Dell Inc.

PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)

**SPECfp®2006 = 91.6**

**SPECfp_base2006 = 87.2**

**CPU2006 license:** 55

**Test sponsor:** Dell Inc.

**Test date:** May-2016

**Hardware Availability:** Jun-2016

**Tested by:** Dell Inc.

**Software Availability:** Dec-2015

---

**410.bwaves**

- Score: 28.1

**416.gamess**

- Score: 24.6

**433.milc**

- Score: 54.0

**434.zeusmp**

- Score: 148

**435.gromacs**

- Score: 33.2

**436.cactusADM**

- Score: 626

**437.leslie3d**

- Score: 212

**444.namd**

- Score: 19.9

**447.dealII**

- Score: 43.4

**450.soplex**

- Score: 34.8

**453.povray**

- Score: 43.7

**454.calculix**

- Score: 37.6

**459.GemsFDTD**

- Score: 38.6

**465.tonto**

- Score: 36.3

**470.lbm**

- Score: 36.1

**471.milc**

- Score: 27.7

**481.wrf**

- Score: 91.3

**482.sphinx3**

- Score: 53.2

---

**Hardware**

- **CPU Name:** Intel Xeon E5-4628L v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 2.20 GHz
- **CPU MHz:** 1800
- **FPU:** Integrated
- **CPU(s) enabled:** 56 cores, 4 chips, 14 cores/chip, 2 threads/core
- **CPU(s) 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

---

**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;
  Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)

---

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Dell Inc.
PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)

**SPEC CFP2006 Result**

**SPECfp2006 =** 91.6
**SPECfp_base2006 =** 87.2

**CPU2006 license:** 55
**Test sponsor:** Dell Inc.
**Tested by:** Dell Inc.
**Test date:** May-2016
**Hardware Availability:** Jun-2016
**Software Availability:** Dec-2015

**L3 Cache:** 35 MB I+D on chip per chip
**Other Cache:** None
**Memory:** 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)
**Disk Subsystem:** 1 x 800 GB SATA SSD
**Other Hardware:** None

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>16.3</td>
<td>833</td>
<td>15.9</td>
<td>852</td>
<td><strong>15.9</strong></td>
<td><strong>852</strong></td>
</tr>
<tr>
<td>416.gamess</td>
<td><strong>796</strong></td>
<td><strong>24.6</strong></td>
<td>795</td>
<td>24.6</td>
<td>798</td>
<td>24.5</td>
</tr>
<tr>
<td>433.milc</td>
<td><strong>170</strong></td>
<td><strong>54.0</strong></td>
<td>165</td>
<td>55.7</td>
<td>177</td>
<td>51.7</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>62.2</td>
<td>146</td>
<td><strong>61.5</strong></td>
<td><strong>148</strong></td>
<td>61.2</td>
<td>149</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>215</td>
<td>33.2</td>
<td><strong>215</strong></td>
<td><strong>33.2</strong></td>
<td>216</td>
<td>33.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td><strong>19.1</strong></td>
<td><strong>626</strong></td>
<td>19.6</td>
<td>611</td>
<td><strong>19.1</strong></td>
<td><strong>626</strong></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td><strong>44.4</strong></td>
<td><strong>212</strong></td>
<td>45.4</td>
<td>207</td>
<td>43.2</td>
<td>218</td>
</tr>
<tr>
<td>444.namd</td>
<td>415</td>
<td>19.3</td>
<td><strong>415</strong></td>
<td><strong>19.3</strong></td>
<td>415</td>
<td>19.3</td>
</tr>
<tr>
<td>447.dealII</td>
<td>265</td>
<td>43.2</td>
<td>263</td>
<td>43.4</td>
<td><strong>264</strong></td>
<td><strong>43.4</strong></td>
</tr>
<tr>
<td>450.soplex</td>
<td>242</td>
<td>34.5</td>
<td>238</td>
<td>35.1</td>
<td><strong>240</strong></td>
<td><strong>34.8</strong></td>
</tr>
<tr>
<td>453.povray</td>
<td>140</td>
<td>37.9</td>
<td>142</td>
<td>37.6</td>
<td><strong>142</strong></td>
<td><strong>37.6</strong></td>
</tr>
<tr>
<td>454.calcualix</td>
<td><strong>227</strong></td>
<td><strong>36.3</strong></td>
<td>227</td>
<td>36.4</td>
<td>228</td>
<td>36.2</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>52.5</td>
<td>202</td>
<td>55.1</td>
<td>192</td>
<td><strong>54.0</strong></td>
<td><strong>196</strong></td>
</tr>
<tr>
<td>465.tonto</td>
<td><strong>356</strong></td>
<td><strong>27.7</strong></td>
<td>361</td>
<td>27.3</td>
<td>337</td>
<td>29.2</td>
</tr>
<tr>
<td>470.Ibm</td>
<td>10.6</td>
<td>1290</td>
<td>11.4</td>
<td>1210</td>
<td><strong>11.0</strong></td>
<td><strong>1250</strong></td>
</tr>
<tr>
<td>481.wrf</td>
<td>125</td>
<td>89.3</td>
<td><strong>122</strong></td>
<td><strong>91.3</strong></td>
<td>121</td>
<td>92.7</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>366</td>
<td>53.2</td>
<td>368</td>
<td>53.0</td>
<td><strong>366</strong></td>
<td><strong>53.2</strong></td>
</tr>
</tbody>
</table>

