



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

PowerEdge R820 (Intel Xeon E5-4650 v2, 2.40 GHz)

**SPECfp<sup>®</sup>2006 = 87.2**

**SPECfp\_base2006 = 84.1**

CPU2006 license: 55

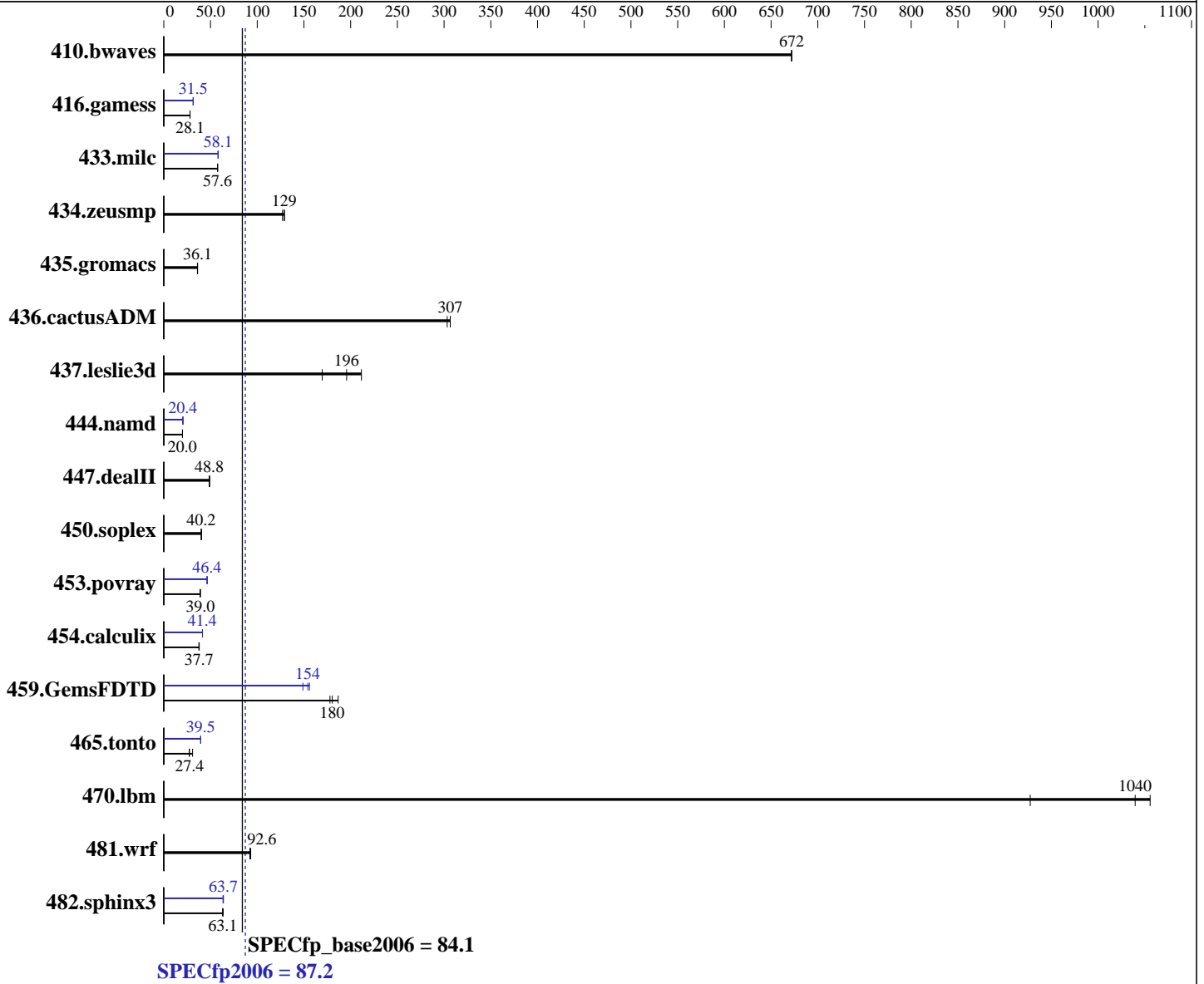
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Mar-2014

