



# SPEC® CFP2006 Result

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Dell Inc.

SPECfp®2006 = 66.9

PowerEdge R730 (Intel Xeon E5-2603 v4, 1.70 GHz)

SPECfp\_base2006 = 65.3

CPU2006 license: 55

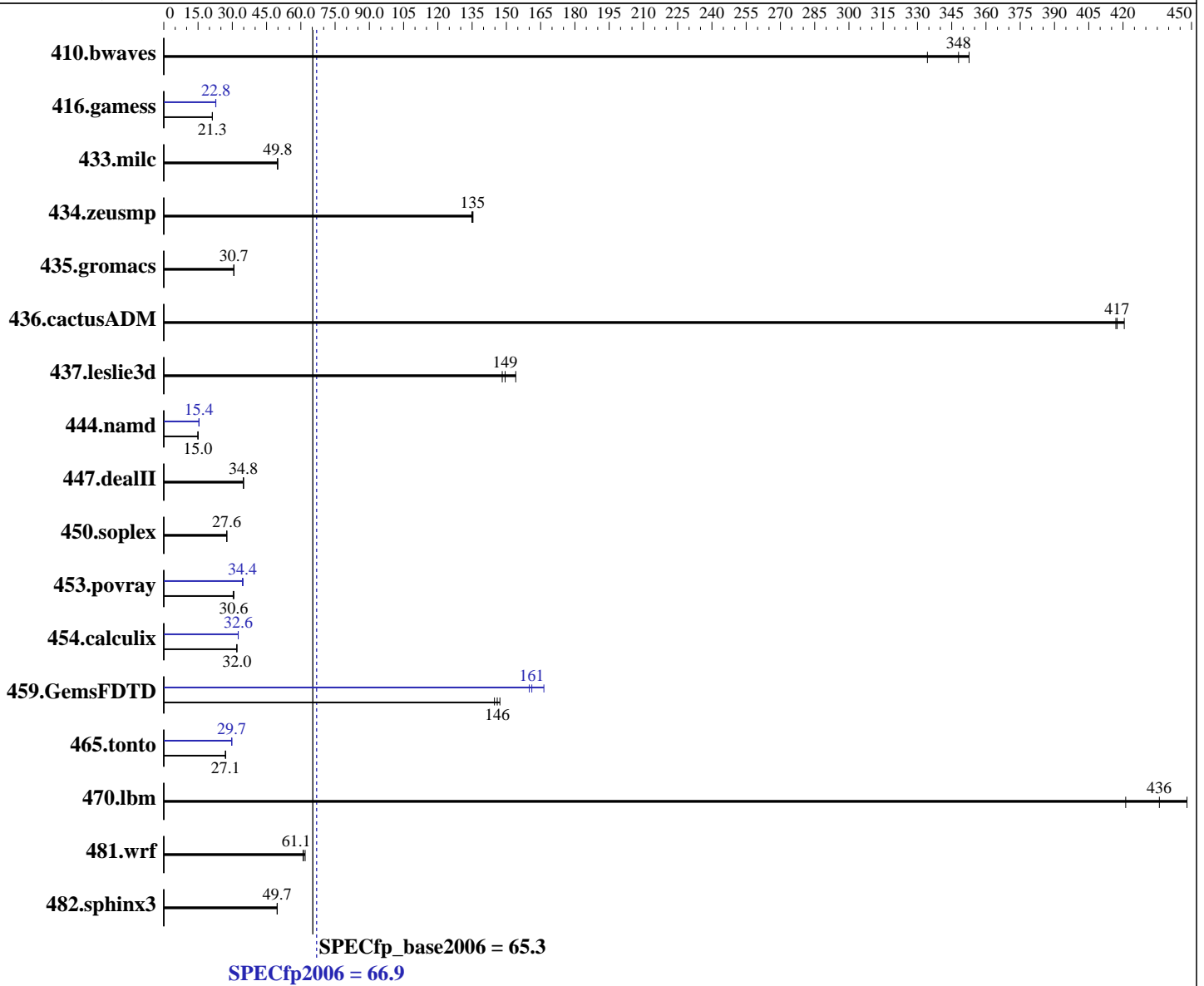
Test date: Jan-2016

Test sponsor: Dell Inc.

