



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

### SPECfp<sup>®</sup>\_rate2006 = 1160

### PowerEdge M830 (Intel Xeon E5-4620 v3, 2.00 GHz)

### SPECfp\_rate\_base2006 = 1140

CPU2006 license: 55

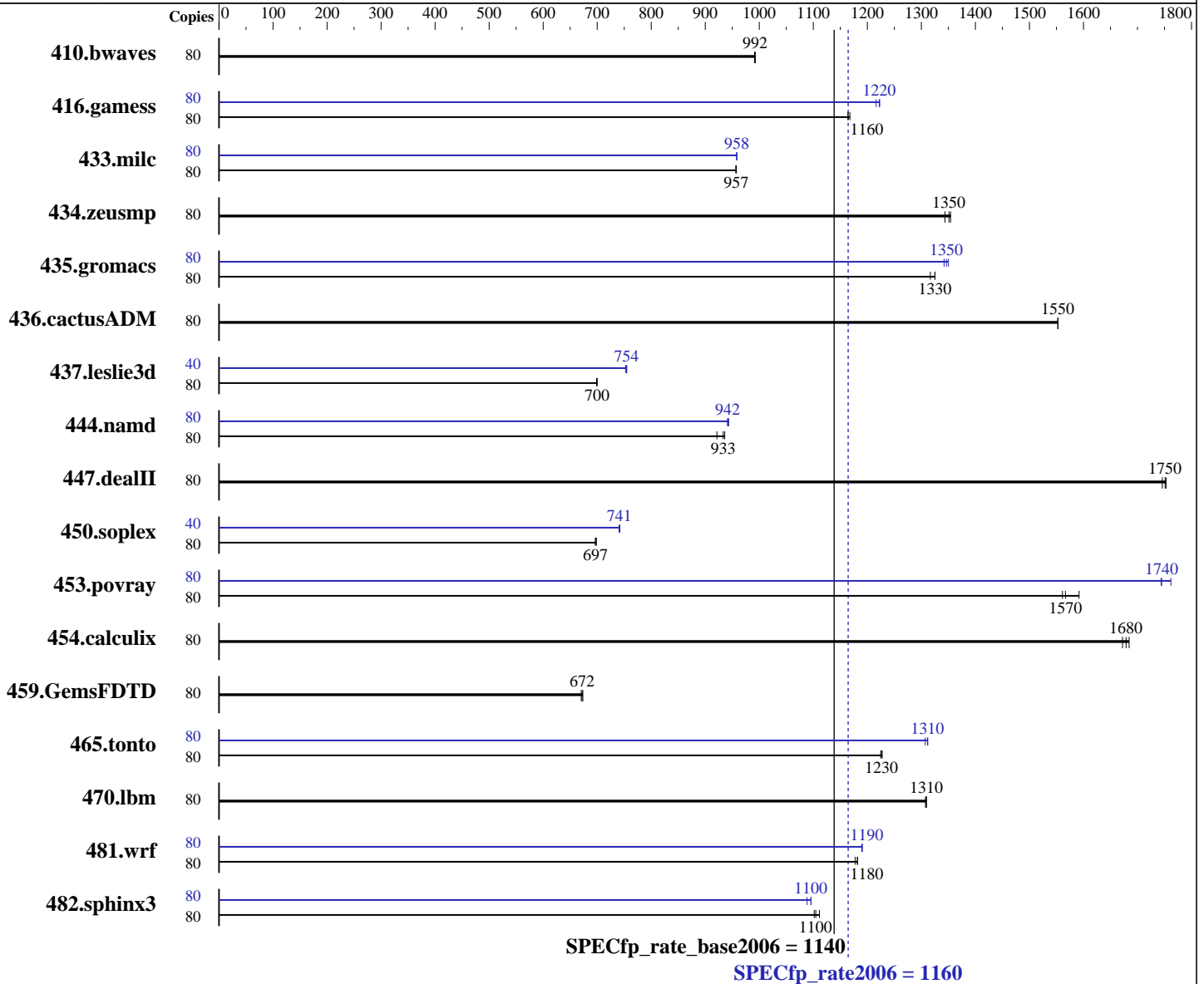
Test date: Feb-2015

Test sponsor: Dell Inc.

Hardware Availability: Jun-2015

Tested by: Dell Inc.

