



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]2006 = 124

PowerEdge R930 (Intel Xeon E7-8890 v4, 2.20 GHz)

SPECfp_base2006 = 116

CPU2006 license: 55

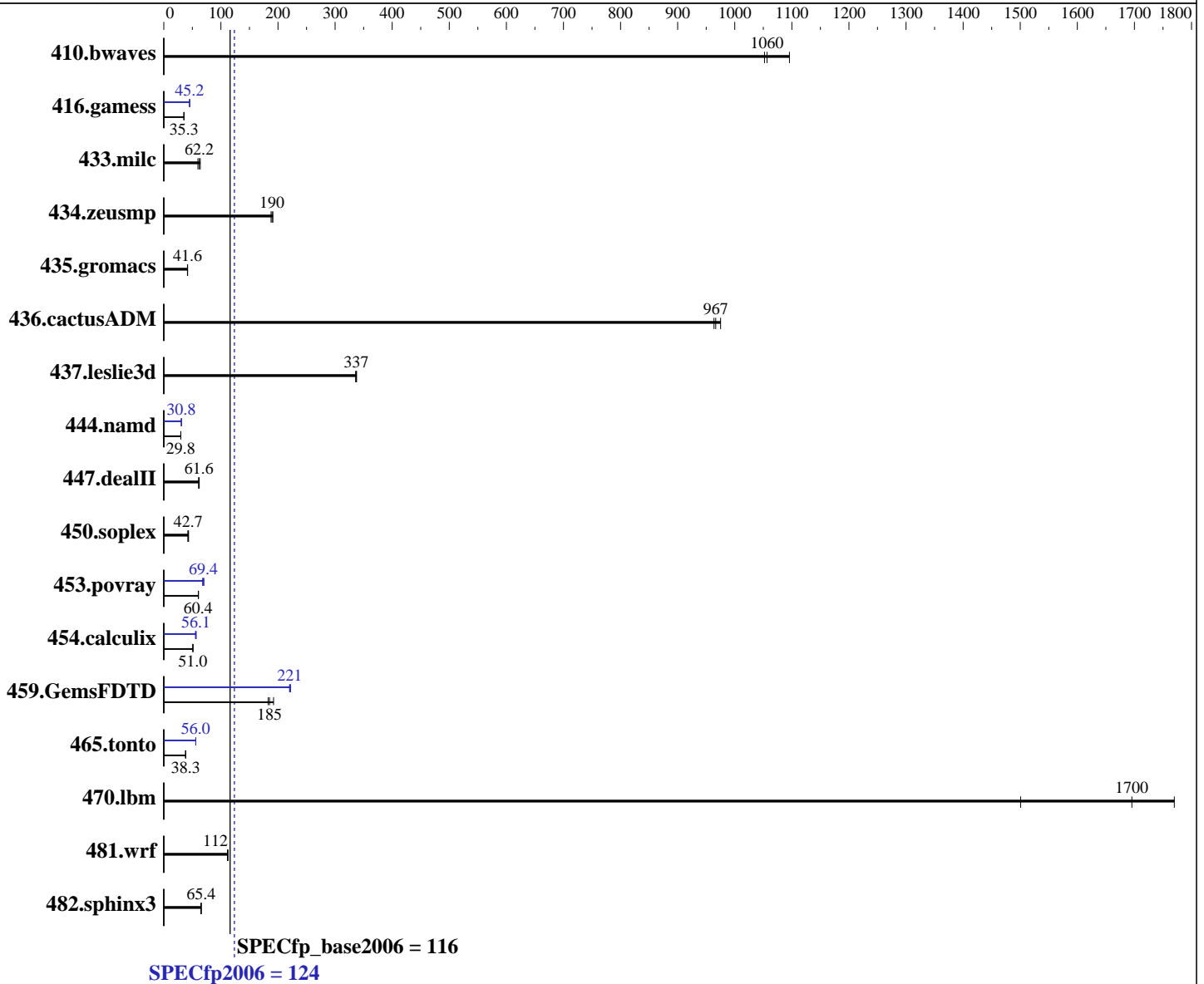
Test date: May-2016

Test sponsor: Dell Inc.

Hardware Availability: Jun-2016

Tested by: Dell Inc.

