# SPEC® CFP2006 Result

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## Dell Inc.

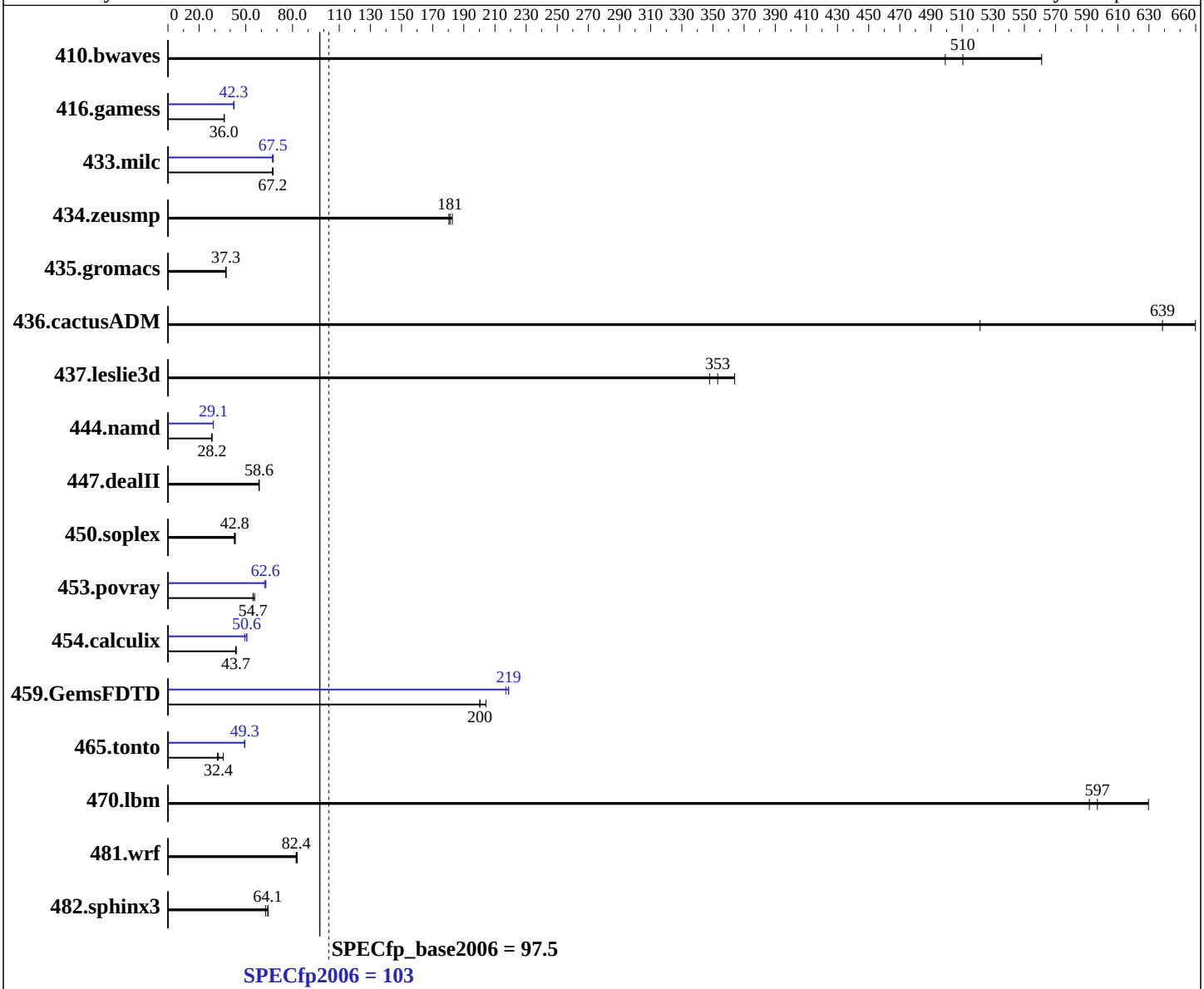
PowerEdge R730 (Intel Xeon E5-2699 v3, 2.30 GHz)

SPECfp®2006 = 103

SPECfp_base2006 = 97.5

**CPU2006 license:** 55
**Test sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test date:** Jul-2014
**Hardware Availability:** Sep-2014
**Software Availability:** Sep-2014




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2699 v3 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.60 GHz |
| CPU MHz: | 2300 |
| FPU: | Integrated |
| CPU(s) enabled: | 36 cores, 2 chips, 18 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 |

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## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 11 (x86_64) 3.0.76-0.11-default |
| Compiler: | C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |

