## SPEC CPU®2017 Floating Point Rate Result

**Fujitsu**

PRIMERGY CX2560 M5, Intel Xeon Silver 4210, 2.20 GHz

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_fp_base = 113</th>
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<tr>
<td>503.bwaves_r 40</td>
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<tr>
<td>507.cactuBSSN_r 40</td>
<td>79.0</td>
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<tr>
<td>508.namd_r 40</td>
<td>58.8</td>
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<tr>
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<td>76.3</td>
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<tr>
<td>511.povray_r 40</td>
<td>126</td>
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<tr>
<td>519.lbm_r 40</td>
<td>131</td>
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<td>521.wrf_r 40</td>
<td>110</td>
</tr>
<tr>
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<td>113</td>
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<td>527.cam4_r 40</td>
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<tr>
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<td>111</td>
</tr>
<tr>
<td>549.fotonik3d_r 40</td>
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</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4210
- **Max MHz:** 3200
- **Nominal:** 2200
- **Enabled:** 20 cores, 2 chips, 2 threads/core
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 13.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x SATA M.2 SSD, 256 GB
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 4.12.14-25.28-default
- **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
- **Parallel:** No
- **Firmware:** Fujitsu BIOS Version V1.0.0.0 R1.6.0 for D3854-B1x, released Jun-2019. Tested as V1.0.0.0 R1.3.3 for D3854-B1x Mar-2019
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** --

---

**SPECrater®2017_fp_peak = Not Run**

**Test Sponsor:** Fujitsu

**Test Date:** Jun-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Feb-2019

---

**CPU2017 License:** 19

**Tested by:** Fujitsu

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SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

Results Table

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</tbody>
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SPECrate®2017_fp_base = 113
SPECrate®2017_fp_peak = Not Run

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"
Kernel Boot Parameter set with : nohz_full=1-39
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_rate_fp/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)
Fujitsu
PRIMERGY CX2560 M5, Intel Xeon Silver 4210, 2.20 GHz

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CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

CPU2017 License: 19
Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

General Notes (Continued)

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 = Disabled
LLC Prefetch = Enabled
Sysinfo program /home/Benchmark/speccpu2017-1.0.5_rate_fp/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd02f999c33d361f64985e45859ea9
running on linux-3m0d Thu Jun 6 01:32:53 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
model name : Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
2 "physical id"s (chips)
40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2

(Continued on next page)
### Fujitsu

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**Platform Notes (Continued)**

```
Vendor ID:                       GenuineIntel  
CPU family:                     6  
Model:                           85  
Model name:                     Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz  
Stepping:                       6  
CPU MHz:                        2200.000  
CPU max MHz:                    3200.0000  
CPU min MHz:                    1000.0000  
BogoMIPS:                       4400.00  
Virtualization:                VT-x  
L1d cache:                      32K  
L1i cache:                      32K  
L2 cache:                       1024K  
L3 cache:                       14080K  
NUMA node0 CPU(s):              0-9,20-29  
NUMA node1 CPU(s):              10-19,30-39  
Flags:                          fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdelgb rdtscp lm constant_tsc art 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 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_puin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmx mpx rdtd_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaveopt xsave x salv cqm_llc cqm_occarg llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni flush_l1d arch_capabilities
```

```
From /proc/cpuinfo cache data

  cache size : 14080 KB
```

```
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
  node 0 size: 192192 MB
  node 0 free: 191854 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
  node 1 size: 193522 MB
  node 1 free: 193128 MB
  node distances:

      node   0   1
    0:  10  18
    1:  18  10
```

(Continued on next page)
Platform Notes (Continued)

MemTotal: 394971732 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-3m0d 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 Jun 6 01:28

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5_rate_fp
  Filesystem Type  Size  Used Avail Use% Mounted on
  /dev/sda2    btrfs  236G 150G  86G  64%  /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 D3854-B1x 03/15/2019
  Memory:
    6x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933, configured at 2400
    4x Not Specified Not Specified
    6x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)
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### CPU2017 License

- **CPU2017 License**: 19
- **Test Sponsor**: Fujitsu
- **Test Date**: Jun-2019
- **Hardware Availability**: Apr-2019
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- **Software Availability**: Feb-2019

### Compiler Version Notes

<table>
<thead>
<tr>
<th>Language</th>
<th>Programs</th>
<th>Compiler</th>
<th>Version</th>
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<tr>
<td>C</td>
<td>lbm_r(base), imagick_r(base), nab_r(base)</td>
<td>icc (ICC)</td>
<td>19.0.0.117 20180804</td>
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<td>icpc (ICC)</td>
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<td>ifort (IFORT)</td>
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<td>C++</td>
<td>namd_r(base), parest_r(base)</td>
<td>icpc (ICC)</td>
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<td>cactuBSSN_r(base)</td>
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<td>Fortran</td>
<td>bwaves_r(base), fotonik3d_r(base), roms_r(base)</td>
<td>ifort (IFORT)</td>
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Compiler Version Notes (Continued)
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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
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
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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++:**
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-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

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

Tested with SPEC CPU®2017 v1.0.5 on 2019-06-05 12:32:52-0400.