# SPEC® CFP2006 Result
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## Dell Inc.

PowerEdge T320 (Intel Xeon E5-2403, 1.80 GHz)

$SPECfp^{®}\_rate2006 =$ 88.9

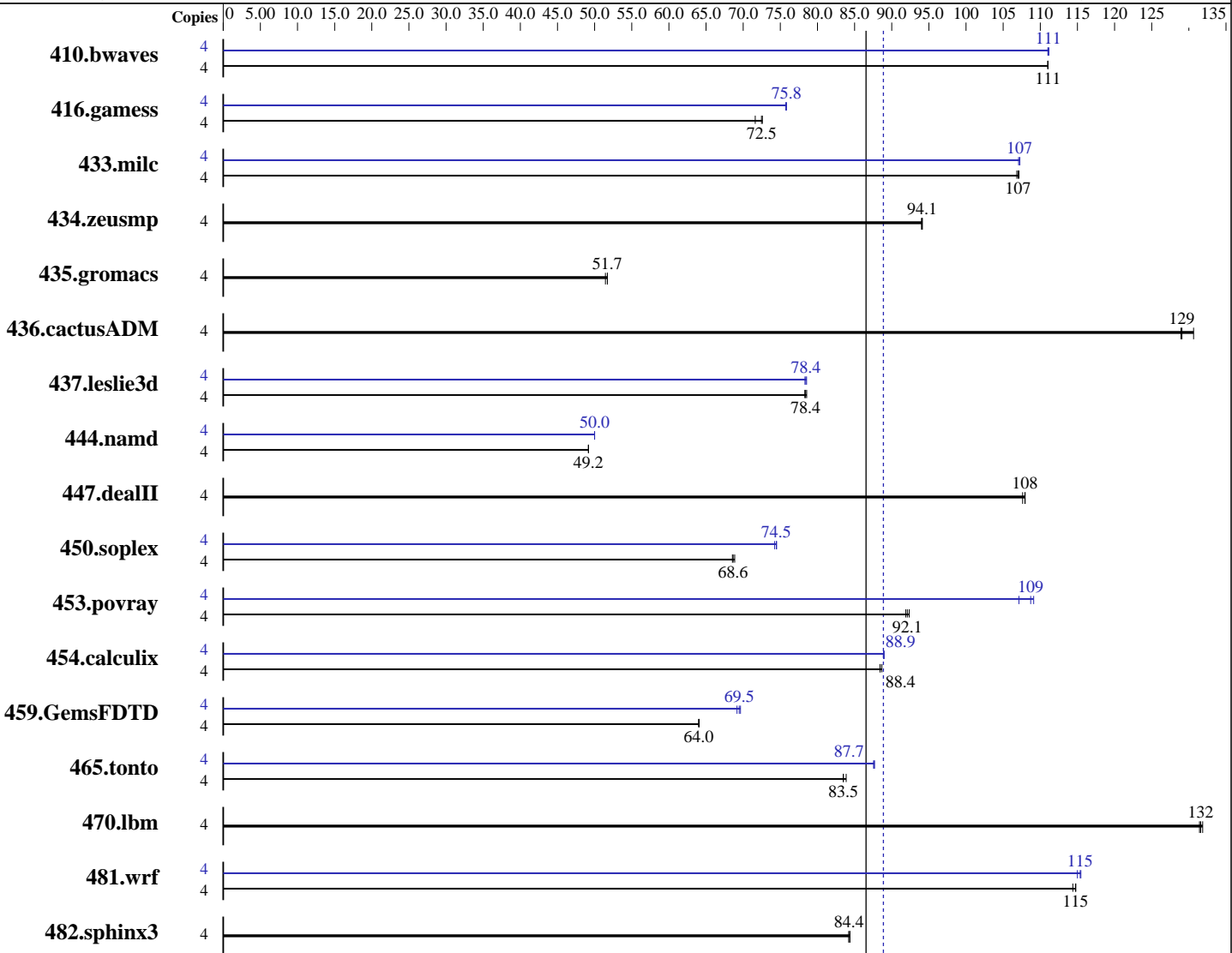$SPECfp\_rate\_base2006 =$ 86.5

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

**Test date:** Jun-2012
**Hardware Availability:** Jun-2012
**Software Availability:** Feb-2012



| | Copies | |
|---|---|---|
| 410.bwaves | 4 | 111 |
| | 4 | 111 |
| 416.gamess | 4 | 75.8 |
| | 4 | 72.5 |
| 433.milc | 4 | 107 |
| | 4 | 107 |
| 434.zeusmp | 4 | 94.1 |
| 435.gromacs | 4 | 51.7 |
| 436.cactusADM | 4 | 129 |
| 437.leslie3d | 4 | 78.4 |
| | 4 | 78.4 |
| 444.namd | 4 | 50.0 |
| | 4 | 49.2 |
| 447.dealII | 4 | 108 |
| 450.soplex | 4 | 74.5 |
| | 4 | 68.6 |
| 453.povray | 4 | 109 |
| | 4 | 92.1 |
| 454.calculix | 4 | 88.9 |
| | 4 | 88.4 |
| 459.GemsFDTD | 4 | 69.5 |
| | 4 | 64.0 |
| 465.tonto | 4 | 87.7 |
| | 4 | 83.5 |
| 470.lbm | 4 | 132 |
| 481.wrf | 4 | 115 |
| | 4 | 115 |
| 482.sphinx3 | 4 | 84.4 |

**SPECfp_rate_base2006 = 86.5**

**SPECfp_rate2006 = 88.9**

## Hardware

CPU Name: Intel Xeon E5-2403
CPU Characteristics:
CPU MHz: 1800
FPU: Integrated
CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip
CPU(s) orderable: 1 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core

*Continued on next page*

## Software

Operating System: SUSE Linux Enterprise Server 11 SP2(x86_64)
3.0.13-0.27-default
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext3
System State: Run level 3 (multi-user)

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| | | | |
|---|---|---|---|
| L3 Cache: | 10 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1067 MHz) | Other Software: | None |
| Disk Subsystem: | 1 x 300 GB 15000 RPM SAS | | |
| Other Hardware: | None | | |

## Results Table

| | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** |
| 410.bwaves | 4 | 490 | 111 | 490 | 111 | **490** | **111** | 4 | 489 | 111 | **489** | **111** | 490 | 111 |
