# SPEC® CPU2017 Integer Rate Result

## Fujitsu

**PRIMERGY TX1330 M4, Intel Xeon E-2144G, 3.60GHz**

**SPECrate2017_int_base = 29.8**

**SPECrate2017_int_peak = 31.9**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon E-2144G</td>
<td>OS: SUSE Linux Enterprise Server 15</td>
</tr>
<tr>
<td>Max MHz.: 4500</td>
<td>4.12.14-23-default</td>
</tr>
<tr>
<td>Nominal: 3600</td>
<td>Compiler: C/C++: Version 19.0.0.117 of Intel C/C++</td>
</tr>
<tr>
<td>Enabled: 4 cores, 1 chip, 2 threads/core</td>
<td>Compiler for Linux: Fortran: Version 19.0.0.117 of Intel Fortran</td>
</tr>
<tr>
<td>Orderable: 1 chip</td>
<td>Compiler for Linux:</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>L2: 256 KB I+D on chip per core</td>
<td>Firmware:</td>
</tr>
<tr>
<td>L3: 8 MB I+D on chip per chip</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x SATA HDD, 1TB, 7200RPM</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator library V5.0.1</td>
</tr>
</tbody>
</table>

## CPU2017 License:

19

## Test Sponsor:

Fujitsu

## Tested by:

Fujitsu

## Test Date:

Oct-2018

## Hardware Availability:

Nov-2018

## Software Availability:

Sep-2018
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Fujitsu

PRIMERGY TX1330 M4, Intel Xeon E-2144G, 3.60GHz

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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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench</td>
<td>8</td>
<td>526</td>
<td>24.2</td>
<td>530</td>
<td>24.0</td>
<td>530</td>
<td>24.0</td>
<td>439</td>
<td>29.0</td>
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<tr>
<td>502.gcc</td>
<td>8</td>
<td>480</td>
<td>23.6</td>
<td>479</td>
<td>23.6</td>
<td>479</td>
<td>23.6</td>
<td>394</td>
<td>28.8</td>
</tr>
<tr>
<td>505.mcf</td>
<td>8</td>
<td>364</td>
<td>35.5</td>
<td>362</td>
<td>35.7</td>
<td>364</td>
<td>35.6</td>
<td>364</td>
<td>35.5</td>
</tr>
<tr>
<td>520.omnetpp</td>
<td>8</td>
<td>578</td>
<td>18.2</td>
<td>574</td>
<td>18.3</td>
<td>572</td>
<td>18.4</td>
<td>578</td>
<td>18.2</td>
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<tr>
<td>523.xalancbmk</td>
<td>8</td>
<td>347</td>
<td>24.4</td>
<td>344</td>
<td>24.6</td>
<td>346</td>
<td>24.4</td>
<td>269</td>
<td>31.4</td>
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<tr>
<td>525.x264</td>
<td>8</td>
<td>203</td>
<td>69.2</td>
<td>201</td>
<td>69.5</td>
<td>202</td>
<td>69.2</td>
<td>194</td>
<td>72.2</td>
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<tr>
<td>531.deepsjeng</td>
<td>8</td>
<td>328</td>
<td>28.0</td>
<td>328</td>
<td>28.0</td>
<td>328</td>
<td>28.0</td>
<td>328</td>
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<tr>
<td>541.leela</td>
<td>8</td>
<td>534</td>
<td>24.8</td>
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<td>25.9</td>
<td>518</td>
<td>25.6</td>
<td>534</td>
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<tr>
<td>548.exchange2</td>
<td>8</td>
<td>360</td>
<td>58.3</td>
<td>361</td>
<td>58.1</td>
<td>360</td>
<td>58.3</td>
<td>360</td>
<td>58.3</td>
</tr>
<tr>
<td>557.xz</td>
<td>8</td>
<td>404</td>
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<td>405</td>
<td>21.3</td>
<td>405</td>
<td>21.3</td>
<td>405</td>
<td>21.3</td>
</tr>
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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"
Process tuning settings:
echo 500000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-ic19-20181011/icc19-lib/ia32"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/Benchmark/speccpu2017-ic19-20181011/icc19-lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/Benchmark/speccpu2017-ic19-20181011/je5.0.1-32"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/Benchmark/speccpu2017-ic19-20181011/je5.0.1-64"

