# SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY RX2540 M6, Intel Xeon Silver 4310, 2.10GHz

<table>
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<th>Copies</th>
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<td>114</td>
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<tr>
<td>557.xz_r</td>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4310
  - Max MHz: 3300
  - Nominal: 2100
  - Enabled: 24 cores, 2 chips, 2 threads/core
  - Orderable: 1.2 chips
  - Cache L1: 32 KB I + 48 KB D on chip per core
  - L2: 1.25 MB I+D on chip per core
  - L3: 18 MB I+D on chip per chip
  - Other: None
  - Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)
  - Storage: 1 x SATA M.2 SSD, 480GB
  - Other: None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.2 (Ootpa)
  - 4.18.0-193.el8.x86_64
- **Compiler:**
  - C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
  - Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- **Firmware:**
  - Fujitsu BIOS Version V1.0.0.0 R1.16.0 for D3891-A1x. Released Aug-2022
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
SPEC CPU® 2017 Integer Rate Result

Fujitsu

PRIMERGY RX2540 M6, Intel Xeon Silver 4310, 2.10GHz

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

SPECrate®2017_int_base = 175
SPECrate®2017_int_peak = Not Run

Test Date: Oct-2022
Hardware Availability: Aug-2021
Software Availability: Jul-2022

Results Table

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</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalanchałk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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=1-23
cpupower -c all frequency-set -g performance

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 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4
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.

**Platform Notes**

BIOS configuration:
DCU Streamer Prefetcher = Disabled
CPU C1E Support = Disabled
Package C State Limit = C2
UPI Link Frequency Select = 10.4 GT/s
XPT Prefetch = Enabled
LLC Prefetch = Enabled
UPI Prefetch = Disabled
FAN Control = Full

Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16ac5fc64d
running on localhost.localdomain Thu Oct 20 05:38:43 2022

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 4310 CPU @ 2.10GHz
  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 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.32.1:
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
Vendor ID: GenuineIntel
CPU family: 6
Model: 106

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

<table>
<thead>
<tr>
<th>Model name:</th>
<th>Intel(R) Xeon(R) Silver 4310 CPU @ 2.10GHz</th>
</tr>
</thead>
<tbody>
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<tr>
<td>CPU MHz:</td>
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<tr>
<td>CPU max MHz:</td>
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<td>CPU min MHz:</td>
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<td>L3 cache:</td>
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<td>NUMA node0 CPU(s):</td>
<td>0-5,24-29</td>
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<tr>
<td>NUMA node1 CPU(s):</td>
<td>6-11,30-35</td>
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<td>NUMA node2 CPU(s):</td>
<td>12-17,36-41</td>
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<tr>
<td>NUMA node3 CPU(s):</td>
<td>18-23,42-47</td>
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<td>Flags:</td>
<td>fpu vme de pse tsc msr 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 aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca asme4_1 asme4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavevc xsaveas cqm_llc cqm_occup_llc cqm_mbm_total cqm_mmb_local vnoinvd dtherm idar pln pts hwp hwp_act_window hwp_ steep hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfn3 vaes vpcmldq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld arch_capabilities</td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data

```
cache size : 18432 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 4 5 24 25 26 27 28 29
- node 0 size: 257465 MB
- node 0 free: 256994 MB
- node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
- node 1 size: 258017 MB
- node 1 free: 257598 MB
- node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
- node 2 size: 258044 MB
- node 2 free: 257825 MB
- node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
- node 3 size: 258042 MB
- node 3 free: 257823 MB
- node distances:

```
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10
```

From /proc/meminfo

```
MemTotal: 1056327684 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

(Continued on next page)
Platform Notes (Continued)

/sbin/tuned-adm active
  Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.2 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.2"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
  Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Oct 20 05:35

SPEC is set to: /home/Benchmark/speccpu
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs 392G 21G 372G 6% /home

From /sys/devices/virtual/dmi/id
  Vendor: FUJITSU
  Product: PRIMERGY RX2540 M6
  Product Family: SERVER
  Serial: EWAAxxxxxx

Additional information from dmidecode 3.2 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:
  32x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2666
Fujitsu
PRIMERGY RX2540 M6, Intel Xeon Silver 4310, 2.10GHz

SPEC CPU®2017 Integer Rate Result
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SPECrate®2017_int_base = 175
SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu
Test Date: Oct-2022
Hardware Availability: Aug-2021
Software Availability: Jul-2022

Fujitsu
2.10GHz
PRIMERGY RX2540 M6, Intel Xeon Silver 4310,

Platform Notes (Continued)

BIOS:
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R1.16.0 for D3891-A1x
BIOS Date: 07/19/2022
BIOS Revision: 1.16
Firmware Revision: 3.40
(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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------

C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------

Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------------

Base Compiler Invocation
C benchmarks:
icx
C++ benchmarks:
icpx
Fortran benchmarks:
ifx

Base Portability Flags
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64

(Continued on next page)
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**CPU2017 License:** 19

**Test Sponsor:** Fujitsu

**Tested by:** Fujitsu

**Test Date:** Oct-2022

**Hardware Availability:** Aug-2021

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### Base Portability Flags (Continued)

- 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:**

- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**C++ benchmarks:**

- `-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**Fortran benchmarks:**

- `-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte -auto`
- `-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`
- `-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.

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