



# SPEC® CFP2006 Result

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## Dell Inc.

SPECfp®2006 = 111

PowerEdge T630 (Intel Xeon E5-2683 v4, 2.10 GHz)

SPECfp\_base2006 = 105

CPU2006 license: 55

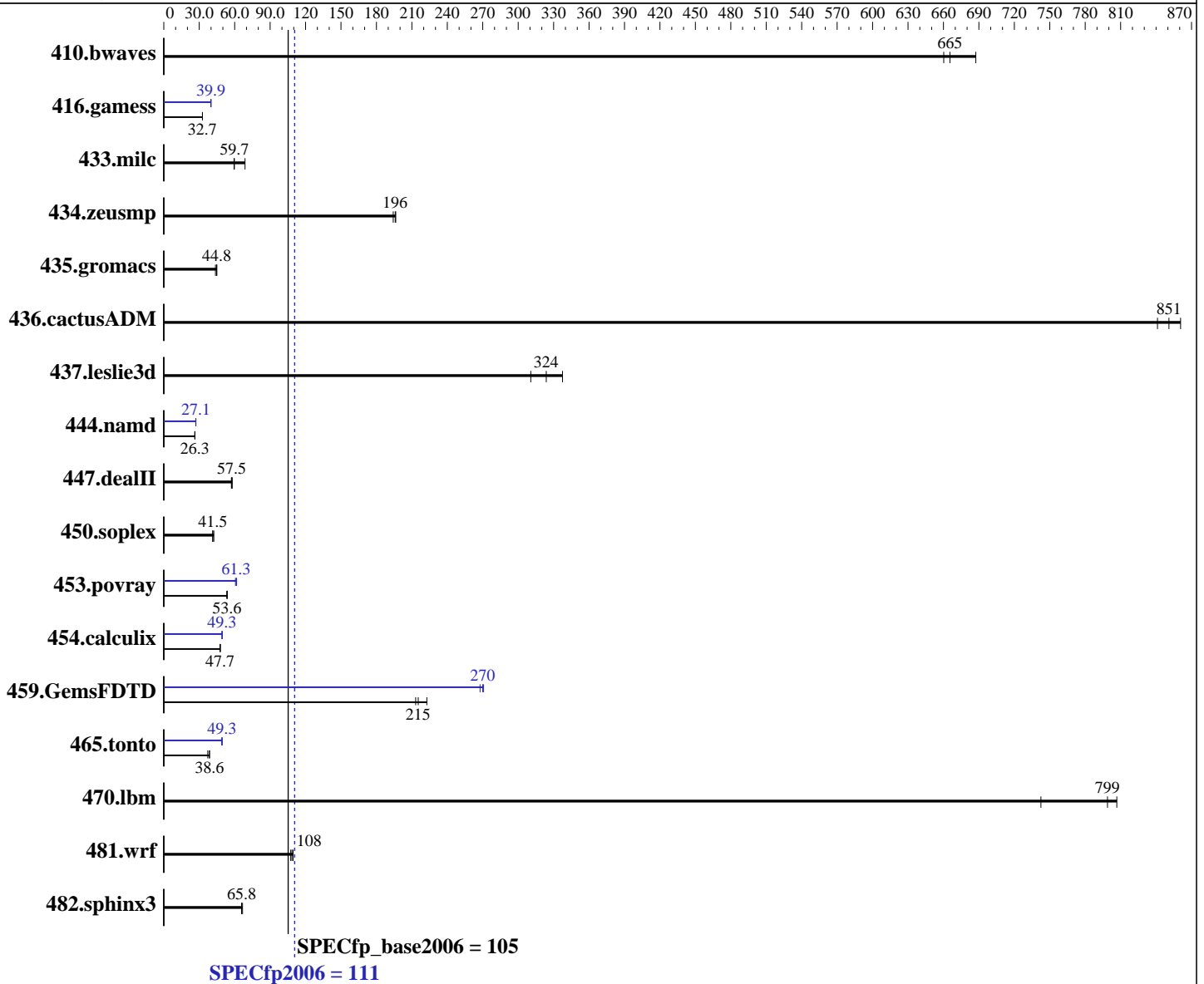
Test date: Jul-2016

Test sponsor: Dell Inc.

Hardware Availability: Jun-2016

Tested by: Dell Inc.

