# Dell Inc.

## PowerEdge M830 (Intel Xeon E5-4620 v4, 2.10 GHz)

### SPECint®2006 = 53.7

**SPECint_base2006 = 51.2**

<table>
<thead>
<tr>
<th>Program</th>
<th>SPECint2006</th>
<th>SPECint_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>53.5</td>
<td>51.2</td>
</tr>
<tr>
<td>bzip2</td>
<td>30.8</td>
<td>28.5</td>
</tr>
<tr>
<td>gcc</td>
<td>19.3</td>
<td>19.2</td>
</tr>
<tr>
<td>mcf</td>
<td>28.5</td>
<td>28.0</td>
</tr>
<tr>
<td>gobmk</td>
<td>51.8</td>
<td>51.5</td>
</tr>
<tr>
<td>hmmr</td>
<td>43.6</td>
<td>43.0</td>
</tr>
<tr>
<td>sjeng</td>
<td>26.4</td>
<td>26.1</td>
</tr>
<tr>
<td>libquantum</td>
<td>28.9</td>
<td>28.0</td>
</tr>
<tr>
<td>h264ref</td>
<td>44.4</td>
<td>43.8</td>
</tr>
<tr>
<td>omnetpp</td>
<td>31.2</td>
<td>30.8</td>
</tr>
<tr>
<td>astar</td>
<td>28.8</td>
<td>28.0</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>56.6</td>
<td>56.3</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55  
**Test date:** May-2016  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Jun-2016  
**CPU(s) enabled:** 40 cores, 4 chips, 10 cores/chip, 2 threads/core  
**Disk Subsystem:** 1 x 800 GB SATA SSD

## Hardware

**CPU Name:** Intel Xeon E5-4620 v4  
**CPU Characteristics:** Intel Turbo Boost Technology up to 2.60 GHz  
**CPU MHz:** 2100  
**CPU Orderable:** 2,4 chip  
**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  
**Memory:** 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)  
**Other Cache:** None

## Software

**Operating System:** SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default  
**Compiler:** C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux  
**Auto Parallel:** Yes  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 32/64-bit  
**Peak Pointers:** 32/64-bit  
**Other Software:** Microquill SmartHeap V10.2
## Dell Inc.

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**SPECint2006** = 53.7  
**SPECint_base2006** = 51.2

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>316</td>
<td>30.9</td>
<td>317</td>
<td>30.8</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>505</td>
<td>19.1</td>
<td>502</td>
<td>19.2</td>
</tr>
<tr>
<td>403.mcf</td>
<td>283</td>
<td>28.5</td>
<td>282</td>
<td>28.5</td>
</tr>
<tr>
<td>429.gcc</td>
<td>170</td>
<td>53.7</td>
<td>177</td>
<td>51.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>465</td>
<td>22.6</td>
<td>463</td>
<td>22.6</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>147</td>
<td>63.5</td>
<td>147</td>
<td>63.6</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>464</td>
<td>26.1</td>
<td>464</td>
<td>26.1</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>4.10</td>
<td>5050</td>
<td>4.18 4960</td>
<td>4.24 4880</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>500</td>
<td>44.3</td>
<td>498</td>
<td>44.4</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>217</td>
<td>28.8</td>
<td>218</td>
<td>28.6</td>
</tr>
<tr>
<td>473.astar</td>
<td>251</td>
<td>28.0</td>
<td>253</td>
<td>27.7</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>120</td>
<td>57.6</td>
<td>124</td>
<td>55.8</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  
  - Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914

```bash
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-9j5l Mon May 9 19:51:51 2016
```

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

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Dell Inc.

PowerEdge M830 (Intel Xeon E5-4620 v4, 2.10 GHz)

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

Platform Notes (Continued)

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) CPU E5-4620 v4 @ 2.10GHz
- 4 "physical id"s (chips)
- 80 "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: 10
  - siblings: 20
  - 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
  - physical 2: cores 0 1 2 3 4 8 9 10 11 12
  - physical 3: cores 0 1 2 3 4 8 9 10 11 12
- cache size: 25600 KB

From /proc/meminfo

- MemTotal: 529326752 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:
  - x86_64 x86_64 x86_64 GNU/Linux

- run-level 3 May 9 19:48

SPEC is set to: /root/cpu2006-1.2

Additional information from dmidecode:

- Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
Platform Notes (Continued)

reads system data which is "intended to allow hardware to be accurately
determined", but the intent may not be met, as there are frequent changes to
hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Dell Inc. 2.0.1 03/31/2016
Memory:
  16x 00AD00B300AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133
        MHz
  16x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133
        MHz
  16x 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/sh"
OMP_NUM_THREADS = "40"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
memory using RedHat EL 7.1
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
  464.h264ref: -DSPEC_CPU_LP64
  471.omnetpp: -DSPEC_CPU_LP64
SPEC CINT2006 Result

Dell Inc.
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Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

Base Portability Flags (Continued)

C benchmarks:
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 -opt-prefetch -auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-\Wl,-z,muldefs -L/sh -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_2016/linux/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
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
464.h264ref: -DSPEC_CPU_LP64

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### Peak Portability Flags (Continued)

- 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: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`  
  `-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`  
  `-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch`  
  `-ansi-alias`  
- 401.bzip2: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`  
  `-ipo(pass 2) -O3(pass 2) -no-prec-div`  
  `-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32`  
  `-opt-prefetch -ansi-alias`  
- 403.gcc: basepeak = yes  
- 429.mcf: `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel`  
  `-opt-prefetch -auto-p32`  
- 445.gobmk: basepeak = yes  
- 456.hmmer: basepeak = yes  
- 458.sjeng: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`  
  `-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`  
  `-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4`  
- 462.libquantum: basepeak = yes  
- 464.h264ref: basepeak = yes

#### C++ benchmarks:

- 471.omnetpp: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`  
  `-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`  
  `-par-num-threads=1(pass 1) -prof-use(pass 2)`  
  `-opt-ra-region-strategy=block`  
  `-ansi-alias`  
  `-Wl,-z,muldefs -L/sh -lsmartheap`  
- 473.astar: basepeak = yes  
- 483.xalancbmk: `-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch`  
  `-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap`
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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-ic16.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.xml

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

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