Herbstevent der „Itanium® and Integrity SIG“

Intel® Itanium® Processor Family Update

Helmut Ott
Manager, Technical Solutions EMEA

Intel® Itanium® Processor Family Advantages

Mainframe Class Reliability

- IT Benefit
- Data Error Protection
- Data Integrity
- Info Security

Demonstrated 7 9’s of Availability

Maximum OS Flexibility

Windows®, Linux or UNIX

(HP-UX*, MIPS®, VMS®, Solaris®, z/OS®, OS/390* ...

One architecture, so many choices
Now featuring over 10,000 applications

Intel® Itanium®2 Processor

Advantages

- Integer Web Servers
- Highest Available Performance
- Highest Scalability
- Maximum OS Flexibility

Integer

- SPECint_rate_base 2000 - 256C
- SPECint_fprate_base 2000 – 256C
- SPECjbb2005 – 256C
- SPECjAppsvr2004 – 32C

World Records!

- 4230
- 4937
- 3772k
- 4915

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*Trademarks by respective owners
New approach to Mission Critical Computing

Traditional Approach (RISC and Mainframe)
- Limited Hardware Software Choice
- Proprietary Technologies
- Limited Vendor Support

Proprietary Architecture

New Industry Standard Choice (Itanium® 2-based Solutions)
- Broad Hardware Software Choice
- Industry-standard Technologies
- Broad Vendor Support

Provides Unprecedented Choice and Flexibility

Choice & Flexibility

Vast variety of Choices of Platforms

Itanium® Architecture

Proprietary System Hardware
- Limited, Proprietary OS
- Proprietary Architecture

Vast variety of Choices of Platforms

Itanium® Architecture

- HP Integrity + HP Integrity +
  Integrity Integrity NonStop
  NonStop Altix 3700

- OpenVMS*

- Vast variety of Choices of Platforms

Intel® Itanium® Processor Family Roadmap

<table>
<thead>
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<th>Processor Generation</th>
<th>Highlights</th>
<th>New Technologies</th>
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<tbody>
<tr>
<td>Itanium 2 Processor</td>
<td>9MB cache, faster FSB</td>
<td>EPIC, Machine Check Architecture, Advanced register model, Large address space</td>
</tr>
<tr>
<td>(Madison 9M/Fanwood)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual-Core Itanium 2</td>
<td>Dual-core, On-die 24MB cache, 104W</td>
<td>Multi-core, High speed system interconnects, Common platform architecture with Intel® Xeon® processor MP</td>
</tr>
<tr>
<td>Processor 9000 series</td>
<td>(Montecito)</td>
<td>Enhanced RAS, Enhanced virtualization, Enhanced I/O &amp; memory</td>
</tr>
<tr>
<td>Montvale</td>
<td>Dual-core, On-die 24MB cache</td>
<td></td>
</tr>
<tr>
<td>Tukwila</td>
<td>Multi-core</td>
<td></td>
</tr>
<tr>
<td>Poulson</td>
<td>Enhanced multi-core architecture</td>
<td></td>
</tr>
</tbody>
</table>

Targeted Line Items for RISC Replacement Availability

- **2005**
  - Montvale
  - Tukwila
  - Poulson

- **2006**
  - Dual-Core
  - Fast, 24MB on-die level 3 cache
  - Intel® Hyper-Threading Technology
  - Intel® Virtualization Technology
  - Intel® Cache Safe Technology (enhanced cache reliability)
  - Dual-Core
  - Hyper-Threading Technology
  - Intel® Virtualization Technology

- **2007**
  - Multi-core
  - On-die 24MB cache

- **2008**
  - Dual-core, On-die 24MB cache

- **Future**
  - Dual-core, On-die 24MB cache

- **Enterprise**
  - 1.72 Billion Transistors
  - Based on EPIC architecture
  - Mainframe class reliability features

- **HPC**
  - 1.72 Billion Transistors
  - Based on EPIC architecture
  - Mainframe class reliability features

- **Ultra dense**
  - 1.72 Billion Transistors
  - Based on EPIC architecture
  - Mainframe class reliability features

- **2X* HIGHER**

- **104W Processor Power Envelope**

- **PCIE-Express Plus...**

- **PERFORMANCE**

- **20%* LOWER**

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*Relative to Intel® Itanium® 2 Single-Core ("Madison") Processor.

