



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]2006 = 112

PowerEdge M830 (Intel Xeon E5-4669 v4, 2.20 GHz)

SPECfp_base2006 = 106

CPU2006 license: 55

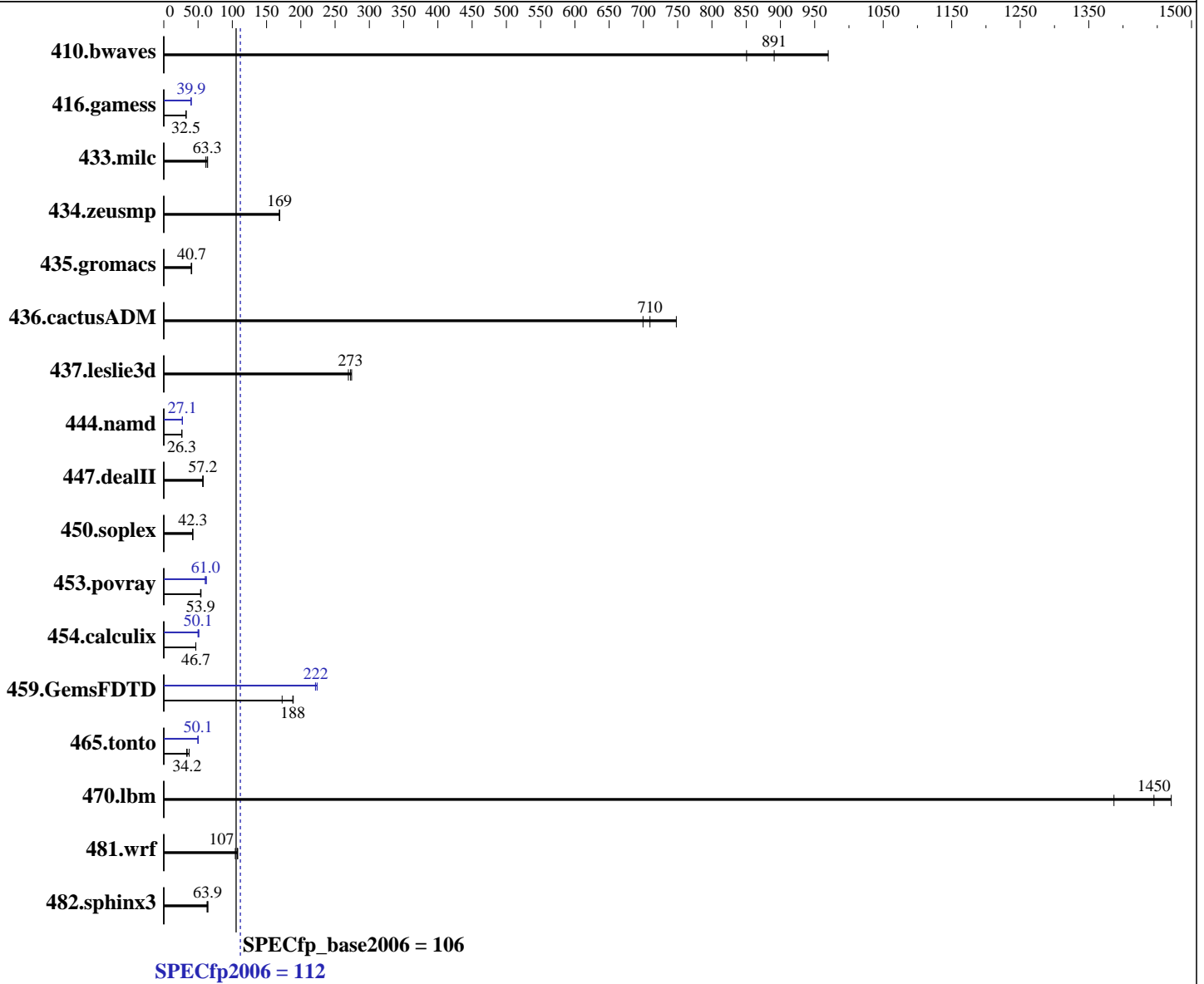
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Apr-2016

Hardware Availability: Jun-2016

Software Availability: Mar-2016



Hardware

CPU Name: Intel Xeon E5-4669 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
 CPU MHz: 2200
 FPU: Integrated
 CPU(s) enabled: 88 cores, 4 chips, 22 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

