



# SPEC<sup>®</sup> CFP2006 Result

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## Fujitsu

PRIMERGY RX2530 M2, Intel Xeon E5-2603 v4, 1.70 GHz

SPECfp<sup>®</sup>\_rate2006 = 358

SPECfp\_rate\_base2006 = 350

CPU2006 license: 19

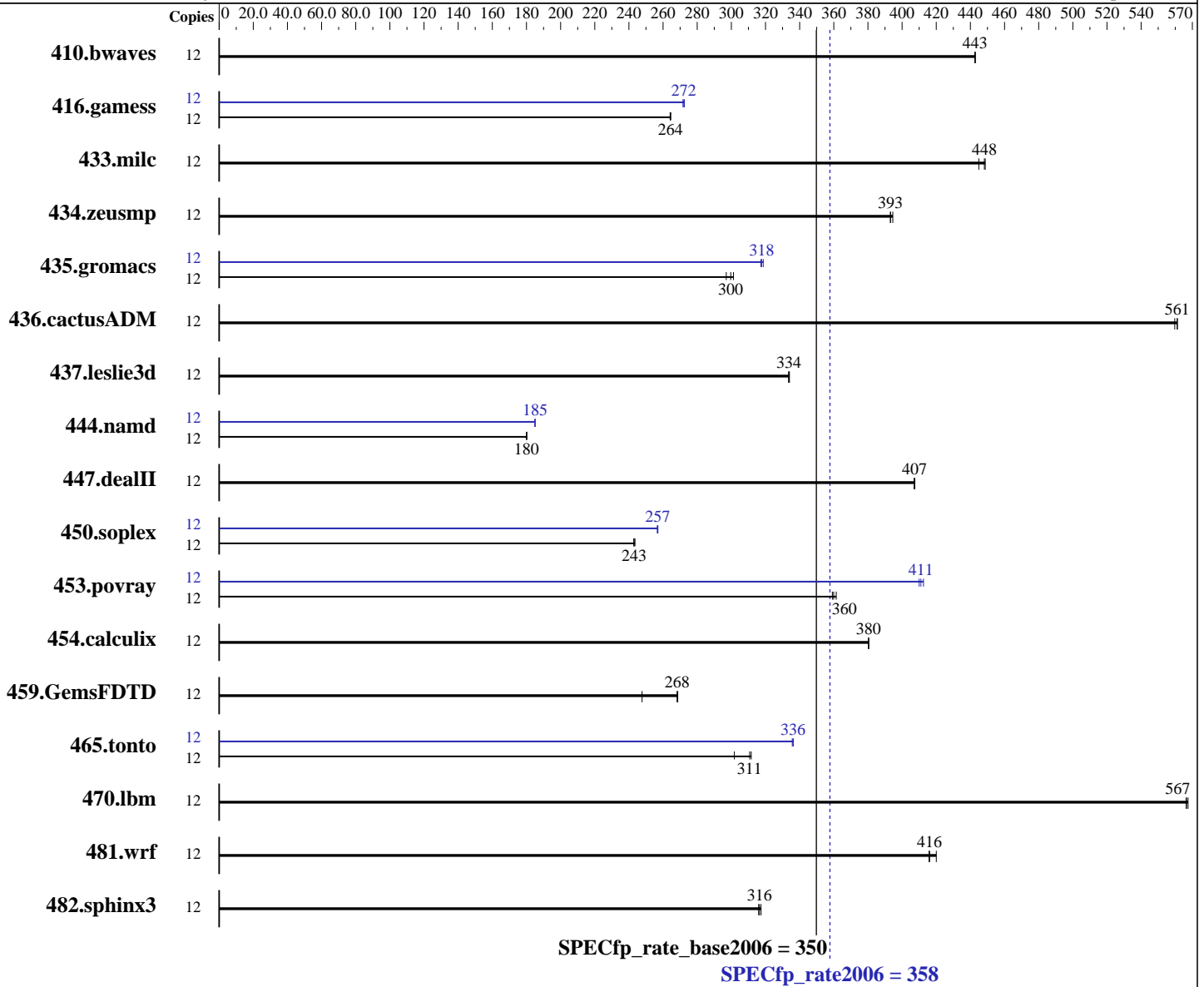
Test sponsor: Fujitsu

Tested by: Fujitsu

Test date: Apr-2016

Hardware Availability: Apr-2016

Software Availability: Sep-2015



### Hardware

CPU Name: Intel Xeon E5-2603 v4  
 CPU Characteristics:  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip  
 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 3 (multi-user)