**POWER**

**PERFORMANCE**

**2X* HIGHER**

**POWER**

**20%* LOWER**
TPCC – 2P/4C

Higher is better

Itanium 2 9050
1.6 GHz DC

P5+ 1.9GHz DC
IBM P570 eServer

0.67x

203,440
230,569

$3.93/tpmc
$2.63/tpmc

244
355

New Dual-core Intel® Itanium® 2 Processor 9000 Series
Platform Scaling Performance

Published results on Java Benchmarks

SPECJBB2005 benchmark

Excellent Scaling

471000
942000
1887000
3772000

Intel Itanium 2 9050 (Montecito)

Data Source: Published or Submitted results as of July 18th, 2006. See backup for details

Nemium 9600: Dual Core Nemium 2 “Montecito” 1.6GHz

Itanium Architecture shows excellent scaling
Itanium® 2 Reliability Advantages: Moving Beyond Legacy Limitations and Cost

<table>
<thead>
<tr>
<th>Reliability Feature</th>
<th>IT Benefit</th>
<th>Intel® Itanium® 2 Platforms</th>
<th>RISC &amp; Mainframe Platforms</th>
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</thead>
<tbody>
<tr>
<td>Bad Data Containment</td>
<td>High System Availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor Cache Reliability</td>
<td>Data Error Protection</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Intel Advanced Machine Check Architecture</td>
<td>Data Integrity</td>
<td>Enhanced</td>
<td></td>
</tr>
<tr>
<td>Memory Mirroring &amp; Hot Swap</td>
<td>Data Protection &amp; On-line Repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor Locketstep</td>
<td>Computational Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory Compartmentalization</td>
<td>Information Security</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A Better Business Foundation for Mission Critical Solutions


Itanium® Solutions Alliance 1 Year Anniversary

- $10,000,000,000 ISA Investment
- 2x Itanium Performance
- > 100,000 End-User Deployments
- >10,000 Apps 2x YoY
- 100th ISA ISV Member
- 2.5x Itanium Perf/Watt

www.decus.de
Software Eco System continues to grow rapidly
Example: Tranistive’s QuickTransit®

- Solaris apps running unmodified on Intel/Linux
- Coexist with native apps
- User transparency
- Enables cross platform server consolidation
- Done in user space, no OS modification

Itanium® Processor based System

Seven SQL Server DB's

Sharing Processor & I/O Resources

Itanium® 2 Flexibility & TCO Advantage (Demo Setup at IDF 2007)

#1 Oracle IA64 Native
#2 Oracle Clients SPARC
#3 IBM DB2/MQ SPARC
#4 DB2 Clients SPARC
#5 Apache IA64 Native

www.decus.de
**Intel® Itanium® Processor Family Roadmap**

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<td>Multi-core</td>
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</tr>
</tbody>
</table>

**Targeted Line Items for RISC Replacement Availability**

- **2005**: Enterprise, HPC
- **2006**: Enterprise, HPC, Ultra dense
- **2007**: Enterprise, HPC, Ultra dense
- **2008**: Enterprise, HPC, Ultra dense
- **Future**: Enterprise, HPC, Ultra dense

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**Summary: Itanium® advantages for IT**

- **Unmatched Flexibility, Lower Cost Model**
  - Enabled by broad vendor support and choice

- **Scalable Performance For Mission-Critical Applications**
  - Double the performance and expanded enterprise capabilities along with improved energy efficiency; reducing costs and improving headroom

- **Optimized for Business Analytics**
  - Improve time to critical information and real-time business decision making

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[www.decus.de](http://www.decus.de)
Itanium® 2 9000 series Configuration Details
Database performance

Common Disclaimer

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit http://www.intel.com/performance/resources/limits.htm or call (U.S.) 1-800-628-8686 or (U.K.) 0115-956-3104.

All dates and products specified are for planning purposes only and are subject to change without notice.

