# SPEC® CFP2006 Result

## Fujitsu

PRIMERGY RX2540 M2, Intel Xeon E5-2637 v4, 3.50 GHz

$SPECfp^{®}\_rate2006 = $ 451

$SPECfp\_rate\_base2006 = $ 442

| | |
|---|---|
| **CPU2006 license:** 19 | **Test date:** Mar-2016 |
| **Test sponsor:** Fujitsu | **Hardware Availability:** Apr-2016 |
| **Tested by:** Fujitsu | **Software Availability:** Sep-2015 |

**Copies**

| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 16 | 469 |
| 416.gamess | 16 | 419 |
| 416.gamess | 16 | 406 |
| 433.milc | 16 | 519 |
| 434.zeusmp | 16 | 507 |
| 435.gromacs | 16 | 500 |
| 435.gromacs | 16 | 480 |
| 436.cactusADM | 16 | 517 |
| 437.leslie3d | 16 | 283 |
| 444.namd | 16 | 326 |
| 444.namd | 16 | 323 |
| 447.dealII | 16 | 657 |
| 450.soplex | 16 | 303 |
| 453.povray | 16 | 611 |
| 453.povray | 16 | 522 |
| 454.calculix | 16 | 608 |
| 459.GemsFDTD | 16 | 270 |
| 465.tonto | 16 | 492 |
| 465.tonto | 16 | 452 |
| 470.lbm | 16 | 516 |
| 481.wrf | 16 | 531 |
| 482.sphinx3 | 16 | 392 |

**SPECfp_rate_base2006 = 442**

**SPECfp_rate2006 = 451**

## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2637 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.70 GHz |
| CPU MHz: | 3500 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 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 |

*Continued on next page*

## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12 SP1 (x86_64) Kernel 3.12.49-11-default |
| 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: | No |
| File System: | xfs |
| System State: | Run level 5 (multi-user) |

*Continued on next page*

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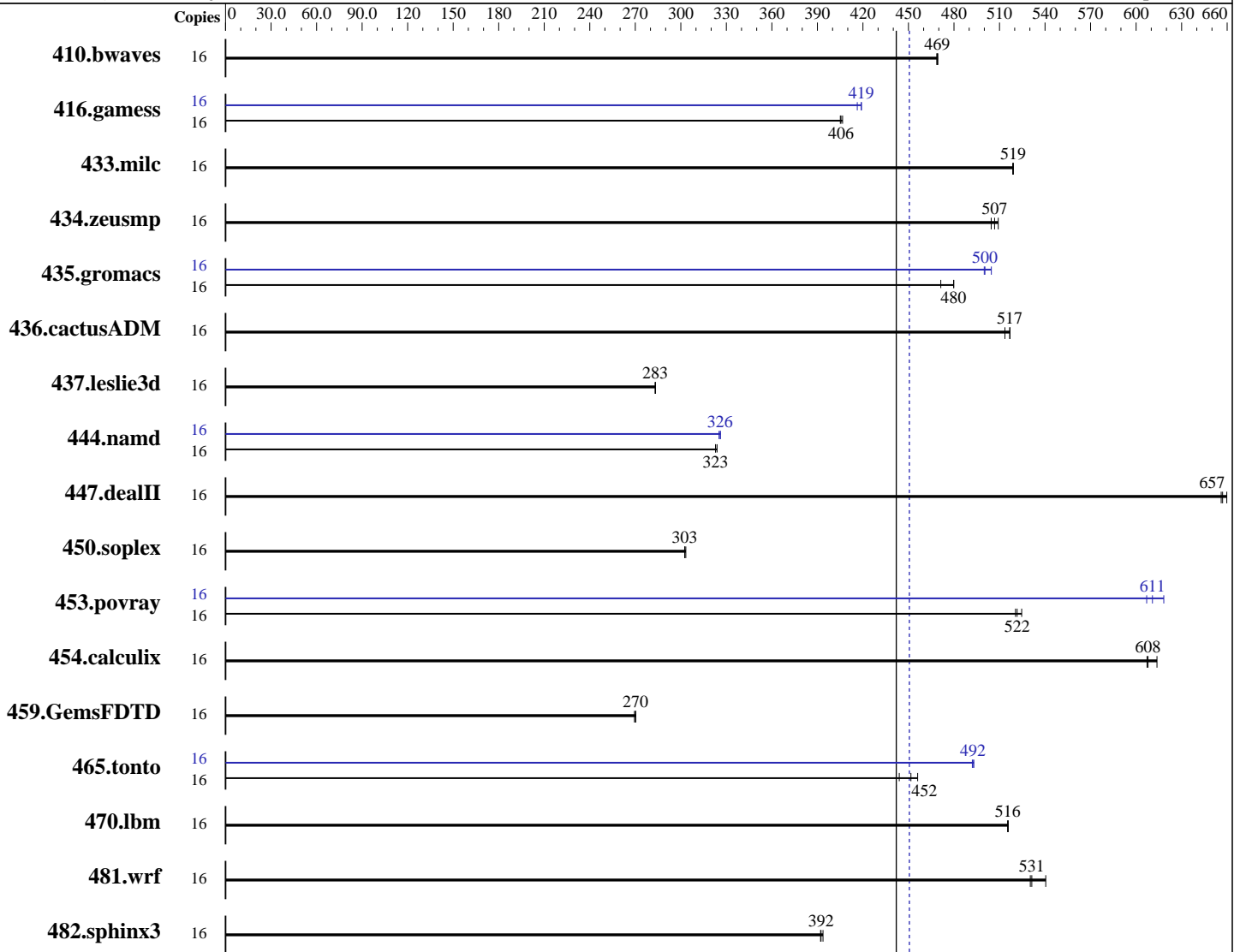| | |
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| | | | |
|---|---|---|---|
| L3 Cache: | 15 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R) | Other Software: | None |
| Disk Subsystem: | 1 x SATA, 500 GB, 7200 RPM | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 16 | 463 | 469 | **464** | **469** | 464 | 469 | 16 | 463 | 469 | **464** | **469** | 464 | 469 |
| 416.gamess | 16 | 771 | 407 | 773 | 405 | **773** | **406** | 16 | **748** | **419** | 748 | 419 | 753 | 416 |
| 433.milc | 16 | 283 | 519 | **283** | **519** | 283 | 519 | 16 | 283 | 519 | **283** | **519** | 283 | 519 |
| 434.zeusmp | 16 | 289 | 505 | **287** | **507** | 286 | 509 | 16 | 289 | 505 | **287** | **507** | 286 | 509 |
| 435.gromacs | 16 | 238 | 480 | 242 | 471 | **238** | **480** | 16 | 226 | 505 | 229 | 500 | **228** | **500** |
| 436.cactusADM | 16 | **370** | **517** | 370 | 517 | 372 | 514 | 16 | **370** | **517** | 370 | 517 | 372 | 514 |
| 437.leslie3d | 16 | 531 | 283 | **531** | **283** | 531 | 283 | 16 | 531 | 283 | **531** | **283** | 531 | 283 |
| 444.namd | 16 | 396 | 324 | 397 | 323 | **397** | **323** | 16 | **394** | **326** | 395 | 325 | 393 | 326 |
| 447.dealII | 16 | 279 | 656 | 277 | 660 | **279** | **657** | 16 | 279 | 656 | 277 | 660 | **279** | **657** |
| 450.soplex | 16 | 440 | 303 | 441 | 303 | **441** | **303** | 16 | 440 | 303 | 441 | 303 | **441** | **303** |
| 453.povray | 16 | 164 | 521 | **163** | **522** | 162 | 525 | 16 | **139** | **611** | 140 | 607 | 138 | 618 |
| 454.calculix | 16 | **217** | **608** | 215 | 614 | 217 | 607 | 16 | **217** | **608** | 215 | 614 | 217 | 607 |
| 459.GemsFDTD | 16 | 628 | 270 | 630 | 269 | **629** | **270** | 16 | 628 | 270 | 630 | 269 | **629** | **270** |
| 465.tonto | 16 | 355 | 444 | **349** | **452** | 345 | 456 | 16 | 320 | 492 | **320** | **492** | 319 | 493 |
| 470.lbm | 16 | 426 | 516 | **426** | **516** | 427 | 515 | 16 | 426 | 516 | **426** | **516** | 427 | 515 |
| 481.wrf | 16 | **336** | **531** | 337 | 530 | 331 | 540 | 16 | **336** | **531** | 337 | 530 | 331 | 540 |
| 482.sphinx3 | 16 | 792 | 394 | **795** | **392** | 795 | 392 | 16 | 792 | 394 | **795** | **392** | 795 | 392 |

