: 8 (4 / 6 core options)

567mm² Technology:
- 45nm lithography, Cu, SOI, eDRAM

Transistors: 1.2 B
- Equivalent function of 2.7B
- eDRAM efficiency

Eight processor cores
- 12 execution units per core
- 4 Way SMT per core – up to 4 threads per core
- 32 Threads per chip
- L1: 32 KB I Cache / 32 KB D Cache
- L2: 256 KB per core
- L3: Shared 32MB on chip eDRAM

Dual DDR3 Memory Controllers
- 100 GB/s Memory bandwidth per chip

Scalability up to 32 Sockets
- 360 GB/s SMP bandwidth/chip
- 20,000 coherent operations in flight

Binary Compatibility with POWER6
Memory Channel Bandwidth Evolution

POWER5

Memory Performance: 2x DIMM
DDR2 @ 553 MHz
Effective Bandwidth: 1.1 GB/s

POWER6

Memory Performance: 4x DIMM
DDR2 @ 553 / 667 MHz
Effective Bandwidth: 2.6 GB/sec

POWER7

Memory Performance: 6x DIMM
DDR3 @ 1066 MHz
Effective Bandwidth: 6.4 GB/sec
POWER7
Model 750

8233-E8B
Power 750 System

4U
Depth: 28.8”

IBM Power Systems

Power 750 System

8233-E8B

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER7 Architecture</td>
<td>6 Cores @ 3.3 GHz</td>
</tr>
<tr>
<td></td>
<td>8 Cores @ 3.0, 3.3, 3.55 GHz</td>
</tr>
<tr>
<td></td>
<td>Max: 4 Sockets</td>
</tr>
<tr>
<td>DDR3 Memory</td>
<td>Up to 512 GB</td>
</tr>
<tr>
<td>System Unit SAS SFF Bays</td>
<td>Up to 8 Drives (HDD or SSD)</td>
</tr>
<tr>
<td></td>
<td>73 / 146 / 300GB @ 15k (2.4 TB) (Opt: cache &amp; RAID-5/6)</td>
</tr>
<tr>
<td>System Unit IO Expansion Slots</td>
<td>PCIe x8: 3 Slots (2 shared)</td>
</tr>
<tr>
<td></td>
<td>PCI-X DDR: 2 Slots</td>
</tr>
<tr>
<td>Integrated SAS / SATA</td>
<td>Yes</td>
</tr>
<tr>
<td>System Unit Integrated Ports</td>
<td>3 USB, 2 Serial, 2 HMC</td>
</tr>
<tr>
<td>Integrated Virtual Ethernet</td>
<td>Quad 10/100/1000 Optional: Dual 10 Gb</td>
</tr>
<tr>
<td>System Unit Media Bays</td>
<td>1 Slim-line DVD &amp; 1 Half Height</td>
</tr>
<tr>
<td>IO Drawers w/ PCI slots</td>
<td>PCIe = 4 Max: PCI-X = Max 8</td>
</tr>
<tr>
<td>Cluster</td>
<td>12X SDR / DDR (IB technology)</td>
</tr>
<tr>
<td>Redundant Power and Cooling</td>
<td>Yes (AC or DC Power)</td>
</tr>
<tr>
<td></td>
<td>Single phase 240 VAC or -48 VDC</td>
</tr>
<tr>
<td>Certification (SoD)</td>
<td>NEBS / ETSI for harsh environments</td>
</tr>
<tr>
<td>EnergyScale</td>
<td>Active Thermal Power Management Dynamic Energy Save &amp; Capping</td>
</tr>
</tbody>
</table>
# 750 CPW & rPerf Details

