



# SPEC<sup>®</sup> CFP2006 Result

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## Fujitsu

PRIMEQUEST 3800B, Intel Xeon Platinum 8160,  
2.10GHz

SPECfp<sup>®</sup>\_rate2006 = Not Run

SPECfp\_rate\_base2006 = 6260

CPU2006 license: 19

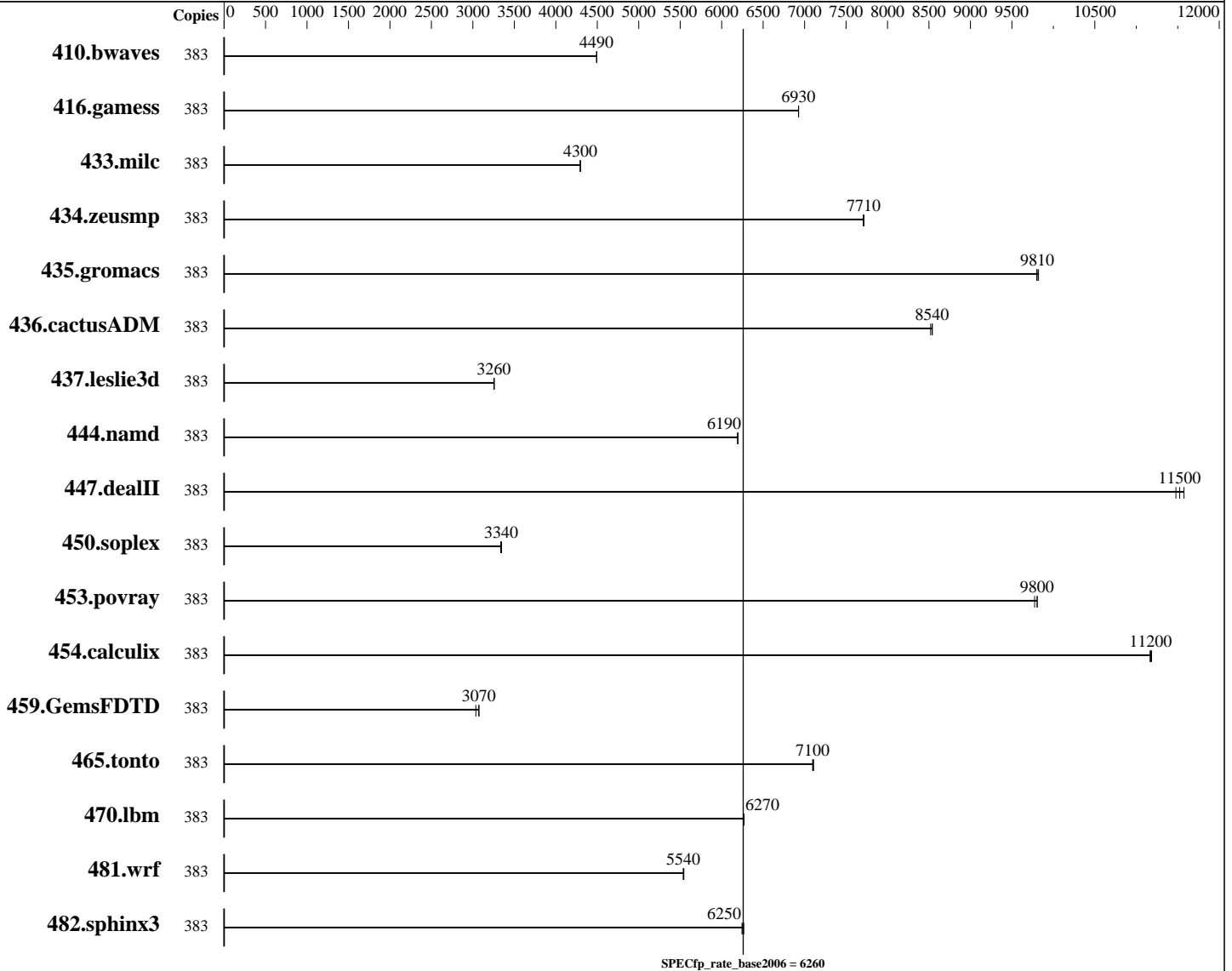
Test sponsor: Fujitsu

Tested by: Fujitsu

Test date: Nov-2017

Hardware Availability: Jul-2017

Software Availability: Sep-2017



### Hardware

CPU Name: Intel Xeon Platinum 8160  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 192 cores, 8 chips, 24 cores/chip, 2 threads/core  
 CPU(s) orderable: 2,4,6,8 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core

Continued on next page

### Software

Operating System: SUSE Linux Enterprise Server 12 SP2  
 4.4.21-69-default  
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 18.0.0.128 of Intel Fortran  
 Compiler for Linux  
 Auto Parallel: No  
 File System: tmpfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 33 MB I+D on chip per chip  
Other Cache: None  
Memory: 1536 GB (96 x 16 GB 2Rx4 PC4-2666V-R)  
Disk Subsystem: 768 GB tmpfs  
Other Hardware: 1 x SAS HDD, 600 GB, 10.5K RPM, used for swap

