# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

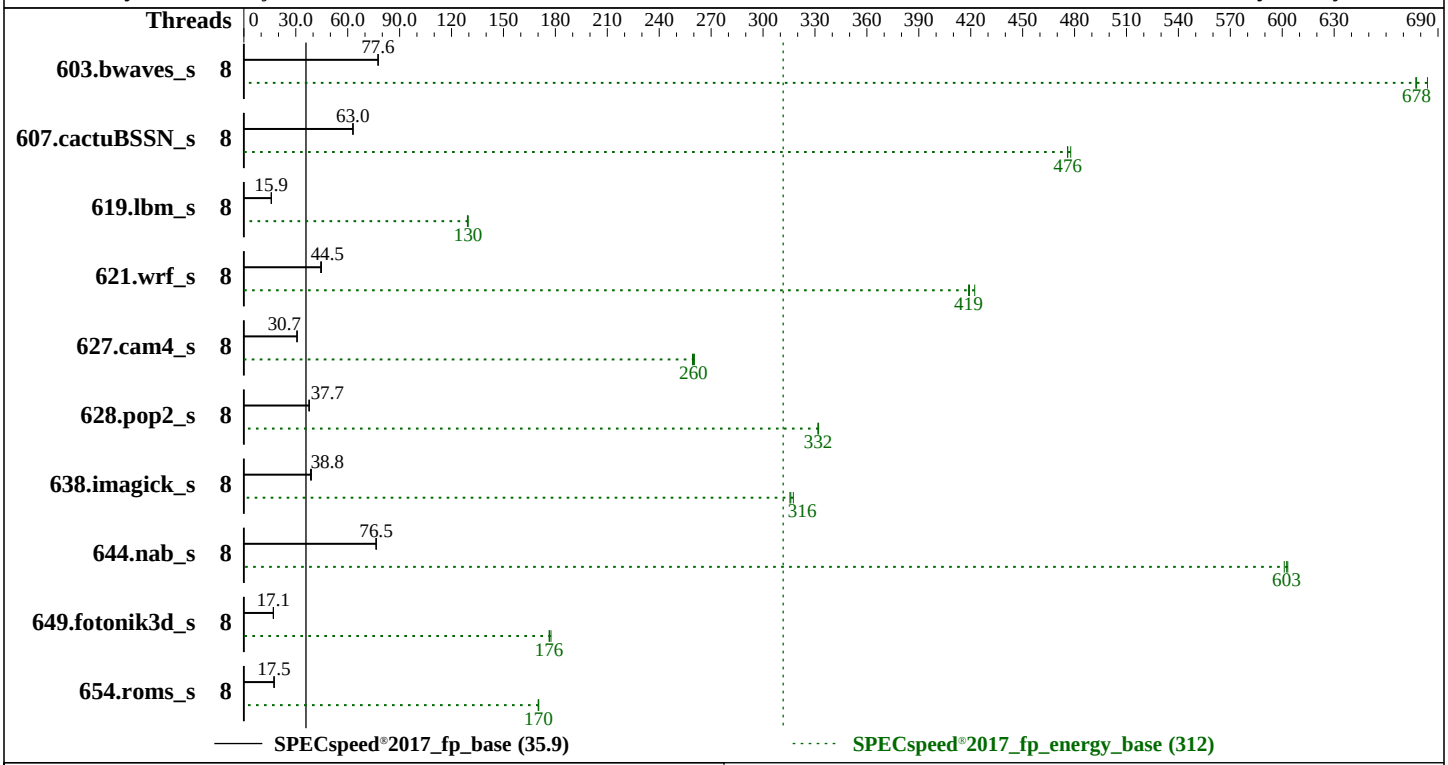
## Fujitsu

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)<br>3.10.0-957.el7.x86_64 |
| Compiler: | C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;<br>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 |

**(Continued on next page)**

# 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

### 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**

**SPECspeed®2017_fp_energy_base = 312**

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

## 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 295195f888a3d7edb1e6e46a485a0011
 running on localhost.localdomain Mon Oct 14 18:19:29 2019
```

**(Continued on next page)**

## 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
     aperfmperf 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)**

## 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 bmi1 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_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)
    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
```

**(Continued on next page)**

## 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.
------------------------------------------------------------------------------

==============================================================================
```

**(Continued on next page)**

## 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)**

## 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

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


PTDaemon, SPEC CPU, and SPECspeed are trademarks or registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.


For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2019-10-14 18:19:29-0400.
Report generated on 2019-11-01 10:43:31 by CPU2017 PS formatter v6255.
Originally published on 2019-11-01.