



SPEC® CFP2006 Result

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Dell Inc.

SPECfp®2006 = 126

PowerEdge R730 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPECfp_base2006 = 119

CPU2006 license: 55

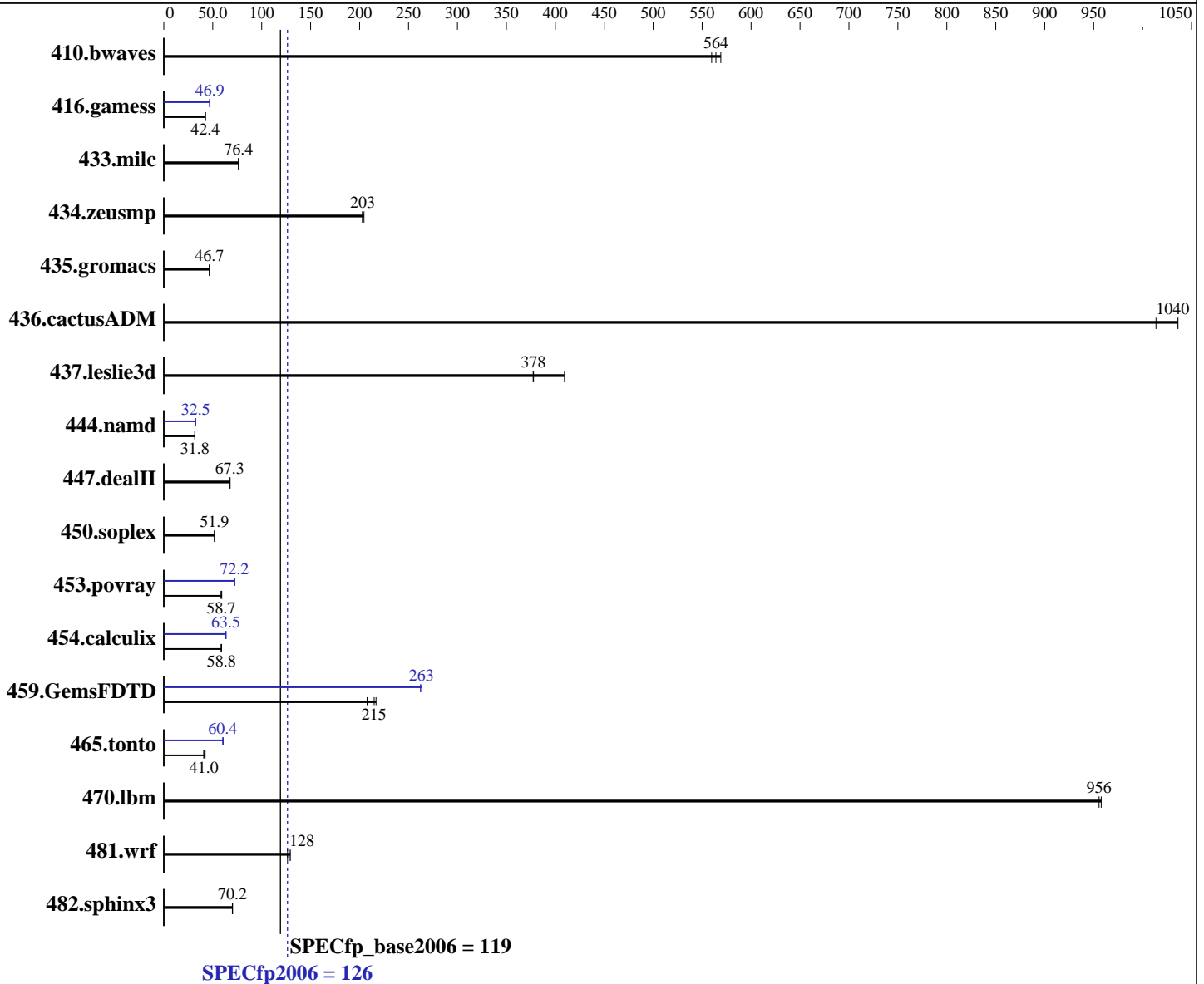
Test date: Feb-2017

Test sponsor: Dell Inc.

Hardware Availability: Mar-2016

Tested by: Dell Inc.