| 416.gamess | 4 | **1081** | **72.5** | 1079 | 72.6 | 1093 | 71.6 | 4 | **1033** | **75.8** | 1033 | 75.8 | 1034 | 75.7 |
| 433.milc | 4 | 343 | 107 | **343** | **107** | 344 | 107 | 4 | **343** | **107** | 342 | 107 | 343 | 107 |
| 434.zeusmp | 4 | 387 | 94.1 | 387 | 94.0 | **387** | **94.1** | 4 | 387 | 94.1 | 387 | 94.0 | **387** | **94.1** |
| 435.gromacs | 4 | **552** | **51.7** | 555 | 51.5 | 552 | 51.7 | 4 | **552** | **51.7** | 555 | 51.5 | 552 | 51.7 |
| 436.cactusADM | 4 | 366 | 131 | 371 | 129 | **370** | **129** | 4 | 366 | 131 | 371 | 129 | **370** | **129** |
| 437.leslie3d | 4 | 480 | 78.3 | 479 | 78.5 | **480** | **78.4** | 4 | **479** | **78.4** | 480 | 78.3 | 479 | 78.5 |
| 444.namd | 4 | **652** | **49.2** | 653 | 49.2 | 652 | 49.2 | 4 | 642 | 50.0 | 642 | 50.0 | **642** | **50.0** |
| 447.dealII | 4 | 425 | 108 | **424** | **108** | 424 | 108 | 4 | 425 | 108 | **424** | **108** | 424 | 108 |
| 450.soplex | 4 | 487 | 68.5 | **486** | **68.6** | 484 | 68.9 | 4 | 448 | 74.5 | **448** | **74.5** | 449 | 74.2 |
| 453.povray | 4 | 230 | 92.4 | 232 | 91.9 | **231** | **92.1** | 4 | 195 | 109 | **196** | **109** | 199 | 107 |
| 454.calculix | 4 | 373 | 88.4 | 372 | 88.7 | **373** | **88.4** | 4 | 371 | 89.0 | **371** | **88.9** | 371 | 88.9 |
| 459.GemsFDTD | 4 | 662 | 64.1 | 663 | 64.0 | **663** | **64.0** | 4 | **611** | **69.5** | 609 | 69.6 | 614 | 69.2 |
| 465.tonto | 4 | 469 | 83.9 | 472 | 83.5 | **471** | **83.5** | 4 | **449** | **87.7** | 449 | 87.7 | 450 | 87.6 |
| 470.lbm | 4 | 417 | 132 | **418** | **132** | 418 | 131 | 4 | 417 | 132 | **418** | **132** | 418 | 131 |
| 481.wrf | 4 | **389** | **115** | 389 | 115 | 391 | 114 | 4 | 387 | 115 | 389 | 115 | **387** | **115** |
| 482.sphinx3 | 4 | 924 | 84.4 | **924** | **84.4** | 926 | 84.2 | 4 | 924 | 84.4 | **924** | **84.4** | 926 | 84.2 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost set to Enabled