Software Availability: Mar-2016



### Hardware

CPU Name: Intel Xeon E5-2683 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip, 2 threads/core  
 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

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### 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: 40 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 512 GB (16 x 32 GB 2Rx8 PC4-2400T-R)  
 Disk Subsystem: 1 x 200 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	20.6	660	<b><u>20.4</u></b>	<b><u>665</u></b>	19.8	687	20.6	660	<b><u>20.4</u></b>	<b><u>665</u></b>	19.8	687
416.gamess	599	32.7	598	32.7	<b><u>598</u></b>	<b><u>32.7</u></b>	491	39.9	<b><u>491</u></b>	<b><u>39.9</u></b>	490	39.9
433.milc	154	59.5	134	68.8	<b><u>154</u></b>	<b><u>59.7</u></b>	154	59.5	134	68.8	<b><u>154</u></b>	<b><u>59.7</u></b>
434.zeusmp	46.9	194	<b><u>46.5</u></b>	<b><u>196</u></b>	46.3	196	46.9	194	<b><u>46.5</u></b>	<b><u>196</u></b>	46.3	196
435.gromacs	<b><u>159</u></b>	<b><u>44.8</u></b>	159	44.8	163	43.7	<b><u>159</u></b>	<b><u>44.8</u></b>	159	44.8	163	43.7
436.cactusADM	<b><u>14.0</u></b>	<b><u>851</u></b>	14.2	841	13.9	861	<b><u>14.0</u></b>	<b><u>851</u></b>	14.2	841	13.9	861
437.leslie3d	30.3	311	<b><u>29.0</u></b>	<b><u>324</u></b>	27.8	338	30.3	311	<b><u>29.0</u></b>	<b><u>324</u></b>	27.8	338
444.namd	<b><u>305</u></b>	<b><u>26.3</u></b>	305	26.3	305	26.3	297	27.0	<b><u>296</u></b>	<b><u>27.1</u></b>	295	27.2
447.dealII	<b><u>199</u></b>	<b><u>57.5</u></b>	198	57.9	200	57.2	<b><u>199</u></b>	<b><u>57.5</u></b>	198	57.9	200	57.2
450.soplex	<b><u>201</u></b>	<b><u>41.5</u></b>	197	42.4	201	41.4	<b><u>201</u></b>	<b><u>41.5</u></b>	197	42.4	201	41.4
453.povray	<b><u>99.2</u></b>	<b><u>53.6</u></b>	99.1	53.7	99.7	53.3	86.3	61.6	87.7	60.7	<b><u>86.8</u></b>	<b><u>61.3</u></b>
454.calculix	172	47.8	<b><u>173</u></b>	<b><u>47.7</u></b>	173	47.7	<b><u>167</u></b>	<b><u>49.3</u></b>	167	49.3	167	49.4
459.GemsFDTD	47.6	223	49.8	213	<b><u>49.3</u></b>	<b><u>215</u></b>	39.2	271	<b><u>39.3</u></b>	<b><u>270</u></b>	39.6	268
465.tonto	<b><u>255</u></b>	<b><u>38.6</u></b>	254	38.7	264	37.2	200	49.1	199	49.4	<b><u>200</u></b>	<b><u>49.3</u></b>
470.lbm	17.0	807	<b><u>17.2</u></b>	<b><u>799</u></b>	18.5	743	17.0	807	<b><u>17.2</u></b>	<b><u>799</u></b>	18.5	743
481.wrf	<b><u>103</u></b>	<b><u>108</u></b>	104	107	102	109	<b><u>103</u></b>	<b><u>108</u></b>	104	107	102	109
482.sphinx3	296	65.8	292	66.6	<b><u>296</u></b>	<b><u>65.8</u></b>	296	65.8	292	66.6	<b><u>296</u></b>	<b><u>65.8</u></b>

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 Home Snoop  
 Virtualization Technology disabled  
 System Profile set to custom  
 CPU Performance set to Maximum Performance  
 C States set to Autonomous  
 C1E enabled  
 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  
 Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
 \$Rev: 6914 \$ \$Date:: 2014-06-25 # \$ e3fbb8667b5a285932ceab81e28219e1  
 running on localhost.localdomain Fri Jul 1 07:30:40 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 E5-2683 v4 @ 2.10GHz
 2 "physical id"s (chips)
 64 "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     : 16
  siblings      : 32
  physical 0:   cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1:   cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size     : 40960 KB
```

```
From /proc/meminfo
MemTotal:      528280408 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 Jul 1 01:55 last=5

```
SPEC is set to: /root/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   140G  9.7G  131G   7% /
Additional information from dmidecode:
```

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## Platform Notes (Continued)

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. 2.2.1 06/06/2016

Memory:

16x 00CE00B300CE M393A4K40BB1-CRC 32 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 = "32"

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

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## Base Portability Flags (Continued)

```

437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deall: -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

```



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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: -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

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## Peak Optimization Flags (Continued)

465.tonto (continued):

`-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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