



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

PowerEdge R940  
(Intel Xeon Platinum 8170, 2.10 GHz)

SPECfp<sup>®</sup>2006 = 148

SPECfp\_base2006 = 141

CPU2006 license: 55

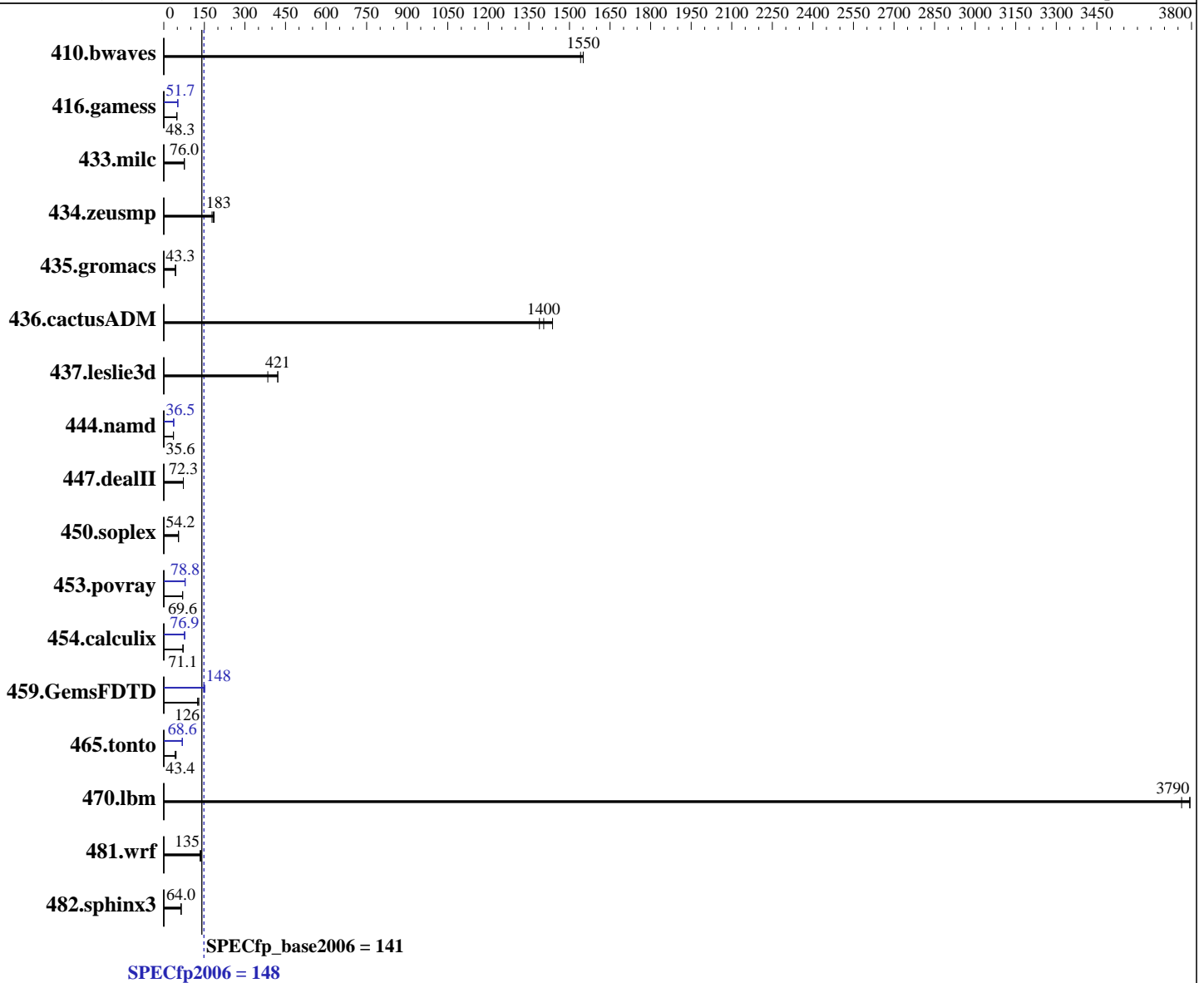
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Oct-2017

Hardware Availability: Jul-2017

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Platinum 8170  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 104 cores, 4 chips, 26 cores/chip  
 CPU(s) orderable: 2,4 chip  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core