<table>
<thead>
<tr>
<th>6-core</th>
<th>3.3 GHz</th>
<th>#8335</th>
<th>CPW</th>
<th>rPerf</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-core</td>
<td></td>
<td></td>
<td>37200</td>
<td>70.07</td>
</tr>
<tr>
<td>12-core</td>
<td></td>
<td></td>
<td>69200</td>
<td>134.54</td>
</tr>
<tr>
<td>18-core</td>
<td></td>
<td></td>
<td>94900</td>
<td>193.40</td>
</tr>
<tr>
<td>24-core</td>
<td></td>
<td></td>
<td>135300</td>
<td>252.26</td>
</tr>
<tr>
<td>8-core</td>
<td>3.0 GHz</td>
<td>#8334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-core</td>
<td></td>
<td></td>
<td>44600</td>
<td>81.24</td>
</tr>
<tr>
<td>16-core</td>
<td></td>
<td></td>
<td>82600</td>
<td>155.99</td>
</tr>
<tr>
<td>24-core</td>
<td></td>
<td></td>
<td>122500</td>
<td>224.23</td>
</tr>
<tr>
<td>32-core</td>
<td></td>
<td></td>
<td>158300</td>
<td>292.47</td>
</tr>
<tr>
<td>8-core</td>
<td>3.3 GHz</td>
<td>#8332</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-core</td>
<td></td>
<td></td>
<td>47800</td>
<td>86.99</td>
</tr>
<tr>
<td>16-core</td>
<td></td>
<td></td>
<td>88700</td>
<td>167.01</td>
</tr>
<tr>
<td>24-core</td>
<td></td>
<td></td>
<td>129700</td>
<td>140.08</td>
</tr>
<tr>
<td>32-core</td>
<td></td>
<td></td>
<td>168800</td>
<td>313.15</td>
</tr>
<tr>
<td>8-core</td>
<td>3.55 GHz</td>
<td>#8336</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 32-core |         |       | 181000| 331.06| Wow!
Power 750 System Overview

Very similar structure/options to POWER6 550

Up to 4 POWER7 Processor / Memory Cards
750 Processor Card

Processor Cards

- **6-core** 3.3 GHz #8335 – 1 to 4 per server (6 – 24 core)
- **8-core** 3.0 GHz #8334 – 1 to 4 per server (8 – 32 core)
- **8-core** 3.3 GHz #8332 – 1 to 4 per server (8 – 32 core)
- **8-core** 3.55 GHz #8336 – 4 per server (32 core)

All processor cards on the same server must be identical feature code.
19-inch I/O Drawer Configuration Rules

If server limited on number of loops, I/O drawer selection can be impacted

<table>
<thead>
<tr>
<th>POWER7 model</th>
<th>Max loops</th>
</tr>
</thead>
<tbody>
<tr>
<td>750 1 proc card</td>
<td>1</td>
</tr>
<tr>
<td>750 2-4 proc card</td>
<td>2</td>
</tr>
<tr>
<td>770 or 780 1 proc enclosure</td>
<td>2</td>
</tr>
<tr>
<td>770 or 780 4 proc enclosure</td>
<td>8</td>
</tr>
</tbody>
</table>

No mixing PCI-X 12X and PCIe 12X on same loop

12X PCIe
Max 2 per loop
10 slots per drawer

12X PCI-X DDR
Max 4 per loop
6 slots per drawer

Note:
- No RIO/HSL
- No IOPs (IBM i)
## 550/750 Functional Differences

<table>
<thead>
<tr>
<th>Power 550</th>
<th>Power 750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 8 Cores (4 sockets)</td>
<td>Up to 32 Cores (4 sockets)</td>
</tr>
<tr>
<td>Up to 256 GB Memory</td>
<td>Up to 512 GB Memory</td>
</tr>
<tr>
<td>32 DIMM slots</td>
<td>32 DIMM slots</td>
</tr>
<tr>
<td>DDR2 DIMMS</td>
<td>DDR3 DIMMs</td>
</tr>
<tr>
<td>6 3.5 in or 8 SFF SAS disk/SSD</td>
<td>8 SFF SAS disk/SSD</td>
</tr>
<tr>
<td>175MB Write cache RAID card</td>
<td>175MB Write cache RAID card</td>
</tr>
<tr>
<td>Split backplane with PCI SAS adapter</td>
<td>Split backplane with PCI SAS adapter</td>
</tr>
<tr>
<td>3 PCIe &amp; 2 PCI-X slots</td>
<td>3 PCIe &amp; 2 PCI-X slots</td>
</tr>
<tr>
<td>Commercial focus</td>
<td>Commercial &amp; HPC focus</td>
</tr>
<tr>
<td>1 GX+ &amp; 1 GX++ slot</td>
<td>1 GX+ &amp; 1 GX++ slot</td>
</tr>
<tr>
<td>RIO/HSL or 12X</td>
<td>12X</td>
</tr>
<tr>
<td>IVE: Dual Gb</td>
<td>IVE: Quad Gb</td>
</tr>
<tr>
<td>Optional: Quad Gb, or 10 Gb</td>
<td>Optional: Dual 10 Gb</td>
</tr>
<tr>
<td>TPMD</td>
<td>Enhanced TPMD</td>
</tr>
<tr>
<td>Guiding Light</td>
<td>Light Path</td>
</tr>
</tbody>
</table>
Offering for IBM i HA/DR environments