Hardware Availability: Mar-2016

Tested by: Dell Inc.

Software Availability: Mar-2016



Hardware	
CPU Name:	Intel Xeon E5-2603 v4
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 cores/chip
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:	Red Hat Enterprise Linux Server release 7.1 (Maipo)
	3.10.0-229.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: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)  
Disk Subsystem: 1 x 120 GB SATA SSD  
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	38.5	353	<b>39.1</b>	<b>348</b>	40.6	334	38.5	353	<b>39.1</b>	<b>348</b>	40.6	334
416.gamess	919	21.3	923	21.2	<b>920</b>	<b>21.3</b>	861	22.7	<b>860</b>	<b>22.8</b>	859	22.8
433.milc	184	49.8	<b>184</b>	<b>49.8</b>	184	49.8	184	49.8	<b>184</b>	<b>49.8</b>	184	49.8
434.zeusmp	67.2	135	<b>67.3</b>	<b>135</b>	67.5	135	67.2	135	<b>67.3</b>	<b>135</b>	67.5	135
435.gromacs	232	30.7	<b>233</b>	<b>30.7</b>	233	30.7	232	30.7	<b>233</b>	<b>30.7</b>	233	30.7
436.cactusADM	28.7	417	28.4	421	<b>28.6</b>	<b>417</b>	28.7	417	28.4	421	<b>28.6</b>	<b>417</b>
437.leslie3d	61.0	154	<b>62.9</b>	<b>149</b>	63.4	148	61.0	154	<b>62.9</b>	<b>149</b>	63.4	148
444.namd	<b>536</b>	<b>15.0</b>	536	15.0	536	15.0	520	15.4	<b>520</b>	<b>15.4</b>	520	15.4
447.dealII	328	34.8	<b>328</b>	<b>34.8</b>	327	34.9	328	34.8	<b>328</b>	<b>34.8</b>	327	34.9
450.soplex	303	27.6	302	27.6	<b>302</b>	<b>27.6</b>	303	27.6	302	27.6	<b>302</b>	<b>27.6</b>
453.povray	173	30.7	175	30.4	<b>174</b>	<b>30.6</b>	<b>154</b>	<b>34.4</b>	155	34.4	153	34.7
454.calculix	<b>258</b>	<b>32.0</b>	258	31.9	258	32.0	253	32.6	253	32.6	<b>253</b>	<b>32.6</b>
459.GemsFDTD	72.1	147	73.3	145	<b>72.7</b>	<b>146</b>	<b>65.8</b>	<b>161</b>	63.8	166	66.3	160
465.tonto	366	26.9	363	27.1	<b>363</b>	<b>27.1</b>	330	29.8	331	29.7	<b>331</b>	<b>29.7</b>
470.lbm	32.6	421	<b>31.5</b>	<b>436</b>	30.7	448	32.6	421	<b>31.5</b>	<b>436</b>	30.7	448
481.wrf	183	61.0	<b>183</b>	<b>61.1</b>	180	61.9	183	61.0	<b>183</b>	<b>61.1</b>	180	61.9
482.sphinx3	393	49.6	<b>392</b>	<b>49.7</b>	392	49.7	393	49.6	<b>392</b>	<b>49.7</b>	392	49.7

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 Performance  
Memory Patrol Scrub disabled  
C1E/Cstates disabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on localhost.localdomain Fri Jan 29 17:21:54 2016

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## Platform Notes (Continued)

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 E5-2603 v4@ 1.70GHz
 2 "physical id"s (chips)
 12 "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 : 6
  siblings  : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
 cache size : 15360 KB
```

From /proc/meminfo

```
MemTotal:      528284252 kB
HugePages_Total: 0
Hugepagesize:   2048 kB
```

From /etc/\*release\* /etc/\*version\*

```
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.1 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.1"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server
```

uname -a:

```
Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38 EST 2015 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Jan 28 06:13

SPEC is set to: /root/cpu2006-1.2

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sda2        xfs       102G  8.8G  93G   9% /
```

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.

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## Platform Notes (Continued)

BIOS Dell Inc. 2.0.0 01/21/2016

Memory:

16x 00CE00B300CE M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 1866 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 = "12"

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.leslie3d: -DSPEC\_CPU\_LP64

444.namd: -DSPEC\_CPU\_LP64

447.dealII: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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