TPCC-4P

Performance Claim: Based on TPCC publication

Itanium® 2 9000 series Configuration Details

Database performance

TPCH-16P/1TB

- **Performance Claim:** Based on TPCH publication
  - Source: www.tpc.org - Itanium® 2 processor, result of 26,246 QphH@3000GB, 44.58 US $ per QphH@3000GB, on Unisys ES7000 Orion 440 Enterprise, using 32 Intel Itanium® 2 1.6GHz 6MB L3 cache, (32 processors/32 cores/32 threads), 256GB memory, Microsoft SQL Server 2003, Datacenter Edition for 64-bit Itanium-based Systems SP1, published on 3rd July 2005.
  - Source: www.tpc.org - Itanium® 2 processor, result of 26,246 QphH@3000GB, 44.58 US $ per QphH@3000GB, on Unisys ES7000/one Enterprise, using Intel® Dual Core Itanium® 2 9000 series, 1.6GHz w/ 1MB L2 cache, (16 processors/32 cores/64 threads), 256GB memory, Microsoft Windows Server 2003, Datacenter Edition for 64-bit Itanium-based Systems, published on 3rd July 2005.

TPCH-16P/3TB

- **Performance Claim:** Based on TPCH publication
  - Source: www.spec.org - Itanium® 2 processor results of 4937 on SGI Altix 4700 system, using 12 Itanium® 2 DC 1.6GHz w/ 9MB L3 cache, (16 processors/2 cores/64threads), 128GB memory, published on 18th July 2006.

SPECint_rate_base_2000

- **Performance Claim:** Based on SPEC publication
  - Source: www.spec.org - Itanium® 2 processor results of 26,246 QphH@3000GB, 44.58 US $ per QphH@3000GB, on Unisys ES7000 Orion 440 Enterprise, using 32 Intel Itanium® 2 1.6GHz 6MB L3 cache, (32 processors/32 cores/32 threads), 256GB memory, Microsoft Windows Server 2003, Datacenter Edition for 64-bit Itanium-based Systems SP1, published on 3rd July 2005.
  - Source: www.spec.org - Itanium® 2 processor results of 33,488.1 QphH@1000GB, US $27.00 US per QphH@1000GB , on HP rx8640, using Intel® Itanium® 2 1.6GHz with 24MB L3 cache, (16 processors/2 cores/64threads), 128GB memory, OS Microsoft Windows Server 2003, Datacenter Edition (64-bit), SQL Server 2005 result published on July 2006.

SPECmp_rate_base_2000

- **Performance Claim:** Based on SPEC publication
  - Source: www.spec.org - Itanium® 2 processor results of 863,761 on SGI Altix 4700 system, using 64 Itanium® 2 DC processors (128 processors, 256 Cores), 1.6GHz with 24MB L3 cache, 512GB memory, IBM PowerPC® 64 SP3 OS, published on 29th July 2005.
  - Source: www.spec.org - Itanium® 2 processor results of 33,488.1 QphH@1000GB, US $27.00 US per QphH@1000GB , on HP rx8640, using Intel® Itanium® 2 1.6GHz with 24MB L3 cache, (16 processors/2 cores/64threads), 128GB memory, OS Microsoft Windows Server 2003, Datacenter Edition (64-bit), SQL Server 2005 result published on July 2006.

SPECOMPL2001

- **Performance Claim:** Based on SPEC publication
  - Source: www.spec.org - Itanium® 2 processor results of 863,761 on SGI Altix 4700 system, using 64 Itanium® 2 DC processors (128 processors, 256 Cores), 1.6GHz with 24MB L3 cache, 512GB memory, IBM PowerPC® 64 SP3 OS, published on 29th July 2005.
  - Source: www.spec.org - Itanium® 2 processor results of 33,488.1 QphH@1000GB, US $27.00 US per QphH@1000GB , on HP rx8640, using Intel® Itanium® 2 1.6GHz with 24MB L3 cache, (16 processors/2 cores/64threads), 128GB memory, OS Microsoft Windows Server 2003, Datacenter Edition (64-bit), SQL Server 2005 result published on July 2006.

SPECJBB2005

- **Performance Claim:** Based on SPEC publication

World Record performance


**Itanium® 2 9000 series Configuration Details**

**High End Platform Performance Comparison**

**SPECint_rate_base_2000**
- Performance Claim: Based on SPEC publication

Source: www.spec.org : Itanium® 2 processor results of 2367 on HP Integrity Superdome system, using 64 Itanium® 2 DC processors (64 processors, 128 Cores), 1.6GHz with 24MB L3 cache, HT disabled, 512GB memory, OS HPUX11i TC0E B.11.23.0006, result submitted on 10th July 2006 and the data is under review. Sun Microsystems has published a result of 2313 on Sun Fire E25K (72 processor), 144 cores, 72 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 288 GB memory, on Solaris 10 and result published on Dec 2006.

