



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

SPECfp<sup>®</sup>\_rate2006 = 1750

PowerEdge R930 (Intel Xeon E7-8880L v3, 2.00 GHz)

SPECfp\_rate\_base2006 = 1710

CPU2006 license: 55

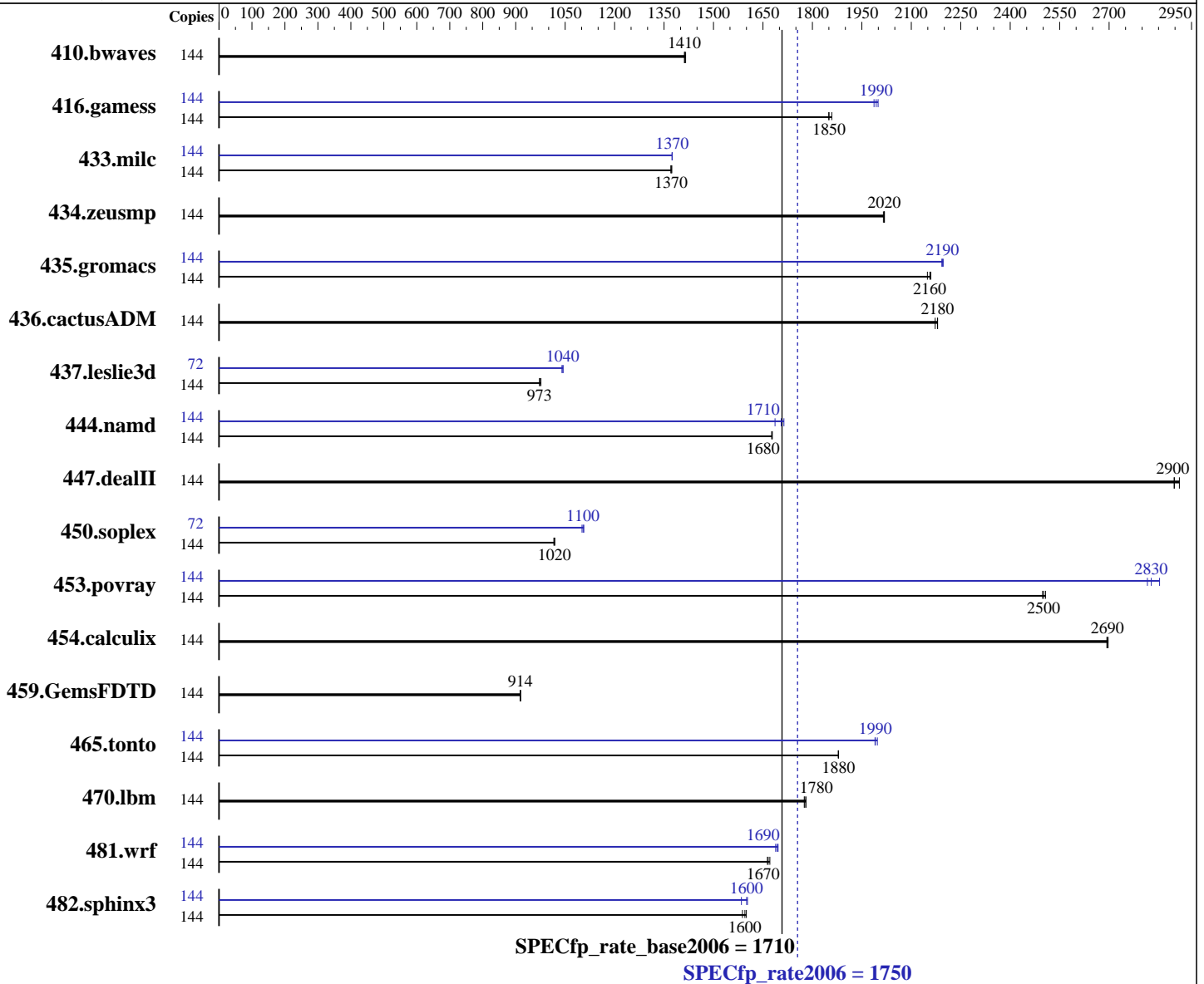
Test date: Apr-2015

Test sponsor: Dell Inc.

Hardware Availability: Jun-2015

Tested by: Dell Inc.