Base Pointers: 32/64-bit  
Peak Pointers: Not Applicable  
Other Software: None

## Results Table

| Benchmark     | Base   |             |             |             |              |             |              | Peak   |         |       |         |       |         |       |
|---------------|--------|-------------|-------------|-------------|--------------|-------------|--------------|--------|---------|-------|---------|-------|---------|-------|
|               | Copies | Seconds     | Ratio       | Seconds     | Ratio        | Seconds     | Ratio        | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves    | 383    | <b>1158</b> | <b>4490</b> | 1159        | 4490         | 1158        | 4490         |        |         |       |         |       |         |       |
| 416.gamess    | 383    | 1083        | 6930        | 1082        | 6930         | <b>1083</b> | <b>6930</b>  |        |         |       |         |       |         |       |
| 433.milc      | 383    | 819         | 4300        | <b>818</b>  | <b>4300</b>  | 818         | 4300         |        |         |       |         |       |         |       |
| 434.zeusmp    | 383    | 452         | 7720        | <b>452</b>  | <b>7710</b>  | 452         | 7710         |        |         |       |         |       |         |       |
| 435.gromacs   | 383    | 279         | 9800        | <b>279</b>  | <b>9810</b>  | 278         | 9820         |        |         |       |         |       |         |       |
| 436.cactusADM | 383    | <b>536</b>  | <b>8540</b> | 536         | 8540         | 537         | 8520         |        |         |       |         |       |         |       |
| 437.leslie3d  | 383    | 1106        | 3250        | <b>1106</b> | <b>3260</b>  | 1105        | 3260         |        |         |       |         |       |         |       |
| 444.namd      | 383    | 496         | 6190        | <b>496</b>  | <b>6190</b>  | 496         | 6200         |        |         |       |         |       |         |       |
| 447.dealII    | 383    | 379         | 11600       | <b>380</b>  | <b>11500</b> | 382         | 11500        |        |         |       |         |       |         |       |
| 450.soplex    | 383    | 958         | 3340        | 955         | 3350         | <b>955</b>  | <b>3340</b>  |        |         |       |         |       |         |       |
| 453.povray    | 383    | 208         | 9810        | <b>208</b>  | <b>9800</b>  | 208         | 9770         |        |         |       |         |       |         |       |
| 454.calculix  | 383    | 283         | 11200       | 283         | 11200        | <b>283</b>  | <b>11200</b> |        |         |       |         |       |         |       |
| 459.GemsFDTD  | 383    | 1338        | 3040        | <b>1323</b> | <b>3070</b>  | 1322        | 3070         |        |         |       |         |       |         |       |
| 465.tonto     | 383    | <b>531</b>  | <b>7100</b> | 531         | 7100         | 530         | 7110         |        |         |       |         |       |         |       |
| 470.lbm       | 383    | 840         | 6260        | 839         | 6270         | <b>839</b>  | <b>6270</b>  |        |         |       |         |       |         |       |
| 481.wrf       | 383    | 773         | 5540        | 772         | 5540         | <b>772</b>  | <b>5540</b>  |        |         |       |         |       |         |       |
| 482.sphinx3   | 383    | <b>1194</b> | <b>6250</b> | 1195        | 6240         | 1191        | 6270         |        |         |       |         |       |         |       |

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"  
Set Kernel Boot Parameter : nohz\_full=1-383 isolcpus=1-383  
Set CPU frequency governor to maximum performance with:  
cpupower -c all frequency-set -g performance  
Set tmpfs filesystem with:  
mkdir /home/memory  
mount -t tmpfs -o size=768g,rw tmpfs /home/memory  
Process tuning settings:

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**Test date:** Nov-2017  
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### Operating System Notes (Continued)

```
echo 10000000 > /proc/sys/kernel/sched_min_granularity_ns
echo 15000000 > /proc/sys/kernel/sched_wakeup_granularity_ns
echo 0 > /proc/sys/kernel/numa_balancing
echo always > /sys/kernel/mm/transparent_hugepage/enabled
cpu idle state set with:
cpupower idle-set -d 2
cpupower idle-set -d 3
set affinity of rcu threads to the cpu0:
for i in `pgrep rcu` ; do taskset -pc 0 $i ; done
```

### Platform Notes

BIOS configuration:  
Intel Virtualization Technology = Disabled  
HWPM Support = Disabled  
DCU Streamer Prefetcher = Disabled  
Stale AtoS = Enabled  
LLC dead line alloc = Disabled  
Sub NUMA Clustering = Enabled  
Fan Control = Full  
Sysinfo program /home/memory/speccpu/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on linux-k55j Mon Nov 6 13:55:14 2017

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) Platinum 8160 CPU @ 2.10GHz
 8 "physical id"s (chips)
384 "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 : 24
  siblings  : 48
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 4: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 5: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
  physical 6: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
```

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### Platform Notes (Continued)

```
physical 7: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
cache size : 33792 KB
```

```
From /proc/meminfo
MemTotal:      1583801256 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux linux-k55j 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Nov 6 05:01
```

```
SPEC is set to: /home/memory/speccpu
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs           tmpfs    768G  9.7G 759G   2% /home/memory
```

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 V1.0.0.0 R1.21.0 for D3858-A1x          09/15/2017
Memory:
45x Hynix HMA42GR7BJR4N-VK 16 GB 2 rank 2666 MHz
51x Samsung M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz
```

(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 = "/home/memory/speccpu/icc2018lib/ia32:/home/memory/speccpu/icc2018lib/intel64"  
LD\_LIBRARY\_PATH = "\$LD\_LIBRARY\_PATH:/home/memory/speccpu/sh10.2"  
Binaries compiled on a system with 2x Intel Xeon Platinum 8180 CPU + 384GB RAM  
memory using SUSE Linux Enterprise Server 12 SP2  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run  
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.deallI: -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



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## Base Optimization Flags

### C benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3
```

### C++ benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3
```

### Fortran benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

### Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-qopt-mem-layout-trans=3
```

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

<http://www.spec.org/cpu2006/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevC.html>  
<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.html>

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

<http://www.spec.org/cpu2006/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevC.xml>  
<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml>

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

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