



SPEC® CFP2006 Result

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Dell Inc.

SPECfp®2006 = 111

PowerEdge R630 (Intel Xeon E5-2637 v4, 3.50 GHz)

SPECfp_base2006 = 107

CPU2006 license: 55

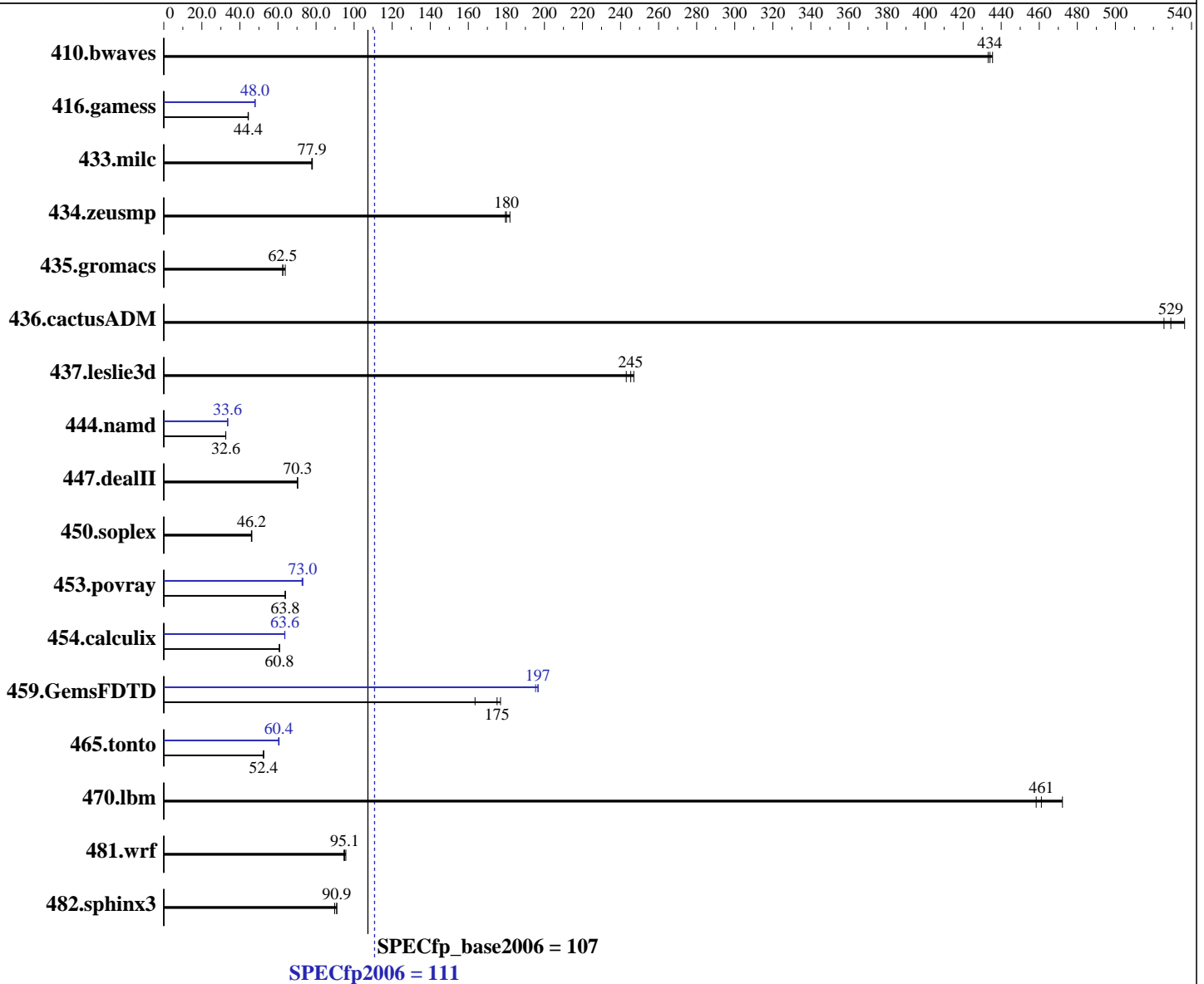
Test date: Mar-2016

Test sponsor: Dell Inc.

Hardware Availability: Mar-2016

Tested by: Dell Inc.

