



SPEC® CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®2006 = 157

PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)

SPECfp_base2006 = 151

CPU2006 license: 55

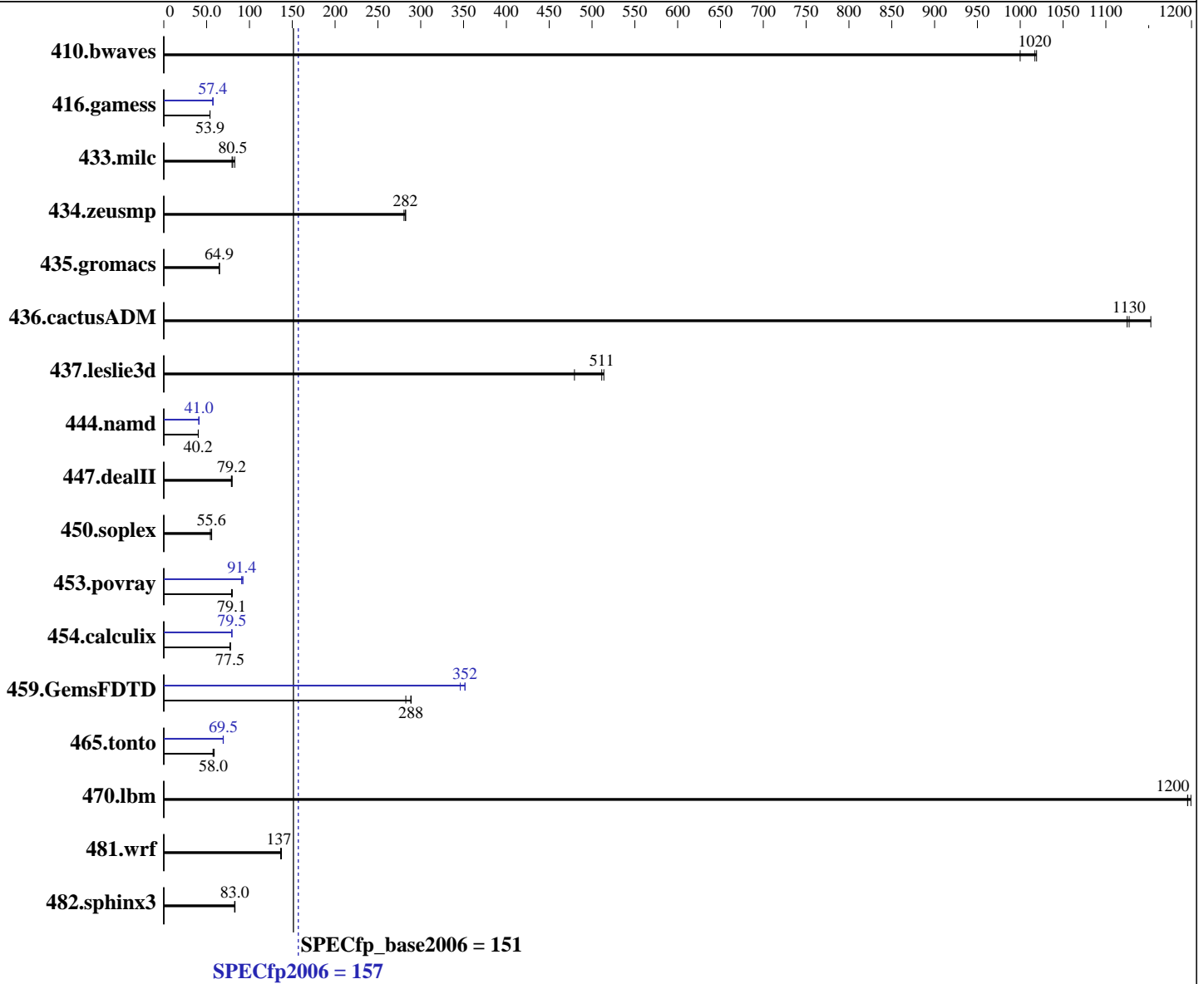
Test date: Jul-2017

Test sponsor: Dell Inc.

Hardware Availability: Aug-2017

Tested by: Dell Inc.