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### Software

Operating System: SUSE Linux Enterprise Server 12 (x86\_64) SP2  
 4.4.21-69-default  
 Compiler: C/C++: Version 17.0.3.191 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 17.0.3.191 of Intel Fortran  
 Compiler for Linux  
 Auto Parallel: Yes  
 File System: xfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 35.75 MB I+D on chip per chip  
Other Cache: None  
Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
Disk Subsystem: 1 x 900 GB 15K RPM SAS12  
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	8.82	1540	<b>8.76</b>	<b>1550</b>	8.76	1550	8.82	1540	<b>8.76</b>	<b>1550</b>	8.76	1550
416.gamess	406	48.2	<b>405</b>	<b>48.3</b>	405	48.3	379	51.7	379	51.7	<b>379</b>	<b>51.7</b>
433.milc	122	75.4	121	76.1	<b>121</b>	<b>76.0</b>	122	75.4	121	76.1	<b>121</b>	<b>76.0</b>
434.zeusmp	48.8	186	51.0	178	<b>49.8</b>	<b>183</b>	48.8	186	51.0	178	<b>49.8</b>	<b>183</b>
435.gromacs	165	43.2	165	43.3	<b>165</b>	<b>43.3</b>	165	43.2	165	43.3	<b>165</b>	<b>43.3</b>
436.cactusADM	<b>8.51</b>	<b>1400</b>	8.60	1390	8.31	1440	<b>8.51</b>	<b>1400</b>	8.60	1390	8.31	1440
437.leslie3d	22.3	422	24.4	385	<b>22.3</b>	<b>421</b>	22.3	422	24.4	385	<b>22.3</b>	<b>421</b>
444.namd	225	35.6	<b>225</b>	<b>35.6</b>	225	35.6	220	36.5	220	36.5	<b>220</b>	<b>36.5</b>
447.dealII	158	72.4	158	72.2	<b>158</b>	<b>72.3</b>	158	72.4	158	72.2	<b>158</b>	<b>72.3</b>
450.soplex	155	54.0	<b>154</b>	<b>54.2</b>	153	54.5	155	54.0	<b>154</b>	<b>54.2</b>	153	54.5
453.povray	76.7	69.4	76.3	69.7	<b>76.5</b>	<b>69.6</b>	<b>67.5</b>	<b>78.8</b>	67.6	78.7	67.5	78.8
454.calculix	116	71.1	116	71.1	<b>116</b>	<b>71.1</b>	108	76.7	107	77.3	<b>107</b>	<b>76.9</b>
459.GemsFDTD	<b>83.9</b>	<b>126</b>	81.8	130	84.8	125	<b>71.5</b>	<b>148</b>	71.7	148	69.9	152
465.tonto	216	45.5	<b>227</b>	<b>43.4</b>	234	42.1	<b>143</b>	<b>68.6</b>	143	68.6	144	68.2
470.lbm	3.62	3790	<b>3.62</b>	<b>3790</b>	3.65	3760	3.62	3790	<b>3.62</b>	<b>3790</b>	3.65	3760
481.wrf	81.4	137	83.0	135	<b>82.8</b>	<b>135</b>	81.4	137	83.0	135	<b>82.8</b>	<b>135</b>
482.sphinx3	306	63.7	303	64.3	<b>304</b>	<b>64.0</b>	306	63.7	303	64.3	<b>304</b>	<b>64.0</b>

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:  
Logical Processor Disabled  
Virtualization Technology Disabled  
Sub NUMA Cluster Disabled  
System Profile set to Custom  
CPU Performance set to Maximum Performance  
C1E Disabled  
C States set to Autonomous  
Uncore Frequency set to Dynamic  
Memory Patrol Scrub Disabled

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## Platform Notes (Continued)

Energy Efficiency Policy set to Performance  
CPU Interconnect Bus Link Power Management Disabled  
PCI ASPM L1 Link Power Management Disabled  
Sysinfo program /home/cpu2006/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on linux-2h8y Wed Oct 18 13:50:55 2017

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) Platinum 8170 CPU @ 2.10GHz
 4 "physical id"s (chips)
 104 "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      : 26
  siblings       : 26
  physical 0:    cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
                  26 27 28 29
  physical 1:    cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
                  26 27 28 29
  physical 2:    cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
                  26 27 28 29
  physical 3:    cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
                  26 27 28 29
cache size      : 36608 KB
```

From /proc/meminfo

```
MemTotal:       791225344 kB
HugePages_Total: 0
Hugepagesize:   2048 kB
```

/usr/bin/lsb\_release -d

```
SUSE Linux Enterprise Server 12 SP2
```

From /etc/\*release\* /etc/\*version\*

```
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
```

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## Platform Notes (Continued)

```
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux linux-2h8y 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Oct 18 09:27
```

```
SPEC is set to: /home/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   796G  17G  779G   3% /home
```

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. 1.1.7 08/10/2017
Memory:
48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz
```

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:  
KMP\_AFFINITY = "granularity=fine,compact"  
LD\_LIBRARY\_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"  
OMP\_NUM\_THREADS = "104"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2  
Transparent Huge Pages disabled with:  
echo never > /sys/kernel/mm/transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run

## 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 -qopt-prefetch  
C++ benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
Fortran benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch  
Benchmarks using both Fortran and C:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

## Peak Compiler Invocation

C benchmarks:  
icc -m64  
C++ benchmarks:  
icpc -m64

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## Peak Compiler Invocation (Continued)

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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -fno-alias -auto-ilp32

447.dealIII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(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: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll2 -inline-level=0  
-qopt-prefetch -parallel`

465.tonto: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -inline-calloc -qopt-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`

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-ic17.0-official-linux64-revF.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revC.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml>

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