Binaries compiled on a system with 2x Intel Xeon Silver 4108 CPU + 384GB RAM memory using SUSE Linux Enterprise Server 12 SP2
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
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;

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PRIMERGY TX1330 M4, Intel Xeon E-2144G, 3.60GHz

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Tested by: Fujitsu

General Notes (Continued)
jemalloc: sources available via jemalloc.net;
Yes: 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:
Hardware Prefetcher = Disabled
Adjacent Cache Line Prefetch = Disabled
VT-d = Disabled
Fan Control = Full
Race To Halt (RTH) = Disabled
DMI Link ASPM Control = L0s
REFRESH_2X_MODE = 2- Enabled HOT only
.Sysinfo program /home/Benchmark/speccpu2017-ic19-20181011/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f
running on TX1330M4 Thu Oct 18 22:24:41 2018

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-2144G CPU @ 3.60GHz
  1 "physical id"s (chips)
  8 "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 : 4
siblings : 8
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1

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Testing Notes:
- NUMA node(s): 1
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 158
- Model name: Intel(R) Xeon(R) E-2144G CPU @ 3.60GHz
- Stepping: 10
- CPU MHz: 3600.000
- CPU max MHz: 4500.0000
- CPU min MHz: 800.0000
- BogoMIPS: 7200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 256K
- L3 cache: 8192K
- NUMA node0 CPU(s): 0-7
- 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 aperf perfctr tscknown_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 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 pti tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdtscp intel_pt xsaveopt xsaveas xsaveopt ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp ssbd

/proc/cpuinfo cache data
- cache size: 8192 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
- node 0 size: 63916 MB
- node 0 free: 63438 MB
- node distances:
- node 0
- 0: 10

From /proc/meminfo
- MemTotal: 65450232 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
- os-release:

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Platform Notes (Continued)

NAME="SLES"
VERSION="15"
VERSION_ID="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 TX1330M4 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b) x86_64
x86_64 x86_64 GNU/Linux

run-level 3 Oct 18 22:23

SPEC is set to: /home/Benchmark/speccpu2017-ic19-20181011
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 828G 102G 726G 13% /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 R1.0.0 for D3673-A1x
09/14/2018
Memory:
4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC   500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
     525.x264_r(base, peak) 557.xz_r(base, peak)
==============================================================================
icc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC   500.perlbench_r(peak) 502.gcc_r(peak)
==============================================================================
icc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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Compiled Programs:

**C benchmarks:**
- icc -m64 -std=c11

**C++ benchmarks:**
- icpc -m64

**Fortran benchmarks:**
- ifort -m64

Compiler Version Notes (Continued)

```plaintext
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
     541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
     541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 19.0.0.117 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
FC  548.exchange2_r(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 19.0.0.117 20180804
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

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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Software Availability: Sep-2018

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:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
- L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation
C benchmarks (except as noted below):
icc -m64 -std=c11

502.gcc_r: icc -m32 -std=c11 -L/opt/intel/compilers_and_libraries_2019/linux/lib/ia32

C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/opt/intel/compilers_and_libraries_2019/linux/lib/ia32

Fortran benchmarks:
ifort -m64

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

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Test Date: Oct-2018
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Software Availability: Sep-2018

### Peak Portability Flags (Continued)

- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -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) -ipo
  -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
  -fno-strict-overflow -L/usr/local/je5.0.1-64/lib
  -ljemalloc

- 502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
  -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
  -L/usr/local/je5.0.1-32/lib -ljemalloc

- 505.mcf_r: basepeak = yes

- 525.x264_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=3 -fno-alias
  -L/usr/local/je5.0.1-64/lib -ljemalloc

- 557.xz_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib
  -ljemalloc

#### C++ benchmarks:

- 520.omnetpp_r: basepeak = yes

- 523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
  -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
  -L/usr/local/je5.0.1-32/lib -ljemalloc

- 531.deepsjeng_r: basepeak = yes

- 541.leela_r: basepeak = yes

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#### Peak Optimization Flags (Continued)

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/Fujitsu-Platform-Settings-V1.0.2-CFL-RevA.xml](http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevA.xml)