Continued on next page

## Dell Inc.

PowerEdge T320 (Intel Xeon E5-2403, 1.80 GHz)

SPECfp_rate2006 = 88.9

SPECfp_rate_base2006 = 86.5

**CPU2006 license:** 55
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**Test date:** Jun-2012
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**Software Availability:** Feb-2012

## Platform Notes (Continued)

```
C States/C1E set to Enabled
Sysinfo program /root/CPU2006-1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on linux-sxkz Thu Jun 21 21:12:13 2012

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 E5-2403 0 @ 1.80GHz
      1 "physical id"s (chips)
      4 "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  : 4
      physical 0: cores 0 1 2 3
   cache size : 10240 KB

From /proc/meminfo
   MemTotal:        49348896 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 = 2

uname -a:
   Linux linux-sxkz 3.0.13-0.27-default #1 SMP Wed Feb 15 13:33:49 UTC 2012
   (d73692b) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 21 09:41 last=S

SPEC is set to: /root/CPU2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext3  271G   40G  218G  16% /

Additional information from dmidecode:

(End of data from sysinfo program)
```

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## 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"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RHEL5.5
 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>
 The Dell PowerEdge T320 and
 the Bull NovaScale T820 F3 models are electronically equivalent.
 The results have been measured on a Dell PowerEdge T320 model
```

## 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

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## Base Portability Flags (Continued)

482.sphinx3: -DSPEC_CPU_LP64

## Base Optimization Flags

C benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

## Peak Compiler Invocation

C benchmarks:
```
icc    -m64
```

C++ benchmarks (except as noted below):
```
icpc   -m64
```
```
  450.soplex: icpc  -m32
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc    -m64 ifort -m64
```

## Peak 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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# Peak Portability Flags (Continued)

```
437.leslie3d: -DSPEC_CPU_LP64
  444.namd: -DSPEC_CPU_LP64
  447.dealII: -DSPEC_CPU_LP64
 453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
  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
```

# Peak Optimization Flags

C benchmarks:

```
   433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32
            -opt-mem-layout-trans=3

    470.lbm: basepeak = yes

 482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
   444.namd: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

  453.povray: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -static

  416.gamess: -xAVX(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- -static

  434.zeusmp: basepeak = yes
```

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# Peak Optimization Flags (Continued)

437.leslie3d: `-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch`

459.GemsFDTD: `-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
`-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3`

465.tonto: `-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
`-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto`
`-inline-calloc -opt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `basepeak = yes`

436.cactusADM: `basepeak = yes`

454.calculix: `-xAVX -ipo -O3 -no-prec-div -static -auto-ilp32`
`-opt-mem-layout-trans=3`

481.wrf: `Same as 454.calculix`

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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