**SPECfp_rate_base_2000**
- Performance Claim: Based on SPEC publication

Source: www.spec.org : Itanium® 2 processor results of 1,887,226 BOPS, bops/JVM = 58976, 32 JVM’s, on SGI Altix 4700 system,  using 64 Itanium® 2 DC processors (64 processors, 128 Cores), 1.5GHz with 24MB L3 cache, 288 GB memory, SGI ProPack 4 SP4 OS, submitted as of 18th July 2006 and results are under review. IBM Corporation has published result of 1861 on IBM eServer xSeries 306, 16 cores, 1.67GHz, 288 GB memory, on AIX 5L V5.3 ML 5.0_06, published on 18th July 2006. Sun Microsystems has published a result of 1,164,995 BOPS on Sun Fire E25K (72 processor), 144 cores, 72 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 288 GB memory, 36 JVM instances, 32 bops/JVM Java HotSpot(TM) 32-Bit Server VM on Solaris 10 1.5.0_06-20050529 (build P26.4.0-10), published on 18th July 2006. Sun Microsystems has published a result of 1,000,000 BOPS on Sun Fire E25K (72 processor), 144 cores, 72 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 288 GB memory, OS HPUX11i TC0E B.11.23.060, result submitted on 10th July 2006 and the data is under review. Sun Microsystems has published a result of 1,164,995 BOPS on Sun Fire E25K (72 processor), 144 cores, 72 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 288 GB memory, on Solaris 10 1.5.0_06-20050529 (build P26.4.0-10), published on 18th July 2006.

**SPECJB2005**
- Performance Claim: Based on SPEC publication

Source: www.spec.org : Itanium® 2 processor results of 1,491,567 BOPS, bops/JVM = 57276, 32 JVM’s, on SGI Altix 4700 system, using 64 Itanium® 2 DC processors (64 processors, 128 Cores), 1.6GHz with 24MB L3 cache, 512GB memory, Red Hat Enterprise Linux AS 4 update 3, result submitted as of 18th July 2006 and the data is under review. IBM Corporation has published result of 1861 on IBM eServer xSeries 306, 16 cores, 1.67GHz, 288 GB memory, on AIX 5L V5.3 ML 5.0_06, published on 18th July 2006. Sun Microsystems has published a result of 1213 on Sun Fire V890 (8 processor), 16 cores, 8 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 288 GB memory, SUSE Linux Enterprise server 9 SP3 OS, JVM BEA JRockit(R) 5.0 P26.4.0-10 (build P26.4.0-10), published on 18th July 2006 and the data is under review.

**Itanium® 2 9000 series Configuration Details**

**Mid-Range Platform Performance Comparison**

**SPECint_rate_base_2000**
- Performance Claim: Based on SPEC publication

Source: www.spec.org : Itanium® 2 processor results of 259 on HITACHI Blade Symphony BS1000 (Dual Core Itanium 2 processor 9050, 1.60GHz/24MB, FSB 400MHz), using 8 Itanium® 2 DC processors (8 processors, 16 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, Red Hat Enterprise Linux AS 4 update 3, result submitted as of 18th July 2006 and the data is under review. Sun Microsystems has published a result of 156 on Sun Fire V890 (8 processor), 16 cores, 8 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 64 GB memory, on Solaris 10 1.5.0_06-20050529 (build P26.4.0-10), published on 18th July 2006.

**SPECfp_rate_base_2000**
- Performance Claim: Based on SPEC publication

Source: www.spec.org : Itanium® 2 processor results of 318 on HITACHI Blade Symphony BS1000 (Dual Core Itanium 2 processor 9050, 1.60GHz/24MB, FSB 400MHz), using 8 Itanium® 2 DC processors (8 processors, 16 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, Red Hat Enterprise Linux AS 4 update 3, result submitted as of 18th July 2006 and the data is under review. Sun Microsystems has published a result of 137 on Sun Fire V890 (8 processor), 16 cores, 8 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 64 GB memory, on Solaris 10 and result published on Dec 2004.
Itanium® 2 9000 series Configuration Details
Entry Class Platform Performance Comparison

