### CPU2017 Floating Point Rate Result

**Fujitsu**

**PRIMERGY RX2540 M4, Intel Xeon Bronze 3106, 1.70GHz**

<table>
<thead>
<tr>
<th>Copy</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>16</td>
<td>60.8</td>
<td>62.2</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Bronze 3106
- **Max MHz.:** 1700
- **Nominal:** 1700
- **Enabled:** 16 cores, 2 chips
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 11 MB I+D on chip per core
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R, running at 2133)
- **Storage:** 384 GB tmpfs
- **Other:** 1 x SATA HDD, 1000 GB, 7200 RPM, used for swap

#### Software

- **OS:** SUSE Linux Enterprise Server 12 SP2 4.4.114-92.64-default
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** Fujitsu BIOS Version V5.0.0.12 R1.17.0 for D3384-A1x. Released Feb-2018
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
SPEC CPU2017 Floating Point Rate Result

Fujitsu
PRIMERGY RX2540 M4, Intel Xeon Bronze 3106, 1.70GHz

SPECr2ate2017_fp_base = 60.8
SPECr2ate2017_fp_peak = 62.2

Results Table

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</tbody>
</table>

SPECr2ate2017_fp_base = 60.8
SPECr2ate2017_fp_peak = 62.2

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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"
Set Kernel Boot Parameter: nohz_full=1-15
Set CPU frequency governor to maximum performance with:
cpupower -c all frequency-set -g performance
Set tmpfs filesystem with:
mkdir /home/memory
mount -t tmpfs -o size=384g,rw tmpfs /home/memory
Process tuning settings:
cpu idle state set with:
cpupower idle-set -d 1

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/memory/speccpu/lib/ia32:/home/memory/speccpu/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/memory/speccpu/je5.0.1-32:/home/memory/speccpu/je5.0.1-64"

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

**Fujitsu**
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**SPECrate2017_fp_base** = 60.8
**SPECrate2017_fp_peak** = 62.2

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

**Test Date:** Mar-2018
**Hardware Availability:** Jul-2017
**Software Availability:** Feb-2018

---

### General Notes (Continued)

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystsem page cache synced and cleared with:

```bash
sync; echo 3 > /proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:

```bash
numactl --interleave=all runcpu <etc>
```

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:
DCU Streamer Prefetcher = Disabled
Override OS Energy Performance = Enabled
Energy Performance = Performance
Package C State limit = C0
LLC Dead Line Alloc = Disabled
Stale AtoS = Enabled
Sub NUMA Clustering = Disabled
IMC Interleaving = 2-way
Fan Control = Full

Sysinfo program /home/memory/speccpu/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-RX2540M4 Sat Mar 24 03:32:19 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From `/proc/cpuinfo`

