Dell Inc. PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

**SPECfp®2006 = 79.6**  
**SPECfp_base2006 = 76.5**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>May-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E5-4610 v4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU MHz:</td>
<td>1800</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>40 cores, 4 chips, 10 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>2, 4 chip</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

Continued on next page
### Dell Inc.

PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

**SPEC CFP2006 Result**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>18.9</td>
<td>718</td>
<td>17.7</td>
<td>768</td>
<td>20.0</td>
<td>679</td>
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<tr>
<td>416.gamess</td>
<td>859</td>
<td>22.8</td>
<td>866</td>
<td>22.6</td>
<td>862</td>
<td>22.7</td>
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<tr>
<td>433.milc</td>
<td>196</td>
<td>46.9</td>
<td>188</td>
<td>48.7</td>
<td>187</td>
<td>49.2</td>
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<tr>
<td>434.zeusmp</td>
<td>67.3</td>
<td>135</td>
<td>68.6</td>
<td>133</td>
<td>67.9</td>
<td>134</td>
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<tr>
<td>435.gromacs</td>
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<td>32.3</td>
<td>226</td>
<td>31.5</td>
<td>222</td>
<td>32.2</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>24.0</td>
<td>499</td>
<td>24.9</td>
<td>481</td>
<td>24.6</td>
<td>485</td>
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<tr>
<td>437.leslie3d</td>
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<td>171</td>
<td>55.6</td>
<td>169</td>
<td>58.9</td>
<td>160</td>
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<tr>
<td>444.namd</td>
<td>507</td>
<td>15.8</td>
<td>507</td>
<td>15.8</td>
<td>507</td>
<td>15.8</td>
</tr>
<tr>
<td>447.dealII</td>
<td>311</td>
<td>36.7</td>
<td>313</td>
<td>36.6</td>
<td>311</td>
<td>36.8</td>
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<tr>
<td>450.soplex</td>
<td>282</td>
<td>29.5</td>
<td>289</td>
<td>28.9</td>
<td>283</td>
<td>29.5</td>
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<tr>
<td>453.povray</td>
<td>167</td>
<td>31.9</td>
<td>165</td>
<td>32.2</td>
<td>166</td>
<td>32.1</td>
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<tr>
<td>454.calculix</td>
<td>258</td>
<td>32.0</td>
<td>258</td>
<td>32.0</td>
<td>258</td>
<td>32.0</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>58.1</td>
<td>183</td>
<td>65.1</td>
<td>163</td>
<td>59.3</td>
<td>179</td>
</tr>
<tr>
<td>465.tonto</td>
<td>372</td>
<td>26.5</td>
<td>365</td>
<td>27.0</td>
<td>374</td>
<td>26.3</td>
</tr>
<tr>
<td>470.lbm</td>
<td>12.5</td>
<td>1100</td>
<td>12.7</td>
<td>1080</td>
<td>13.2</td>
<td>1040</td>
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<tr>
<td>481.wrf</td>
<td>137</td>
<td>81.4</td>
<td>136</td>
<td>82.2</td>
<td>135</td>
<td>82.5</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>384</td>
<td>50.7</td>
<td>387</td>
<td>50.4</td>
<td>388</td>
<td>50.3</td>
</tr>
</tbody>
</table>

**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

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Continued on next page
Dell Inc.

PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp2006 = 79.6

SPECfp_base2006 = 76.5

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 $ $Date:: 2014-06-25 #$ e3fbb0667b5a285932ceab81e28219e1
running on linux-t2sb Thu May 26 19:18:05 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 E5-4610 v4 @ 1.80GHz
  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: 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.
on-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
Dell Inc. PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

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<thead>
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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 26 10:40

SPEC is set to: /root/cpu2006-1.2
/system/ Type  Size  Used Avail Use% Mounted on
/dev/sda3  btrfs  461G  12G  450G  3% /

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. 1.0.2 05/13/2016
Memory:
  31x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 1866
  MHz
  1x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 1866
  MHz
  16x Not Specified Not Specified

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 = "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/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 E5-4610 v4, 1.80 GHz)  

SPECfp2006 = 79.6
SPECfp_base2006 = 76.5

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

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.games: -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
**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
Dell Inc.

PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

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CPU2006 license: 55
Test sponsor: Dell Inc.
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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

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

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