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L3 Cache: 15 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)  
Disk Subsystem: 1 x SATA, 1000 GB, 7200 RPM  
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    | 12     | 368        | 443        | <u>368</u> | <u>443</u> | 368        | 443        | 12     | 368        | 443        | <u>368</u> | <u>443</u> | 368        | 443        |  |  |
| 416.gamess    | 12     | <u>889</u> | <u>264</u> | 890        | 264        | 888        | 264        | 12     | <u>863</u> | <u>272</u> | 862        | 272        | 865        | 272        |  |  |
| 433.milc      | 12     | <u>246</u> | <u>448</u> | 246        | 449        | 248        | 445        | 12     | <u>246</u> | <u>448</u> | 246        | 449        | 248        | 445        |  |  |
| 434.zeusmp    | 12     | <u>278</u> | <u>393</u> | 278        | 393        | 277        | 395        | 12     | <u>278</u> | <u>393</u> | 278        | 393        | 277        | 395        |  |  |
| 435.gromacs   | 12     | 284        | 301        | <u>286</u> | <u>300</u> | 288        | 297        | 12     | 270        | 317        | <u>270</u> | <u>318</u> | 269        | 319        |  |  |
| 436.cactusADM | 12     | 256        | 560        | <u>256</u> | <u>561</u> | 256        | 561        | 12     | 256        | 560        | <u>256</u> | <u>561</u> | 256        | 561        |  |  |
| 437.leslie3d  | 12     | <u>338</u> | <u>334</u> | 338        | 334        | 338        | 334        | 12     | <u>338</u> | <u>334</u> | 338        | 334        | 338        | 334        |  |  |
| 444.namd      | 12     | <u>534</u> | <u>180</u> | 534        | 180        | 535        | 180        | 12     | 520        | 185        | 520        | 185        | <u>520</u> | <u>185</u> |  |  |
| 447.dealII    | 12     | 337        | 407        | 337        | 407        | <u>337</u> | <u>407</u> | 12     | 337        | 407        | 337        | 407        | <u>337</u> | <u>407</u> |  |  |
| 450.soplex    | 12     | 411        | 244        | 412        | 243        | <u>412</u> | <u>243</u> | 12     | <u>390</u> | <u>257</u> | 389        | 257        | 390        | 257        |  |  |
| 453.povray    | 12     | <u>177</u> | <u>360</u> | 178        | 359        | 177        | 361        | 12     | 155        | 413        | <u>155</u> | <u>411</u> | 156        | 410        |  |  |
| 454.calculix  | 12     | 260        | 380        | <u>260</u> | <u>380</u> | 260        | 380        | 12     | 260        | 380        | <u>260</u> | <u>380</u> | 260        | 380        |  |  |
| 459.GemsFDTD  | 12     | 514        | 248        | <u>475</u> | <u>268</u> | 474        | 269        | 12     | 514        | 248        | <u>475</u> | <u>268</u> | 474        | 269        |  |  |
| 465.tonto     | 12     | <u>380</u> | <u>311</u> | 379        | 312        | 391        | 302        | 12     | 352        | 336        | 351        | 336        | <u>351</u> | <u>336</u> |  |  |
| 470.lbm       | 12     | 291        | 567        | <u>291</u> | <u>567</u> | 291        | 566        | 12     | 291        | 567        | <u>291</u> | <u>567</u> | 291        | 566        |  |  |
| 481.wrf       | 12     | <u>322</u> | <u>416</u> | 322        | 416        | 319        | 420        | 12     | <u>322</u> | <u>416</u> | 322        | 416        | 319        | 420        |  |  |
| 482.sphinx3   | 12     | 737        | 317        | 740        | 316        | <u>739</u> | <u>316</u> | 12     | 737        | 317        | 740        | 316        | <u>739</u> | <u>316</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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CPU2006 license: 19  
Test sponsor: Fujitsu  
Tested by: Fujitsu

Test date: Apr-2016  
Hardware Availability: Apr-2016  
Software Availability: Sep-2015

### Platform Notes

BIOS configuration:  
Energy Performance = Performance  
Utilization Profile = Unbalanced  
QPI snoop mode: Early Snoop  
COD Enable = Disabled, Early Snoop = Enabled, Home Snoop Dir OSB = Disabled  
CPU ClE Support = Disabled  
Sysinfo program /home/SPECcpu2006/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on RX2530M2 Thu Apr 21 19:55:31 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 E5-2603 v4 @ 1.70GHz
 2 "physical id"s (chips)
 12 "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 : 6
  siblings  : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
cache size : 15360 KB
```

```
From /proc/meminfo
MemTotal:      264328584 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"
```

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### Platform Notes (Continued)

```
uname -a:
Linux RX2530M2 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Apr 21 10:24
```

```
SPEC is set to: /home/SPECcpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   890G  15G  875G   2% /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 D3279-B1x
03/11/2016
```

```
Memory:
16x Micron 36ASF2G72PZ-2G3A3 16 GB 2 rank 2400 MHz, configured at 1866 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

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## Base Compiler Invocation (Continued)

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 -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

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## Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):  
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

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  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.deallI: -DSPEC\_CPU\_LP64  
450.soplex: -D\_FILE\_OFFSET\_BITS=64  
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: 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

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## Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

450.soplex: -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-malloc-options=3

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

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



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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-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Fujitsu-Platform-Settings-V1.2-HSW-RevA.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.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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