



# SPEC® CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®2006 = 66.8

PowerEdge R320 (Intel Xeon E5-2420 v2, 2.20 GHz)

SPECfp\_base2006 = 64.4

CPU2006 license: 55

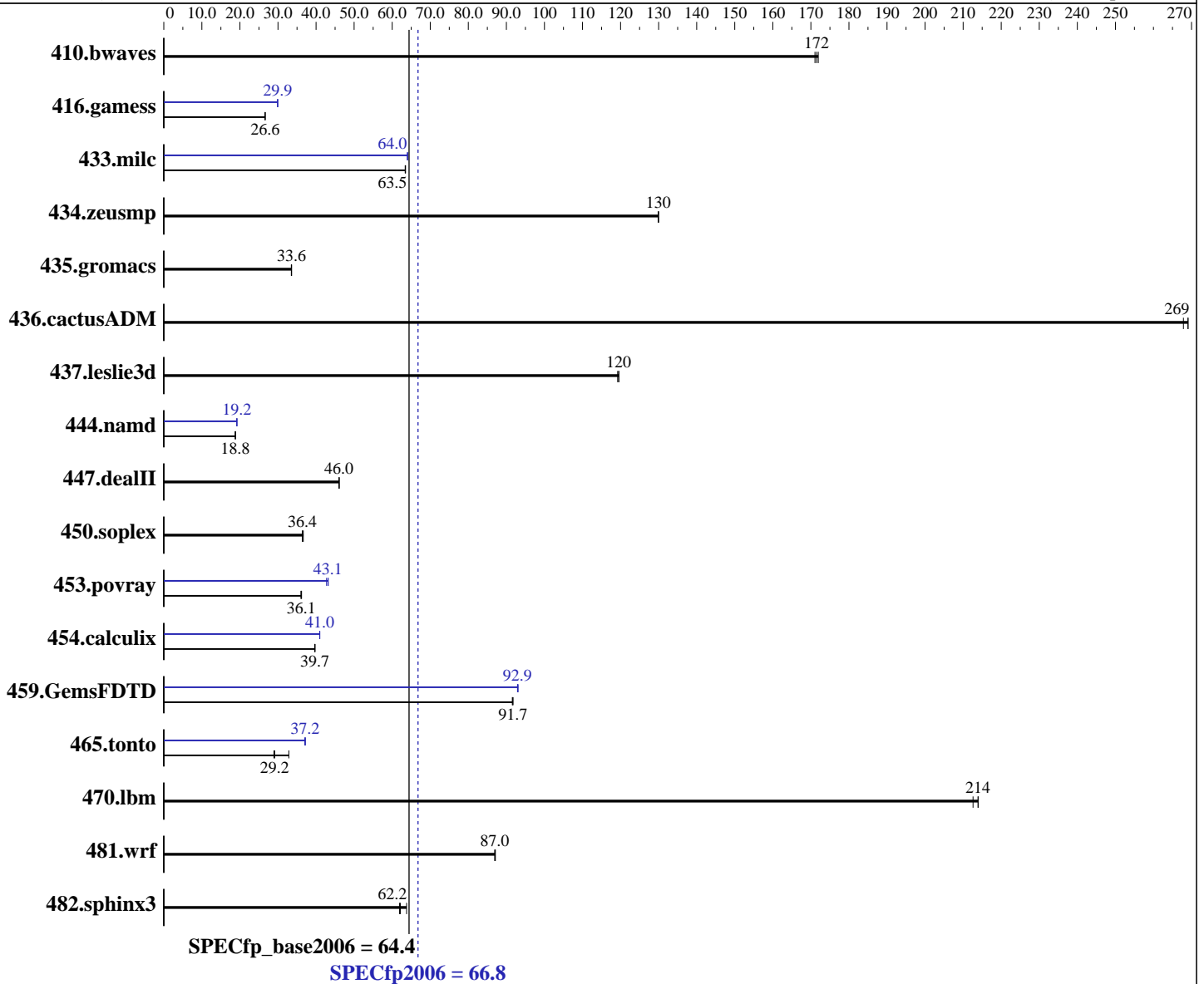
Test date: Oct-2013

Test sponsor: Dell Inc.

Hardware Availability: Jan-2014

Tested by: Dell Inc.

