



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

SPECfp<sup>®</sup>\_rate2006 = **672**

PowerEdge C6320 (Intel Xeon E5-2630 v4, 2.20 GHz)

SPECfp\_rate\_base2006 = **657**

CPU2006 license: 55

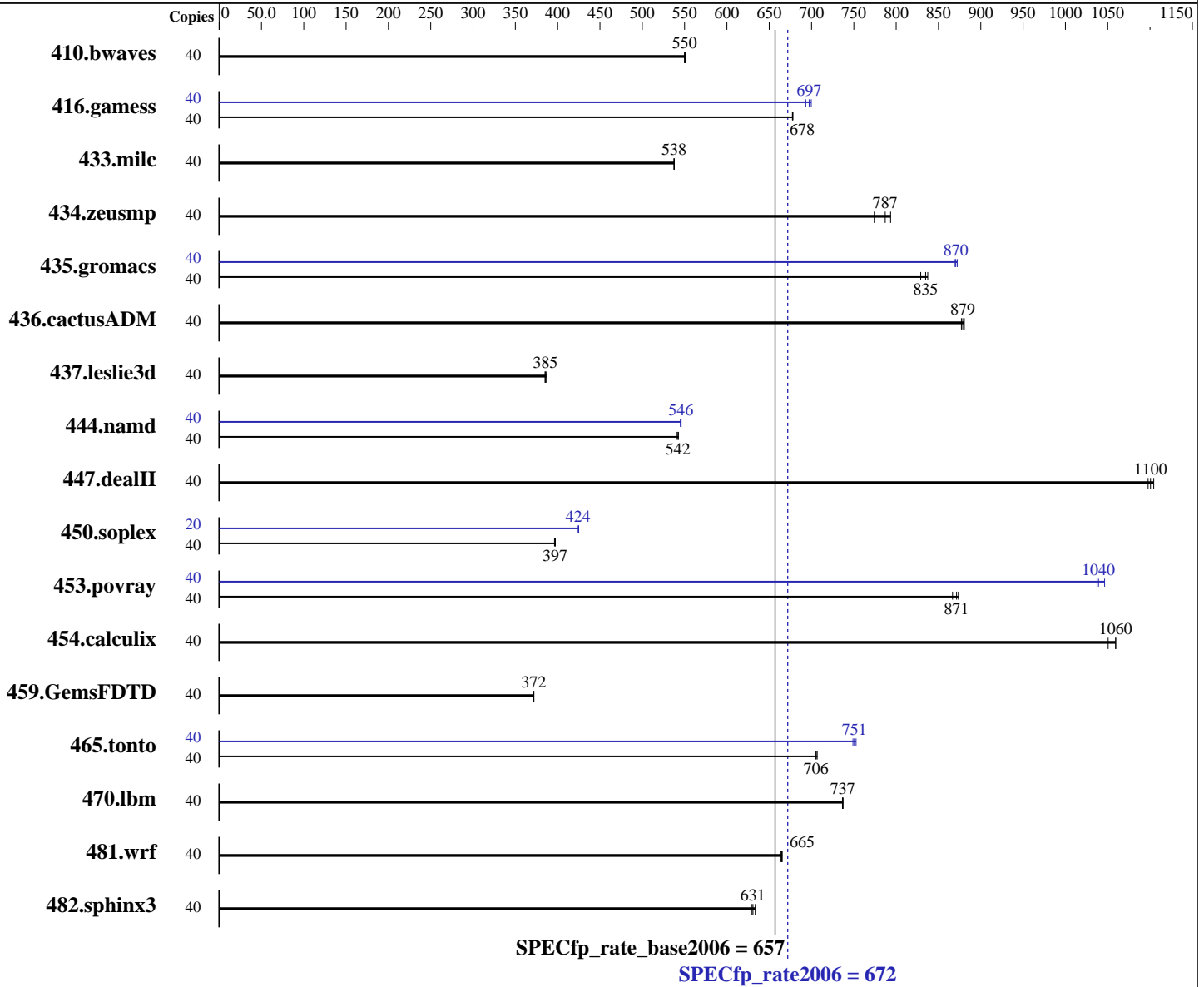
Test date: Jul-2017

Test sponsor: Dell Inc.

Hardware Availability: Jun-2016

Tested by: Dell Inc.