Offering Advantages
- Temporary transfer of unused IBM i processor license entitlement from primary to CBU server
- Temporary transfer of unused IBM i 5250 Enablement from primary to CBU server
- Note: no hardware savings

Prerequisites
- New Power 750 server order
- Primary server must be a Power 780, 770, 750, 570, 560, or 550.
- Must purchase minimum of one IBM i processor license entitlement for new 750 CBU
- If transfer 5250, must have at least one 5250 Enterprise Enablement on 750
- Registration of primary system and CBU is required prior to CBU order being manufactured
POWER7
Model 755
8236-E8C
755 Processor Card

- 8-core 3.3 GHz #8332 – 4 per server (32 core)

Processor activation feature structure
- Chargeable - none
- No-charge #2325

100% activations are no charge
## Power 755 vs. 750

<table>
<thead>
<tr>
<th>Feature</th>
<th>755</th>
<th>750</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>AIX, Linux</td>
<td>AIX, IBM i, Linux</td>
</tr>
<tr>
<td>Processors</td>
<td>32-core @ 3.3 GHz</td>
<td>32-core @ 3.55 GHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 / 12 / 18 / 24-core @ 3.3 GHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 / 16 / 24 / 32-core @ 3.3 GHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 / 16 / 24 / 32-core @ 3.0 GHz</td>
</tr>
<tr>
<td>Memory</td>
<td>128 – 256 GB 4GB &amp; 8GB DIMMS</td>
<td>8 – 512 GB 4GB, 8GB, 16GB DIMMS</td>
</tr>
<tr>
<td>GX slot support</td>
<td>Yes 1 GX++ for IB clustering</td>
<td>Yes, 1 GX+ &amp; 1 GX++ for IB clustering or for I/O drawer expansion</td>
</tr>
<tr>
<td>175 MB cache RAID</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Split backplane</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Integrated Ethernet</td>
<td>Quad GbE or Dual 10GbE</td>
<td>Quad GbE or Dual 10GbE</td>
</tr>
<tr>
<td>Virtualization</td>
<td>No PowerVM support</td>
<td>PowerVM Standard and Enterprise</td>
</tr>
<tr>
<td>DASD / Bays</td>
<td>8 SFF SAS HDD / SDD 10k and 15K SFF drives</td>
<td>8 SFF SAS HDD / SDD 10k and 15K SFF drives</td>
</tr>
<tr>
<td>Internal Tape</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Performance Metric</td>
<td>TFLOPS</td>
<td>rPerf, CPW</td>
</tr>
<tr>
<td>Active Memory Exp</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
POWER7
Model 770
Model 780

9117-MMB

9179-MHB

Power your planet.
## Power 770

### Processor Technology
- 6 Cores @ 3.55 GHz
- 8 Cores @ 3.1 GHz

### L3 Cache
- On Chip

### Redundant Power & Cooling
- Yes

### Redundant Server Processor
- Yes / Two Enclosure minimum

### Redundant Clock
- Yes / Two Enclosure minimum

### Concurrent Add Support
- Yes

### Concurrent Service
- Yes

### System Unit

<table>
<thead>
<tr>
<th>System Unit</th>
<th>Single Enclosure</th>
<th>4 Enclosures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processors</td>
<td>Up to 2 Sockets</td>
<td>8 Sockets</td>
</tr>
<tr>
<td>DDR3 Memory (Buffered)</td>
<td>Up to 512 GB</td>
<td>Up to 2 TB</td>
</tr>
<tr>
<td>SAS/SSD SFF Bays</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>DVD-RAM Media Bays</td>
<td>1 Slim-line</td>
<td>4 Slim-line</td>
</tr>
<tr>
<td>SAS / SATA Controller</td>
<td>2 / 1</td>
<td>8 / 4</td>
</tr>
<tr>
<td>PCIe bays</td>
<td>6 PCIe</td>
<td>24 PCIe</td>
</tr>
<tr>
<td>GX++ Slots (12X DDR)</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Integrated Ethernet</td>
<td>Std: Quad 1Gb Opt: Dual 10Gb + Dual 1 Gb</td>
<td>Std: Four Quad 1Gb Opt: Four x Dual 10Gb + Dual 1 Gb</td>
</tr>
<tr>
<td>USB</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>12X I/O Drawers w/ PCI slots</td>
<td>Max: 4 PCIe, 8 PCI-X</td>
<td>Max: 16 PCIe, 32 PCI-X</td>
</tr>
</tbody>
</table>