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2420 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.70 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 6 cores, 1 chip, 6 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

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### 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)

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L3 Cache: 15 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 96 GB (6 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	79.4	171	79.0	172	<b><u>79.2</u></b>	<b><u>172</u></b>	79.4	171	79.0	172	<b><u>79.2</u></b>	<b><u>172</u></b>
416.gamess	736	26.6	735	26.6	<b><u>736</u></b>	<b><u>26.6</u></b>	654	29.9	655	29.9	<b><u>654</u></b>	<b><u>29.9</u></b>
433.milc	<b><u>145</u></b>	<b><u>63.5</u></b>	145	63.5	145	63.4	<b><u>143</u></b>	<b><u>64.0</u></b>	143	64.0	143	64.0
434.zeusmp	70.0	130	70.0	130	<b><u>70.0</u></b>	<b><u>130</u></b>	70.0	130	70.0	130	<b><u>70.0</u></b>	<b><u>130</u></b>
435.gromacs	<b><u>213</u></b>	<b><u>33.6</u></b>	213	33.6	213	33.5	<b><u>213</u></b>	<b><u>33.6</u></b>	213	33.6	213	33.5
436.cactusADM	<b><u>44.4</u></b>	<b><u>269</u></b>	44.4	269	44.6	268	<b><u>44.4</u></b>	<b><u>269</u></b>	44.4	269	44.6	268
437.leslie3d	<b><u>78.6</u></b>	<b><u>120</u></b>	78.8	119	78.6	120	<b><u>78.6</u></b>	<b><u>120</u></b>	78.8	119	78.6	120
444.namd	<b><u>427</u></b>	<b><u>18.8</u></b>	426	18.8	427	18.8	418	19.2	418	19.2	<b><u>418</u></b>	<b><u>19.2</u></b>
447.dealII	<b><u>248</u></b>	<b><u>46.0</u></b>	249	46.0	248	46.1	<b><u>248</u></b>	<b><u>46.0</u></b>	249	46.0	248	46.1
450.soplex	228	36.6	<b><u>229</u></b>	<b><u>36.4</u></b>	229	36.4	228	36.6	<b><u>229</u></b>	<b><u>36.4</u></b>	229	36.4
453.povray	147	36.2	148	36.0	<b><u>147</u></b>	<b><u>36.1</u></b>	<b><u>123</u></b>	<b><u>43.1</u></b>	124	42.7	123	43.2
454.calculix	<b><u>208</u></b>	<b><u>39.7</u></b>	208	39.7	208	39.6	201	41.0	<b><u>201</u></b>	<b><u>41.0</u></b>	201	41.0
459.GemsFDTD	<b><u>116</u></b>	<b><u>91.7</u></b>	116	91.7	116	91.6	<b><u>114</u></b>	<b><u>92.9</u></b>	114	93.1	114	92.9
465.tonto	<b><u>338</u></b>	<b><u>29.2</u></b>	340	28.9	300	32.9	<b><u>265</u></b>	<b><u>37.2</u></b>	265	37.2	266	37.1
470.lbm	<b><u>64.2</u></b>	<b><u>214</u></b>	64.2	214	64.6	213	<b><u>64.2</u></b>	<b><u>214</u></b>	64.2	214	64.6	213
481.wrf	<b><u>128</u></b>	<b><u>87.0</u></b>	128	87.1	128	87.0	<b><u>128</u></b>	<b><u>87.0</u></b>	128	87.1	128	87.0
482.sphinx3	<b><u>314</u></b>	<b><u>62.2</u></b>	306	63.8	315	61.9	<b><u>314</u></b>	<b><u>62.2</u></b>	306	63.8	315	61.9

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 Wed Oct 23 17:14:02 2013

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## Platform Notes (Continued)

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 E5-2420 v2 @ 2.20GHz
 1 "physical id"s (chips)
 6 "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 : 6
  siblings  : 6
  physical 0: cores 0 1 2 3 4 5
cache size : 15360 KB

```

```

From /proc/meminfo
MemTotal:      99123704 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 Oct 23 10:13 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:
6x 00CE00B300CE M393B2G70BH0-YK0 16 GB 1600 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 = "6"

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: basepeak = yes

C++ benchmarks:

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## Peak Optimization Flags (Continued)

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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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