Software Availability: Dec-2015



Hardware

CPU Name: Intel Xeon E7-8890 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz
 CPU MHz: 2200
 FPU: Integrated
 CPU(s) enabled: 96 cores, 4 chips, 24 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 SP1
 3.12.49-11-default
 Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE
 for Linux;
 Fortran: Version 16.0.0.101 of Intel Fortran
 Studio XE for Linux
 Auto Parallel: Yes
 File System: xfs
 System State: Run level 3 (multi-user)

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L3 Cache: 60 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: 1 x 480 GB SAS 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	<u>12.9</u>	<u>1060</u>	12.4	1100	12.9	1050	<u>12.9</u>	<u>1060</u>	12.4	1100	12.9	1050
416.gamess	554	35.4	555	35.3	<u>554</u>	<u>35.3</u>	433	45.2	<u>433</u>	<u>45.2</u>	433	45.2
433.milc	144	63.9	<u>148</u>	<u>62.2</u>	154	59.7	144	63.9	<u>148</u>	<u>62.2</u>	154	59.7
434.zeusmp	48.5	188	47.6	191	<u>48.0</u>	<u>190</u>	48.5	188	47.6	191	<u>48.0</u>	<u>190</u>
435.gromacs	<u>172</u>	<u>41.6</u>	171	41.7	173	41.4	<u>172</u>	<u>41.6</u>	171	41.7	173	41.4
436.cactusADM	12.3	975	<u>12.4</u>	<u>967</u>	12.4	964	12.3	975	<u>12.4</u>	<u>967</u>	12.4	964
437.leslie3d	28.0	336	27.8	338	<u>27.9</u>	<u>337</u>	28.0	336	27.8	338	<u>27.9</u>	<u>337</u>
444.namd	268	29.9	269	29.8	<u>269</u>	<u>29.8</u>	260	30.8	<u>261</u>	<u>30.8</u>	261	30.8
447.dealII	<u>186</u>	<u>61.6</u>	184	62.1	188	60.9	<u>186</u>	<u>61.6</u>	184	62.1	188	60.9
450.soplex	192	43.4	198	42.2	<u>195</u>	<u>42.7</u>	192	43.4	198	42.2	<u>195</u>	<u>42.7</u>
453.povray	87.4	60.8	88.1	60.4	<u>88.0</u>	<u>60.4</u>	75.6	70.3	78.3	67.9	<u>76.7</u>	<u>69.4</u>
454.calculix	162	51.0	<u>162</u>	<u>51.0</u>	162	50.9	149	55.5	<u>147</u>	<u>56.1</u>	145	56.8
459.GemsFDTD	55.2	192	<u>57.3</u>	<u>185</u>	58.0	183	47.8	222	<u>48.1</u>	<u>221</u>	48.2	220
465.tonto	255	38.6	<u>257</u>	<u>38.3</u>	259	37.9	<u>176</u>	<u>56.0</u>	176	56.0	176	56.0
470.lbm	7.76	1770	<u>8.10</u>	<u>1700</u>	9.16	1500	7.76	1770	<u>8.10</u>	<u>1700</u>	9.16	1500
481.wrf	100	112	99.3	112	<u>99.9</u>	<u>112</u>	100	112	99.3	112	<u>99.9</u>	<u>112</u>
482.sphinx3	299	65.2	297	65.6	<u>298</u>	<u>65.4</u>	299	65.2	297	65.6	<u>298</u>	<u>65.4</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:
Virtualization Technology Disabled
System Profile set to Custom
CPU Power Management set to Hardware P States
Memory Frequency set to Maximum Performance
Turbo Boost Enabled
Energy Efficient Turbo Enabled
C1E Disabled
C States set to Autonomous

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Platform Notes (Continued)

Collaborative CPU Performance Control Disabled
 Memory Patrol Scrub Disabled
 Memory Refresh Rate set to 1x
 Uncore Frequency set to Dynamic
 Energy Efficient Policy set to Performance
 Monitor/MWait Enabled
 Snoop Mode set to Home Snoop
 Sysinfo program /root/icl6.0_Sept12_2015/config/sysinfo.rev6914
 \$Rev: 6914 \$ \$Date:: 2014-06-25 # \$ e3fbb8667b5a285932ceab81e28219e1
 running on bdx-perf01 Thu May 5 19:42:43 2016

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 E7-8890 v4 @ 2.20GHz
 4 "physical id"s (chips)
 192 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
cache size : 61440 KB
```

```
From /proc/meminfo
MemTotal: 529322532 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# 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"
```

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Platform Notes (Continued)

```

VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

```

```

uname -a:
Linux bdx-perf01 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 May 5 14:21

```

SPEC is set to: /root/ic16.0_Sept12_2015
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   368G  9.7G  358G   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. 2.0.1 04/20/2016

Memory:

```

32x 00AD00B300AD HMA42GR7MFR4N-TF 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:

```

KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/root/ic16.0_Sept12_2015/libs/32:/root/ic16.0_Sept12_2015/libs/64:/root/ic16.0_Sept12_2015/sh"
OMP_NUM_THREADS = "96"

```

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation

C benchmarks:

icc -m64

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Base Compiler Invocation (Continued)

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 -parallel -opt-prefetch
-ansi-alias

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias



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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

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: -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) -fno-alias
-auto-ilp32

447.dealIII: basepeak = yes

450.soplex: basepeak = yes

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) -prof-use(pass 2) -unroll4
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

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Peak Optimization Flags (Continued)

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: -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 -opt-prefetch -parallel

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) -inline-calloc
-opt-malloc-options=3 -auto -unroll4

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 -ansi-alias

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-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.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.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.xml>

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