Software Availability: Oct-2014



### Hardware

CPU Name: Intel Xeon E7-8880L v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 72 cores, 4 chips, 18 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 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: 45 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)  
 Disk Subsystem: 2 x 300 GB 15000 RPM SAS6, RAID0  
 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	144	1383	1420	<b>1386</b>	<b>1410</b>	1386	1410	144	1383	1420	<b>1386</b>	<b>1410</b>	1386	1410		
416.gamess	144	<b>1524</b>	<b>1850</b>	1517	1860	1524	1850	144	<b>1414</b>	<b>1990</b>	1419	1990	1410	2000		
433.milc	144	964	1370	962	1370	<b>964</b>	<b>1370</b>	144	961	1370	962	1370	<b>962</b>	<b>1370</b>		
434.zeusmp	144	650	2020	649	2020	<b>649</b>	<b>2020</b>	144	650	2020	649	2020	<b>649</b>	<b>2020</b>		
435.gromacs	144	478	2150	<b>477</b>	<b>2160</b>	476	2160	144	468	2200	469	2190	<b>469</b>	<b>2190</b>		
436.cactusADM	144	<b>790</b>	<b>2180</b>	792	2170	789	2180	144	<b>790</b>	<b>2180</b>	792	2170	789	2180		
437.leslie3d	144	<b>1392</b>	<b>973</b>	1392	972	1386	977	72	649	1040	651	1040	<b>649</b>	<b>1040</b>		
444.namd	144	688	1680	689	1680	<b>689</b>	<b>1680</b>	144	685	1690	674	1710	<b>677</b>	<b>1710</b>		
447.dealII	144	<b>568</b>	<b>2900</b>	569	2900	565	2910	144	<b>568</b>	<b>2900</b>	569	2900	565	2910		
450.soplex	144	1179	1020	<b>1180</b>	<b>1020</b>	1182	1020	72	<b>544</b>	<b>1100</b>	545	1100	543	1110		
453.povray	144	307	2500	<b>306</b>	<b>2500</b>	306	2510	144	<b>271</b>	<b>2830</b>	272	2820	269	2850		
454.calculix	144	440	2700	441	2690	<b>441</b>	<b>2690</b>	144	440	2700	441	2690	<b>441</b>	<b>2690</b>		
459.GemsFDTD	144	1673	913	1670	915	<b>1671</b>	<b>914</b>	144	1673	913	1670	915	<b>1671</b>	<b>914</b>		
465.tonto	144	754	1880	<b>754</b>	<b>1880</b>	754	1880	144	712	1990	<b>712</b>	<b>1990</b>	710	2000		
470.lbm	144	1111	1780	<b>1113</b>	<b>1780</b>	1114	1780	144	1111	1780	<b>1113</b>	<b>1780</b>	1114	1780		
481.wrf	144	967	1660	963	1670	<b>966</b>	<b>1670</b>	144	948	1700	<b>950</b>	<b>1690</b>	953	1690		
482.sphinx3	144	1754	1600	1768	1590	<b>1759</b>	<b>1600</b>	144	1771	1580	<b>1754</b>	<b>1600</b>	1751	1600		

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  
System Profile set to Custom

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## Platform Notes (Continued)

CPU Power Management set to Maximum Performance  
 Memory Frequency set to Maximum Performance  
 Turbo Boost enabled  
 Energy Efficient Turbo disabled  
 C1E disabled  
 C States disabled  
 Collaborative CPU Performance Control disabled  
 Memory Patrol Scrub disabled  
 Memory Refresh Rate set to 1x  
 Uncore Frequency set to Maximum  
 Energy Efficient Policy set to Performance  
 Monitor/MWait enabled

Sysinfo program

```
/root/Desktop/Performance/ic15.0_Aug29_2014/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-wq6y Wed Apr 1 06:45:17 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 E7-8880L v3 @ 2.00GHz
 4 "physical id"s (chips)
 144 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB
```

From /proc/meminfo

```
MemTotal: 529169424 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

/usr/bin/lsc\_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.
```

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## Platform Notes (Continued)

```
# 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-wq6y 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 31 16:00 last=5

SPEC is set to: /root/Desktop/Performance/ic15.0_Aug29_2014
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext4 366G   19G 346G   6% /
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. 1.0.1 [MRC_096] 03/27/2015
Memory:
32x 00AD00B300AD Not Specified 16 GB 2 rank 2133 MHz, configured at 1600 MHz
64x 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/Desktop/Performance/ic15.0\_Aug29\_2014/libs/32:/root/Desktop/Performance/ic15.0\_Aug29\_2014/libs/64:/root/Desktop/Performance/ic15.0\_Aug29\_2014/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>
```



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## 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

## 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

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## Base Optimization Flags (Continued)

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
```

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:

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## Peak Optimization Flags (Continued)

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

447.dealII: 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) -unroll4  
-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) -unroll2  
-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) -unroll4  
-auto -inline-calloc -opt-malloc-options=3

### Benchmarks using both Fortran and C:

Continued on next page



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## Peak Optimization Flags (Continued)

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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