Software Availability: Mar-2016



Hardware	
CPU Name:	Intel Xeon E5-2637 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	3500
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 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

Software	
Operating System:	Red Hat Enterprise Linux Server release 7.2 (Maipo)
	3.10.0-327.el7.x86_64
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

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L3 Cache: 15 MB I+D on chip per chip
 Other Cache: None
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
 Disk Subsystem: 1 x 500 GB 7200 RPM SATA
 Other Hardware: None

System State: Run level 3 (multi-user)
 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	31.4	433	<u>31.3</u>	<u>434</u>	31.2	435	31.4	433	<u>31.3</u>	<u>434</u>	31.2	435
416.gamess	442	44.3	<u>441</u>	<u>44.4</u>	441	44.4	408	48.0	409	47.9	<u>408</u>	<u>48.0</u>
433.milc	<u>118</u>	<u>77.9</u>	118	78.1	118	77.7	<u>118</u>	<u>77.9</u>	118	78.1	118	77.7
434.zeusmp	50.7	180	<u>50.5</u>	<u>180</u>	50.0	182	50.7	180	<u>50.5</u>	<u>180</u>	50.0	182
435.gromacs	114	62.5	<u>114</u>	<u>62.5</u>	112	63.8	114	62.5	<u>114</u>	<u>62.5</u>	112	63.8
436.cactusADM	22.3	536	22.7	526	<u>22.6</u>	<u>529</u>	22.3	536	22.7	526	<u>22.6</u>	<u>529</u>
437.leslie3d	38.7	243	<u>38.3</u>	<u>245</u>	38.1	247	38.7	243	<u>38.3</u>	<u>245</u>	38.1	247
444.namd	<u>246</u>	<u>32.6</u>	246	32.5	246	32.6	239	33.6	239	33.5	<u>239</u>	<u>33.6</u>
447.dealII	<u>163</u>	<u>70.3</u>	163	70.3	163	70.2	<u>163</u>	<u>70.3</u>	163	70.3	163	70.2
450.soplex	180	46.2	<u>181</u>	<u>46.2</u>	181	46.0	180	46.2	<u>181</u>	<u>46.2</u>	181	46.0
453.povray	<u>83.4</u>	<u>63.8</u>	83.2	63.9	83.4	63.8	<u>72.9</u>	<u>73.0</u>	72.9	73.0	73.2	72.6
454.calculix	<u>136</u>	<u>60.8</u>	136	60.7	136	60.8	130	63.5	130	63.6	<u>130</u>	<u>63.6</u>
459.GemsFDTD	64.9	164	<u>60.6</u>	<u>175</u>	60.0	177	53.9	197	<u>54.0</u>	<u>197</u>	54.3	195
465.tonto	<u>188</u>	<u>52.4</u>	188	52.3	187	52.5	162	60.6	163	60.3	<u>163</u>	<u>60.4</u>
470.lbm	29.1	472	30.0	458	<u>29.8</u>	<u>461</u>	29.1	472	30.0	458	<u>29.8</u>	<u>461</u>
481.wrf	118	94.7	<u>118</u>	<u>95.1</u>	117	95.7	118	94.7	<u>118</u>	<u>95.1</u>	117	95.7
482.sphinx3	<u>215</u>	<u>90.9</u>	214	90.9	217	89.8	<u>215</u>	<u>90.9</u>	214	90.9	217	89.8

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 Power Management set to Maximum Performance
 Energy Efficient Turbo disabled
 Memory Patrol Scrub disabled
 Cstates autonomous/C1E enabled
 Energy Efficient Policy set to Performance
 Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914

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Platform Notes (Continued)

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Mon Mar 7 11:46:12 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 E5-2637 v4@ 3.50GHz
 2 "physical id"s (chips)
 16 "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 : 4
  siblings  : 8
  physical 0: cores 0 1 2 3
  physical 1: cores 0 1 2 3
 cache size : 15360 KB
```

```
From /proc/meminfo
MemTotal:      264040560 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.2 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.2"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server
```

```
uname -a:
Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29
EDT 2015 x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Mar 7 07:00
```

```
SPEC is set to: /root/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   256G  14G  243G   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

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Platform Notes (Continued)

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 02/12/2016

Memory:

16x 002C0632002C 18ASF2G72PDZ-2G3B1 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,compact,1,0"

LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

OMP_NUM_THREADS = "8"

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

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.lelie3d: -DSPEC_CPU_LP64

444.namd: -DSPEC_CPU_LP64

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Base Portability Flags (Continued)

```

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

```

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



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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.dealII: 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

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:

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Peak Optimization Flags (Continued)

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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