# SPEC® CFP2006 Result

Fujitsu

PRIMEQUEST 3800B, Intel Xeon Platinum 8168, 2.70GHz

# SPECfp®_rate2006 = Not Run

SPECfp_rate_base2006 = 6770

## Hardware

<table>
<thead>
<tr>
<th>Application</th>
<th>Copies</th>
<th>SPEC</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>383</td>
<td>4500</td>
<td>8500</td>
</tr>
<tr>
<td>416.gamess</td>
<td>383</td>
<td>4300</td>
<td>7870</td>
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<tr>
<td>433.milc</td>
<td>383</td>
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<td>11900</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>383</td>
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</tr>
<tr>
<td>435.gromacs</td>
<td>383</td>
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<td>436.cactusADM</td>
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<td>437.leslie3d</td>
<td>383</td>
<td>3260</td>
<td>8740</td>
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<tr>
<td>444.namd</td>
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<td>7560</td>
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<tr>
<td>447.dealII</td>
<td>383</td>
<td>3360</td>
<td>13000</td>
</tr>
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<td>450.soplex</td>
<td>383</td>
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<td>453.povray</td>
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<tr>
<td>454.calculix</td>
<td>383</td>
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</tr>
<tr>
<td>459.GemsFDTD</td>
<td>383</td>
<td>3080</td>
<td></td>
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<tr>
<td>465.tonto</td>
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<td>383</td>
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<tr>
<td>482.sphinx3</td>
<td>383</td>
<td>6450</td>
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</table>

## Software

<table>
<thead>
<tr>
<th>Tool</th>
<th>Version</th>
<th>License</th>
<th>Availability</th>
<th>System State</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8168</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.70 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2700</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>192 cores, 8 chips, 24 cores/chip, 2 threads/core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>2.4,6.8 chips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>1 MB I+D on chip per core</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File System</td>
<td>tmpfs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test date: Nov-2017

Hardware Availability: Jul-2017

Software Availability: Sep-2017

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SPEC CF2006 Result
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Fujitsu
PRIMEQUEST 3800B, Intel Xeon Platinum 8168, 2.70GHz

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 6770

CPU2006 license: 19
Test sponsor: Fujitsu
Tested by: Fujitsu

Test date: Nov-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td>6450</td>
<td>1163</td>
<td>6420</td>
<td>1155</td>
<td>6460</td>
</tr>
</tbody>
</table>

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:

Continued on next page

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CPU2006 license: 19
Test sponsor: Fujitsu
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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 Sat Nov 11 10:29:12 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 8168 CPU @ 2.70GHz
  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
```

Continued on next page

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### Fujitsu

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</table>

CPU2006 license: 19  
Test sponsor: Fujitsu  
Tested by: Fujitsu

#### 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"  
ANSL_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:  
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 11 02:33

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:  
46x Hynix HMA42GR7BJR4N-VK 16 GB 2 rank 2666 MHz  
50x Samsung M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)
**General Notes**

Environment variables set by runspec before the start of the run:

```plaintext
LD_LIBRARY_PATH = "/home/memory/spec/cpu/icc2018lib/ia32:/home/memory/spec/cpu/icc2018lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/memory/spec/cpu/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:

```
sync; echo 3 > /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**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>416.gamess</td>
<td><code>-DSPEC_CPU_LP64</code></td>
</tr>
<tr>
<td>433.milc</td>
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</tr>
</tbody>
</table>
| 435.gromacs | `-DSPEC_CPU_LP64` `-nofor_main`
| 436.cactusADM | `-DSPEC_CPU_LP64` `-nofor_main`
| 437.lesle3d | `-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`              |
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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.

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