



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Fujitsu

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

| | |
|---------------------------------|---------|
| SPECspeed®2017_fp_base = | 35.9 |
| SPECspeed®2017_fp_energy_base = | 312 |
| SPECspeed®2017_fp_peak = | Not Run |
| SPECspeed®2017_fp_energy_peak = | Not Run |

CPU2017 License: 19

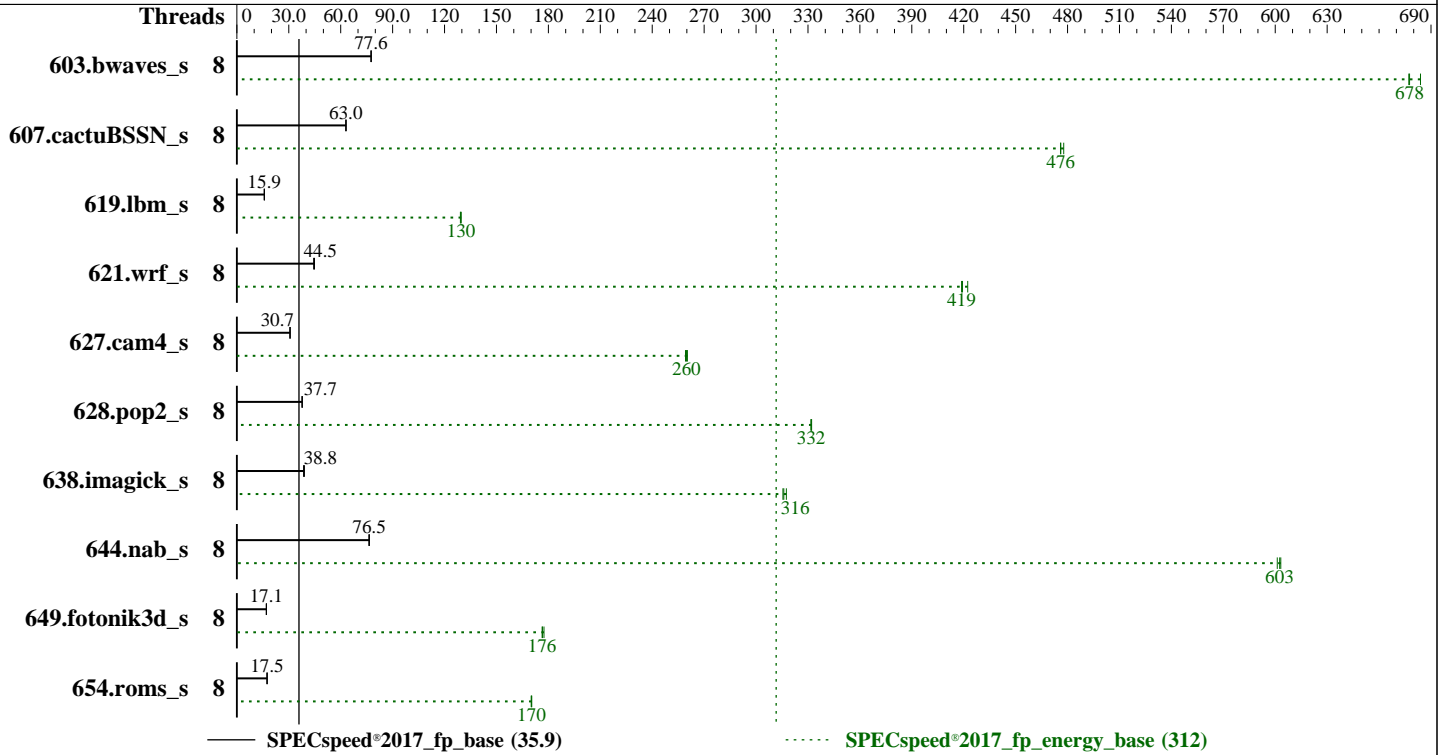
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Oct-2019

Hardware Availability: Oct-2019

Software Availability: May-2019



Hardware

CPU Name: Intel Xeon E-2288G
 Max MHz: 5000
 Nominal: 3700
 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 19.0.4.227 of Intel C/C++ Compiler for Linux;
 Fortran: Version 19.0.4.227 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: Not Applicable
 Other: None
 Power Management: Enabled

Power

Max. Power (W): 180.06
 Idle Power (W): 19.76
 Min. Temperature (C): 20.56
 Elevation (m): 11

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Power (Continued)

Line Standard: 200 V / 50 Hz / 1 phase / 2 wires
 Provisioning: Line-powered

Power Settings

Management FW: Version 1.60h for D3673-A1x of Fujitsu BMC Firmware
 Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 450 W (non-redundant)
 Details: Standard power supply part of base unit S26361-K1639-V101
 Backplane: 4 x 2.5inch HDD back plane
 Other Storage: Embedded SATA Controller
 Storage Model #s: S26361-F5706
 NICs Installed: 2 x Intel I210 Springville @ 1 Gb
 NICs Enabled (FW/OS): 2 / 2
 NICs Connected/Speed: 1 @ 1 Gb
 Other HW Model #s: None

Power Analyzer

Power Analyzer: 10.26.120.153:8888
 Hardware Vendor: Hioki
 Model: Hioki PW3336:1-Channel
 Serial Number: 170134584
 Input Connection: USB via USB-Serial CH340
 Metrology Institute: NICT
 Calibration By: HIOKI E.E. CORPORATION
 Calibration Label: H06400087-1901T
 Calibration Date: 1-Jan-2019
 PTDaemon™ Version: 1.9.1 (a2d19f26; 2019-07-17)
 Setup Description: Connected to PSU 1
 Current Ranges Used: 1A
 Voltage Range Used: 300V