Software Availability: Mar-2016



### Hardware

CPU Name: Intel Xeon E5-2630 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip, 2 threads/core  
 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 12 SP3 (x86\_64) 4.4.70-2-default  
 Compiler: C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux;  
 Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: btrfs  
 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: 256 GB (8 x 32 GB 2Rx8 PC4-2400T-R, running at 2133 MT/s)  
Disk Subsystem: 1 TB SATA 7.2K  
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	40	987	551	988	550	<b>988</b>	<b>550</b>	40	987	551	988	550	<b>988</b>	<b>550</b>
416.gamess	40	1156	677	1155	678	<b>1156</b>	<b>678</b>	40	1119	700	<b>1123</b>	<b>697</b>	1130	693
433.milc	40	683	537	683	538	<b>683</b>	<b>538</b>	40	683	537	683	538	<b>683</b>	<b>538</b>
434.zeusmp	40	470	774	<b>462</b>	<b>787</b>	459	793	40	470	774	<b>462</b>	<b>787</b>	459	793
435.gromacs	40	<b>342</b>	<b>835</b>	344	829	341	837	40	327	872	<b>328</b>	<b>870</b>	328	870
436.cactusADM	40	545	877	543	881	<b>544</b>	<b>879</b>	40	545	877	543	881	<b>544</b>	<b>879</b>
437.leslie3d	40	<b>975</b>	<b>385</b>	972	387	976	385	40	<b>975</b>	<b>385</b>	972	387	976	385
444.namd	40	<b>592</b>	<b>542</b>	591	543	593	541	40	<b>588</b>	<b>546</b>	589	545	588	546
447.dealII	40	<b>416</b>	<b>1100</b>	414	1100	417	1100	40	<b>416</b>	<b>1100</b>	414	1100	417	1100
450.soplex	40	<b>840</b>	<b>397</b>	842	396	840	397	20	<b>393</b>	<b>424</b>	393	425	394	423
453.povray	40	<b>244</b>	<b>871</b>	244	873	246	867	40	203	1050	<b>205</b>	<b>1040</b>	205	1040
454.calculix	40	314	1050	311	1060	<b>312</b>	<b>1060</b>	40	314	1050	311	1060	<b>312</b>	<b>1060</b>
459.GemsFDTD	40	1143	371	1141	372	<b>1141</b>	<b>372</b>	40	1143	371	1141	372	<b>1141</b>	<b>372</b>
465.tonto	40	557	707	558	705	<b>558</b>	<b>706</b>	40	526	749	523	753	<b>524</b>	<b>751</b>
470.lbm	40	745	737	<b>746</b>	<b>737</b>	746	737	40	745	737	<b>746</b>	<b>737</b>	746	737
481.wrf	40	<b>672</b>	<b>665</b>	671	665	673	664	40	<b>672</b>	<b>665</b>	671	665	673	664
482.sphinx3	40	<b>1236</b>	<b>631</b>	1238	630	1231	633	40	<b>1236</b>	<b>631</b>	1238	630	1231	633

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:  
Snoop Mode set to Cluster on Die  
Virtualization Technology disabled

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CPU2006 license: 55

Test date: Jul-2017

Test sponsor: Dell Inc.

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## Platform Notes (Continued)

System Profile set to custom  
 CPU Performance set to Hardware P States  
 C States set to Autonomous  
 C1E disabled  
 Energy Efficient Turbo disabled  
 Uncore Frequency set to Dynamic  
 Energy Efficiency Policy set to Balanced Performance  
 Memory Patrol Scrub disabled  
 Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
 \$Rev: 6914 \$ \$Date:: 2014-06-25 # \$ e3fbb8667b5a285932ceab81e28219e1  
 running on linux-lajq Fri Jul 14 03:36:46 2017

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 E5-2630 v4@ 2.20GHz
 2 "physical id"s (chips)
 40 "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
cache size     : 25600 KB
```

```
From /proc/meminfo
MemTotal:      264037444 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# 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-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

uname -a:

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## Platform Notes (Continued)

```
Linux linux-lajq 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017
(4502c76) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jul 13 15:32
```

```
SPEC is set to: /root/cpu2006-1.2
```

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sdal        btrfs    864G  7.8G  854G   1% /
```

```
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. 2.4.2 01/09/2017
```

```
Memory:
```

```
8x 002C00B3002C 36ASF4G72PZ-2G3B1 32 GB 2 rank 2400 MHz, configured at 2133 MHz
```

```
8x 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 Intel Core i7-4790K CPU + 32GB memory using RedHat EL 7.2 glibc 2.17
```

```
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
```

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## Base Compiler Invocation (Continued)

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

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

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## Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

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.deall: -DSPEC\_CPU\_LP64  
 450.soplex: -D\_FILE\_OFFSET\_BITS=64  
 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: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

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

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## Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

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

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -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:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3

### Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -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: basepeak = yes



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

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64-revB.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge13G-revE.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64-revB.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge13G-revE.xml>

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