



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

PowerEdge M520 (Intel Xeon E5-2450L v2, 1.70 GHz)

SPECfp<sup>®</sup>2006 = **60.8**

SPECfp\_base2006 = **57.9**

CPU2006 license: 55

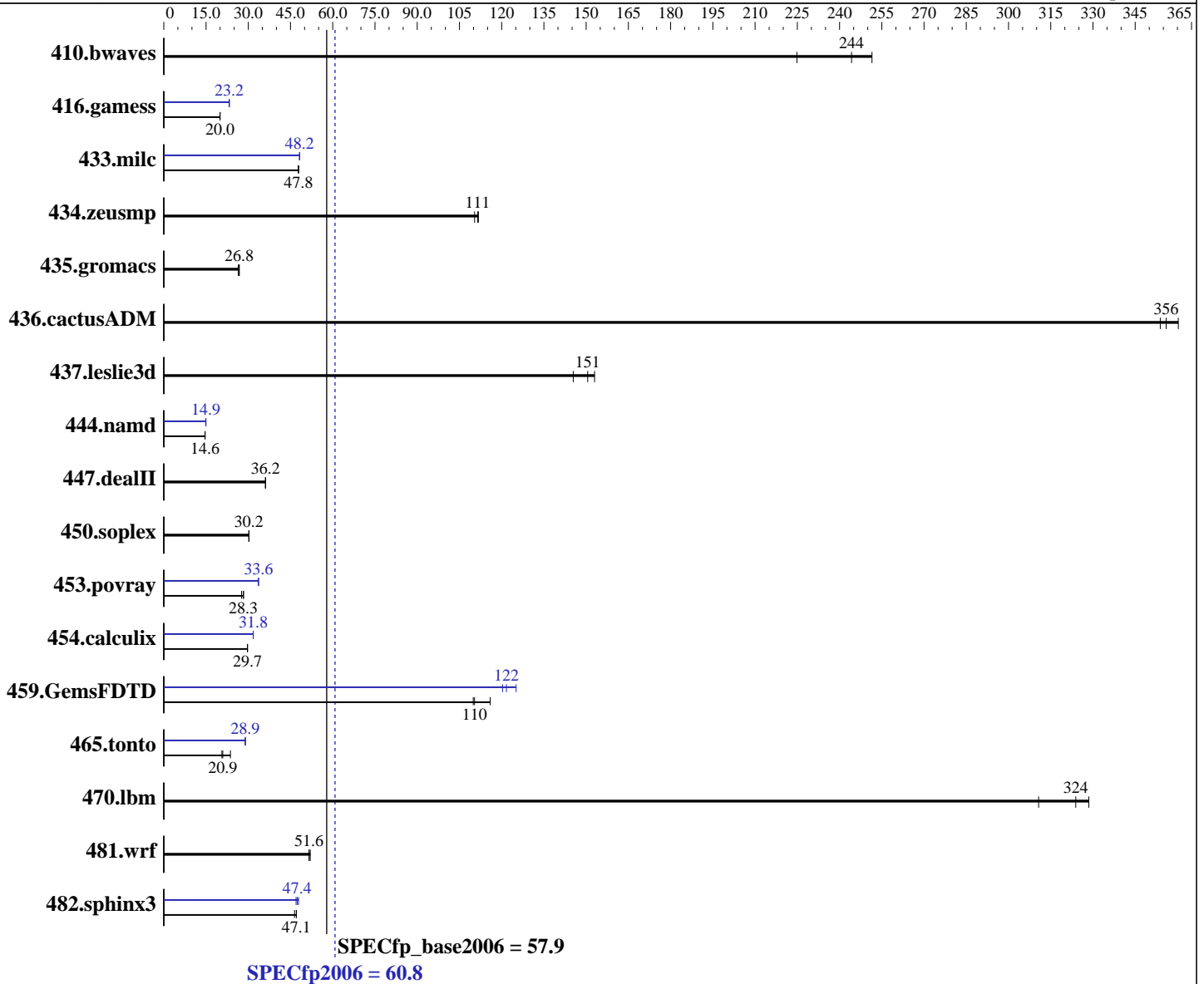
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Nov-2013