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

BIOS configuration:
Energy Performance = Performance
Utilization Profile = Unbalanced

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## Platform Notes (Continued)

```
QPI snoop mode: Early Snoop
   COD Enable = Disabled, Early Snoop = Enabled, Home Snoop Dir OSB = Disabled
CPU C1E Support = Disabled
Sysinfo program /home/SPECcpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on RX2540M2 Wed Mar 30 21:42:50 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 E5-2637 v4 @ 3.50GHz
      2 "physical id"s (chips)
      16 "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  : 8
      physical 0: cores 0 1 2 3
      physical 1: cores 0 1 2 3
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:       264402704 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux RX2540M2 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

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## Platform Notes (Continued)

```
  run-level 5 Mar 30 13:34

  SPEC is set to: /home/SPECcpu2006
     Filesystem      Type   Size   Used Avail Use% Mounted on
     /dev/sda4        xfs    424G   65G  360G  16% /home
  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.

  BIOS FUJITSU // American Megatrends Inc. V5.0.0.11 R1.6.0 for D3289-B1x
  03/11/2016
  Memory:
   16x Micron 36ASF2G72PZ-2G3A3 16 GB 2 rank 2400 MHz
   8x NO DIMM NO DIMM

  (End of data from sysinfo program)
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPECcpu2006/libs/32:/home/SPECcpu2006/libs/64:/home/SPECcpu2006/sh"

 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
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
 For information about Fujitsu please visit: http://www.fujitsu.com
```

## 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

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# 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 -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -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:

```
icpc  -m64
```

Fortran benchmarks:

```
ifort -m64
```

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# Peak Compiler Invocation (Continued)

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: 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) -opt-mem-layout-trans=3(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:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
            -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
```

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# Peak Optimization Flags (Continued)

459.GemsFDTD: basepeak = yes

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) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -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) -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: 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/Fujitsu-Platform-Settings-V1.2-HSW-RevA.20160517.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/Fujitsu-Platform-Settings-V1.2-HSW-RevA.20160517.xml

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

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