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

**Operating System Notes**

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

**Platform Notes**

BIOS settings:
Snoop Mode set to Home Snoop
Virtualization Technology disabled
System Profile set to custom
CPU Power Management set to Maximum Performance
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic

Continued on next page
Dell Inc.

**PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)**

| SPECfp2006 = | 91.6 |
| SPECfp_base2006 = | 87.2 |

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test date: May-2016  
Hardware Availability: Jun-2016  
Software Availability: Dec-2015

### Platform Notes (Continued)

Energy Efficiency Policy set to Performance  
Memory Patrol Scrub disabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on linux-t2sb Thu May 19 08:11:53 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

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) CPU E5-4628L v4 @ 1.80GHZ  
4 "physical id"s (chips)  
112 "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 : 14  
siblings : 28  
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14  
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14  
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14  
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14  
cache size : 35840 KB

From /proc/meminfo  
MemTotal: 529326748 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:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 1  
# 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-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-t2sb 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015

Continued on next page
SPEC CFP2006 Result

Dell Inc.

PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)

SPECfp2006 = 91.6
SPECfp_base2006 = 87.2

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.
Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Platform Notes (Continued)

(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 May 19 00:55
SPEC is set to: /root/cpu2006-1.2
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 determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Dell Inc. 1.0.0 04/26/2016
Memory:
31x 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
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,compact,1,0"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "56"

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/enable

Base Compiler Invocation

C benchmarks:
  icc  -m64

C++ benchmarks:
icpc  -m64

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  icc  -m64 ifort -m64
Dell Inc.  
PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)  

SPECfp2006 = 91.6  
SPECfp_base2006 = 87.2

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test date: May-2016  
Hardware Availability: Jun-2016  
Software Availability: Dec-2015

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Continued on next page
## SPEC CFP2006 Result

**Dell Inc.**

PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)

**SPECfp2006 = 91.6**

**SPECfp_base2006 = 87.2**

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test date:</td>
<td>May-2016</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

### Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```plaintext
icc -m64 ifort -m64
```

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

- 433.milc: basepeak = yes
- 470.lbm: basepeak = yes
- 482.sphinx3: basepeak = yes

**C++ benchmarks:**

- 444.namd: -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) -fno-alias
  -auto-ilp32

- 447.dealII: basepeak = yes
- 450.soplex: basepeak = yes
- 453.povray: -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
  -ansi-alias

**Fortran benchmarks:**

- 410.bwaves: basepeak = yes
- 416.gamess: -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) -unroll2
  -inline-level=0 -scalar-rep-

- 434.zeusmp: basepeak = yes
- 437.leslie3d: basepeak = yes

Continued on next page
SPEC CFP2006 Result

Dell Inc.

PowerEdge R830 (Intel Xeon E5-4628L v4, 1.80 GHz)

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test date:</td>
<td>May-2016</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

**SPECfp2006 = 91.6**

**SPECfp_base2006 = 87.2**

**Peak Optimization Flags (Continued)**

459.GemsFDTD: -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) -unroll2
-inline-level=0 -opt-prefetch -parallel

465.tonto: -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) -inline-calloc
-opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
481.wrf: basepeak = yes

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

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Originally published on 26 July 2016.