Temperature Meter

Temperature Meter: 10.26.120.153:8889
 Hardware Vendor: Digi International Inc.
 Model: DigiWATCHPORT_H
 Serial Number: W 640 45112
 Input Connection: USB
 PTDaemon Version: 1.9.1 (a2d19f26; 2019-07-17)
 Setup Description: 5 mm in front of SUT main air intake

Base Results Table

| Benchmark | Threads | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power |
|-----------------|---------|------------|-------------|-------------|--------------|---------------|---------------|------------|-------------|-------------|--------------|---------------|---------------|------------|-------------|-------------|--------------|---------------|---------------|
| 603.bwaves_s | 8 | 761 | 77.6 | 94.1 | 684 | 124 | 131 | 761 | 77.6 | 95.0 | 678 | 125 | 132 | 761 | 77.6 | 95.1 | 677 | 125 | 132 |
| 607.cactuBSSN_s | 8 | 264 | 63.1 | 38.2 | 478 | 145 | 175 | 265 | 63.0 | 38.3 | 476 | 145 | 175 | 265 | 63.0 | 38.3 | 476 | 145 | 175 |
| 619.lbm_s | 8 | 330 | 15.9 | 45.9 | 130 | 139 | 141 | 330 | 15.9 | 46.1 | 129 | 140 | 141 | 330 | 15.9 | 46.0 | 129 | 139 | 141 |
| 621.wrf_s | 8 | 295 | 44.8 | 34.2 | 422 | 116 | 118 | 297 | 44.5 | 34.4 | 419 | 116 | 118 | 297 | 44.5 | 34.5 | 419 | 116 | 118 |
| 627.cam4_s | 8 | 288 | 30.8 | 37.0 | 260 | 129 | 136 | 288 | 30.7 | 37.1 | 260 | 129 | 136 | 289 | 30.7 | 37.2 | 259 | 129 | 138 |
| 628.pop2_s | 8 | 314 | 37.8 | 39.3 | 332 | 125 | 132 | 315 | 37.7 | 39.3 | 332 | 125 | 126 | 315 | 37.7 | 39.3 | 332 | 125 | 126 |
| 638.imagick_s | 8 | 370 | 39.0 | 49.5 | 318 | 134 | 179 | 372 | 38.8 | 49.8 | 316 | 134 | 179 | 374 | 38.6 | 49.8 | 316 | 133 | 180 |
| 644.nab_s | 8 | 229 | 76.5 | 31.5 | 603 | 138 | 177 | 229 | 76.4 | 31.5 | 603 | 138 | 177 | 228 | 76.5 | 31.6 | 601 | 139 | 177 |
| 649.fotonik3d_s | 8 | 534 | 17.1 | 58.0 | 176 | 109 | 115 | 533 | 17.1 | 57.7 | 177 | 108 | 115 | 536 | 17.0 | 58.0 | 177 | 108 | 116 |
| 654.roms_s | 8 | 901 | 17.5 | 103 | 170 | 115 | 126 | 901 | 17.5 | 103 | 170 | 115 | 127 | 903 | 17.4 | 104 | 170 | 115 | 126 |

SPECspeed®2017_fp_base = 35.9

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



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Test Sponsor: Fujitsu
Tested by: Fujitsu

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

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/speccpu2017-2/ic19u5-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 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:
Energy Efficient Turbo = Disabled
Fan Control = Full
Hyper-Threading = Disabled
SW Guard Extension(SGX) = Enabled

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on localhost.localdomain Mon Oct 14 18:19:29 2019

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Platform Notes (Continued)

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)
 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-2288G CPU @ 3.70GHz
Stepping:        13
CPU MHz:         4562.896
CPU max MHz:     5000.0000
CPU min MHz:     800.0000
BogoMIPS:        7392.00
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfperf eagerfpu 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

```

(Continued on next page)



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Platform Notes (Continued)

```
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 bml hle
avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec
xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl
intel_stibp flush_lld 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)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6:ga:server
```

```
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
```

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Platform Notes (Continued)

run-level 3 Oct 14 18:18

SPEC is set to: /home/Benchmark/speccpu2017-1.1.0

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|-----------------------|------|------|------|-------|------|------------|
| /dev/mapper/rhel-home | xfs | 392G | 20G | 373G | 6% | /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 TX1320 M4
Serial: YMJKXXXXXX

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)

Power Settings Notes

PTDaemon to measure power and temperature was run on a PRIMERGY RX2530 M5 as a controller with 2x Intel Xeon Platinum 8280 CPU and 768 GB of memory using Windows Server 2012 R2. Power management in the BIOS was default except for any settings mentioned in BIOS Configuration. No power management settings were set in the management firmware. The optional optical drive was not installed. The run was started and observed through the management firmware.

Compiler Version Notes

```
=====
C          | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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.
=====
```

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Compiler Version Notes (Continued)

C++, C, Fortran | 607.cactuBSSN_s(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.
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.
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.
-----
```

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

```
-----
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.
-----
```

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

```
-----
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.
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.
-----
```

Base Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

(Continued on next page)



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Base Compiler Invocation (Continued)

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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The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevB.2019-11-01.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevB.2019-11-01.xml>

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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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