Dell Inc.  

PowerEdge R730xd (Intel Xeon E5-2630 v4, 2.20 GHz)  

**SPECint²006** = 63.7  
**SPECint_base²006** = 60.2

---

**Hardware**

- **CPU Name:** Intel Xeon E5-2630 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.10 GHz
- **CPU MHz:** 2200
- **FPU:** Integrated
- **CPU(s) enabled:** 20 cores, 2 chips, 10 cores/chip
- **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:** 25 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:** 2 x 2000 GB 7200 RPM SAS RAID 0
- **Other Hardware:** None

**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 3.12.28-4-default
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>272</td>
<td>36.0</td>
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<td>36.0</td>
<td>270</td>
<td>36.1</td>
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<td>41.5</td>
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<td>41.8</td>
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<td>41.6</td>
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<tr>
<td>401.bzip2</td>
<td>417</td>
<td>23.2</td>
<td>417</td>
<td>23.2</td>
<td>416</td>
<td>23.2</td>
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<td>230</td>
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<td>35.0</td>
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<td>34.9</td>
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<td>429.mcf</td>
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<td>64.3</td>
<td>139</td>
<td>65.8</td>
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<td>141</td>
<td>64.7</td>
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<td>445=gobmk</td>
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<td>384</td>
<td>27.3</td>
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<td>456.hmmer</td>
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<td>76.5</td>
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<td>458=sjeng</td>
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<td>30.8</td>
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<td>385</td>
<td>31.4</td>
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<td>31.4</td>
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<td>462.libquantum</td>
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<tr>
<td>464.h264ref</td>
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<td>421</td>
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<tr>
<td>471.omnetpp</td>
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<td>33.8</td>
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<td>31.7</td>
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<td>32.7</td>
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<td>47.1</td>
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<tr>
<td>473.astar</td>
<td>220</td>
<td>31.9</td>
<td>219</td>
<td>32.0</td>
<td>220</td>
<td>31.9</td>
<td>219</td>
<td>32.0</td>
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<td>32.0</td>
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<tr>
<td>483=xalancbmk</td>
<td>100</td>
<td>68.8</td>
<td>100</td>
<td>68.9</td>
<td>102</td>
<td>67.7</td>
<td>91.7</td>
<td>75.3</td>
<td>91.7</td>
<td>75.3</td>
<td>91.9</td>
<td>75.1</td>
</tr>
</tbody>
</table>

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## 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 disabled
- Sysinfo program /root/previous-cpu2006-1.2/config/sysinfo.rev6993
- Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
- running on linux-0171 Mon Feb 13 16:12:43 2017

This section contains SUT (System Under Test) info as seen by...
Dell Inc.  
PowerEdge R730xd (Intel Xeon E5-2630 v4, 2.20 GHz)  

SPECint2006 = 63.7  
SPECint_base2006 = 60.2

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  

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

Platform Notes (Continued)

some common utilities. To remove or add to this section, see:
http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2630 v4 @ 2.20GHz
 2 "physical id"s (chips)
 20 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 10
siblings : 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 264567484 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 0
  # This file is deprecated and will be removed in a future service pack or
  release.
  # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12"
    VERSION_ID="12"
    PRETTY_NAME="SUSE Linux Enterprise Server 12"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
Linux linux-0171 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 13 16:01

SPEC is set to: /root/previous-cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 246G 19G 226G 8% /

Additional information from dmidecode:

Continued on next page
### SPEC CINT2006 Result

<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is &quot;intended to allow hardware to be accurately determined&quot;, but the intent may not be met, as there are frequent changes to hardware, firmware, and the &quot;DMTF SMBIOS&quot; standard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BIOS Dell Inc. 2.3.4 11/08/2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory:</td>
</tr>
<tr>
<td>7x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133 MHz</td>
</tr>
<tr>
<td>9x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133 MHz</td>
</tr>
<tr>
<td>8x Not Specified Not Specified</td>
</tr>
</tbody>
</table>

(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/previous-cpu2006-1.2/libs/32:/root/previous-cpu2006-1.2/libs/64:/root/previous-cpu2006-1.2/sh10.2"
- OMP_NUM_THREADS = "20"

The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent. The results have been measured on a Dell PowerEdge R730xd 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.hmmer: -DSPEC_CPU_LP64
- 456.sjeng: -DSPEC_CPU_LP64
- 458.sjeng: -DSPEC_CPU_LP64
- 462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
### Dell Inc.

**PowerEdge R730xd (Intel Xeon E5-2630 v4, 2.20 GHz)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint2006</td>
<td>63.7</td>
</tr>
<tr>
<td>SPECint_base2006</td>
<td>60.2</td>
</tr>
</tbody>
</table>

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

### Base Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>464.h264ref</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>471.omnetpp</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>473.astar</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td><code>-DSPEC_CPU_LP64</code> <code>-DSPEC_CPU_LINUX</code></td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**

- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-parallel`  
- `-qopt-prefetch`  
- `-auto-p32`

**C++ benchmarks:**

- `-xCORE-AVX2`  
- `-ipo`  
- `-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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td><code>-D_FILE_OFFSET_BITS=64</code> <code>-DSPEC_CPU_LINUX_IA32</code></td>
</tr>
<tr>
<td>401.bzip2</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>403.gcc</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>429.mcf</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
</tbody>
</table>
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2630 v4, 2.20 GHz)

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SPECint_base2006 = 60.2

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

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

Peak Portability Flags (Continued)

445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-prefetch

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div -auto-ilp32 -qopt-prefetch

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-qopt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-qopt-prefetch -auto-p32

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2)

456.hmmer: basepeak = yes

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll14

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-ra-region-strategy=block
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

Continued on next page
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2630 v4, 2.20 GHz)

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SPECint_base2006 = 60.2

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

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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For other inquiries, please contact webmaster@spec.org.

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