**Fujitsu**

**PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz**

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</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>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Parallel: No</td>
<td>Nominal: 2200</td>
</tr>
<tr>
<td>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</td>
<td>Enabled: 36 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>File System: btrfs</td>
<td>Orderable: 1,2 chips</td>
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<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
<td>L3: 24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

**Test Sponsor:** Fujitsu

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Tested by:** Fujitsu

**Software Availability:** Feb-2019

**CPU2017 License:** 19

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Tested by:** Fujitsu

**Software Availability:** Feb-2019

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<tr>
<th>Copies</th>
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<tr>
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</tr>
<tr>
<td>507.cactuBSSN_r 72</td>
<td></td>
</tr>
<tr>
<td>508.namd_r 72</td>
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</tr>
<tr>
<td>510.parest_r 72</td>
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</tr>
<tr>
<td>511.povray_r 72</td>
<td></td>
</tr>
<tr>
<td>519.lbm_r 72</td>
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<tr>
<td>521.wrf_r 72</td>
<td></td>
</tr>
<tr>
<td>526.blender_r 72</td>
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<tr>
<td>527.cam4_r 72</td>
<td></td>
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<tr>
<td>538.imagick_r 72</td>
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<tr>
<td>544.nab_r 72</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r 72</td>
<td></td>
</tr>
<tr>
<td>554.roms_r 72</td>
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<table>
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<tr>
<th>SPECrate®2017_fp_base (187)</th>
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</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = Not Run</td>
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</tbody>
</table>

---

**CPU Name:** Intel Xeon Gold 5220

**Max MHz:** 3900

**Nominal:** 2200

**Enabled:** 36 cores, 2 chips, 2 threads/core

**Orderable:** 1,2 chips

**Cache L1:** 32 KB I + 32 KB D on chip per core

**L2:** 1 MB I+D on chip per core

**L3:** 24.75 MB I+D on chip per chip

**Other:** None

**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)

**Storage:** 1 x SATA M.2 SSD, 256 GB

**Other:** None
SPEC CPU®2017 Floating Point Rate Result

Fujitsu
PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate®2017_fp_base = 187
SPECrate®2017_fp_peak = Not Run

Results Table

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<tr>
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<th>Ratio</th>
<th>Seconds</th>
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<td>1436</td>
<td>79.7</td>
<td>1431</td>
<td>80.0</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=1-71
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 Gold 5220, 2.20 GHz

**SPECrate®2017_fp_base = 187**
**SPECrate®2017_fp_peak = Not Run**

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

**General Notes (Continued)**

```bash
cnumactl --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_rate_fp/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-3m0d Tue May 21 01:32:39 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

```bash
model name : Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
  2 "physical id"s (chips)
    72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 4

(Continued on next page)
## Fujitsu

PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz

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<thead>
<tr>
<th>CPU2017 License:</th>
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<tbody>
<tr>
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<td>Fujitsu</td>
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<tr>
<td>Tested by:</td>
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<tr>
<td>Test Date:</td>
<td>May-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

### SPECrate®2017_fp_base = 187
### SPECrate®2017_fp_peak = Not Run

### Platform Notes (Continued)

Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz  
Stepping: 6  
CPU MHz: 2200.000  
CPU max MHz: 3900.0000  
CPU min MHz: 1000.0000  
BogoMIPS: 4400.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 25344K  
NUMA node0 CPU(s): 0-2, 5, 6, 9, 10, 14, 15, 36-38, 41, 42, 45, 46, 50, 51  
NUMA node1 CPU(s): 3, 4, 7, 8, 11-13, 16, 17, 39, 40, 43, 44, 47-49, 52, 53  
NUMA node2 CPU(s): 18-20, 23, 24, 27, 28, 32, 33, 34-56, 59, 60, 63, 64, 68, 69  
NUMA node3 CPU(s): 21, 22, 25-27, 29-31, 34, 35, 57, 58, 61, 62, 65-67, 70, 71  
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 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_pppin ssbd mba ibrs ibpb stibp ibrs Enhanced tm_prc_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2  erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xarch xsave icq cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts hwp hwp_act_window hwp epp hwp_pkg_req pkup ospk avx512_vnni flush_l1d arch_capabilities  

/proc/cpuinfo cache data  
cache size : 25344 KB

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 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51  
node 0 size: 95423 MB  
node 0 free: 95137 MB  
node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53  
node 1 size: 96756 MB  
node 1 free: 96554 MB  
node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69  
node 2 size: 96756 MB  
node 2 free: 96523 MB  
node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71

(Continued on next page)
Platform Notes (Continued)

node 3 size: 96753 MB
node 3 free: 96555 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:       394945224 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-3md0d 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 21 01:25

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5_rate_fp
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 btrfs 236G 147G 90G 62% /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

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Fujitsu**

PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 187</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = Not Run</td>
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</table>

**CPU2017 License:** 19

**Test Sponsor:** Fujitsu

**Test Date:** May-2019

**Tested by:** Fujitsu

**Hardware Availability:** Apr-2019

**Software Availability:** Feb-2019

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### Platform Notes (Continued)

Memory:
- 6x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933, configured at 2666
- 4x Not Specified Not Specified
- 6x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(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          | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
icpc (ICC) 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.
------------------------------------------------------------------------------
==============================================================================
Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
(Continued on next page)```
Fujitsu
PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz

SPECrate®2017_fp_base = 187
SPECrate®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

ifort (IFORT) 19.0.0.117 20180804
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

(Continued on next page)
Fujitsu
PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz

**SPECrate®2017_fp_base = 187**
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### Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

### 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
**SPEC CPU®2017 Floating Point Rate Result**

**Fujitsu**  
PRIMERGY CX2560 M5, Intel Xeon Gold 5220, 2.20 GHz  

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| CPU2017 License | 19 |
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| Tested by       | Fujitsu |

**Test Date:** May-2019  
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**Software Availability:** Feb-2019

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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 2019-05-20 12:32:38-0400.  