# SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>282</th>
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<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
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**CPU2017 License:** 19

**Test Sponsor:** Fujitsu

**Tested by:** Fujitsu

**Test Date:** Jul-2020

**Hardware Availability:** Feb-2019

**Software Availability:** Apr-2020

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<th>Copies</th>
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<tr>
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<td>502.gcc_r 96</td>
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<td>520.omnetpp_r 96</td>
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<td>523.xalancbmk_r 96</td>
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<td>525.x264_r 96</td>
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<tr>
<td>557.xz_r 96</td>
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<td>179</td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Gold 5220R
- **Max MHz:** 4000
- **Nominal:** 2200
- **Enabled:** 48 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:** 35.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- **Storage:** 1 x SATA M.2 SSD, 480 GB
- **Other:** None

## Software

- **OS:** Red Hat Enterprise Linux release 8.0 (Ootpa) 4.18.0-80.e18.x86_64
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux
- **Parallel:** No
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
## SPEC CPU®2017 Integer Rate Result

### Fujitsu
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### SPECrate®2017_int_base = 282

| SPECrate®2017_int_peak = 293 |

#### Results Table

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### Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

### 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"

### Environment Variables Notes

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

```
LD_LIBRARY_PATH = 
  
  "*/home/benchmark/speccpu/lib/intel64:/home/benchmark/speccpu/lib/ia32:/home/benchmark/speccpu/je5.0.1-32"
MALLOC_CONF = "retain:true"
```
General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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)
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Intel Virtualization Technology = Disabled
VT-d = Disabled
CPU C1E Support = Disabled
LLC Dead Line Alloc = Disabled
LLC prefetch = Enabled
Patrol Scrub = Disabled
WR CRC feature Control = Disabled
Fan Control = Full

Sysinfo program /home/benchmark/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011
running on localhost.localdomain Tue Jul 14 18:27:46 2020

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) Gold 5220R CPU @ 2.20GHz
  2  "physical id"s (chips)
  96 "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
**SPEC CPU®2017 Integer Rate Result**

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PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz

**SPECrate®2017_int_base = 282**
**SPECrate®2017_int_peak = 293**

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<td>Apr-2020</td>
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**Platform Notes (Continued)**

```
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

From `lscpu`:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 96
- On-line CPU(s) list: 0-95
- Thread(s) per core: 2
- Core(s) per socket: 24
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz
- Stepping: 7
- CPU MHz: 1222.917
- CPU max MHz: 4000.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 36608K
- NUMA node0 CPU(s): 0-3,7-9,13-15,19,20,48-51,55-57,61-63,67,68
- NUMA node1 CPU(s): 4-6,10-12,16-18,21-23,52,54-58,60,64-66,69-71
- NUMA node2 CPU(s): 24-27,31,32,36-38,42-44,47,72-75,79,80,84-86,90-92
- NUMA node3 CPU(s): 28-30,33-35,39-41,45-47,76-78,81-83,87-89,93-95
- 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
- aperfmperf pni pclmulqdq dtes64monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
- xtrigp pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
- avx f16c rdrand lahf_lm abml3 abm3nowprefetch cpuid_fault epb cat_l3 cd_p_l3
- invpcid_single intel_pinn ssbd mba ibrs ibpb stbip ibrs_enhanced tpr_shadow vmi
- n flexpriority ept vpid fsgsbase tsc_adjust bmi1 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 xsavevc qword reorder xsavec qcm llc qcm_occup llc qcm_mb_total
- q cm qcm_m m b_local dt hrm ida ar at pln pts hwp hwp_act_window hwp_em p hwp_pkg req pk
- u ospk avx512_vnni flush_lld arch_capabilities

/proc/cpuinfo cache data
- cache size: 36608 KB

(Continued on next page)
Fujitsu
PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz

SPEC CPU®2017 Integer Rate Result

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Fujitsu

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Platform Notes (Continued)

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

node 0 cpus: 0 1 2 3 7 8 9 13 14 15 19 20 48 49 50 51 55 56 57 61 62 63 67 68
node 0 size: 192046 MB
node 0 free: 191463 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 22 23 52 53 54 58 59 60 64 65 66 69 70 71
node 1 size: 193531 MB
node 1 free: 192820 MB
node 2 cpus: 24 25 26 27 31 32 36 37 38 42 43 44 72 73 74 75 79 80 84 85 86 90 91 92
node 2 size: 193506 MB
node 2 free: 192906 MB
node 3 cpus: 28 29 30 33 34 35 39 40 41 45 46 47 76 77 78 81 82 83 87 88 89 93 94 95
node 3 size: 193530 MB
node 3 free: 192932 MB
node distances:

node   0   1   2   3
0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal: 791157792 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.0 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.0"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
ANSI_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga

uname -a:
Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
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Fujitsu
2.20 GHz

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Platform Notes (Continued)

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
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 Jul 14 16:47

SPEC is set to: /home/benchmark/speccpu

From /sys/devices/virtual/dmi/id
BIOS: FUJITSU // American Megatrends Inc. V5.0.0.14 R1.21.0 for D3383-B1x
05/29/2020
Vendor: FUJITSU
Product: PRIMERGY RX2530 M5
Product Family: SERVER
Serial: YMLUXXXXXX

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.
Memory:
24x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

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<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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### Compiler Version Notes (Continued)

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
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C
| 500.perlbench_r(peak) 557.xz_r(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
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Fortran
| 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
### Fujitsu

**PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz**

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

#### SPEC CPU®2017 Integer Rate Result

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>282</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>293</td>
</tr>
</tbody>
</table>

**Test Date:** Jul-2020  
**Hardware Availability:** Feb-2019  
**Software Availability:** Apr-2020

---

### 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:**

- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compiled_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

**C++ benchmarks:**

- -m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
- -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compiled_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

**Fortran benchmarks:**

- -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto
- -mbranches-within-32B-boundaries
- -L/usr/local/IntelCompiler19/compiled_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

---

### Peak Compiler Invocation

**C benchmarks:**

- icc
Fujitsu
PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz

| SPECrate®2017_int_base = 282 |
| SPECrate®2017_int_peak = 293 |

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

Test Date: Jul-2020
Hardware Availability: Feb-2019
Software Availability: Apr-2020

Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
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

Peak Optimization Flags

C benchmarks:
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin
-std=gnu89
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib
-ljemalloc

505.mcf_r: basepeak = yes

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Fujitsu

PRIMERGY RX2530 M5, Intel Xeon Gold 5220R, 2.20 GHz

SPECrate®2017_int_base = 282
SPECrate®2017_int_peak = 293

CPU2017 License: 19
Test Sponsor: Fujitsu
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Test Date: Jul-2020
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Peak Optimization Flags (Continued)

525.x264_r: -m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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/Intel-ic19.1u1-official-linux64_revA.xml
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 v1.1.0 on 2020-07-14 05:27:46-0400.
Report generated on 2020-08-04 14:40:07 by CPU2017 PDF formatter v6255.
Originally published on 2020-08-04.