



# SPEC® CFP2006 Result

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## Dell Inc.

SPECfp®2006 = 117

PowerEdge R830 (Intel Xeon E5-4655 v4, 2.50 GHz)

SPECfp\_base2006 = 110

CPU2006 license: 55

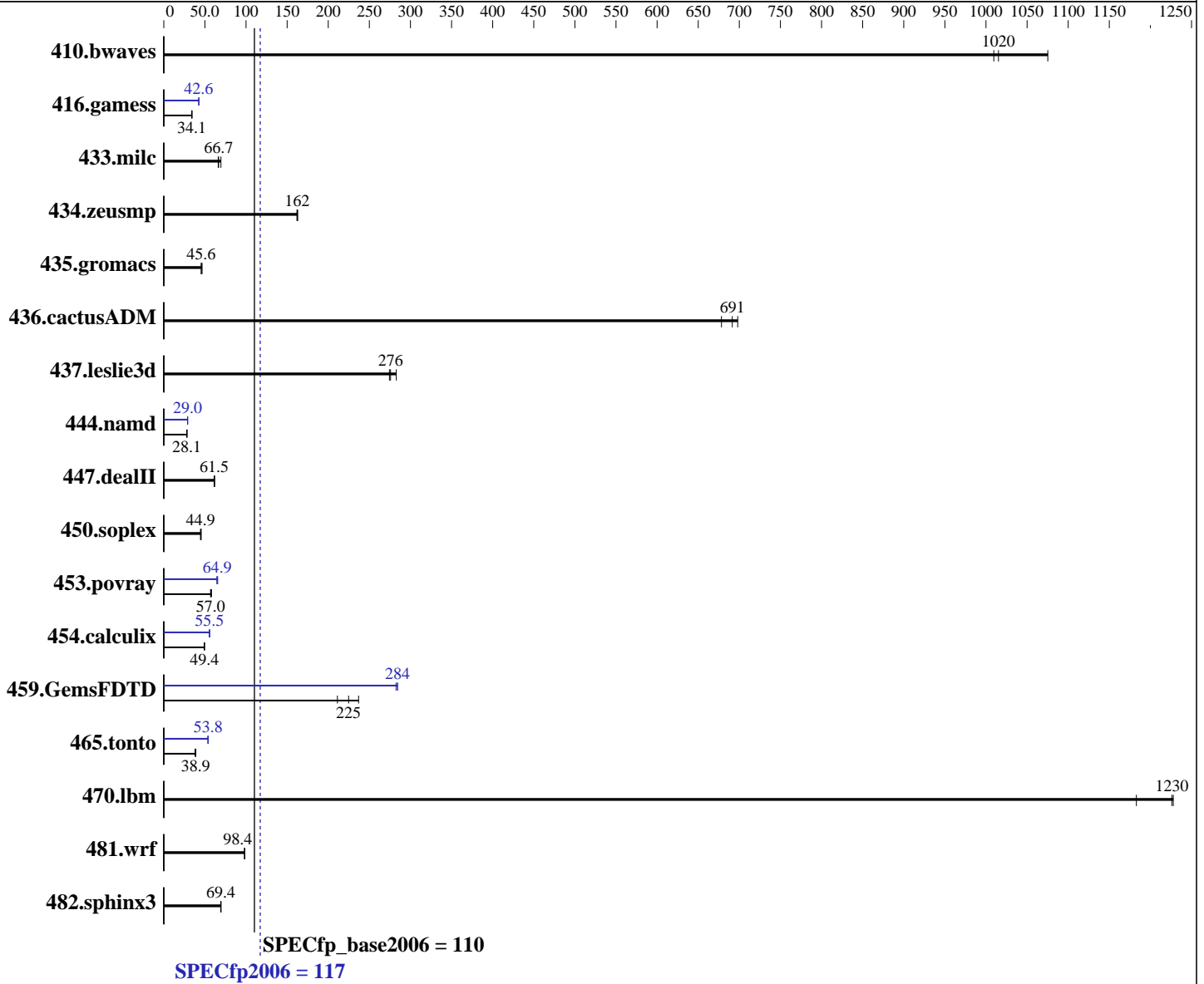
Test date: Apr-2016

Test sponsor: Dell Inc.