**Maint Coverage:** 9 x 5

**Power your planet.**
# 770 and 780 CPW & rPerf Details

<table>
<thead>
<tr>
<th>12-core</th>
<th>3.5 GHz</th>
<th>#4980</th>
<th>CPW</th>
<th>rPerf</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-core</td>
<td></td>
<td></td>
<td>73100</td>
<td>140.75</td>
</tr>
<tr>
<td>24-core</td>
<td></td>
<td></td>
<td>99000</td>
<td>261.19</td>
</tr>
<tr>
<td>36-core</td>
<td></td>
<td></td>
<td>131050</td>
<td>377.28</td>
</tr>
<tr>
<td>48-core</td>
<td></td>
<td></td>
<td>248550</td>
<td>493.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16-core</th>
<th>3.1 GHz</th>
<th>#4981</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16-core</td>
<td></td>
<td>88800</td>
<td>165.30</td>
<td></td>
</tr>
<tr>
<td>32-core</td>
<td></td>
<td>155850</td>
<td>306.74</td>
<td></td>
</tr>
<tr>
<td>48-core</td>
<td></td>
<td>229800</td>
<td>443.06</td>
<td></td>
</tr>
<tr>
<td>64-core</td>
<td></td>
<td>292700</td>
<td>579.39</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8-core</th>
<th>3.86 GHz</th>
<th>#4982</th>
<th>CPW</th>
<th>rPerf</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-core</td>
<td></td>
<td>105200</td>
<td>195.45</td>
<td></td>
</tr>
<tr>
<td>32-core</td>
<td></td>
<td>177400</td>
<td>362.70</td>
<td></td>
</tr>
<tr>
<td>48-core</td>
<td></td>
<td>265200</td>
<td>523.89</td>
<td></td>
</tr>
<tr>
<td>64-core</td>
<td></td>
<td>343050</td>
<td>685.09</td>
<td></td>
</tr>
</tbody>
</table>

780 TurboCore mode values not shown

Wow!!!
Power 770 and Power 780 Processor Options

Power 770 Processor Options  (2 Sockets per enclosure )
- 12-core  3.5 GHz   #4980 – 1 to 4 per server
- 16-core  3.1 GHz   #4981 – 1 to 4 per server

All 770 processor cards on the same server must be identical feature code

Power 780 Processor Options  (2 Sockets per enclosure )
- 16-core  3.86 GHz   #4982 – 1 to 4 per server
- 8-core  4.14 GHz   #4982 – 1 to 4 per server - Turbo Core

The 780 processor cards all IPLed to either 3.86 or to 4.14 GHz
Capacity on Demand Enhancements

More attractive pricing of On/Off CoD and of Utility CoD

- Applicable to Power 770, Power 780 and Power 595
- New On/Off “breakeven” time periods compared to permanent activation
  - Around 360 On/Off days (vs. previous 120 days)
- Utility CoD pricing also much more favorable

More Standard Trial CoD resource available

- This is the no-charge repeatable* 30-day trial,
- Was: up to 2 processors and up to 4GB memory activated
- New: up to 8 processors and up to 64GB memory activated
- For the Power 770, Power 780 and Power 595

For more information, see

- www.ibm.com/systems/power/hardware/cod/

*repeatable assuming at least one processor activation is purchased after a trial.
#1808 GX++ 12X Adapter for Power 770 and 780

- DDR capable adapter – faster than POWER6 570 GX+
- Runs DDR for #5802/5877, SDR for #5796/5714-G30
- Can use 12X to 4X cable to connect to IB switch for clustering

**POWER7 model** | Max loops
---|---
770 or 780 per proc enclosure | 2
770 or 780 with 4 proc enclosures | 8

If server limited on number of loops, I/O drawer selection can be impacted

**Note:**
- No RIO/HSL
- No IOPs (IBM i)
Power 770 CBU for i

Offering for IBM i HA/DR environments

Offering Advantages
- Temporary transfer of unused IBM i processor license entitlement from primary to CBU server
- Temporary transfer of unused IBM i 5250 Enablement from primary to CBU server
- Note: no hardware savings

Prerequisites
- New Power 770 server order or a model upgrade into 770
- Primary server must be a Power 780, 770, 595, 570.
- Must purchase minimum of one IBM i processor license entitlement for new 770 CBU
- If transfer 5250, must have at least one 5250 Enterprise Enablement on 770
- Registration of primary system and CBU is required prior to CBU order being manufactured

Primary = 780, 770, 595, 570

IBM i processor license entitlement
Temporary transfers
5250 Enterprise Enablements

