## SPEC CPU®2017 Floating Point Speed Result

**Fujitsu**

PRIMERGY TX1330 M4, Intel Core i3-9100, 3.60 GHz

<table>
<thead>
<tr>
<th>SPECspeed®2017 fp_base = 24.5</th>
<th>SPECspeed®2017 fp_peak = 24.8</th>
</tr>
</thead>
</table>

### CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Dec-2019

Hardware Availability: Oct-2019

Software Availability: Sep-2019

### Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Core i3-9100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 4200</td>
</tr>
<tr>
<td>Nominal: 3600</td>
</tr>
<tr>
<td>Enabled: 4 cores, 1 chip</td>
</tr>
<tr>
<td>Orderable: 1 chip</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 6 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)</td>
</tr>
<tr>
<td>Storage: 1 x SATA M.2 SSD, 480 GB</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

### 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 |

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>71.9</td>
<td>36.9</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>14.9</td>
<td>14.9</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>4</td>
<td>27.7</td>
<td>29.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>4</td>
<td>17.3</td>
<td>30.8</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>4</td>
<td>28.7</td>
<td>35.5</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>19.1</td>
<td>19.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>4</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>820</td>
<td>71.9</td>
<td>820</td>
<td>71.9</td>
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<td></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>451</td>
<td>37.0</td>
<td>452</td>
<td>36.9</td>
<td>452</td>
<td>36.9</td>
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<tr>
<td>619.lbm_s</td>
<td>4</td>
<td>353</td>
<td>14.8</td>
<td>353</td>
<td>14.9</td>
<td>353</td>
<td>14.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>4</td>
<td>478</td>
<td>27.7</td>
<td>479</td>
<td>27.6</td>
<td>477</td>
<td>27.8</td>
<td></td>
<td></td>
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<tr>
<td>627.cam4_s</td>
<td>4</td>
<td>511</td>
<td>17.3</td>
<td>512</td>
<td>17.3</td>
<td>511</td>
<td>17.3</td>
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<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>414</td>
<td>28.7</td>
<td>414</td>
<td>28.7</td>
<td>414</td>
<td>28.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>754</td>
<td>19.1</td>
<td>760</td>
<td>19.0</td>
<td>755</td>
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<tr>
<td>644.nab_s</td>
<td>4</td>
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<td>35.5</td>
<td>492</td>
<td>35.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td>563</td>
<td>16.2</td>
<td>563</td>
<td>16.2</td>
<td>563</td>
<td>16.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td>1201</td>
<td>13.1</td>
<td>1203</td>
<td>13.1</td>
<td>1200</td>
<td>13.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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
- Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)
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Fujitsu
PRIMERGY TX1330 M4, Intel Core i3-9100, 3.60 GHz

**SPECspeed**2017_fp_base = 24.5
**SPECspeed**2017_fp_peak = 24.8

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Fujitsu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Fujitsu</td>
</tr>
</tbody>
</table>

**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

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Tue Dec 10 13:57:10 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

```plaintext
model name : Intel(R) Core(TM) i3-9100 CPU @ 3.60GHz
  1 "physical id"s (chips)
  4 "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 : 4
physical 0: cores 0 1 2 3
```

From lscpu:

```plaintext
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Core(TM) i3-9100 CPU @ 3.60GHz
Stepping: 11
CPU MHz: 4043.847
```

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

<table>
<thead>
<tr>
<th>CPU max MHz:</th>
<th>4200.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU min MHz:</td>
<td>800.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>7200.00</td>
</tr>
<tr>
<td>Virtualization:</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>256K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>6144K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-3</td>
</tr>
<tr>
<td>Flags:</td>
<td>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 bs rep_good nop1 xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movck popcnt tsc_deadline_timer aes xsave xsaves xcrs xsaveopt xsavesopt xsaveopt xsaveopt xgetbv1 dtherm ida arat pln pts hwp hwp notifies hwp_act_window hwp_epp spec_ctrl intel_stibpflush_l1d</td>
</tr>
</tbody>
</table>

```
From /proc/cpuinfo cache data
  cache size : 6144 KB
```

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

```
From /proc/meminfo
  MemTotal:       65724644 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)
```

```
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
```
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Fujitsu
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SPECspeed®2017_fp_base = 24.5
SPECspeed®2017_fp_peak = 24.8

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

Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Mitigation: PTE Inversion; VMX: SMT disabled, L1D conditional cache flushes
Microarchitectural Data Sampling: No status reported
CVE-2018-5754 (Meltdown): Mitigation: PTI
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 sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Dec 10 13:55

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

From /sys/devices/virtual/dmi/id
BIOS: FUJITSU // American Megatrends Inc. V5.0.0.13 R1.12.0 for D3673-Alx 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, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_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.
==============================================================================

(Continued on next page)
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**Fujitsu**

PRIMERGY TX1330 M4, Intel Core i3-9100, 3.60 GHz

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<tr>
<th>SPECspeed®2017_fp_base</th>
<th>24.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>24.8</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 19  
**Test Sponsor:** Fujitsu  
**Test Date:** Dec-2019  
**Hardware Availability:** Oct-2019

**Tested by:** Fujitsu  
**Software Availability:** Sep-2019

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**Compiler Version Notes (Continued)**

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**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**

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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**

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**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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---

**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**

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

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**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`

Benchmarks using both Fortran and C:

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

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

| Fujitsu | SPECspeed®2017_fp_base = 24.5 |
| PRIMERGY TX1330 M4, Intel Core i3-9100, 3.60 GHz | SPECspeed®2017_fp_peak = 24.8 |

| CPU2017 License: | 19 | Test Date: | Dec-2019 |
| Test Sponsor: | Fujitsu | Hardware Availability: | Oct-2019 |
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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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Test Sponsor: Fujitsu
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Test Date: Dec-2019
Hardware Availability: Oct-2019
Software Availability: Sep-2019

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-lhs

(Continued on next page)
Fujitsu
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Fujitsu

SPECspeed®2017_fp_base = 24.5
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CPU2017 License: 19
Test Sponsor: Fujitsu
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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

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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 2019-12-09 23:57:09-0500.
Originally published on 2020-02-04.