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| | |
|---|---|
| L3 Cache: | 45 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R) |
| Disk Subsystem: | 1 x 250 GB 7200 RPM SATA |
| 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 | 24.2 | 561 | **26.6** | **510** | 27.2 | 499 | 24.2 | 561 | **26.6** | **510** | 27.2 | 499 |
| 416.gamess | 544 | 36.0 | **543** | **36.0** | 540 | 36.2 | 464 | 42.2 | 460 | 42.5 | **463** | **42.3** |
| 433.milc | 136 | 67.5 | 137 | 67.2 | **137** | **67.2** | 136 | 67.7 | 137 | 67.0 | **136** | **67.5** |
| 434.zeusmp | 49.8 | 183 | 50.4 | 180 | **50.2** | **181** | 49.8 | 183 | 50.4 | 180 | **50.2** | **181** |
| 435.gromacs | 192 | 37.2 | **191** | **37.3** | 191 | 37.3 | 192 | 37.2 | **191** | **37.3** | 191 | 37.3 |
| 436.cactusADM | 22.9 | 522 | 18.1 | 660 | **18.7** | **639** | 22.9 | 522 | 18.1 | 660 | **18.7** | **639** |
| 437.leslie3d | 25.8 | 364 | 27.0 | 348 | **26.6** | **353** | 25.8 | 364 | 27.0 | 348 | **26.6** | **353** |
| 444.namd | 284 | 28.2 | 284 | 28.2 | **284** | **28.2** | **275** | **29.1** | 275 | 29.2 | 276 | 29.1 |
| 447.dealII | **195** | **58.6** | 195 | 58.6 | 196 | 58.4 | **195** | **58.6** | 195 | 58.6 | 196 | 58.4 |
| 450.soplex | 195 | 42.7 | **195** | **42.8** | 193 | 43.3 | 195 | 42.7 | **195** | **42.8** | 193 | 43.3 |
| 453.povray | 97.4 | 54.6 | 95.5 | 55.7 | **97.2** | **54.7** | **85.0** | **62.6** | 84.6 | 62.9 | 85.7 | 62.1 |
| 454.calculix | 190 | 43.5 | 188 | 43.9 | **189** | **43.7** | 167 | 49.3 | **163** | **50.6** | 163 | 50.7 |
| 459.GemsFDTD | **53.0** | **200** | 52.0 | 204 | 53.0 | 200 | 48.5 | 219 | **48.5** | **219** | 48.9 | 217 |
| 465.tonto | **304** | **32.4** | 310 | 31.8 | 277 | 35.5 | 200 | 49.2 | **200** | **49.3** | 199 | 49.4 |
| 470.lbm | **23.0** | **597** | 23.2 | 592 | 21.8 | 630 | **23.0** | **597** | 23.2 | 592 | 21.8 | 630 |
| 481.wrf | 136 | 82.4 | 135 | 83.0 | **136** | **82.4** | 136 | 82.4 | 135 | 83.0 | **136** | **82.4** |
| 482.sphinx3 | 303 | 64.3 | 311 | 62.7 | **304** | **64.1** | 303 | 64.3 | 311 | 62.7 | **304** | **64.1** |

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
Execute Disable disabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on linux-fm7q Wed Jul 23 11:01:18 2014
```

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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 E5-2699 v3 @ 2.30GHz
      2 "physical id"s (chips)
      72 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       264441052 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 11 (x86_64)
      VERSION = 11
      PATCHLEVEL = 3

uname -a:
   Linux linux-fm7q 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013
   (ccab990) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 23 05:25 last=S

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      ext3  228G   11G  217G   5% /

Additional information from dmidecode:
  BIOS Dell Inc. 0.3.24 06/12/2014
  Memory:
   4x 00AD00B300AD HMA42GR7MFR4N-TFTD 16 GB 2133 MHz
   6x 00AD063200AD HMA42GR7MFR4N-TFT1 16 GB 2133 MHz
   6x 00CE00B300CE M393A2G40DB0-CPB 16 GB 2133 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:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "36"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>       /proc/sys/vm/drop_caches
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

## 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
     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

## Peak Optimization Flags

C benchmarks:

433.milc: `-xCORE-AVX2`(pass 2) `-prof-gen`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-prof-use`(pass 2) `-auto-ilp32 -ansi-alias`

470.lbm: `basepeak = yes`

482.sphinx3: `basepeak = yes`

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# Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -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(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -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-ic14.0-official-linux64-revC.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64-revC.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.xml


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