# SPEC CPU®2017 Floating Point Speed Result

**Fujitsu**

PRIMERGY TX1330 M4, Intel Xeon E-2278G, 3.40 GHz

<table>
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<tr>
<th>SPECspeed®2017_fp_base</th>
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**CPU2017 License:** 19
**Test Date:** Nov-2019
**Hardware Availability:** Oct-2019
**Test Sponsor:** Fujitsu
**Software Availability:** Sep-2019
**Tested by:** Fujitsu

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## Hardware

**CPU Name:** Intel Xeon E-2278G
**Max MHz:** 5000
**Nominal:** 3400
**Enabled:** 8 cores, 1 chip
**Orderable:** 1 chip
**Cache L1:** 32 KB I + 32 KB D on chip per core
**L2:** 256 KB I+D on chip per core
**L3:** 16 MB I+D on chip per chip
**Other:** None
**Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
**Storage:** 1 x SATA M.2 SSD, 480 GB
**Other:** None

## Software

**OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo) 3.10.0-957.el7.x86_64
**Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++ Compiler for Linux;
Fortran: Version 19.0.5.281 of Intel Fortran Compiler for Linux
**Parallel:** Yes
**Firmware:** Fujitsu BIOS Version V5.0.0.13 R1.12.0 for D3673-A1x.
Released Sep-2019
**File System:** xfs
**System State:** Run level 3 (multi-user)
**Base Pointers:** 64-bit
**Peak Pointers:** 64-bit
**Other:** None
**Power Management:** BIOS set to prefer performance at the cost of additional power usage
### 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:
- KMP_AFFINITY = "granularity=fine,compact"
- LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-1.1.0/lib/intel64"
- OMP_STACKSIZE = "192M"

### General Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,compact"
- LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-1.1.0/lib/intel64"
- OMP_STACKSIZE = "192M"
- echo 100000000 > sched_min_granularity_ns
- echo 150000000 > sched_wakeup_granularity_ns
- echo 240000000 > sched_latency_ns

Binaries compiled on a system with 1x Intel Xeon E-2288G CPU + 64 GB RAM memory using Redhat Enterprise Linux 7.6

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)

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

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:  
Energy Efficient Turbo = Disabled  
Fan Control = Full  
Hyper-Threading = Disabled  
SW Guard Extensions (SGX) = Enabled

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edeb0e6466a485a0011  
running on localhost.localdomain Wed Nov 20 07:29:38 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-2278G CPU @ 3.40GHz  
    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 : 8  
    siblings : 8  
    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): 8  
On-line CPU(s) list: 0-7  
Thread(s) per core: 1  
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-2278G CPU @ 3.40GHz

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Fujitsu
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| SPECspeed®2017_fp_base = 36.3 |
| SPECspeed®2017_fp_peak = 36.8 |

**Platform Notes (Continued)**

| Stepping: | 13 |
| CPU MHz: | 4801.379 |
| CPU max MHz: | 5000.0000 |
| CPU min MHz: | 800.0000 |
| BogoMIPS: | 6816.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 256K |
| L3 cache: | 16384K |
| 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 aperfmperf eagerfpup npi 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 epb intel_pt ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 idvez invpcid rdtscp rtm rdseed adx ciflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 16384 KB

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

From /proc/meminfo
  MemTotal:  65596036 kB
  HugePages_Total:  0
  Hugepagesize:  2048 kB

From /etc/*release* /etc/*version*
  os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.6 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_ID="7.6"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
  redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

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Platform Notes (Continued)

uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 Nov 20 07:28
SPEC is set to: /home/Benchmark/speccpu2017-1.1.0
    Filesystem            Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   392G   28G  365G   8% /home

From /sys/devices/virtual/dmi/id
    BIOS: FUJITSU // American Megatrends Inc. V5.0.0.13 R1.12.0 for D3673-A1x
          09/06/2019
    Vendor: FUJITSU
    Product: PRIMERGY TX1330 M4
    Serial: YMJLXXXXXX

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

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
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<th>C</th>
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==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985–2019 Intel Corporation. All rights reserved.
Representative Floating Point Speed Result

Fujitsu
PRIMERGY TX1330 M4, Intel Xeon E-2278G, 3.40 GHz

SPECspeed®2017_fp_base = 36.3
SPECspeed®2017_fp_peak = 36.8

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

Compiler Version Notes (Continued)

C++, C, Fortran | 607.cactuBSSN_s(base, peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
654.roms_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
628.pop2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64
## Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

## Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.lbm_s: -DSPEC_LP64
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
  -assume byterecl
- 638.imagick_s: -DSPEC_LP64
- 644.nab_s: -DSPEC_LP64
- 649.fotonik3d_s: -DSPEC_LP64
- 654.roms_s: -DSPEC_LP64

## Base Optimization Flags

### C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

### Fortran benchmarks:
```
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs
```

### Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

### Benchmarks using Fortran, C, and C++:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```
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Copyright 2017-2020 Standard Performance Evaluation Corporation

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Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP

638.imagick_s: Same as 619.lbm_s

644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-1hs

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Peak Optimization Flags (Continued)

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.html

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-RevD.xml