SPECint_rate_base_2000

- Performance Claim: Based on SPEC publication

Source: www.spec.org: Itanium® 2 processor results of 134 on Bull Nova Scale 3045 (1600MHz). 8 cores, 4 chips, 2 core/chip (Hyper-Threading Technology disabled) using 4 Itanium® 2 DC processors (4 processors, 8 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, OS Bull Advanced Server 4 (Linux kernel 2.6.12 (644 pages), glibc 2.3.4), Intel(R) Fortran Compiler for Linux 9.1 (Build 20060523) Compiler for Linux 9.1 (Build 20060523) result published on June 2006. IBM Corporation has published result of 122 on IBM System p5 590 (1500 MHz, 8 CPU), 8 cores, 4 chips, 2 core/chip (SMT on), 64 GB memory and on OS AIX 5L Version 5.3, compilers XLC++/ Enterprise Edition Version 8.0 for AIX XL Fortran Enterprise Edition Version 10.1 for AIX published on Sept 2005. Sun Microsystems has published a result of 79 on Sun Fire V490 (4 processor), 6 cores, 4 chip, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 32 GB memory, on Solaris 10, Sun Studio 11 and result published on Oct 2005.

SPECfp_rate_base_2000

- Performance Claim: Based on SPEC publication

Source: www.spec.org: Itanium® 2 processor results of 186 on Bull Nova Scale 3045 (1600MHz). 8 cores, 4 chips, 2 cores/chip (Hyper-Threading Technology disabled) using 4 Itanium® 2 DC processors (4 processors, 8 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, OS Bull Advanced Server 4 (Linux kernel 2.6.12 (644 pages), glibc 2.3.4), Intel(R) Fortran Compiler for Linux 9.1 (Build 20060523) Compiler for Linux 9.1 (Build 20060523) result published on June 2006. IBM Corporation has published result of 174 on IBM System p5 590 (1500 MHz, 8 CPU), 8 cores, 2 chips, 2 cores/chip (SMT on), 64 GB memory and on OS AIX SL Version 5.3, compilers XLC++/ Enterprise Edition Version 8.0 for AIX XL Fortran Enterprise Edition Version 10.1 for AIX published on Sept 2005. Sun Microsystems has published a result of 75 on Sun Fire V490 (4 processor), 6 cores, 4 chips, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 32 GB memory, on Solaris 10, Sun Studio 11 and result published on Dec 2004.

Itanium® 2 9000 series Configuration Details
Scaling and Energy Performance Comparison

SPECjbb2005 (Scalability performance)

- Performance Claim: Based on SPEC publication

Source: www.spec.org: Itanium® 2 processor results of 471,030 BOPS, bops/JVM = 58879, 8 JVMs, on SGI Altix 4700 system, using 16 Itanium® 2 DC processors (16 processors, 32 Cores), 1.6GHz with 24MB L3 cache, 64GB memory, SUSLinux Enterprise server 9 SP3 OS, JVM BEA JRockit(R) 5.0 P26.4.0-10 (build P26.4.0-10-624596-2101-linux-a64), published on 18th July 2006. Itanium® 2 processor results of 472,931 BOPS, bops/JVM = 59927, 16 JVMs, on SGI Altix 4700 system, using 32 Itanium® 2 DC processors (32 processors, 64 Cores), 1.6GHz with 24MB L3 cache, 128GB memory, SUSLinux Enterprise server 9 SP3 OS, JVM BEA JRockit(R) 5.0 P26.4.0-10 (build P26.4.0-10-624596-2101-linux-a64), published on 18th July 2006. Itanium® 2 processor results of 477,228 BOPS, bops/JVM = 62976, 32 JVMs, on SGI Altix 4700 system, using 64 Itanium® 2 DC processors (64 processors, 128 Cores), 1.6GHz with 24MB L3 cache, 256GB memory, SUN Microsystems has published a result of 79 on Sun Fire V490 (4 processor), 6 cores, 4 chip, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 32 GB memory, on Solaris 10, Sun Studio 11 and result published on Oct 2005.

