Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2623 v4, 2.60 GHz)

**SPECint®2006** = 58.5

**SPECint_base2006** = 55.9

---

**Hardware**

- **CPU Name:** Intel Xeon E5-2623 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.20 GHz
- **CPU MHz:** 2600
- **FPU:** Integrated
- **CPU(s) enabled:** 8 cores, 2 chips, 4 cores/chip, 2 threads/core
- **CPU(s) orderable:** 1.2 chips
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 256 KB I+D on chip per core
- **L3 Cache:** 10 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)
- **Disk Subsystem:** 1 x 120 GB SATA SSD
- **Other Hardware:** None

---

**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
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CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Nov-2016

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Result Seconds</th>
<th>Ratio</th>
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<tr>
<td>400.perlbench</td>
<td>266</td>
<td>36.7</td>
<td>266</td>
<td>36.8</td>
<td>231</td>
<td>42.4</td>
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<tr>
<td>401.bzip2</td>
<td>404</td>
<td>23.9</td>
<td>405</td>
<td>23.8</td>
<td>399</td>
<td>24.2</td>
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<tr>
<td>403.gcc</td>
<td>403</td>
<td>32.4</td>
<td>247</td>
<td>32.6</td>
<td>249</td>
<td>32.3</td>
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<tr>
<td>429.mcf</td>
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<td>65.0</td>
<td>138</td>
<td>66.0</td>
<td>139</td>
<td>65.6</td>
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<tr>
<td>445.gobmk</td>
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<td>458.sjeng</td>
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<td>394</td>
<td>30.7</td>
<td>382</td>
<td>31.7</td>
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<tr>
<td>462.libquantum</td>
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<td>3100</td>
<td>6.87</td>
<td>3020</td>
<td>6.70</td>
<td>3090</td>
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<tr>
<td>464.h264ref</td>
<td>402</td>
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<td>404</td>
<td>54.8</td>
<td>403</td>
<td>54.9</td>
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<tr>
<td>471.omnetpp</td>
<td>281</td>
<td>22.2</td>
<td>277</td>
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<td>22.5</td>
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<tr>
<td>473.astar</td>
<td>226</td>
<td>31.0</td>
<td>225</td>
<td>31.2</td>
<td>227</td>
<td>31.0</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>107</td>
<td>64.6</td>
<td>106</td>
<td>64.9</td>
<td>105</td>
<td>66.0</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS settings:
Snoop Mode set to Opportunistic Snoop Broadcast
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb5ed28d7f98696cbe290c1)
runtime on linux-b0uv Thu Feb 2 16:52:35 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
http://www.spec.org/cpu2006/Docs/config.html#sysinfo
Continued on next page
## Platform Notes (Continued)

From `/proc/cpuinfo`

- model name : Intel(R) Xeon(R) CPU E5-2623 v4 @ 2.60GHz
- 2 "physical id"s (chips)
- 16 "processors"
- cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from `/proc/cpuinfo` might not be reliable. Use with caution.)
  - cpu cores : 4
  - siblings : 8
  - physical 0: cores 0 1 2 3
  - physical 1: cores 0 1 2 3
- cache size : 10240 KB

From `/proc/meminfo`

- MemTotal: 264568092 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

 `/usr/bin/lsb_release -d`

- SUSE Linux Enterprise Server 12 SP1

From `/etc/*release* /etc/*version*`

- SuSE-release:
  - NAME="SLES"
  - VERSION="12-SP1"
  - VERSION_ID="12.1"
  - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
  - ID="sles"
  - ANSI_COLOR="0;32"
  - CPE_NAME="cpe:/o:suse:sles:12:sp1"

`uname -a`:

- Linux linux-b0uv 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
  (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

`run-level` 3 Feb 2 16:48

`SPEC is set to: /root/cpu2006-1.2`

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda2</td>
<td>xfs</td>
<td>110G</td>
<td>22G</td>
<td>89G</td>
<td>20%</td>
<td>/</td>
</tr>
</tbody>
</table>

`Additional information from dmidecode:`

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately Continued on next page
Dell Inc.
PowerEdge R730xd (Intel Xeon E5-2623 v4, 2.60 GHz)

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CPU2006 license: 55  Test date: Feb-2017
Test sponsor: Dell Inc. Hardware Availability: Mar-2016
Tested by: Dell Inc. Software Availability: Nov-2016

Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to
hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Dell Inc. 2.2.5 09/06/2016
Memory:
  4x 00AD00B300AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133
  MHz
  11x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133
  MHz
  1x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133
  MHz
  8x Not Specified Not Specified

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "8"
The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent.
The results have been measured on a Dell PowerEdge R730 model.
Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled with:
    echo always > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation

C benchmarks:
  icc -m64

C++ benchmarks:
  icpc -m64

Base Portability Flags

  400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
  403.gcc: -DSPEC_CPU_LP64
  429.mcf: -DSPEC_CPU_LP64
  445.gobmk: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
  462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Continued on next page
Dell Inc. PowerEdge R730xd (Intel Xeon E5-2623 v4, 2.60 GHz)

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Base Portability Flags (Continued)

464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
-auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmartheap64

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64

400.perlbench: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64

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Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Dell Inc.

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Peak Portability Flags (Continued)

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<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>445.gobmk</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td></td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>473.astar</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX</td>
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</table>

Peak Optimization Flags

C benchmarks:

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<td>400.perlbench</td>
<td>-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-no-prec-div(pass 2) -qopt-prefetch</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-no-prec-div -auto-ilp32 -qopt-prefetch</td>
</tr>
<tr>
<td>403.gcc</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>429.mcf</td>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel</td>
</tr>
<tr>
<td></td>
<td>-qopt-prefetch -auto-p32</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-no-prec-div(pass 2)</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>basepeak = yes</td>
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<tr>
<td>458.sjeng</td>
<td>-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)</td>
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<td>-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)</td>
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<td>-no-prec-div(pass 2) -unroll4</td>
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<td>462.libquantum</td>
<td>basepeak = yes</td>
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C++ benchmarks:

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<td>-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)</td>
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<tr>
<td></td>
<td>-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)</td>
</tr>
<tr>
<td></td>
<td>-no-prec-div(pass 2) -qopt-ra-region-strategy=block</td>
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<tr>
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<td>-Wl,-z, muldefs -L/sh10.2 -lsmartheap</td>
</tr>
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PowerEdge R730xd (Intel Xeon E5-2623 v4, 2.60 GHz)  

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Peak Optimization Flags (Continued)

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch 
-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch 
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml

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