Hardware Availability: Mar-2014

Software Availability: Aug-2013



### Hardware

CPU Name: Intel Xeon E5-4650 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 4 chips, 10 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 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: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
Disk Subsystem: 1 x 160 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	20.2	672	<b><u>20.2</u></b>	<b><u>672</u></b>	20.2	672	20.2	672	<b><u>20.2</u></b>	<b><u>672</u></b>	20.2	672
416.gamess	<b><u>698</u></b>	<b><u>28.1</u></b>	698	28.1	697	28.1	624	31.4	<b><u>622</u></b>	<b><u>31.5</u></b>	622	31.5
433.milc	160	57.5	159	57.6	<b><u>160</u></b>	<b><u>57.6</u></b>	<b><u>158</u></b>	<b><u>58.1</u></b>	157	58.4	158	57.9
434.zeusmp	70.5	129	<b><u>70.7</u></b>	<b><u>129</u></b>	71.7	127	70.5	129	<b><u>70.7</u></b>	<b><u>129</u></b>	71.7	127
435.gromacs	<b><u>198</u></b>	<b><u>36.1</u></b>	199	36.0	197	36.2	<b><u>198</u></b>	<b><u>36.1</u></b>	199	36.0	197	36.2
436.cactusADM	<b><u>39.0</u></b>	<b><u>307</u></b>	39.0	307	39.4	303	<b><u>39.0</u></b>	<b><u>307</u></b>	39.0	307	39.4	303
437.leslie3d	<b><u>48.0</u></b>	<b><u>196</u></b>	55.4	170	44.4	212	<b><u>48.0</u></b>	<b><u>196</u></b>	55.4	170	44.4	212
444.namd	401	20.0	401	20.0	<b><u>401</u></b>	<b><u>20.0</u></b>	392	20.4	<b><u>392</u></b>	<b><u>20.4</u></b>	392	20.5
447.dealII	233	49.1	<b><u>235</u></b>	<b><u>48.8</u></b>	235	48.7	233	49.1	<b><u>235</u></b>	<b><u>48.8</u></b>	235	48.7
450.soplex	208	40.2	208	40.2	<b><u>208</u></b>	<b><u>40.2</u></b>	208	40.2	208	40.2	<b><u>208</u></b>	<b><u>40.2</u></b>
453.povray	136	39.1	137	38.9	<b><u>136</u></b>	<b><u>39.0</u></b>	<b><u>115</u></b>	<b><u>46.4</u></b>	115	46.4	115	46.2
454.calculix	217	37.9	219	37.6	<b><u>219</u></b>	<b><u>37.7</u></b>	199	41.4	<b><u>199</u></b>	<b><u>41.4</u></b>	199	41.4
459.GemsFDTD	59.7	178	56.8	187	<b><u>58.9</u></b>	<b><u>180</u></b>	71.2	149	68.0	156	<b><u>68.8</u></b>	<b><u>154</u></b>
465.tonto	319	30.8	<b><u>359</u></b>	<b><u>27.4</u></b>	362	27.2	249	39.5	<b><u>249</u></b>	<b><u>39.5</u></b>	249	39.5
470.lbm	<b><u>13.2</u></b>	<b><u>1040</u></b>	13.0	1060	14.8	927	<b><u>13.2</u></b>	<b><u>1040</u></b>	13.0	1060	14.8	927
481.wrf	121	92.1	120	93.0	<b><u>121</u></b>	<b><u>92.6</u></b>	121	92.1	120	93.0	<b><u>121</u></b>	<b><u>92.6</u></b>
482.sphinx3	307	63.5	310	62.9	<b><u>309</u></b>	<b><u>63.1</u></b>	308	63.3	<b><u>306</u></b>	<b><u>63.7</u></b>	305	63.8

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  
System Profile set to Custom  
ClE enabled  
C States enabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on linux Fri Mar 14 12:26:57 2014

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**SPECfp2006 = 87.2**

PowerEdge R820 (Intel Xeon E5-4650 v2, 2.40 GHz)

**SPECfp\_base2006 = 84.1**

**CPU2006 license:** 55

**Test date:** Mar-2014

**Test sponsor:** Dell Inc.

**Hardware Availability:** Mar-2014

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**Software Availability:** Aug-2013

## 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 E5-4650 v2 @ 2.40GHz
 4 "physical id"s (chips)
 80 "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    : 10
  siblings     : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
  physical 2: cores 0 1 2 3 4 8 9 10 11 12
  physical 3: cores 0 1 2 3 4 8 9 10 11 12
cache size     : 25600 KB

```

```

From /proc/meminfo
MemTotal:      529392212 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 Mar 14 12:24 last=S

```

SPEC is set to: /root/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext2  139G   20G  118G  15% /

```

```

Additional information from dmidecode:
BIOS Dell Inc. 2.0.20 01/16/2014
Memory:
32x 00AD00B300AD HMT42GR7AFR4C-RD 16 GB 1866 MHz

```

(End of data from sysinfo program)



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## 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 = "40"

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/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-revC.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-revC.xml>

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