Software Availability: Apr-2017



Hardware

CPU Name: Intel Xeon Gold 6146
 CPU Characteristics: Intel Turbo Boost Technology up to 4.20 GHz
 CPU MHz: 3200
 FPU: Integrated
 CPU(s) enabled: 24 cores, 2 chips, 12 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: 1 MB I+D on chip per core

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Software

Operating System: SUSE Linux Enterprise Server 12 SP2 4.4.21-69-default
 Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux;
 Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
 Auto Parallel: Yes
 File System: xfs
 System State: Run level 3 (multi-user)

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L3 Cache: 24.75 MB I+D on chip per chip
 Other Cache: None
 Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
 Disk Subsystem: 1 x 960 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	13.3	1020	13.6	1000	<u>13.4</u>	<u>1020</u>	13.3	1020	13.6	1000	<u>13.4</u>	<u>1020</u>
416.gamess	363	53.9	<u>363</u>	<u>53.9</u>	363	53.9	341	57.3	<u>341</u>	<u>57.4</u>	341	57.4
433.milc	<u>114</u>	<u>80.5</u>	111	82.9	115	79.7	<u>114</u>	<u>80.5</u>	111	82.9	115	79.7
434.zeusmp	32.2	282	32.4	280	<u>32.3</u>	<u>282</u>	32.2	282	32.4	280	<u>32.3</u>	<u>282</u>
435.gromacs	<u>110</u>	<u>64.9</u>	110	64.9	110	64.8	<u>110</u>	<u>64.9</u>	110	64.9	110	64.8
436.cactusADM	10.4	1150	<u>10.6</u>	<u>1130</u>	10.6	1120	10.4	1150	<u>10.6</u>	<u>1130</u>	10.6	1120
437.leslie3d	19.6	480	<u>18.4</u>	<u>511</u>	18.3	514	19.6	480	<u>18.4</u>	<u>511</u>	18.3	514
444.namd	199	40.3	199	40.2	<u>199</u>	<u>40.2</u>	<u>196</u>	<u>41.0</u>	195	41.1	196	40.9
447.dealII	<u>144</u>	<u>79.2</u>	145	78.9	143	79.9	<u>144</u>	<u>79.2</u>	145	78.9	143	79.9
450.soplex	149	55.9	<u>150</u>	<u>55.6</u>	153	54.4	149	55.9	<u>150</u>	<u>55.6</u>	153	54.4
453.povray	<u>67.2</u>	<u>79.1</u>	67.3	79.1	66.5	80.0	57.5	92.5	<u>58.2</u>	<u>91.4</u>	58.5	90.9
454.calculix	106	77.8	<u>106</u>	<u>77.5</u>	107	77.4	<u>104</u>	<u>79.5</u>	104	79.4	104	79.5
459.GemsFDTD	<u>36.8</u>	<u>288</u>	36.7	289	37.5	283	<u>30.2</u>	<u>352</u>	30.6	346	30.2	352
465.tonto	167	58.9	171	57.5	<u>170</u>	<u>58.0</u>	142	69.3	142	69.5	<u>142</u>	<u>69.5</u>
470.lbm	11.5	1200	11.5	1200	<u>11.5</u>	<u>1200</u>	11.5	1200	11.5	1200	<u>11.5</u>	<u>1200</u>
481.wrf	<u>81.8</u>	<u>137</u>	81.3	137	81.8	136	<u>81.8</u>	<u>137</u>	81.3	137	81.8	136
482.sphinx3	236	82.6	<u>235</u>	<u>83.0</u>	234	83.2	236	82.6	<u>235</u>	<u>83.0</u>	234	83.2

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:
 Sub NUMA Cluster disabled
 Virtualization Technology disabled
 System Profile set to Custom
 CPU Performance set to Maximum Performance
 C States set to Autonomous
 C1E disabled
 Energy Efficient Turbo disabled
 Uncore Frequency set to Dynamic
 Energy Efficiency Policy set to Performance

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Platform Notes (Continued)

Memory Patrol Scrub disabled
 Logical Processor enabled
 CPU Interconnect Bus Link Power Management disabled
 PCI ASPM L1 Link Power Management disabled
 Sysinfo program /root/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on linux-wwko Tue Jul 25 15:29:01 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) Gold 6146 CPU @ 3.20GHz
 2 "physical id"s (chips)
 48 "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    : 12
  siblings     : 24
  physical 0   : cores 0 1 2 3 9 10 16 18 19 24 26 27
  physical 1   : cores 0 3 4 5 6 7 16 18 19 20 21 22
cache size     : 25344 KB
```

```
From /proc/meminfo
MemTotal:      394868376 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux linux-wwko 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
```

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Platform Notes (Continued)

(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 25 11:28 last=5

SPEC is set to: /root/cpu2006-1.2_icl7u3

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	xfs	892G	12G	881G	2%	/

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. 1.0.8 07/11/2017

Memory:

18x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz
6x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)

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_icl7u3/lib/ia32:/root/cpu2006-1.2_icl7u3/lib/intel64:/root/cpu2006-1.2_icl7u3/sh10.2"

OMP_NUM_THREADS = "24"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

Transparent Huge Pages enabled by default.

Filesystem page cache cleared with:

shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run

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 -parallel -qopt-prefetch

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

```

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

```



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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

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

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

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

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0
-qopt-prefetch -parallel

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

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

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-ic17.0-official-linux64-revF.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revC.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml>

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For other inquiries, please contact webmaster@spec.org.

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