



# SPEC<sup>®</sup> CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz)

SPECfp<sup>®</sup>\_rate2006 = 1480

SPECfp\_rate\_base2006 = 1430

CPU2006 license: 55

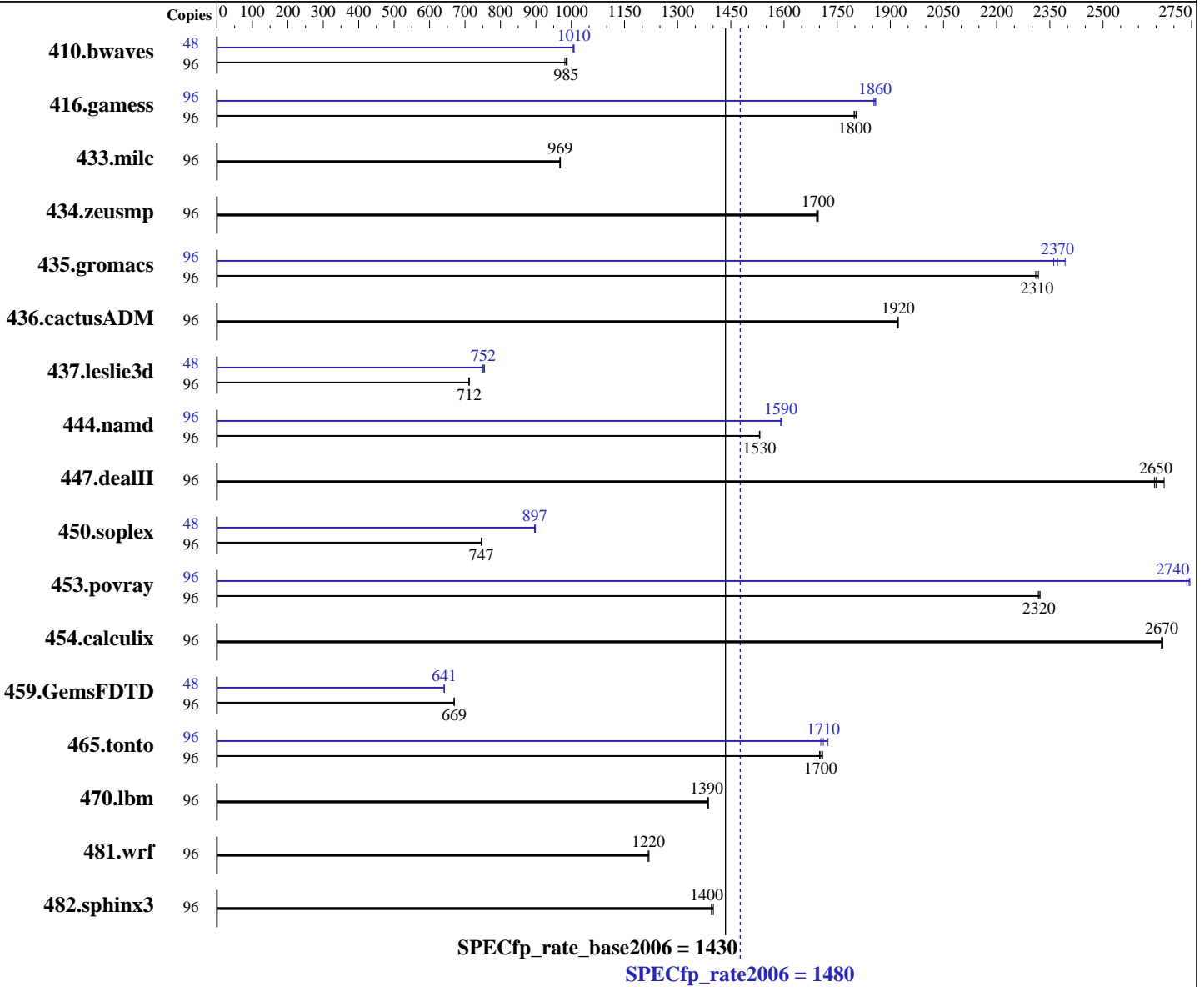
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: May-2017

Hardware Availability: Jul-2017

Software Availability: Nov-2016



### Hardware

CPU Name: Intel Xeon Platinum 8160  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 48 cores, 2 chips, 24 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 chip  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core

Continued on next page

### Software

Operating System: SUSE Linux Enterprise Server 12 SP2 (x86\_64) 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)

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

SPECfp\_rate2006 = 1480

SPECfp\_rate\_base2006 = 1430

CPU2006 license: 55

Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: May-2017

Hardware Availability: Jul-2017

Software Availability: Nov-2016

L3 Cache: 33 MB I+D on chip per chip  
Other Cache: None  
Memory: 384 GB (12 x 32 GB 2Rx8 PC4-2400T-R)  
Disk Subsystem: 1 x 960 GB SATA SSD  
Other Hardware: None

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

## Results Table

| Benchmark     | Base   |             |             |             |             |             |             | Peak   |             |             |             |             |            |             |
|---------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|--------|-------------|-------------|-------------|-------------|------------|-------------|
|               | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds    | Ratio       |
| 410.bwaves    | 96     | <b>1324</b> | <b>985</b>  | 1329        | 982         | 1320        | 988         | 48     | 647         | 1010        | <b>648</b>  | <b>1010</b> | 649        | 1000        |
| 416.gamess    | 96     | <b>1045</b> | <b>1800</b> | 1046        | 1800        | 1042        | 1800        | 96     | 1011        | 1860        | <b>1012</b> | <b>1860</b> | 1014       | 1850        |
| 433.milc      | 96     | 911         | 967         | 909         | 969         | <b>910</b>  | <b>969</b>  | 96     | 911         | 967         | 909         | 969         | <b>910</b> | <b>969</b>  |
| 434.zeusmp    | 96     | <b>515</b>  | <b>1700</b> | 515         | 1700        | 516         | 1690        | 96     | <b>515</b>  | <b>1700</b> | 515         | 1700        | 516        | 1690        |
| 435.gromacs   | 96     | 296         | 2320        | <b>296</b>  | <b>2310</b> | 297         | 2310        | 96     | <b>289</b>  | <b>2370</b> | 286         | 2390        | 290        | 2360        |
| 436.cactusADM | 96     | 597         | 1920        | 597         | 1920        | <b>597</b>  | <b>1920</b> | 96     | 597         | 1920        | 597         | 1920        | <b>597</b> | <b>1920</b> |
| 437.leslie3d  | 96     | 1268        | 712         | <b>1268</b> | <b>712</b>  | 1268        | 711         | 48     | <b>600</b>  | <b>752</b>  | 601         | 750         | 598        | 755         |
| 444.namd      | 96     | 503         | 1530        | <b>503</b>  | <b>1530</b> | 503         | 1530        | 96     | <b>484</b>  | <b>1590</b> | 484         | 1590        | 483        | 1590        |
| 447.dealII    | 96     | 411         | 2670        | <b>414</b>  | <b>2650</b> | 415         | 2650        | 96     | 411         | 2670        | <b>414</b>  | <b>2650</b> | 415        | 2650        |
| 450.soplex    | 96     | 1074        | 746         | 1071        | 747         | <b>1072</b> | <b>747</b>  | 48     | <b>446</b>  | <b>897</b>  | 445         | 899         | 447        | 896         |
| 453.povray    | 96     | 220         | 2320        | 220         | 2320        | <b>220</b>  | <b>2320</b> | 96     | 187         | 2740        | 186         | 2750        | <b>186</b> | <b>2740</b> |
| 454.calculix  | 96     | 297         | 2670        | 297         | 2670        | <b>297</b>  | <b>2670</b> | 96     | 297         | 2670        | 297         | 2670        | <b>297</b> | <b>2670</b> |
| 459.GemsFDTD  | 96     | <b>1521</b> | <b>669</b>  | 1521        | 670         | 1522        | 669         | 48     | 794         | 641         | <b>794</b>  | <b>641</b>  | 794        | 641         |
| 465.tonto     | 96     | 556         | 1700        | 553         | 1710        | <b>555</b>  | <b>1700</b> | 96     | 554         | 1700        | 548         | 1720        | <b>552</b> | <b>1710</b> |
| 470.lbm       | 96     | 951         | 1390        | <b>952</b>  | <b>1390</b> | 952         | 1390        | 96     | 951         | 1390        | <b>952</b>  | <b>1390</b> | 952        | 1390        |
| 481.wrf       | 96     | 880         | 1220        | <b>881</b>  | <b>1220</b> | 883         | 1210        | 96     | 880         | 1220        | <b>881</b>  | <b>1220</b> | 883        | 1210        |
| 482.sphinx3   | 96     | <b>1340</b> | <b>1400</b> | 1341        | 1400        | 1336        | 1400        | 96     | <b>1340</b> | <b>1400</b> | 1341        | 1400        | 1336       | 1400        |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

BIOS settings:  
Sub NUMA Cluster enabled  
Virtualization Technology disabled

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

**Dell Inc.**

**SPECfp\_rate2006 = 1480**

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

**SPECfp\_rate\_base2006 = 1430**

**CPU2006 license:** 55

**Test date:** May-2017

**Test sponsor:** Dell Inc.

**Hardware Availability:** Jul-2017

**Tested by:** Dell Inc.

**Software Availability:** Nov-2016

## Platform Notes (Continued)

System Profile set to Custom  
 CPU Performance set to Maximum Performance  
 C States set to autonomous  
 C1E disabled  
 Uncore Frequency set to Dynamic  
 Energy Efficiency Policy set to Performance  
 Memory Patrol Scrub disabled  
 Logical Processor enabled  
 CPU Interconnect Bus Link Power Management disabled  
 PCI ASPM L1 Link Power Management disabled  
 Sysinfo program /root/cpu2006-1.2\_icl17u3/config/sysinfo.rev6993  
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
 running on linux-xp0h Fri May 19 13:37:04 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 8160 CPU @ 2.10GHz
 2 "physical id"s (chips)
 96 "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 : 24
  siblings  : 48
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
 27 28 29
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
 27 28 29
cache size : 33792 KB
```

```
From /proc/meminfo
MemTotal:      394867844 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
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"
```

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

**SPECfp\_rate2006 = 1480**

**SPECfp\_rate\_base2006 = 1430**

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

**Test date:** May-2017  
**Hardware Availability:** Jul-2017  
**Software Availability:** Nov-2016

## Platform Notes (Continued)

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

```
uname -a:
Linux linux-xp0h 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 May 19 01:41
```

```
SPEC is set to: /root/cpu2006-1.2_ic17u3
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   930G  8.3G  921G   1% /
```

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 05/17/2017
Memory:
12x 002C00B3002C 36ASF4G72PZ-2G3B1 32 GB 2 rank 2400 MHz
4x Not Specified Not Specified
```

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

```
LD_LIBRARY_PATH = "/root/cpu2006-1.2_ic17u3/lib/ia32:/root/cpu2006-1.2_ic17u3/lib/intel64:/root/cpu2006-1.2_ic17u3/sh10.2"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2  
Transparent Huge Pages enabled by default  
Filesystem page cache cleared with:  
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run  
runspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <etc>

## Base Compiler Invocation

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

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

**SPECfp\_rate2006 = 1480**

**SPECfp\_rate\_base2006 = 1430**

**CPU2006 license:** 55

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test date:** May-2017

**Hardware Availability:** Jul-2017

**Software Availability:** Nov-2016

## 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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3`

C++ benchmarks:

`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3`

Fortran benchmarks:

`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`

Benchmarks using both Fortran and C:

`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3`

## Peak Compiler Invocation

C benchmarks:

`icc -m64`

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

**SPECfp\_rate2006 = 1480**

**SPECfp\_rate\_base2006 = 1430**

**CPU2006 license:** 55

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test date:** May-2017

**Hardware Availability:** Jul-2017

**Software Availability:** Nov-2016

## Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak 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.deallI: -DSPEC\_CPU\_LP64  
 450.soplex: -D\_FILE\_OFFSET\_BITS=64  
 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

## 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-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -fno-alias -auto-ilp32  
 -qopt-mem-layout-trans=3

Continued on next page



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp\_rate2006 = 1480

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

SPECfp\_rate\_base2006 = 1430

CPU2006 license: 55

Test date: May-2017

Test sponsor: Dell Inc.

Hardware Availability: Jul-2017

Tested by: Dell Inc.

Software Availability: Nov-2016

## Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -qopt-malloc-options=3  
-qopt-mem-layout-trans=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll4 -qopt-mem-layout-trans=3

### Fortran benchmarks:

410.bwaves: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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: Same as 410.bwaves

459.GemsFDTD: Same as 410.bwaves

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll4 -auto -inline-calloc  
-qopt-malloc-options=3

### Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32  
-qopt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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>



# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Platinum 8160, 2.10 GHz))

**SPECfp\_rate2006 = 1480**

**SPECfp\_rate\_base2006 = 1430**

**CPU2006 license:** 55

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test date:** May-2017

**Hardware Availability:** Jul-2017

**Software Availability:** Nov-2016

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>

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.2.  
Report generated on Wed Aug 23 13:13:17 2017 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 22 August 2017.