# SPEC CPU®2017 Integer Rate Result

## Fujitsu

PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Fujitsu</th>
<th>Test Date:</th>
<th>Oct-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Fujitsu</td>
<td>Hardware Availability:</td>
<td>Oct-2019</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 60.5**

**SPECrate®2017_int_peak = Not Run**

### Hardware

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E-2288G</td>
</tr>
<tr>
<td>Max MHz</td>
<td>5000</td>
</tr>
<tr>
<td>Nominal</td>
<td>3700</td>
</tr>
<tr>
<td>Enabled</td>
<td>8 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>16 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x SATA M.2 SSD, 480 GB</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 4.12.14-25.28-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Fujitsu BIOS Version V5.0.0.13 R1.12.0 for D3673-A1x. Released Sep-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
</tr>
</tbody>
</table>

### SPECrate®2017_int_base (60.5)

<table>
<thead>
<tr>
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<th>Value</th>
</tr>
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<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 4.12.14-25.28-default</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
</tr>
</tbody>
</table>
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td>492</td>
<td>51.8</td>
<td>494</td>
<td>51.5</td>
<td>495</td>
<td>51.4</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>16</td>
<td>502</td>
<td>45.1</td>
<td>502</td>
<td>45.1</td>
<td>501</td>
<td>45.3</td>
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<tr>
<td>505.mcf_r</td>
<td>16</td>
<td>383</td>
<td>67.5</td>
<td>381</td>
<td>67.8</td>
<td>383</td>
<td>67.5</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>16</td>
<td>693</td>
<td>30.3</td>
<td>690</td>
<td>30.4</td>
<td>690</td>
<td>30.4</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
<td>285</td>
<td>59.3</td>
<td>286</td>
<td>59.0</td>
<td>291</td>
<td>58.1</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>16</td>
<td>195</td>
<td>144</td>
<td>196</td>
<td>143</td>
<td>196</td>
<td>143</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
<td>327</td>
<td>56.1</td>
<td>327</td>
<td>56.1</td>
<td>328</td>
<td>56.0</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
<td>519</td>
<td>51.0</td>
<td>520</td>
<td>51.0</td>
<td>520</td>
<td>51.0</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
<td>287</td>
<td>146</td>
<td>289</td>
<td>145</td>
<td>284</td>
<td>147</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
<td>441</td>
<td>39.2</td>
<td>441</td>
<td>39.2</td>
<td>442</td>
<td>39.1</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 60.5**

**SPECrate®2017_int_peak = Not Run**

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

### Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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=1-15

### General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017/lib/intel64"
Binaries compiled on a system with 1x Intel Core i9-799X 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
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:
Adjacent Cache Line Prefetch = Disabled
C states = Disabled
Fan Control = Full
Hardware Prefetcher = Disabled
Intel Virtualization Technology = Disabled
Intel Speed Shift Technology = Disabled
Sysinfo program /home/Benchmark/spec/cpu2017-1.0.5/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd08f2999c3361f64985e45859ea9
running on TX1320M4 Sat Oct 12 05:16:51 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) E-2288G CPU @ 3.70GHz
   1 "physical id"s (chips)
   16 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
Stepping: 13
CPU MHz: 3700.000
CPU max MHz: 5000.0000
CPU min MHz: 800.0000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

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

| L2 cache: | 256K |
| L3 cache: | 16384K |
| NUMA node0 CPU(s): | 0-15 |

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 rdscv
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmrperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdmb fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt
intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify
hwp_act_window hwp_epp flush_l1d arch_capabilities
```

```
# From /proc/cpuinfo
cache data
cache size: 16384 KB
```

```
# From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 63885 MB
node 0 free: 63395 MB
node distances:
node 0	node distances: 10
```

```
# From /proc/meminfo
MemTotal: 65418524 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 TX1320M4 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
```

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

Fujitsu
PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

SPECrate®2017_int_base = 60.5
SPECrate®2017_int_peak = Not Run

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

Platform Notes (Continued)

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 Oct 12 04:58

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb4 xfs 191G 73G 119G 38% /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 // American Megatrends Inc. V5.0.0.13 R1.12.0 for D3673-A1x
09/06/2019

Memory:
4x SK Hynix HMA82GU7CJR8N-VK 16 GB 2 rank 2667

(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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
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Fortran  548.exchange2_r(base)

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

Fujitsu
PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

SPECrat®2017_int_base = 60.5
SPECrat®2017_int_peak = Not Run

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

Test Date: Oct-2019
Hardware Availability: Oct-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4

(Continued on next page)
Fujitsu
PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

| SPECrate®2017_int_base = | 60.5 |
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CPU2017 License: 19
Test Sponsor: Fujitsu
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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/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.