CBU Power 770
#4891 specify
Power 780 CBU for IBM i

Offering for IBM i HA/DR environments

Offering Advantages
• Temporary transfer of unused IBM i processor license entitlement from primary to CBU server
• Temporary transfer of unused IBM i 5250 Enablement from primary to CBU server
• Note: no hardware savings

Prerequisites
• New Power 780 server order or a model upgrade into 780
• Primary server must be a Power 780 or 595
• Must purchase minimum of one IBM i processor license entitlement for new 780 CBU
• If transfer 5250, must have at least one 5250 Enterprise Enablement on 780
• Registration of primary system and CBU is required prior to CBU order being manufactured
## Power 770 & 780 vs. Power 570 Differences

<table>
<thead>
<tr>
<th>Power 570</th>
<th>Power 770 &amp; Power 780</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 8 sockets, Up to 32 Cores</td>
<td>Up to 8 Sockets, Up to 64 cores</td>
</tr>
<tr>
<td>Up to 768 GB Memory</td>
<td>Up to 2 TB Memory (Initially 1TB until Nov 2010)</td>
</tr>
<tr>
<td>DDR2 DIMMS</td>
<td>DDR3 DIMMS</td>
</tr>
<tr>
<td>Six 3.5” SAS Bays / Enclosure</td>
<td>Six SFF SAS Bays / Enclosure</td>
</tr>
<tr>
<td>4 PCIe &amp; 2 PCI-X slots per Enclosure</td>
<td>6 PCIe slots per Enclosure</td>
</tr>
<tr>
<td>No integrated cache or RAID-5/6 support</td>
<td>175MB integrated cache &amp; RAID-5/6 support</td>
</tr>
<tr>
<td>Single integrated DASD/SSD/Media Controller per enclosure</td>
<td>Three integrated DASD/SSD/Media Controllers per enclosure</td>
</tr>
<tr>
<td>Optional Split Backplane</td>
<td>Standard Split backplane</td>
</tr>
<tr>
<td>No Power &amp; Management Thermal</td>
<td>Optional Tri-Split Backplane</td>
</tr>
<tr>
<td>Clock Cold Failover</td>
<td>Clock Hot Failover</td>
</tr>
<tr>
<td>No Concurrent Maintenance of FSP/Clock</td>
<td>Planned Concurrent Maintenance</td>
</tr>
<tr>
<td>Concurrent Drawer Maint restrictions</td>
<td>No Restrictions ( 4Q / 2010 )</td>
</tr>
<tr>
<td>Concurrent Drawer Add cable restrictions</td>
<td>No Restrictions</td>
</tr>
<tr>
<td>One service processor per enclosure</td>
<td>One service processor in 1st &amp; 2nd enclosure, passthrough 3rd &amp; 4th</td>
</tr>
<tr>
<td>No option to attach disk drawer to system unit (no SAS port)</td>
<td>Option to attach #5886 disk drawer to SAS port</td>
</tr>
</tbody>
</table>
Power SODs for Upgrades

Definition “upgrade” as a model change keeping same serial number

Power 595
- SOD issued in 2009 & augmented 2010

Power 570
- SOD issued in 2009
- Upgrades announced Feb 2010, shipping June 2010
- Built on unified structure, 9406-MMA must first convert to 9117-MMA

Power 575 and 560 and 550
- SODs not issued

Power 520
- SOD issued February 2010 with plans to be delivered in 2010
- For Power 520 (8203-E4A) 2-core or 4-core servers
- Insight: POWER5 520 to POWER6 520 upgrades did not have savings in the hardware. Client savings were in easy license transfer (including IBM i), documented upgrade procedures for upgrading, and perhaps easier leasing/depreciation structure continuation

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Statement of Direction

IBM plans to deliver a new high-end server in 2010 with up to 256 POWER7 processor cores, offering unprecedented IBM Power Systems scalability combined with massive bandwidth to enable enterprises to more effectively deploy and consolidate large-scale applications and infrastructure.

The POWER7 high-end server is expected to dramatically improve high-end performance per-watt and performance per-square-foot, as it is designed to operate within the same physical footprint and energy envelope of the current 64-core Power 595 server. Additionally, the POWER7 high-end server is being enabled to support optional high-voltage DC power inputs to further increase its energy efficiency.

As previously stated in July 2009, IBM also plans to provide an upgrade path from the current IBM Power 595 server with 12X I/O to the new POWER7 high-end server. Enterprises with multiple systems leveraging PowerVM Live Partition Mobility may use this function to maintain application availability during the upgrade process.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
**Power Solid State Drive - Reminder**

**Sweet spots**
1. Batch window reduction for disk bound applications
   - You can cut up to 40-50% off window
2. Response time - transaction/data base for disk bound applications
   - Internal drives or perhaps even SAN drives
3. Potentially speed up IPLs – one customer reported 3 min IPLs

**Key points**
-- A modest quantity of SSD can make a big difference
-- Both write-heavy and read-heavy work is fine for SSD – biggest performance boost for random write workload
Power your planet.