Continued on next page

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)

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L3 Cache: 55 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

Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 14.0 | 970 | <u>15.3</u> | <u>891</u> | 16.0 | 851 | 14.0 | 970 | <u>15.3</u> | <u>891</u> | 16.0 | 851 |
| 416.gamess | 602 | 32.5 | <u>602</u> | <u>32.5</u> | 603 | 32.5 | <u>491</u> | <u>39.9</u> | 491 | 39.9 | 491 | 39.9 |
| 433.milc | 143 | 64.0 | 150 | 61.1 | <u>145</u> | <u>63.3</u> | 143 | 64.0 | 150 | 61.1 | <u>145</u> | <u>63.3</u> |
| 434.zeusmp | 53.9 | 169 | <u>53.9</u> | <u>169</u> | 53.8 | 169 | 53.9 | 169 | <u>53.9</u> | <u>169</u> | 53.8 | 169 |
| 435.gromacs | <u>176</u> | <u>40.7</u> | 175 | 40.8 | 179 | 39.9 | <u>176</u> | <u>40.7</u> | 175 | 40.8 | 179 | 39.9 |
| 436.cactusADM | <u>16.8</u> | <u>710</u> | 16.0 | 748 | 17.1 | 699 | <u>16.8</u> | <u>710</u> | 16.0 | 748 | 17.1 | 699 |
| 437.leslie3d | <u>34.5</u> | <u>273</u> | 34.3 | 274 | 34.9 | 269 | <u>34.5</u> | <u>273</u> | 34.3 | 274 | 34.9 | 269 |
| 444.namd | <u>305</u> | <u>26.3</u> | 305 | 26.3 | 304 | 26.4 | 296 | 27.1 | <u>296</u> | <u>27.1</u> | 295 | 27.2 |
| 447.dealII | 201 | 56.8 | 199 | 57.4 | <u>200</u> | <u>57.2</u> | 201 | 56.8 | 199 | 57.4 | <u>200</u> | <u>57.2</u> |
| 450.soplex | 199 | 42.0 | <u>197</u> | <u>42.3</u> | 197 | 42.4 | 199 | 42.0 | <u>197</u> | <u>42.3</u> | 197 | 42.4 |
| 453.povray | 99.0 | 53.7 | 97.8 | 54.4 | <u>98.7</u> | <u>53.9</u> | <u>87.2</u> | <u>61.0</u> | 85.5 | 62.2 | 87.9 | 60.5 |
| 454.calculix | <u>177</u> | <u>46.7</u> | 176 | 46.8 | 177 | 46.7 | 161 | 51.3 | <u>165</u> | <u>50.1</u> | 165 | 50.1 |
| 459.GemsFDTD | 61.4 | 173 | 56.1 | 189 | <u>56.4</u> | <u>188</u> | 47.4 | 224 | <u>47.9</u> | <u>222</u> | 47.9 | 221 |
| 465.tonto | <u>288</u> | <u>34.2</u> | 266 | 37.1 | 295 | 33.4 | 198 | 49.8 | <u>197</u> | <u>50.1</u> | 196 | 50.2 |
| 470.lbm | 9.34 | 1470 | <u>9.51</u> | <u>1450</u> | 9.91 | 1390 | 9.34 | 1470 | <u>9.51</u> | <u>1450</u> | 9.91 | 1390 |
| 481.wrf | <u>104</u> | <u>107</u> | 107 | 104 | 104 | 108 | <u>104</u> | <u>107</u> | 107 | 104 | 104 | 108 |
| 482.sphinx3 | 309 | 63.1 | <u>305</u> | <u>63.9</u> | 303 | 64.4 | 309 | 63.1 | <u>305</u> | <u>63.9</u> | 303 | 64.4 |

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
Energy Efficiency Policy set to Performance

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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 # \$ e3fbb8667b5a285932ceab81e28219e1
running on linux-9j5l Tue Apr 19 02:36:31 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 E5-4669 v4 @ 2.20GHz
 4 "physical id"s (chips)
 176 "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 : 22
siblings : 44
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
cache size : 56320 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"
```

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Platform Notes (Continued)

```
uname -a:
Linux linux-9j5l 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Apr 18 20:57
```

```
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
16x 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 = "88"
```

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
```

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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

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
 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

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Peak Compiler Invocation (Continued)

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

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.dealIII: 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-

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Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

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>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.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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