# SPEC CPU®2017 Integer Rate Result

## Fujitsu

PRIMERGY RX2540 M6, Intel Xeon Gold 6326, 2.90GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 260</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

### CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Jun-2021

Hardware Availability: Aug-2021

Software Availability: Aug-2020

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (260)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
</tr>
<tr>
<td>505.mcf_r</td>
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</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>64</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
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<tr>
<td>541.leela_r</td>
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</tr>
<tr>
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<td>64</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 6326

**Max MHz:** 3500

**Nominal:** 2900

**Enabled:** 32 cores, 2 chips, 2 threads/core

**Orderable:** 1.2 chips

**Cache L1:** 32 KB I + 48 KB D on chip per core

**Cache L2:** 1.25 MB I+D on chip per core

**Cache L3:** 24 MB I+D on chip per chip

**Other:** None

**Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)

**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 19.1.2.275 of Intel C/C++ Compiler for Linux;

Fortran: Version 19.1.2.275 of Intel Fortran Compiler for Linux

**Parallel:** No

**Firmware:** Fujitsu BIOS Version V1.0.0.0 R1.6.0 for D3891-A1x. Released Jun-2021 tested as V1.0.0.0 R1.2.0 for D3891-A1x Apr-2021

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** None

**Power Management:** BIOS set to prefer performance at the cost of additional power usage
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<table>
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<th>Ratio</th>
<th>Base</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
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<th>Seconds</th>
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<tr>
<td>502.gcc_r</td>
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<td>520.omnetpp_r</td>
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<td>488</td>
<td>142</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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

## Submit Notes

The config file option 'submit' was used.

## Operating System Notes

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

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:
```
LD_LIBRARY_PATH = 
    "/home/PVT/speccpu-1.1.8/lib/intel64:/home/PVT/speccpu-1.1.8/lib/ia32:/h 
ome/PVT/speccpu-1.1.8/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.:
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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:
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
SNC = Enable SNC2
UPI Prefetch = Disabled
FAN Control = Full

Sysinfo program /home/PVT/speccpu-1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Tue Jun 8 11:06:09 2021

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 6326 CPU @ 2.90GHz
 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 from util-linux 2.32.1:
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

(Continued on next page)
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Platform Notes (Continued)

Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6326 CPU @ 2.90GHz
Stepping: 6
CPU MHz: 1114.728
CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 24576K
NUMA node0 CPU(s): 0-7,32-39
NUMA node1 CPU(s): 8-15,40-47
NUMA node2 CPU(s): 16-23,48-55
NUMA node3 CPU(s): 24-31,56-63
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 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertz invpcid rtm cmpm/cm_mbm_total cmp_mbb/local wbinvd dtcld berm ida ar at pln pts hwp hwp_act_window hwp_esp
hwp_kpg_req avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xavveopt xsave vgetb1 xaves cqm_llc cqm_occup_llc cqm_mbb_total
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 6 7 32 33 34 35 36 37 38 39
node 0 size: 257464 MB
node 0 free: 257063 MB
node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47

(Continued on next page)
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<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 1 size: 258016 MB</td>
</tr>
<tr>
<td>node 1 free: 257787 MB</td>
</tr>
<tr>
<td>node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55</td>
</tr>
<tr>
<td>node 2 size: 258044 MB</td>
</tr>
<tr>
<td>node 2 free: 257456 MB</td>
</tr>
<tr>
<td>node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63</td>
</tr>
<tr>
<td>node 3 size: 258041 MB</td>
</tr>
<tr>
<td>node 3 free: 257756 MB</td>
</tr>
<tr>
<td>node distances:</td>
</tr>
<tr>
<td>node 0 1 2 3</td>
</tr>
<tr>
<td>0: 10 11 20 20</td>
</tr>
<tr>
<td>1: 11 10 20 20</td>
</tr>
<tr>
<td>2: 20 20 10 11</td>
</tr>
<tr>
<td>3: 20 20 11 10</td>
</tr>
<tr>
<td>From /proc/meminfo</td>
</tr>
<tr>
<td>MemTotal: 1056325068 kB</td>
</tr>
<tr>
<td>HugePages_Total: 0</td>
</tr>
<tr>
<td>Hugepagesize: 2048 kB</td>
</tr>
<tr>
<td>/sbin/tuned-adm active</td>
</tr>
<tr>
<td>Current active profile: throughput-performance</td>
</tr>
<tr>
<td>/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance</td>
</tr>
<tr>
<td>From /etc/<em>release</em>/etc/<em>version</em></td>
</tr>
<tr>
<td>os-release:</td>
</tr>
<tr>
<td>NAME=&quot;Red Hat Enterprise Linux&quot;</td>
</tr>
<tr>
<td>VERSION=&quot;8.2 (Ootpa)&quot;</td>
</tr>
<tr>
<td>ID=&quot;rhel&quot;</td>
</tr>
<tr>
<td>ID_LIKE=&quot;fedora&quot;</td>
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<tr>
<td>VERSION_ID=&quot;8.2&quot;</td>
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<td>PLATFORM_ID=&quot;platform:el8&quot;</td>
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<tr>
<td>PRETTY_NAME=&quot;Red Hat Enterprise Linux 8.2 (Ootpa)&quot;</td>
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<tr>
<td>ANSI_COLOR=&quot;0;31&quot;</td>
</tr>
<tr>
<td>redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)</td>
</tr>
<tr>
<td>system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)</td>
</tr>
<tr>
<td>system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga</td>
</tr>
<tr>
<td>uname -a:</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>Kernel self-reported vulnerability status:</td>
</tr>
<tr>
<td>CVE-2018-12207 (iTLB Multihit): Not affected</td>
</tr>
</tbody>
</table>

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Platform Notes (Continued)

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: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jun 8 11:03
SPEC is set to: /home/PVT/speccpu-1.1.8
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 xfs 330G 101G 230G 31% /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

BIOS:
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R1.2.0 for D3891-A1x
BIOS Date: 04/01/2021
BIOS Revision: 1.2
Firmware Revision: 3.20

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
==============================================================================

(Continued on next page)
Compiler Version Notes (Continued)

<table>
<thead>
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<tbody>
<tr>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version</td>
</tr>
<tr>
<td>19.1.2.275 Build 20200604</td>
</tr>
<tr>
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<tbody>
<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623</td>
</tr>
<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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</table>

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

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

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Base Portability Flags (Continued)

```
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-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc
```

**C++ benchmarks:**

```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc
```

**Fortran benchmarks:**

```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/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:

http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-ICL-RevA.xml
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.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 v1.1.8 on 2021-06-08 11:06:09-0400.
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