POWER7 with IBM i 7.1
IBM i 7.1 Announcement Highlights

**DB2**
- Support for XML and column level encryption

**PowerHA**
- Async Geographic Mirroring & LUN-level switching

**Virtualization**
- IBM i 6.1 virtualization for i 7.1 partitions

**Solid State Drives**
- Automatic movement of hot data to SSDs

**Open Access for RPG**
- Extend application reach to pervasive devices

**Management**
- Systems Director and Navigator enhancements

---

**PO** | **Customer #** | **Date** | **Credit Card** | **Purchase Order**
---|---|---|---|---
123 | 2468 | 5/27/09 | &^$^$^ | XML

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DB2 for i – XML Support

XML is an industry standard for exchanging information between customers, suppliers, and partners

Rich XML Support now available with DB2 for i

1. XML data type stores XML documents supporting database operations
2. Decompose (shred) XML documents into relational columns
3. Generate XML documents from existing relational data

OmniFind Text Search Server provides support for searching XML documents

- Search elements of an XML document (e.g., customer name = Smith)
- SQL statements use OmniFind to search the XML documents
- Available with IBM i for no additional charge

Strategic replacement for XML Extenders Program Product
DB2 for i - Additional Enhancements

Column Level Encryption
- Allows for transparent (no application changes) encryption of a specific column in a database table accessed through SQL or native
- Solutions from tool providers including Patrick Townsend, Linoma Software, and Protegrity supply encryption algorithms

Application Developers
- MERGE, Array support, Global Variables, and consuming result sets in RPG allows for more powerful and efficient programming

Performance
- Adaptive Query Processing can modify query plan while the query is running to significantly improve performance
- Advanced SQE query optimizer now supports native logical files

Management
- New tooling to monitor long running operations
- SQL_CANCEL procedure to cancel long running queries.
- Random or Sequential I/O statistics to identify tables that can benefit from SSDs

On-Demand Performance Center
- Rich tools for DB2 for i
- Including Visual Explain
- Adaptive Query Processing can automatically build an index to replace table scan …taking queries from 30 minutes to 1 minute

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>City</th>
<th>State</th>
<th>Credit Card#</th>
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</tr>
</tbody>
</table>

DB2 is an integrated database supporting transaction processing and business intelligence applications
PowerHA SystemMirror for i

Asynchronous Geographic Mirroring for multi-site DR solution

- IBM i based mirroring for geographically dispersed systems
- Asynchronously mirrors disk writes to target system
- Support for automatic failover
- Supports IASPs on integrated disk, SAN, and virtual disk

LUN level switching for local HA solution

- Switch IASP on DS8000 or DS6000 between local systems
- Support for automatic failover
- Supports native and VIOS with NPIV attached SANs

PowerHA provides a robust, simple to manage High Availability and Disaster Recovery solution
Virtualization Enhancements for IBM i

IBM i 6.1 partition can host
- IBM i 7.1 and 6.1 partitions
- AIX 5.2, 5.3, 6.1 and SLES and Red Hat Linux partitions
- iSCSI attached System x and BladeCenter

IBM i 7.1 partition can host
- IBM i 7.1 and 6.1 partitions
- AIX 5.2, 5.3, 6.1 and SLES and Red Hat Linux partitions
- iSCSI attached System x and BladeCenter

PowerVM VIOS can host
- IBM i 7.1 and 6.1 partitions
- AIX and Linux partitions
- VIOS supports advanced virtualization technologies
  including Active Memory Sharing and NPIV

Storage Virtualization can reduce costs while improving IT infrastructure flexibility
IBM i Storage Management Enhancements for SSD

IBM i supports hierarchical storage management

- Now IBM i automatically collects I/O performance data and moves most active data to Solid State Drives (SSD)

DB2 for i supports SSD as preferred media

- New DB2 Random Read Statistics

Additional enhancements for SSDs

- New “SSD-Aware” utilities
- Improved performance instrumentation
- Usability enhancements

SSD Analyzer Tool

- Designed to help determine if SSDs can help improve application performance
- Runs on IBM i 5.4 or 6.1 system#

SSDs can improve performance of long running batch jobs or queries. IBM i can easily get the right data on the SSDs