Software Availability: Jun-2015



#### Hardware

CPU Name: Intel Xeon E5-4620 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.60 GHz  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core  
 CPU(s) orderable: 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 12  
 3.12.28-4-default  
 Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;  
 Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4  
 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 PC4-2133P-R, running at 1866 MHz)  
Disk Subsystem: 1 x 400 GB 7200 RPM SATA  
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	80	1096	992	<b>1096</b>	<b>992</b>	1097	991	80	1096	992	<b>1096</b>	<b>992</b>	1097	991
416.gamess	80	<b>1345</b>	<b>1160</b>	1341	1170	1345	1160	80	<b>1282</b>	<b>1220</b>	1281	1220	1288	1220
433.milc	80	768	956	<b>767</b>	<b>957</b>	767	958	80	<b>766</b>	<b>958</b>	766	958	766	958
434.zeusmp	80	542	1340	<b>539</b>	<b>1350</b>	538	1350	80	542	1340	<b>539</b>	<b>1350</b>	538	1350
435.gromacs	80	431	1330	<b>431</b>	<b>1330</b>	434	1320	80	423	1350	426	1340	<b>424</b>	<b>1350</b>
436.cactusADM	80	616	1550	<b>616</b>	<b>1550</b>	616	1550	80	616	1550	<b>616</b>	<b>1550</b>	616	1550
437.leslie3d	80	1076	699	<b>1075</b>	<b>700</b>	1075	700	40	500	752	<b>498</b>	<b>754</b>	498	755
444.namd	80	<b>688</b>	<b>933</b>	685	936	696	922	80	<b>681</b>	<b>942</b>	680	944	682	941
447.dealII	80	<b>523</b>	<b>1750</b>	524	1750	522	1750	80	<b>523</b>	<b>1750</b>	524	1750	522	1750
450.soplex	80	955	699	<b>957</b>	<b>697</b>	958	697	40	<b>450</b>	<b>741</b>	450	742	450	741
453.povray	80	<b>272</b>	<b>1570</b>	267	1590	273	1560	80	<b>244</b>	<b>1740</b>	<b>244</b>	<b>1740</b>	242	1760
454.calculix	80	392	1680	395	1670	<b>393</b>	<b>1680</b>	80	392	1680	395	1670	<b>393</b>	<b>1680</b>
459.GemsFDTD	80	1266	670	<b>1263</b>	<b>672</b>	1260	673	80	1266	670	<b>1263</b>	<b>672</b>	1260	673
465.tonto	80	641	1230	643	1220	<b>642</b>	<b>1230</b>	80	600	1310	602	1310	<b>600</b>	<b>1310</b>
470.lbm	80	840	1310	<b>840</b>	<b>1310</b>	841	1310	80	840	1310	<b>840</b>	<b>1310</b>	841	1310
481.wrf	80	759	1180	<b>756</b>	<b>1180</b>	756	1180	80	751	1190	<b>751</b>	<b>1190</b>	750	1190
482.sphinx3	80	1403	1110	1415	1100	<b>1412</b>	<b>1100</b>	80	1423	1100	<b>1423</b>	<b>1100</b>	1432	1090

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:  
Virtualization Technology disabled  
Execute Disable disabled

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Software Availability: Jun-2015

## Platform Notes (Continued)

System Profile set to Performance  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 # \$ e3fbb8667b5a285932ceab81e28219e1  
running on linux-4bm6 Sat Feb 7 02:13:48 2015

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 E5-4620 v3 @ 2.00GHz
 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: 529334380 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 0
# 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"
VERSION_ID="12"
PRETTY_NAME="SUSE Linux Enterprise Server 12"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12"
```

```
uname -a:
Linux linux-4bm6 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux
```

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## Platform Notes (Continued)

run-level 3 Feb 6 12:03

SPEC is set to: /root/cpu2006-1.2

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	ext4	359G	8.7G	350G	3%	/

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. 0.3.8 12/18/2014

Memory:

32x 00CE00B300CE M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1867 MHz

16x 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/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0

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



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## 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-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

## Peak Compiler Invocation

C benchmarks:

```

icc -m64

```

C++ benchmarks (except as noted below):

```

icpc -m64

```

```

450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

```

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## Peak Compiler Invocation (Continued)

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.dealII: -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

## Peak Optimization Flags

C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
 -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3  
 -unroll2

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -fno-alias  
 -auto-ilp32

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## Peak Optimization Flags (Continued)

447.dealIII: basepeak = yes

450.soplex: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
-opt-malloc-options=3

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll14  
-ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll12  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll14  
-auto -inline-calloc -opt-malloc-options=3

### Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revE.20150421.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revE.20150421.xml>



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

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