Software Availability: Nov-2016



Hardware

CPU Name: Intel Xeon E5-2699 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
 CPU MHz: 2200
 FPU: Integrated
 CPU(s) enabled: 44 cores, 2 chips, 22 cores/chip
 CPU(s) orderable: 1,2 chips
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core

Continued on next page

Software

Operating System: SUSE Linux Enterprise Server 12
 3.12.28-4-default
 Compiler: C/C++: Version 17.0.0.098 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 17.0.0.098 of Intel Fortran
 Compiler for Linux
 Auto Parallel: Yes
 File System: ext4
 System State: Run level 3 (multi-user)

Continued on next page



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L3 Cache: 55 MB I+D on chip per chip
 Other Cache: None
 Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)
 Disk Subsystem: 2 x 2000 GB 7200 RPM SAS RAID 0
 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	24.3	560	<u>24.1</u>	<u>564</u>	23.9	569	24.3	560	<u>24.1</u>	<u>564</u>	23.9	569
416.gamess	<u>462</u>	<u>42.4</u>	462	42.4	462	42.3	<u>417</u>	<u>46.9</u>	418	46.8	417	47.0
433.milc	<u>120</u>	<u>76.4</u>	120	76.8	120	76.3	<u>120</u>	<u>76.4</u>	120	76.8	120	76.3
434.zeusmp	44.8	203	44.5	205	<u>44.8</u>	<u>203</u>	44.8	203	44.5	205	<u>44.8</u>	<u>203</u>
435.gromacs	153	46.7	<u>153</u>	<u>46.7</u>	153	46.7	153	46.7	<u>153</u>	<u>46.7</u>	153	46.7
436.cactusADM	11.8	1010	11.5	1040	<u>11.5</u>	<u>1040</u>	11.8	1010	11.5	1040	<u>11.5</u>	<u>1040</u>
437.leslie3d	<u>24.9</u>	<u>378</u>	24.9	377	23.0	409	<u>24.9</u>	<u>378</u>	24.9	377	23.0	409
444.namd	253	31.7	252	31.8	<u>252</u>	<u>31.8</u>	247	32.5	<u>247</u>	<u>32.5</u>	247	32.5
447.dealII	<u>170</u>	<u>67.3</u>	171	66.7	169	67.8	<u>170</u>	<u>67.3</u>	171	66.7	169	67.8
450.soplex	161	51.9	<u>161</u>	<u>51.9</u>	161	51.8	161	51.9	<u>161</u>	<u>51.9</u>	161	51.8
453.povray	<u>90.6</u>	<u>58.7</u>	89.9	59.2	91.9	57.9	73.8	72.1	<u>73.6</u>	<u>72.2</u>	73.4	72.5
454.calculix	<u>140</u>	<u>58.8</u>	140	58.8	141	58.6	130	63.5	<u>130</u>	<u>63.5</u>	130	63.4
459.GemsFDTD	<u>49.4</u>	<u>215</u>	48.9	217	51.1	208	<u>40.3</u>	<u>263</u>	40.5	262	40.2	264
465.tonto	<u>240</u>	<u>41.0</u>	241	40.8	233	42.2	163	60.3	163	60.5	<u>163</u>	<u>60.4</u>
470.lbm	<u>14.4</u>	<u>956</u>	14.4	955	14.3	958	<u>14.4</u>	<u>956</u>	14.4	955	14.3	958
481.wrf	<u>87.2</u>	<u>128</u>	88.4	126	86.4	129	<u>87.2</u>	<u>128</u>	88.4	126	86.4	129
482.sphinx3	277	70.3	278	70.0	<u>278</u>	<u>70.2</u>	277	70.3	278	70.0	<u>278</u>	<u>70.2</u>

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:
 Snoop Mode set to Opportunistic Snoop Broadcast
 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 disabled
 Sysinfo program /root/previous-cpu2006-1.2/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on linux-0171 Fri Feb 3 20:24:50 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 E5-2699 v4 @ 2.20GHz
 2 "physical id"s (chips)
 44 "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    : 22
  siblings    : 22
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
cache size     : 56320 KB
```

```
From /proc/meminfo
MemTotal:      264567484 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-0171 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
```

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Platform Notes (Continued)

(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 3 10:58

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

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	ext4	246G	19G	226G	8%	/

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. 2.3.4 11/08/2016

Memory:

7x	00AD063200AD	HMA82GR7MFR8N-UH	16 GB	2 rank	2400 MHz
9x	00CE00B300CE	M393A2K43BB1-CRC	16 GB	2 rank	2400 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:

KMP_AFFINITY = "granularity=fine,scatter"

LD_LIBRARY_PATH = "/root/previous-cpu2006-1.2/libs/32:/root/previous-cpu2006-1.2/libs/64:/root/previous-cpu2006-1.2/sh10.2"

OMP_NUM_THREADS = "20"

The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent. The results have been measured on a Dell PowerEdge R730xd model.

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM

memory using Redhat Enterprise Linux 7.2

Transparent Huge Pages enabled with:

echo never > /sys/kernel/mm/transparent_hugepage/enabled

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.deallI: -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.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-ic17.0-official-linux64.xml>

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

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Tested with SPEC CPU2006 v1.2.

Report generated on Tue Mar 7 16:14:41 2017 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 7 March 2017.