```
model name : Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
 2 "physical id"s (chips)
16 "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
physical 1: cores 0 1 2 3 4 5 6 7
```

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

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Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1353.645
CPU max MHz: 1700.0000
CPU min MHz: 800.0000
BogoMIPS: 3392.02
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_cxtsw spec_ctrl retpoline
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2 ersed invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb
avx512cd avx512bw avx512vl xsavesopt xsavec xsaves avx512f16c avx512f128
avx2sm mcm ssse3 sse2 sse x87 mmx fxsr

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 191784 MB
node 0 free: 182448 MB

(Continued on next page)
Platform Notes (Continued)

node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 193383 MB
node 1 free: 192875 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 394412036 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
os-release:
  NAME="SLES"
  VERSION="12-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux linux-RX2540M4 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018
  (c6ce5db) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 23 18:04

SPEC is set to: /home/memory/speccpu
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 384G 8.9G 376G 3% /home/memory

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. V5.0.0.12 R1.17.0 for D3384-A1x

(Continued on next page)
Fujitsu
PRIMERGY RX2540 M4, Intel Xeon Bronze 3106, 1.70GHz

SPECrate2017_fp_base = 60.8
SPECrate2017_fp_peak = 62.2

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Mar-2018
Hardware Availability: Jul-2017
Software Availability: Feb-2018

Platform Notes (Continued)

02/08/2018
Memory:
  24x Samsung M393A2G40EB2-CTD 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
  CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
  icc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
  CXXC 508.namd_r(base) 510.parest_r(base)
  icpc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
  CC  519.lbm_r(peak) 544.nab_r(peak)
  icc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
  CXXC 508.namd_r(peak) 510.parest_r(peak)
  icpc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
  CC  511.povray_r(base) 526.blender_r(base)
  icc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
  icpc (ICC) 18.0.0 20170811
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
(Continued on next page)
Fujitsu
PRIMERGY RX2540 M4, Intel Xeon Bronze 3106, 1.70GHz

SPEC CPU2017 Floating Point Rate Result

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

TEST RESULTS

SPECrade2017_fp_base = 60.8
SPECrade2017_fp_peak = 62.2

 Compiler Version Notes (Continued)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.0 20170811
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

(Continued on next page)
## Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  

Base Compiler Invocation

<table>
<thead>
<tr>
<th>C benchmarks:</th>
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<tbody>
<tr>
<td>icc</td>
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<table>
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<th>C++ benchmarks:</th>
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<tbody>
<tr>
<td>icpc</td>
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<table>
<thead>
<tr>
<th>Fortran benchmarks:</th>
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<td>ifort</td>
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<table>
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<tr>
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<tr>
<td>ifort icc</td>
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### Base Portability Flags

503.bwaves_r: -DSPEC_LP64  
507.cactuBSSN_r: -DSPEC_LP64  
508.namd_r: -DSPEC_LP64  
510.parest_r: -DSPEC_LP64  
511.povray_r: -DSPEC_LP64  
519.lbm_r: -DSPEC_LP64  

(Continued on next page)
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**SPECrate2017_fp_base** = 60.8
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---

**CPU2017 License**: 19
**Test Sponsor**: Fujitsu
**Tested by**: Fujitsu

---

**Base Portability Flags (Continued)**

- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 538.imagick_r: -DSPEC_LP64
- 544.nab_r: -DSPEC_LP64
- 549.fotonik3d_r: -DSPEC_LP64
- 554.roms_r: -DSPEC_LP64

---

**Base Optimization Flags**

**C benchmarks**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**C++ benchmarks**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**Fortran benchmarks**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

**Benchmarks using both C and C++**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

**Benchmarks using Fortran, C, and C++**:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

---

**Base Other Flags**

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

**C++ benchmarks**:  
-m64

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(Continued on next page)
## Fujitsu

PRIMERGY RX2540 M4, Intel Xeon Bronze 3106, 1.70GHz

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### CPU2017 License: 19

**Test Sponsor:** Fujitsu  
**Tested by:** Fujitsu

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<td>Jul-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2018</td>
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</table>

### Base Other Flags (Continued)

Fortran benchmarks:
- `-m64`

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

Benchmarks using both C and C++:
- `-m64 -std=c11`

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

### Peak Compiler Invocation

#### C benchmarks:
- `icc`

#### C++ benchmarks:
- `icpc`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

Benchmarks using both C and C++:
- `icpc icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

(Continued on next page)
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Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Mar-2018
Hardware Availability: Jul-2017
Software Availability: Feb-2018

Peak Optimization Flags (Continued)

519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

C++ benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
-nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-align array32byte

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

(Continued on next page)
### Peak Optimization Flags (Continued)

507.cactuBSSN_r: basepeak = yes

### Peak Other Flags

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

- **C++ benchmarks:**
  - `-m64`

- **Fortran benchmarks:**
  - `-m64`

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

- **Benchmarks using both C and C++:**
  - `-m64 -std=c11`

- **Benchmarks using Fortran, C, and C++:**
  - `-m64 -std=c11`

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: