



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 61.3

PowerEdge R520 (Intel Xeon E5-2407 v2, 2.40 GHz)

SPECfp\_base2006 = 59.5

CPU2006 license: 55

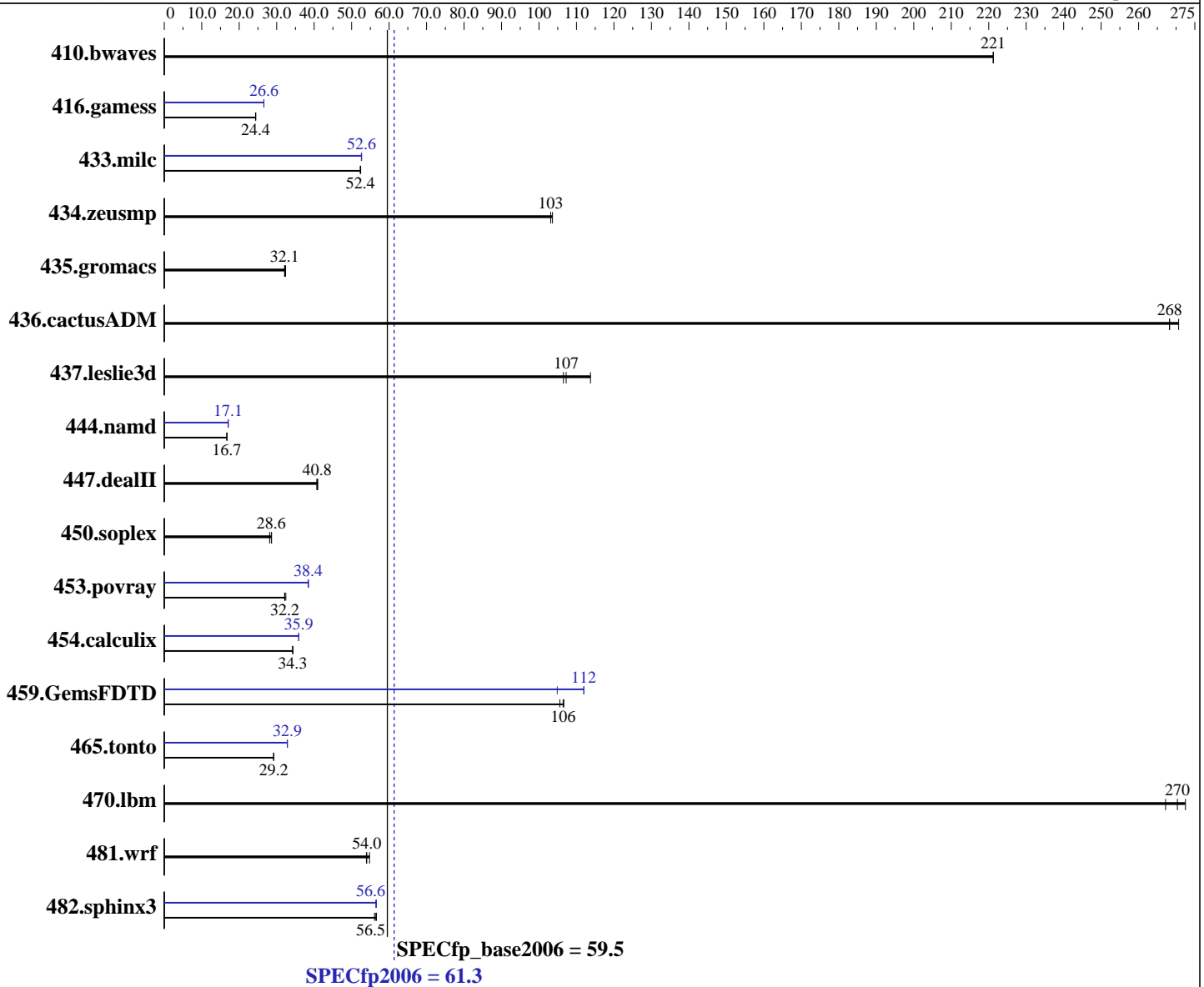
Test date: Nov-2013

Test sponsor: Dell Inc.

Hardware Availability: Jan-2014

Tested by: Dell Inc.

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2407 v2  
 CPU Characteristics:  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip  
 CPU(s) orderable: 1,2 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 11 (x86\_64)  
 3.0.76-0.11-default  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: Yes  
 File System: ext2  
 System State: Run level 3 (multi-user)

Continued on next page



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L3 Cache: 10 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 192 GB (12 x 16 GB 2Rx4 PC3L-12800R-11, ECC)  
 Disk Subsystem: 1 x 300 GB 15000 RPM SAS  
 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    | <b>61.4</b> | <b>221</b>  | 61.4        | 221         | 61.4        | 221         | <b>61.4</b> | <b>221</b>  | 61.4        | 221         | 61.4        | 221         |
| 416.gamess    | 803         | 24.4        | 801         | 24.4        | <b>803</b>  | <b>24.4</b> | 736         | 26.6        | <b>736</b>  | <b>26.6</b> | 737         | 26.6        |
| 433.milc      | 176         | 52.3        | 175         | 52.4        | <b>175</b>  | <b>52.4</b> | 174         | 52.7        | <b>174</b>  | <b>52.6</b> | 175         | 52.6        |
| 434.zeusmp    | 87.8        | 104         | 88.2        | 103         | <b>88.2</b> | <b>103</b>  | 87.8        | 104         | 88.2        | 103         | <b>88.2</b> | <b>103</b>  |
| 435.gromacs   | 221         | 32.4        | 222         | 32.1        | <b>222</b>  | <b>32.1</b> | 221         | 32.4        | 222         | 32.1        | <b>222</b>  | <b>32.1</b> |
| 436.cactusADM | 44.5        | 268         | 44.1        | 271         | <b>44.5</b> | <b>268</b>  | 44.5        | 268         | 44.1        | 271         | <b>44.5</b> | <b>268</b>  |
| 437.leslie3d  | 82.6        | 114         | 88.2        | 107         | <b>87.6</b> | <b>107</b>  | 82.6        | 114         | 88.2        | 107         | <b>87.6</b> | <b>107</b>  |
| 444.namd      | 480         | 16.7        | <b>480</b>  | <b>16.7</b> | 480         | 16.7        | <b>470</b>  | <b>17.1</b> | 470         | 17.1        | 470         | 17.1        |
| 447.dealII    | 279         | 41.0        | <b>280</b>  | <b>40.8</b> | 281         | 40.7        | 279         | 41.0        | <b>280</b>  | <b>40.8</b> | 281         | 40.7        |
| 450.soplex    | <b>292</b>  | <b>28.6</b> | 297         | 28.1        | 291         | 28.6        | <b>292</b>  | <b>28.6</b> | 297         | 28.1        | 291         | 28.6        |
| 453.povray    | <b>165</b>  | <b>32.2</b> | 166         | 32.1        | 164         | 32.4        | 138         | 38.5        | <b>138</b>  | <b>38.4</b> | 139         | 38.4        |
| 454.calculix  | <b>241</b>  | <b>34.3</b> | 240         | 34.3        | 241         | 34.3        | 230         | 35.9        | <b>230</b>  | <b>35.9</b> | 230         | 35.9        |
| 459.GemsFDTD  | 101         | 106         | <b>99.7</b> | <b>106</b>  | 99.5        | 107         | 94.8        | 112         | <b>94.8</b> | <b>112</b>  | 101         | 105         |
| 465.tonto     | 337         | 29.2        | 337         | 29.2        | <b>337</b>  | <b>29.2</b> | <b>299</b>  | <b>32.9</b> | 299         | 32.9        | 300         | 32.8        |
| 470.lbm       | <b>50.8</b> | <b>270</b>  | 51.4        | 267         | 50.4        | 272         | <b>50.8</b> | <b>270</b>  | 51.4        | 267         | 50.4        | 272         |
| 481.wrf       | 204         | 54.8        | 207         | 53.9        | <b>207</b>  | <b>54.0</b> | 204         | 54.8        | 207         | 53.9        | <b>207</b>  | <b>54.0</b> |
| 482.sphinx3   | 344         | 56.6        | <b>345</b>  | <b>56.5</b> | 347         | 56.1        | 345         | 56.5        | <b>345</b>  | <b>56.6</b> | 344         | 56.6        |

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:  
 Virtualization Technology disabled  
 Execute Disable disabled  
 Logical Processor disabled  
 System Profile set to Performance  
 Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818  
 \$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
 running on linux Fri Nov 1 22:07:18 2013

This section contains SUT (System Under Test) info as seen by  
Continued on next page



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## Platform Notes (Continued)

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 E5-2407 v2 @ 2.40GHz
  2 "physical id"s (chips)
  8 "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 : 4
    siblings  : 4
    physical 0: cores 0 1 2 3
    physical 1: cores 0 1 2 3
  cache size : 10240 KB

```

```

From /proc/meminfo
MemTotal:      198410440 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 11 (x86_64)

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 11 (x86_64)
VERSION = 11
PATCHLEVEL = 3

```

```

uname -a:
Linux linux 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013 (ccab990)
x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Nov 1 14:09 last=S

```

SPEC is set to: /root/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext2  267G  9.4G  257G   4% /

```

```

Additional information from dmidecode:
BIOS Dell Inc. 2.0.21 09/23/2013
Memory:
 1x 00AD00B300AD HMT42GR7MFR4A-PB 16 GB 1333 MHz
11x 00AD04B300AD HMT42GR7AFR4A-PB 16 GB 1333 MHz

```

(End of data from sysinfo program)



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## General Notes

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

```
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "8"
```

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4

Transparent Huge Pages enabled with:

```
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
```

Filesystem page cache cleared with:

```
echo 1> /proc/sys/vm/drop_caches
```

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
```

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
```



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## Base Optimization Flags

C benchmarks:

-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

C++ benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -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

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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32  
-ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias  
-parallel

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -fno-alias  
-auto-ilp32

447.dealIII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -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: -xAVX -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-ic14.0-official-linux64.20140128.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revB.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revB.xml>



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