## SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY CX2560 M5, Intel Xeon Silver 4216, 2.10 GHz

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**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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### Hardware

**CPU Name:** Intel Xeon Silver 4216  
**Max MHz:** 3200  
**Nominal:** 2100  
**Enabled:** 32 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:** 22 MB I+D on chip per chip  
**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 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 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:** --
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SPECrater®2017_int_base = 168
SPECrater®2017_int_peak = Not Run

Results Table

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Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Kernel Boot Parameter set with : nohz_full=1-63

General Notes

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

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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.:
  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)
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**General Notes (Continued)**

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:**
  - Adjacent Cache Line Prefetch = Disabled
  - DCU Ip Prefetcher = Disabled
  - DCU Streamer Prefetcher = Disabled
  - Power Technology = Custom
  - Energy Performance = Balanced Performance
  - Uncore Frequency Scaling = Disabled
  - Sub NUMA Clustering = Enabled
  - Stale AtoS = Enable
  - LLC Prefetch = Enabled

- **Sysinfo program** /home/Benchmark/speccpu2017-1.0.5_rate_int/bin/sysinfo
  Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  running on linux-3m0d Tue May 28 01:24:20 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 4216 CPU @ 2.10GHz
  - 2 "physical id"s (chips)
  - 64 "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: 16
    - siblings: 32
    - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

- **From lscpu:**
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 64
  - On-line CPU(s) list: 0-63
  - Thread(s) per core: 2
  - Core(s) per socket: 16
  - Socket(s): 2
  - NUMA node(s): 4
  - Vendor ID: GenuineIntel

(Continued on next page)
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CPU2017 License: 19
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Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2100.000
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3, 8-11, 32-35, 40-43
NUMA node1 CPU(s): 4-7, 12-15, 36-39, 44-47
NUMA node2 CPU(s): 16-19, 24-27, 48-51, 56-59
NUMA node3 CPU(s): 20-23, 28-31, 52-55, 60-63
Flags: fpu vme de pse tsc msr pae 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 abml lahf_lm abml 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_p6ip sno mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 0rms invpcid rtm
cqm mxp rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512wb avx512vl xsaveopt xsave xsavec xgetbv1 xsavec cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local dtherm ida arat pmt hwp hwp_act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 22528 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 3 8 9 10 11 32 33 34 35 40 41 42 43
  node 0 size: 95458 MB
  node 0 free: 95178 MB
  node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 40 41 42 43
  node 1 size: 96732 MB
  node 1 free: 96543 MB
  node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
  node 2 size: 96761 MB
  node 2 free: 96565 MB
  node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
  node 3 size: 96760 MB

(Continued on next page)
Platform Notes (Continued)

node 3 free: 96580 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:       394970360 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release*/etc/*version*
NAME="SLES"
VERSION="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 May 28 01:16

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5_rate_int
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 236G 150G 87G 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:
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### Platform Notes (Continued)

- 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)

### Compiler Version Notes

```
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
       | 525.x264_r(base) 557.xz_r(base)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
       | 541.leela_r(base)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
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
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### Base Portability Flags

- `500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `502.gcc_r: -DSPEC_LP64`
- `505.mcf_r: -DSPEC_LP64`
- `520.omnetpp_r: -DSPEC_LP64`
- `523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX`
- `525.x264_r: -DSPEC_LP64`
- `531.deepsjeng_r: -DSPEC_LP64`
- `541.leela_r: -DSPEC_LP64`
- `548.exchange2_r: -DSPEC_LP64`
- `557.xz_r: -DSPEC_LP64`

### Base Optimization Flags

**C benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

**C++ benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

**Fortran benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

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:

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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 2019-05-27 12:24:19-0400.