Hardware Availability: Jun-2016

Tested by: Dell Inc.

Software Availability: Dec-2015



### Hardware

CPU Name: Intel Xeon E5-4655 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
 CPU MHz: 2500  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 4 chips, 8 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

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### 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: 30 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	12.6	1080	13.5	1010	<u>13.4</u>	<u>1020</u>	12.6	1080	13.5	1010	<u>13.4</u>	<u>1020</u>
416.gamess	571	34.3	575	34.1	<u>574</u>	<u>34.1</u>	<u>459</u>	<u>42.6</u>	459	42.7	460	42.5
433.milc	<u>138</u>	<u>66.7</u>	139	66.2	132	69.5	<u>138</u>	<u>66.7</u>	139	66.2	132	69.5
434.zeusmp	55.9	163	<u>56.0</u>	<u>162</u>	56.2	162	55.9	163	<u>56.0</u>	<u>162</u>	56.2	162
435.gromacs	<u>157</u>	<u>45.6</u>	153	46.6	157	45.6	<u>157</u>	<u>45.6</u>	153	46.6	157	45.6
436.cactusADM	<u>17.3</u>	<u>691</u>	17.1	698	17.6	678	<u>17.3</u>	<u>691</u>	17.1	698	17.6	678
437.leslie3d	34.3	274	<u>34.1</u>	<u>276</u>	33.2	283	34.3	274	<u>34.1</u>	<u>276</u>	33.2	283
444.namd	285	28.1	285	28.1	<u>285</u>	<u>28.1</u>	<u>277</u>	<u>29.0</u>	277	29.0	277	29.0
447.dealII	185	61.9	187	61.3	<u>186</u>	<u>61.5</u>	185	61.9	187	61.3	<u>186</u>	<u>61.5</u>
450.soplex	187	44.7	183	45.5	<u>186</u>	<u>44.9</u>	187	44.7	183	45.5	<u>186</u>	<u>44.9</u>
453.povray	93.3	57.0	<u>93.3</u>	<u>57.0</u>	91.7	58.0	<u>82.0</u>	<u>64.9</u>	82.4	64.6	81.1	65.6
454.calculix	166	49.6	<u>167</u>	<u>49.4</u>	168	49.2	148	55.8	<u>149</u>	<u>55.5</u>	149	55.4
459.GemsFDTD	44.8	237	50.3	211	<u>47.2</u>	<u>225</u>	37.6	282	<u>37.3</u>	<u>284</u>	37.3	284
465.tonto	252	39.0	259	38.0	<u>253</u>	<u>38.9</u>	182	53.9	<u>183</u>	<u>53.8</u>	183	53.7
470.lbm	11.2	1230	<u>11.2</u>	<u>1230</u>	11.6	1180	11.2	1230	<u>11.2</u>	<u>1230</u>	11.6	1180
481.wrf	<u>114</u>	<u>98.4</u>	114	98.0	113	98.5	<u>114</u>	<u>98.4</u>	114	98.0	113	98.5
482.sphinx3	282	69.2	280	69.6	<u>281</u>	<u>69.4</u>	282	69.2	280	69.6	<u>281</u>	<u>69.4</u>

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

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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-t2sb Thu Apr 21 15:09:31 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 E5-4655 v4 @ 2.50GHz
 4 "physical id"s (chips)
 64 "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 : 8
siblings : 16
physical 0: cores 0 1 3 5 8 10 12 13
physical 1: cores 0 1 3 5 8 10 12 13
physical 2: cores 0 1 2 4 9 11 12 13
physical 3: cores 0 1 3 5 8 10 12 13
cache size : 30720 KB
```

```
From /proc/meminfo
MemTotal: 529325584 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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```



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## Platform Notes (Continued)

run-level 3 Apr 21 09:54

SPEC is set to: /root/cpu2006-1.2

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda3	btrfs	461G	11G	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. 0.2.4 03/31/2016

Memory:

32x 00AD063200AD HMA82GR7MFR8N-UH 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 = "32"

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



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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
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

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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

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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>

<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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