Associated Bank Reduces Batch Run Time by 40% with SSDs*

Batch Performance Runs

# Download http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRRS3780
Platform Management Enhancements

Systems Director Navigator for i
- Ability to manage a target IBM i 5.4, 6.1 or 7.1 system
  - Navigator management server runs in one place
  - One browser used to manage multiple environments
  - Extends Navigator management IBM i 5.4
- Support for Tape and Journal management and BRMS

Performance Management Enhancements
- More metrics into Collection Services: DS8000, 12X Bus, Save/Restore, and Tape
- Performance Data Investigator is enhanced to include Disk response time and Java memory perspectives

Systems Director Enhancements
- New functions for managing IBM i
- Management server runs on AIX, Linux, or Windows
- Manages IBM i 6.1 and 7.1 environments

Systems Director provides an integrated platform management solution for IBM i and heterogeneous servers
Web Server Enhancements

IBM HTTP Server for i running Apache
- Latest Apache 2.2 release
- Payment Card Industry (PCI) Compliant

IBM Technology for Java
- Java 5 and 6 support for 32-bit and 64-bit JVMs
- No longer shipping Classic JVM

Integrated Web Application Server
- Part of IBM i
- Supports running Java 5 and 6 applications

Integrated Web Services Server
- Up to 2x performance improvement
- Static WSDL support providing enhanced flexibility
- Now supports programs in iASP

Integrated web technologies easily support new application deployments
WebSphere Support for IBM i 7.1

**WebSphere Application Server**
- WebSphere Application Server Express V6.1 and V7.0
- WebSphere Application Server V6.1 and V7.0
- WebSphere Application Server Network Deployment V6.1 and V7.0

**WebSphere MQ**
- WebSphere MQ V
- WebSphere MQ File Transfer Edition V7

**WebSphere Portal**
- WebSphere Portal 6.1.5

**WebSphere Commerce Server**
- WebSphere Commerce Server 6
- WebSphere Commerce Server 7
  - (SOD for 2010 delivery for IBM i 6.1 and 7,1)

_WebSphere offers rich web application server solutions for IBM i_
Additional Enhancements

IBM Transform Services for i Enhancement
- Delivers Adobe PDF output support to IBM i applications
- New support to transform existing Spool Files to PDF format
- Shipped with IBM i

Encrypted ASP Enhancements
- Added ability to start/stop encryption on an existing iASP
- Encryption key management enhancements

BRMS Enhancements
- Improved functions for managing backups, media, backup history, and recoveries

Support for additional Tape Libraries with NPIV through PowerVM VIOS
- 3577 (TS3400) with (TS1120/TS1130) drives
- 3584 (TS3500) with (TS1120/TS1130) drives
- 3576 (TS3310) with LTO drives
Additional Enhancements

IBM i Access Family Enhancements

IBM i Access for Windows 7.1 offers:
- Enhancements to the .NET, ODBC, and OLE DB providers including support for XML data type
- Enhancements to Data Transfer
- Updated PC5250 Display and Printer Emulation based on IBM Personal Communications 6.0
- Help files converted to html help format
- Enhancements to Install, including install-time support for secondary languages

IBM i Access for Web 7.1 includes:
- Additional option for viewing spooled files as PDF documents

Networking Enhancements

IBM i DHCP server is now based on the ISC (Internet Systems Consortium) DHCP server which contains support for IPv6 and DHCP failover
- IPv6 support for the DHCP Client, PPP (Point-to-point protocol), L2TP (Layer 2 Tunneling Protocol), and RADIUS (Remote Authentication Dial In User Service)
- Support for the IKEv2 (Internet Key Exchange version 2) tunneling protocol in the IBM i VPN support
- Telnet Client support on IBM i is now SSL enabled (also PTF to IBM i 6.1 & 5.4)
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IBM benchmark results can be found in the IBM Power Systems Performance Report at http://www.ibm.com/systems/p/hardware/system_perf.html.

All performance measurements were made with AIX or AIX 5L operating systems unless otherwise indicated to have used Linux. For new and upgraded systems, AIX Version 4.3, AIX 5L or AIX 6 were used. All other systems used previous versions of AIX. The SPEC CPU2006, SPEC2000, LINPACK, and Technical Computing benchmarks were compiled using IBM's high performance C, C++, and FORTRAN compilers for AIX 5L and Linux. For new and upgraded systems, the latest versions of these compilers were used: XL C Enterprise Edition V7.0 for AIX, XL C/C++ Enterprise Edition V7.0 for AIX, XL FORTRAN Enterprise Edition V9.1 for AIX, XL C/C++ Advanced Edition V7.0 for Linux, and XL FORTRAN Advanced Edition V9.1 for Linux. The SPEC CPU95 (retired in 2000) tests used preprocessors, KAP 3.2 for FORTRAN and KAP/C 1.4.2 from Kuck & Associates and VAST-2 v4.01X8 from Pacific-Sierra Research. The preprocessors were purchased separately from these vendors. Other software packages like IBM ESSL for AIX, MASS for AIX and Kazushige Goto’s BLAS Library for Linux were also used in some benchmarks.