Hardware Availability: Jan-2014

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2450L v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.10 GHz  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip  
 CPU(s) orderable: 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: 25 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 1 TB 7200 RPM SATA  
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	60.4	225	54.0	252	<b>55.6</b>	<b>244</b>	60.4	225	54.0	252	<b>55.6</b>	<b>244</b>
416.gamess	981	20.0	<b>981</b>	<b>20.0</b>	980	20.0	842	23.3	843	23.2	<b>843</b>	<b>23.2</b>
433.milc	192	47.9	<b>192</b>	<b>47.8</b>	192	47.8	<b>190</b>	<b>48.2</b>	190	48.2	190	48.2
434.zeusmp	81.4	112	82.4	110	<b>81.6</b>	<b>111</b>	81.4	112	82.4	110	<b>81.6</b>	<b>111</b>
435.gromacs	<b>267</b>	<b>26.8</b>	270	26.4	266	26.8	<b>267</b>	<b>26.8</b>	270	26.4	266	26.8
436.cactusADM	<b>33.6</b>	<b>356</b>	33.2	360	33.8	354	<b>33.6</b>	<b>356</b>	33.2	360	33.8	354
437.leslie3d	64.6	145	<b>62.4</b>	<b>151</b>	61.4	153	64.6	145	<b>62.4</b>	<b>151</b>	61.4	153
444.namd	548	14.6	<b>548</b>	<b>14.6</b>	548	14.6	<b>537</b>	<b>14.9</b>	537	14.9	537	14.9
447.dealII	317	36.1	316	36.2	<b>316</b>	<b>36.2</b>	317	36.1	316	36.2	<b>316</b>	<b>36.2</b>
450.soplex	276	30.2	<b>276</b>	<b>30.2</b>	275	30.3	276	30.2	<b>276</b>	<b>30.2</b>	275	30.3
453.povray	193	27.6	<b>188</b>	<b>28.3</b>	188	28.3	<b>158</b>	<b>33.6</b>	159	33.5	158	33.6
454.calculix	277	29.8	278	29.7	<b>278</b>	<b>29.7</b>	<b>260</b>	<b>31.8</b>	260	31.8	260	31.7
459.GemsFDTD	91.5	116	<b>96.1</b>	<b>110</b>	96.5	110	<b>87.2</b>	<b>122</b>	88.2	120	84.8	125
465.tonto	416	23.7	<b>470</b>	<b>20.9</b>	477	20.6	340	28.9	<b>340</b>	<b>28.9</b>	340	29.0
470.lbm	44.2	311	41.8	329	<b>42.4</b>	<b>324</b>	44.2	311	41.8	329	<b>42.4</b>	<b>324</b>
481.wrf	215	52.0	217	51.6	<b>217</b>	<b>51.6</b>	215	52.0	217	51.6	<b>217</b>	<b>51.6</b>
482.sphinx3	420	46.4	414	47.1	<b>414</b>	<b>47.1</b>	415	47.0	<b>411</b>	<b>47.4</b>	407	47.9

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 Tue Nov 5 07:23:35 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 E5-2450L v2 @ 1.70GHz
  2 "physical id"s (chips)
  20 "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  : 10
    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
  cache size : 25600 KB

```

```

From /proc/meminfo
MemTotal:      198410424 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 4 22:02 last=S

```

SPEC is set to: /root/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext2  910G  9.4G  899G   2% /

```

```

Additional information from dmidecode:
BIOS Dell Inc. 2.0.22 09/23/2013
Memory:
12x 00AD04B300AD HMT42GR7AFR4A-PB 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 = "20"
```

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-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).

Tested with SPEC CPU2006 v1.2.  
Report generated on Thu Jul 24 21:14:46 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 28 January 2014.