



SPEC[®] CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp[®]_rate2006 = 404

PowerEdge R420 (Intel Xeon E5-2440 v2, 1.90 GHz)

SPECfp_rate_base2006 = 393

CPU2006 license: 55

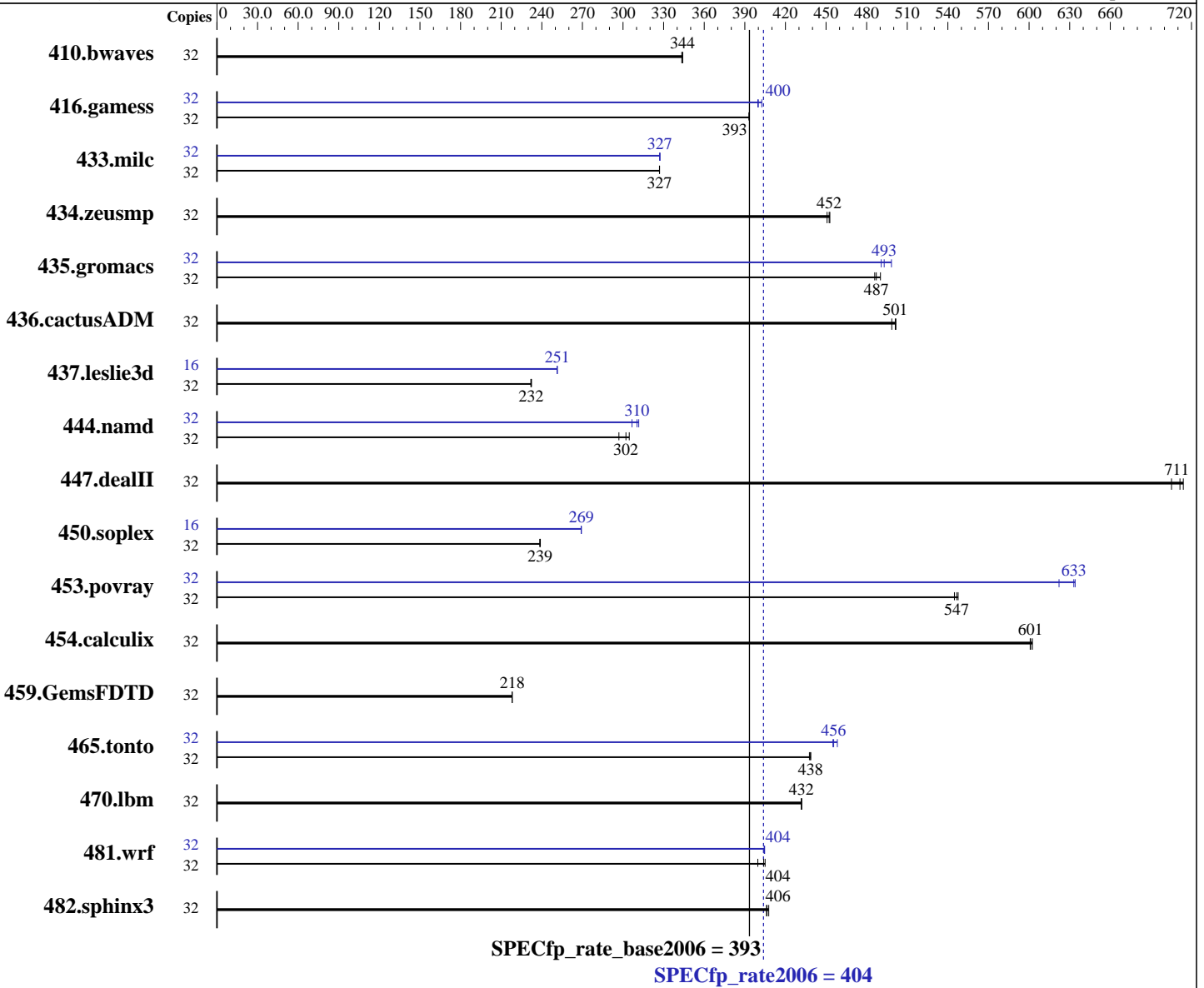
Test date: Oct-2013

Test sponsor: Dell Inc.

Hardware Availability: Jan-2014

Tested by: Dell Inc.

Software Availability: Sep-2013



Hardware

CPU Name: Intel Xeon E5-2440 v2
 CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz
 CPU MHz: 1900
 FPU: Integrated
 CPU(s) enabled: 16 cores, 2 chips, 8 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: No
 File System: ext2
 System State: Run level 3 (multi-user)

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L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 192 GB (12 x 16 GB 2Rx4 PC3L-12800R-11, ECC)
Disk Subsystem: 1 x 300 GB 15000 RPM SAS
Other Hardware: None

Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

| Benchmark | Base | | | | | | | | Peak | | | | | | | |
|---------------|--------|-------------|------------|-------------|------------|-------------|------------|--------|------------|------------|-------------|------------|-------------|------------|--|--|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | | |
| 410.bwaves | 32 | 1264 | 344 | <u>1264</u> | <u>344</u> | 1266 | 343 | 32 | 1264 | 344 | <u>1264</u> | <u>344</u> | 1266 | 343 | | |
| 416.gamess | 32 | 1593 | 393 | <u>1594</u> | <u>393</u> | 1594 | 393 | 32 | 1557 | 403 | <u>1566</u> | <u>400</u> | 1568 | 400 | | |
| 433.milc | 32 | 898 | 327 | 899 | 327 | <u>898</u> | <u>327</u> | 32 | 898 | 327 | 898 | 327 | <u>898</u> | <u>327</u> | | |
| 434.zeusmp | 32 | 643 | 453 | 646 | 451 | <u>644</u> | <u>452</u> | 32 | 643 | 453 | 646 | 451 | <u>644</u> | <u>452</u> | | |
| 435.gromacs | 32 | 466 | 490 | 470 | 486 | <u>469</u> | <u>487</u> | 32 | 458 | 498 | 466 | 491 | <u>463</u> | <u>493</u> | | |
| 436.cactusADM | 32 | 762 | 502 | <u>763</u> | <u>501</u> | 767 | 499 | 32 | 762 | 502 | <u>763</u> | <u>501</u> | 767 | 499 | | |
| 437.leslie3d | 32 | 1295 | 232 | 1297 | 232 | <u>1295</u> | <u>232</u> | 16 | 598 | 251 | 598 | 251 | <u>598</u> | <u>251</u> | | |
| 444.namd | 32 | <u>849</u> | <u>302</u> | 843 | 305 | 864 | 297 | 32 | 837 | 307 | 824 | 312 | <u>827</u> | <u>310</u> | | |
| 447.dealII | 32 | 513 | 714 | <u>515</u> | <u>711</u> | 519 | 705 | 32 | 513 | 714 | <u>515</u> | <u>711</u> | 519 | 705 | | |
| 450.soplex | 32 | <u>1118</u> | <u>239</u> | 1119 | 239 | 1117 | 239 | 16 | 496 | 269 | 496 | 269 | <u>496</u> | <u>269</u> | | |
| 453.povray | 32 | 311 | 548 | <u>311</u> | <u>547</u> | 312 | 545 | 32 | 269 | 634 | 274 | 622 | <u>269</u> | <u>633</u> | | |
| 454.calculix | 32 | 438 | 602 | <u>439</u> | <u>601</u> | 439 | 601 | 32 | 438 | 602 | <u>439</u> | <u>601</u> | 439 | 601 | | |
| 459.GemsFDTD | 32 | 1557 | 218 | 1557 | 218 | <u>1557</u> | <u>218</u> | 32 | 1557 | 218 | 1557 | 218 | <u>1557</u> | <u>218</u> | | |
| 465.tonto | 32 | <u>718</u> | <u>438</u> | 719 | 438 | 718 | 439 | 32 | <u>691</u> | <u>456</u> | 692 | 455 | 687 | 458 | | |
| 470.lbm | 32 | 1018 | 432 | <u>1018</u> | <u>432</u> | 1018 | 432 | 32 | 1018 | 432 | <u>1018</u> | <u>432</u> | 1018 | 432 | | |
| 481.wrf | 32 | <u>885</u> | <u>404</u> | 894 | 400 | 883 | 405 | 32 | <u>884</u> | <u>404</u> | 883 | 405 | 884 | 404 | | |
| 482.sphinx3 | 32 | 1530 | 408 | 1536 | 406 | <u>1535</u> | <u>406</u> | 32 | 1530 | 408 | 1536 | 406 | <u>1535</u> | <u>406</u> | | |

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"



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Platform Notes

BIOS settings:

Virtualization Technology disabled

Execute Disable disabled

Logical Processor enabled

System Profile set to Performance

Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818

\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191

running on linux Sun Oct 13 04:59:49 2013

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 E5-2440 v2 @ 1.90GHz

2 "physical id"s (chips)

32 "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 : 8

siblings : 16

physical 0: cores 0 1 2 3 4 5 6 7

physical 1: cores 0 1 2 3 4 5 6 7

cache size : 20480 KB

From /proc/meminfo

MemTotal: 198410440 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 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 Oct 12 14:03 last=S

SPEC is set to: /root/cpu2006-1.2

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|------------|------|------|------|-------|------|------------|
| /dev/sda2 | ext2 | 267G | 36G | 231G | 14% | / |

Additional information from dmidecode:

BIOS Dell Inc. 2.0.21 09/23/2013

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Platform Notes (Continued)

Memory:

12x 00CE00B300CE M393B2G70BH0-YK0 16 GB 1600 MHz

(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"

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/redhat_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

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Base Portability Flags (Continued)

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:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
 -opt-mem-layout-trans=3

C++ benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
 -opt-mem-layout-trans=3

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -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

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Peak Portability Flags (Continued)

```

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
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

```

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) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -auto-ilp32

```

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) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -unroll4 -ansi-alias

```

Fortran benchmarks:

410.bwaves: basepeak = yes

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Peak Optimization Flags (Continued)

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-

434.zeusmp: basepeak = yes

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

459.GemsFDTD: basepeak = yes

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

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revB.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revB.xml>

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For other inquiries, please contact webmaster@spec.org.

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