For a definition/explanation of each benchmark and the full list of detailed results, visit the Web site of the benchmark consortium or benchmark vendor.

TPC
SPEC
LINPACK
Pro/E
GPC
NotesBench
VolanoMark
STREAM
SAP
Oracle Applications
PeopleSoft - To get information on PeopleSoft benchmarks, contact PeopleSoft directly
Siebel
Baan
Microsoft Exchange
Veritest
Fluent
TOP500 Supercomputers
Ideas International
Storage Performance Council

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http://www.spec.org
http://www.proe.com
http://www.spec.org/gpc
http://www.notesbench.org
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http://www.cs.virginia.edu/stream/
http://www.sap.com/benchmark/
http://www.oracle.com/apps_benchmark/
http://www.sssaglobal.com
http://www.veritest.com/clients/reports
http://www.fluent.com/software/fluent/index.htm
http://www.top500.org/
http://www.ideasinternational.com/benchmark/bench.html
http://www.storageperformance.org/results

Revised January 15, 2008
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IBM benchmark results can be found in the IBM Power Systems Performance Report at [http://www.ibm.com/systems/p/hardware/system_perf.html](http://www.ibm.com/systems/p/hardware/system_perf.html).

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For a definition/explanation of each benchmark and the full list of detailed results, visit the Web site of the benchmark consortium or benchmark vendor.

SPEC [http://www.spec.org](http://www.spec.org)
Pro/E [http://www.proe.com](http://www.proe.com)
GPC [http://www.spec.org/gpc](http://www.spec.org/gpc)
Veritest [http://www.veritest.com/clients/reports](http://www.veritest.com/clients/reports)
TOP500 Supercomputers [http://www.top500.org/](http://www.top500.org/)
AMBER [http://amber.scripps.edu/](http://amber.scripps.edu/)
GAMESS [http://www.msg.chem.iastate.edu/gamess](http://www.msg.chem.iastate.edu/gamess)
GAUSSIAN [http://www.gaussian.com](http://www.gaussian.com)
ABAQUS [http://www.abaqus.com/support/sup_tech_notes64.html](http://www.abaqus.com/support/sup_tech_notes64.html)
select Abaqus v6.4 Performance Data
ANSYS [http://www.ansys.com/services/hardware_support/index.htm](http://www.ansys.com/services/hardware_support/index.htm)
select "Hardware Support Database", then benchmarks
MM5 [http://www.mmm.ucar.edu/mm5/](http://www.mmm.ucar.edu/mm5/)
MSC.NASTRAN [http://www.mscsoftware.com/support/prod%5Fsupport/nstran/perform ance/v04_sn gl.cfm](http://www.mscsoftware.com/support/prod%5Fsupport/nstran/performance/v04_sngl.cfm)
NAMD [http://www.ks.uiuc.edu/Research/namd](http://www.ks.uiuc.edu/Research/namd)
HMMER [http://hmmer.janelia.org/](http://hmmer.janelia.org/)
select HMMER AltivecGen2mod
Notes on performance estimates

rPerf for AIX

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rPerf estimates are calculated based on systems with the latest levels of AIX and other pertinent software at the time of system announcement. Actual performance will vary based on application and configuration specifics. The IBM eServer pSeries 640 is the baseline reference system and has a value of 1.0. Although rPerf may be used to approximate relative IBM UNIX commercial processing performance, actual system performance may vary and is dependent upon many factors including system hardware configuration and software design and configuration. Note that the rPerf methodology used for the POWER6 systems is identical to that used for the POWER5 systems. Variations in incremental system performance may be observed in commercial workloads due to changes in the underlying system architecture.

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========================================================================

CPW for IBM i

Commercial Processing Workload (CPW) is a relative measure of performance of processors running the IBM i operating system. Performance in customer environments may vary. The value is based on maximum configurations. More performance information is available in the Performance Capabilities Reference at:  www.ibm.com/systems/i/solutions/perfmgmt/resource.html

Revised April 2, 2007