Performance/Watt on StarCD* 3.22

- Performance Claim: Based on Intel internal measurement

Source: Based on Intel internal measurement: Itanium® 2 processor measured system power 766 watts on Intel® SR870BN4 Server System; with Intel® Itanium® 2 Processor (processor) 1.6GHz with 4MB L3 Cache, 24 GB memory, Red Hat Enterprise Linux AS release 4, StarCD (Computational Fluid Dynamic modelling for manufacturing vertical), Workload Version: V3.22 (build 871000229-2101-linux-a64), published on 18th July 2005. Itanium® 2 processor results of 122 on IBM System p5 550Q (1600 MHz, 8 CPU), 8 cores, 4 chips, 2 core/chip (Hypercores, 4 chips, 2 cores/chip (Hyper-Threading Technology disabled) using 4 Itanium® 2 DC processors (4 processors, 8 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, OS Bull Advanced Server 4 (Linux kernel 2.6.12 (644 pages), glibc 2.3.4), Intel(R) Fortran Compiler for Linux 9.1 (Build 20060523) Compiler for Linux 9.1 (Build 20060523) result published on June 2006. IBM Corporation has published result of 122 on IBM System p5 590 (1500 MHz, 8 CPU), 8 cores, 4 chips, 2 core/chip (SMT on), 64 GB memory and on OS AIX SL Version 5.3, compilers XLC++/ Enterprise Edition Version 8.0 for AIX XL Fortran Enterprise Edition Version 10.1 for AIX published on Sept 2005. Sun Microsystems has published a result of 79 on Sun Fire V490 (4 processor), 6 cores, 4 chip, 2 cores/chip, UltraSPARC IV+, 1.5GHz, 32 GB memory, on Solaris 10, Sun Studio 11 and result published on Oct 2005.

Performance/Watt on StarCD* 3.22 (Energy scaling)

Source: Based on Intel internal measurement: Itanium® 2 processor measured system power 766 watts on Intel® SR870BN4 Server System; with Intel® Itanium® 2 Processor (processor) 1.6GHz with 4MB L3 Cache, 24 GB memory, Red Hat Enterprise Linux AS release 4, StarCD (Computational Fluid Dynamic modelling for manufacturing vertical), Workload Version: V3.22 (build 871000229-2101-linux-a64), published on 18th July 2005. The relative performance specific measured on STAR-CD 3.22 (Engine valid in day) was 2.6. This gives the performance/energy scaling of 2.6.

www.decus.de
Linpack*
- Hitachi Alpha 2.0 533 MHz FSB quad-C2 (1.6 GHz, 24MB L3 cache) Montecito platform, using the Intel® Optimized LINPACK Benchmark 3.0.1, using 4 Itanium® 2 DC processors (4 processors, 8 Cores), 1.6GHz with 24MB L3 cache, 32GB memory, 64-bit Linux OS Red Hat Enterprise Linux, AS release 4 (Nahant Update 3) Kernel 2.6.9-34.EL SMP. The result was compared to the IBM system.
- IBM System p5 550Q (1500 MHz, 8 CPU), 8 cores, 4 chips, 2 cores/chip (SMT on), published result at http://www-03.ibm.com/systems/p/hardware/whitepapers/p5_perf.pdf

Star-CD*
- SGI Altix 4700 system, using 32 Itanium® 2 DC processors (32 processors, 64 Cores), 1.6GHz with 24MB L3 cache, measured result on StarCD V3240/V3300, large A class models (21 million cells) and the result was compared to the IBM system IBM p5-575 (POWER5+) 2.2 GHz, 64 cores, Large pages + HPS (8), published at http://www.cd-adapco.com/products/STAR-CD/performance/320/largeaclass.html

MSC Nastran*
- SGI Altix 4700 system, using Itanium® 2 DC processors, 1.6GHz with 24MB L3 cache, single core performance measured result on MSC. Nastran V2005/V2006 results compared to IBM P5-575 1.9 GHz system, result published at http://www.mscsoftware.com/support/prod%5Fsupport/nastran/performance/v05_sngl.cfm

The comparison was done by taking the Geomean of 8 workloads (lgqdf(108), xlemf(111), xltdf(108), OX12 (111), xloop(200), xxafst(101), xxcmd(103), xxcmda(103 ACMS))
- IBM p5-575 (POWER5) 2.2 GHz, 64 cores, Large pages + HPS (8), published at http://www.cd-adapco.com/products/STAR-CD/performance/320/largeaclass.html