# SPEC CPU®2017 Floating Point Rate Result

## Fujitsu

PRIMERGY CX2550 M5, Intel Xeon Gold 6246, 3.30 GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 180</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = Not Run</td>
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</tbody>
</table>

<table>
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<tr>
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</tr>
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<tbody>
<tr>
<td>Test Sponsor: Fujitsu</td>
</tr>
<tr>
<td>Tested by: Fujitsu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Date: May-2019</th>
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</thead>
<tbody>
<tr>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

### Copies

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base (180)</th>
</tr>
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<tbody>
<tr>
<td>503.bwaves_r 48</td>
</tr>
<tr>
<td>507.cactuBSSN_r 48</td>
</tr>
<tr>
<td>508.namd_r 48</td>
</tr>
<tr>
<td>510.parest_r 48</td>
</tr>
<tr>
<td>511.povray_r 48</td>
</tr>
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<td>519.lbm_r 48</td>
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<td>544.nab_r 48</td>
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<tr>
<td>549.fotonik3d_r 48</td>
</tr>
<tr>
<td>554.roms_r 48</td>
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### Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Gold 6246</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 4200</td>
</tr>
<tr>
<td>Nominal: 3300</td>
</tr>
<tr>
<td>Enabled: 24 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage: 1 x SATA M.2 SSD, 256 GB</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS: SUSE Linux Enterprise Server 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler: C/C++: Version 19.0.0.117 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.0.117 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel: No</td>
</tr>
<tr>
<td>Firmware: Fujitsu BIOS Version V1.0.0.0 R1.6.0 for D3853-B1x, released Jun-2019. Tested as V1.0.0.0 R1.3.3 for D3853-B1x Mar-2019</td>
</tr>
<tr>
<td>File System: btrfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Power Management: --</td>
</tr>
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Fujitsu
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**Tested by:** Fujitsu
**Test Date:** May-2019
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>1025</td>
<td>469</td>
<td>1019</td>
<td>1018</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
<td>455</td>
<td>133</td>
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<td>134</td>
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<tr>
<td>508.namd_r</td>
<td>48</td>
<td>358</td>
<td>127</td>
<td>357</td>
<td>358</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>48</td>
<td>1133</td>
<td>111</td>
<td>1135</td>
<td>1139</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>48</td>
<td>561</td>
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<td>563</td>
<td>199</td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>48</td>
<td>514</td>
<td>98.4</td>
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<td>513</td>
<td>98.6</td>
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</tr>
<tr>
<td>521.wrf_r</td>
<td>48</td>
<td>541</td>
<td>199</td>
<td>549</td>
<td>544</td>
<td>198</td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
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<tr>
<td>527.cam4_r</td>
<td>48</td>
<td>427</td>
<td>197</td>
<td>428</td>
<td>437</td>
<td>192</td>
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<tr>
<td>538.imagick_r</td>
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<td>421</td>
<td>283</td>
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<td>422</td>
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<tr>
<td>544.nab_r</td>
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<td>305</td>
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<td>266</td>
<td>303</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>48</td>
<td>1291</td>
<td>145</td>
<td>1293</td>
<td>1289</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>48</td>
<td>834</td>
<td>91.5</td>
<td>836</td>
<td>833</td>
<td>91.6</td>
<td></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"
Kernel Boot Parameter set with: nohz_full=1-47
Process tuning settings:
- echo 10000000 > /proc/sys/kernel/sched_min_granularity_ns

### General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-1.0.5/icc19-lib/intel64"

Binaries compiled on a system with 2x Intel Xeon E5-2667 v2 CPU + 64GB RAM
memory using SUSE Linux Enterprise Server 12 SP2
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
- sync; echo 3 > /proc/sys/vm/drop_caches
- runcpu command invoked through numactl i.e.:

(Continued on next page)
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**Test Sponsor:** Fujitsu  
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### General Notes (Continued)

```bash
numactl --interleave=all runcpu <etc>
```

**NA:** The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  
**Yes:** The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.  
**Yes:** The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

### Platform Notes

BIOS configuration:
- Power Technology = Custom
- Energy Performance = Balanced Performance
- Uncore Frequency Scaling = Disabled
- Sub NUMA Clustering = Enabled
- LLC Prefetch = Enabled

Sysinfo program /home/Benchmark/speccpu2017-1.0.5/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcee8f2999c33d61f6498e45859ea9  
running on linux-dftw Wed May 22 17:30:34 2019

SUT (System Under Test) info as seen by some common utilities.  
For more information on this section, see  
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo

```plaintext
model name : Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
2  "physical id"s (chips)
48 "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 : 12
siblings : 24
physical 0: cores 1 2 4 8 9 10 11 16 17 20 26 27
physical 1: cores 1 2 3 4 8 9 10 11 17 18 25 27
```

From lscpu:

```plaintext
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
```

(Continued on next page)
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#### Platform Notes (Continued)

- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
- **Stepping:** 7
- **CPU MHz:** 3300.000
- **CPU max MHz:** 4200.0000
- **CPU min MHz:** 1200.0000
- **BogoMIPS:** 6600.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-2, 4, 5, 7, 8, 24, 25, 27, 28, 31, 32
- **NUMA node1 CPU(s):** 3, 6, 7, 9-11, 26, 29, 30, 33-35
- **NUMA node2 CPU(s):** 12, 13, 16, 17, 20, 22, 26, 29, 30, 33-35
- **NUMA node3 CPU(s):** 14, 15, 18, 19, 21, 23, 38, 39, 42, 43, 45, 47
- **Flags:** fpu vme de pse tsc msr pae mce cmov ss tm xsave nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni ssbd mba ibrs ibpb ibrs_enabled tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 7rms invpcid rtm avx fmxi mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xsavec xsaveopt xsaves cqm_llc cqm_occpl llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospk avx512_vnni flush_l1d arch_capabilities

```
From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 4 5 8 24 25 27 28 31 32
  node 0 size: 95453 MB
  node 0 free: 95176 MB
  node 1 cpus: 3 6 7 9 10 11 26 29 30 33 34 35
  node 1 size: 96756 MB
  node 1 free: 96566 MB
  node 2 cpus: 12 13 16 17 20 22 26 37 40 41 44 46
  node 2 size: 96726 MB
  node 2 free: 96519 MB
  node 3 cpus: 14 15 18 19 21 23 38 39 42 43 45 47
```

(Continued on next page)
Fujitsu
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SPECrate®2017_fp_base = 180
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Platform Notes (Continued)

node 3 size: 96753 MB
node 3 free: 96570 MB
node distances:
   node  0  1  2  3
   0:  10 11 19 19
   1:  11 10 19 19
   2:  19 19 10 11
   3:  19 19 11 10

From /proc/meminfo
- MemTotal: 394946692 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
- os-release:
  - NAME="SLES"
  - VERSION="15"
  - VERSION_ID="15"
  - PRETTY_NAME="SUSE Linux Enterprise Server 15"
  - ID="sles"
  - ID_LIKE="suse"
  - ANSI_COLOR="0;32"
  - CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
- Linux linux-dftw 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
- x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 May 22 17:25

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 238G 92G 146G 39% /home

Additional information from dmidecode follows. 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 R1.3.3 for D3853-B1x 03/15/2019
SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

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Platform Notes (Continued)

Memory:
12x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

C
---------------------
519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
icc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++
---------------------
508.namd_r(base) 510.parest_r(base)
icpc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C++, C
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511.povray_r(base) 526.blender_r(base)
icpc (ICC) 19.0.0.117 20180804
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icc (ICC) 19.0.0.117 20180804
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C++, C, Fortran
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icpc (ICC) 19.0.0.117 20180804
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icc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Fortran
---------------------
503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
ifort (IFORT) 19.0.0.117 20180804

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### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

Fortran, C  | 521.wrf_r(base) 527.cam4_r(base)
---

ifort (IFORT) 19.0.0.117 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

icc (ICC) 19.0.0.117 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

C benchmarks:  
```  
icc -m64 -std=c11  
```

C++ benchmarks:  
```  
icpc -m64  
```

Fortran benchmarks:  
```  
ifort -m64  
```

Benchmarks using both Fortran and C:  
```  
ifort -m64 icc -m64 -std=c11  
```

Benchmarks using both C and C++:  
```  
icpc -m64 icc -m64 -std=c11  
```

Benchmarks using Fortran, C, and C++:  
```  
icpc -m64 icc -m64 -std=c11 ifort -m64  
```

### Base Portability Flags

503.bwaves_r: -DSPEC_LP64  
507.cactuBSSN_r: -DSPEC_LP64  
508.namd_r: -DSPEC_LP64  
510.parest_r: -DSPEC_LP64  
511.povray_r: -DSPEC_LP64  
519.lbm_r: -DSPEC_LP64  
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char  
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG

(Continued on next page)
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**SPECrater®2017_fp_base** = 180
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**Base Portability Flags (Continued)**

<table>
<thead>
<tr>
<th>Flag</th>
<th>Setting</th>
</tr>
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<tbody>
<tr>
<td>538.imagick_r</td>
<td>-DSPEC_LP64</td>
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---

**Base Optimization Flags**

**C benchmarks:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

**C++ benchmarks:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

**Fortran benchmarks:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

**Benchmarks using both Fortran and C:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

**Benchmarks using both C and C++:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

**Benchmarks using Fortran, C, and C++:**
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

---

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


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

http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevE.xml
Fujitsu
PRIMERGY CX2550 M5, Intel Xeon Gold 6246, 3.30 GHz

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</table>

| CPU2017 License: 19 | Test Date: May-2019 |
| Test Sponsor: Fujitsu | Hardware Availability: Apr-2019 |
| Tested by: Fujitsu | Software Availability: Feb-2019 |

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Tested with SPEC CPU®2017 v1.0.5 on 2019-05-22 04:30:33-0400.