Dell Inc.

PowerEdge R830 (Intel Xeon E5-4667 v4, 2.20 GHz)

SPECfp®2006 = 114
SPECfp_base2006 = 108

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

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

SPECfp_base2006 = 108
SPECfp2006 = 114

Hardware
CPU Name: Intel Xeon E5-4667 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 72 cores, 4 chips, 18 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.

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L3 Cache: 45 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R)  
Disk Subsystem: 1 x 800 GB SATA SSD  
Other Hardware: None

Base Pointers: 64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>410.bwaves</strong></td>
<td>Seconds</td>
<td>Ratio</td>
</tr>
<tr>
<td><strong>416.gamess</strong></td>
<td>11.8</td>
<td>1160</td>
</tr>
<tr>
<td><strong>433.milc</strong></td>
<td>599</td>
<td>32.7</td>
</tr>
<tr>
<td><strong>434.zeusmp</strong></td>
<td>139</td>
<td>66.2</td>
</tr>
<tr>
<td><strong>435.gromacs</strong></td>
<td>171</td>
<td>41.7</td>
</tr>
<tr>
<td><strong>436.cactusADM</strong></td>
<td>16.1</td>
<td>744</td>
</tr>
<tr>
<td><strong>437.leslie3d</strong></td>
<td>38.1</td>
<td>247</td>
</tr>
<tr>
<td><strong>444.namd</strong></td>
<td>304</td>
<td>26.4</td>
</tr>
<tr>
<td><strong>447.dealII</strong></td>
<td>200</td>
<td>57.2</td>
</tr>
<tr>
<td><strong>450.soplex</strong></td>
<td>196</td>
<td><strong>42.6</strong></td>
</tr>
<tr>
<td><strong>453.povray</strong></td>
<td>98.2</td>
<td>54.2</td>
</tr>
<tr>
<td><strong>454.calculix</strong></td>
<td>178</td>
<td>46.4</td>
</tr>
<tr>
<td><strong>459.GemsFDTD</strong></td>
<td>55.9</td>
<td>190</td>
</tr>
<tr>
<td><strong>465.tonto</strong></td>
<td>267</td>
<td>36.9</td>
</tr>
<tr>
<td><strong>470.lbm</strong></td>
<td>8.76</td>
<td>1570</td>
</tr>
<tr>
<td><strong>481.wrf</strong></td>
<td>107</td>
<td>105</td>
</tr>
<tr>
<td><strong>482.sphinx3</strong></td>
<td>302</td>
<td>64.5</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 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
- Energy Efficiency Policy set to Performance

Continued on next page
**SPEC CFP2006 Result**

Dell Inc.

PowerEdge R830 (Intel Xeon E5-4667 v4, 2.20 GHz)  

**SPECfp2006 =** 114  
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**CPU2006 license:** 55  
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**Platform Notes (Continued)**

Memory Patrol Scrub disabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb0667b5a285932ceab81e28219e1  
running on linux-t2sb Mon May 9 06:54:33 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 E5-4667 v4 @ 2.20GHz  
- 4 "physical id"s (chips)  
- 144 "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 : 18  
- siblings : 36  
- physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
- physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
- physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
- physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
- cache size : 46080 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:

Linux linux-t2sb 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015  
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

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Dell Inc.

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Platform Notes (Continued)

run-level 3 May 9 01:21

SPEC is set to: /root/cpu2006-1.2
   Filesystem   Type    Size  Used  Avail  Use% Mounted on
   /dev/sda3    btrfs   461G   12G  446G   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. 1.0.0 04/26/2016
Memory:
   31x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
   1x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 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 = "72"

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 R830 (Intel Xeon E5-4667 v4, 2.20 GHz)  

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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 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64
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
### Dell Inc.

**Dell PowerEdge R830 (Intel Xeon E5-4667 v4, 2.20 GHz)**

### SPEC CFP2006 Result

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### CPU2006 license: 55

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### Tested by: Dell Inc.

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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) -03(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) -03(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) -03(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

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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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