Dell Inc.

PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)

**SPECfp®2006** = 79.9

**SPECfp_base2006** = 77.1

**Hardware**

- **CPU Name:** Intel Xeon E5-4610 v4
- **CPU Characteristics:**
  - CPU MHz: 1800
  - FPU: Integrated
  - CPU(s) enabled: 40 cores, 4 chips, 10 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)
Dell Inc.  
PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp2006 = 79.9
SPECfp_base2006 = 77.1

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

L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: 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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>18.1</td>
<td>752</td>
<td>19.1</td>
<td>710</td>
<td>18.6</td>
<td>729</td>
<td>18.1</td>
<td>752</td>
<td>19.1</td>
<td>710</td>
</tr>
<tr>
<td>416.gamess</td>
<td>864</td>
<td>22.6</td>
<td>860</td>
<td>22.8</td>
<td>860</td>
<td>22.8</td>
<td>819</td>
<td>23.9</td>
<td>813</td>
<td>24.1</td>
</tr>
<tr>
<td>433.milc</td>
<td>209</td>
<td>43.8</td>
<td>185</td>
<td>49.6</td>
<td>195</td>
<td>47.1</td>
<td>209</td>
<td>43.8</td>
<td>185</td>
<td>49.6</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>67.9</td>
<td>134</td>
<td>68.8</td>
<td>132</td>
<td>69.3</td>
<td>131</td>
<td>67.9</td>
<td>134</td>
<td>68.8</td>
<td>132</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>220</td>
<td>32.4</td>
<td>225</td>
<td>31.8</td>
<td>221</td>
<td>32.4</td>
<td>220</td>
<td>32.4</td>
<td>225</td>
<td>31.8</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>23.2</td>
<td>514</td>
<td>22.9</td>
<td>522</td>
<td>22.8</td>
<td>525</td>
<td>23.2</td>
<td>514</td>
<td>22.9</td>
<td>522</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>53.4</td>
<td>176</td>
<td>55.6</td>
<td>169</td>
<td>50.8</td>
<td>185</td>
<td>53.4</td>
<td>176</td>
<td>55.6</td>
<td>169</td>
</tr>
<tr>
<td>444.namd</td>
<td>506</td>
<td>15.8</td>
<td>507</td>
<td>15.8</td>
<td>507</td>
<td>15.8</td>
<td>491</td>
<td>16.3</td>
<td>491</td>
<td>16.3</td>
</tr>
<tr>
<td>447.dealII</td>
<td>312</td>
<td>36.7</td>
<td>314</td>
<td>36.4</td>
<td>312</td>
<td>36.6</td>
<td>312</td>
<td>36.7</td>
<td>314</td>
<td>36.4</td>
</tr>
<tr>
<td>450.soplex</td>
<td>284</td>
<td>29.3</td>
<td>283</td>
<td>29.5</td>
<td>289</td>
<td>28.8</td>
<td>284</td>
<td>29.3</td>
<td>283</td>
<td>29.5</td>
</tr>
<tr>
<td>453.povray</td>
<td>165</td>
<td>32.2</td>
<td>162</td>
<td>32.8</td>
<td>165</td>
<td>32.2</td>
<td>146</td>
<td>36.4</td>
<td>142</td>
<td>37.5</td>
</tr>
<tr>
<td>454.calculix</td>
<td>257</td>
<td>32.1</td>
<td>259</td>
<td>31.9</td>
<td>257</td>
<td>32.1</td>
<td>249</td>
<td>33.1</td>
<td>250</td>
<td>33.0</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>57.4</td>
<td>185</td>
<td>55.0</td>
<td>193</td>
<td>58.5</td>
<td>181</td>
<td>45.9</td>
<td>231</td>
<td>45.3</td>
<td>234</td>
</tr>
<tr>
<td>465.tonto</td>
<td>365</td>
<td>26.9</td>
<td>365</td>
<td>27.0</td>
<td>366</td>
<td>26.9</td>
<td>317</td>
<td>31.1</td>
<td>317</td>
<td>31.1</td>
</tr>
<tr>
<td>470.lbm</td>
<td>13.3</td>
<td>1030</td>
<td>12.6</td>
<td>1090</td>
<td>12.7</td>
<td>1080</td>
<td>13.3</td>
<td>1030</td>
<td>12.6</td>
<td>1090</td>
</tr>
<tr>
<td>481.wrf</td>
<td>136</td>
<td>82.3</td>
<td>130</td>
<td>85.9</td>
<td>136</td>
<td>82.2</td>
<td>136</td>
<td>82.3</td>
<td>130</td>
<td>85.9</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>387</td>
<td>50.3</td>
<td>385</td>
<td>50.7</td>
<td>388</td>
<td>50.3</td>
<td>387</td>
<td>50.3</td>
<td>385</td>
<td>50.7</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 Performance set to Hardware P States
- C States set to Autonomous
- C1E disabled
- Uncore Frequency set to Dynamic
- Energy Efficiency Policy set to Balanced Performance

Continued on next page
Dell Inc.

PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)

**SPECfp2006 = 79.9**

**SPECfp_base2006 = 77.1**

---

**CPU2006 license:** 55

**Test date:** May-2016

**Test sponsor:** Dell Inc.

**Hardware Availability:** Jun-2016

**Tested by:** Dell Inc.

**Software Availability:** Mar-2016

---

**Platform Notes (Continued)**

Memory Patrol Scrub disabled

Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-vs2o Thu May  5 17:56:15 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)
- 20 "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: 529195636 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:
- (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

Continued on next page
Dell Inc.

PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp2006 = 79.9
SPECfp_base2006 = 77.1

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

Platform Notes (Continued)

run-level 3 May 5 09:17

SPEC is set to: /root/cpu2006-1.2
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   365G   11G  355G   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. 2.0.1 03/31/2016
Memory:
20x 00AD00B300AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 1866 MHz
12x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 1866 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 = "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

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  icc  -m64 ifort -m64
### Dell Inc.
**PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp2006</td>
<td>79.9</td>
</tr>
<tr>
<td>SPECfp_base2006</td>
<td>77.1</td>
</tr>
</tbody>
</table>

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

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>416.gamess</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>433.milc</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64, -nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64, -nofor_main</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>444.namd</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>447.dealII</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64, -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

### 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
Dell Inc.
PowerEdge M830 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp2006 = 79.9
SPECfp_base2006 = 77.1

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

Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```bash
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 M830 (Intel Xeon E5-4610 v4, 1.80 GHz)  

**SPECfp2006 = 79.9**  
**SPECfp_base2006 = 77.1**

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

**Peak Optimization Flags (Continued)**

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 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:threadsafepass 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.  
Report generated on Tue Jun 28 17:30:12 2016 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 28 June 2016.