Dell Inc.

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

SPECfp®2006 = 102
SPECfp_base2006 = 96.6

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

Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

SPECfp®2006 = = 102
SPECfp_base2006 = = 96.6

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System: SUSE Linux Enterprise Server 12 SP1</td>
<td>CPU Name: Intel Xeon E5-4620 v4</td>
</tr>
<tr>
<td>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</td>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 2.60 GHz</td>
</tr>
<tr>
<td>Auto Parallel: Yes</td>
<td>CPU MHz: 2100</td>
</tr>
<tr>
<td>File System: btrfs</td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td></td>
<td>CPU(s) orderable: 2,4 chip</td>
</tr>
<tr>
<td></td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td></td>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

Continued on next page
**SPEC CFP2006 Result**

**Dell Inc.**

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

<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>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>16.9</td>
<td>806</td>
<td>16.8</td>
<td>807</td>
<td>16.4</td>
<td>827</td>
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<tr>
<td>416.gamess</td>
<td>658</td>
<td>29.8</td>
<td>658</td>
<td>29.7</td>
<td>656</td>
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<td>564</td>
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<td>565</td>
<td>34.7</td>
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<td>433.milc</td>
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<td>63.0</td>
<td>157</td>
<td>58.4</td>
<td>152</td>
<td>60.5</td>
<td>146</td>
<td>63.0</td>
<td>157</td>
<td>58.4</td>
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<tr>
<td>434.zeusmp</td>
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<td>58.3</td>
<td>156</td>
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<td>158</td>
<td>58.3</td>
<td>156</td>
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<td>435.gromacs</td>
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<td>437.leslie3d</td>
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<td>444.namd</td>
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<td>447.dealII</td>
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<td>450.soplex</td>
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<td>453.povray</td>
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<td>47.7</td>
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<td>46.6</td>
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<td>459.GemsFDTD</td>
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<td>59.2</td>
<td>179</td>
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<td>186</td>
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<td>465.tonto</td>
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<td>288</td>
<td>34.2</td>
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<td>44.2</td>
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<td>470.lbm</td>
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<td>11.6</td>
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<tr>
<td>481.wrf</td>
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<td>111</td>
<td>100</td>
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<td>98.6</td>
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<tr>
<td>482.sphinx3</td>
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<td>312</td>
<td>62.5</td>
<td>312</td>
<td>62.5</td>
<td>312</td>
<td>62.5</td>
<td>312</td>
<td>62.5</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 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

Continued on next page
Dell Inc.
PowerEdge M830 (Intel Xeon E5-4620 v4, 2.10 GHz)

**SPEC fp_base2006 =** 96.6

**SPECfp2006 =** 102

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**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-9j5l Tue May 10 02:07:23 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 E5-4620 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:
  - 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:

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Dell Inc.

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Platform Notes (Continued)

(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 9 19:48

SPEC is set to: /root/cpu2006-1.2

Filesystem  Type   Size  Used  Avail Use% Mounted on
/dev/sda2    xfs    225G   11G  215G   5% /

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:
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)

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
SPEC CFP2006 Result

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Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.game5s: -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.GemsFD&D: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -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
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Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
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
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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