Fujitsu
PRIMERGY RX2540 M5, Intel Xeon Gold 6209U, 2.10 GHz

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

Test Date: Jun-2019
Hardware Availability: May-2019
Software Availability: Feb-2019

Copies

503.bwaves_r 40
507.caCTuBSSN_r 40
508.namd_r 40
510.parest_r 40
511.povray_r 40
519.lbm_r 40
521.wrf_r 40
526.blender_r 40
527.cam4_r 40
538.imagick_r 40
544.nab_r 40
549.fotonik3d_r 40
554.roms_r 40

SPECrate®2017_fp_base = 109
SPECrate®2017_fp_peak = Not Run

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554.roms_r:

Hardware
CPU Name: Intel Xeon Gold 6209U
Max MHz: 3900
Nominal: 2100
Enabled: 20 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 27.5 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x SATA M.2 SSD, 240 GB
Other: None

Software
OS: SUSE Linux Enterprise Server 15
Compiler: C/C++; Version 19.0.0.117 of Intel C/C++ Compiler for Linux;
Fortran: Version 19.0.0.117 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Fujitsu BIOS Version V5.0.0.14 R1.8.0 for D3384-B1x. Released Jun-2019
tested as V5.0.0.14 R1.2.0 for D3384-B1x Feb-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: --
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 109
SPECrate®2017_fp_peak = Not Run

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

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"
Kernel Boot Parameter set with : nohz_full=1-39
Process tuning settings:
echo 10000000 > /proc/sys/kernel/sched_min_granularity_ns

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-1.0.5/icc19-lib/intel64"

Binaries compiled on a system with 2x Intel Xeon E5-2667 v2 CPU + 64GB RAM memory using SUSE Linux Enterprise Server 12 SP2
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
runcpu command invoked through numactl i.e.:
SPEC CPU®2017 Floating Point Rate Result

Fujitsu
PRIMERGY RX2540 M5, Intel Xeon Gold 6209U, 2.10 GHz

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>19</th>
<th>Test Date:</th>
<th>Jun-2019</th>
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</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Fujitsu</td>
<td>Hardware Availability:</td>
<td>May-2019</td>
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<td>Software Availability:</td>
<td>Feb-2019</td>
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</tbody>
</table>

SPECraten®2017_fp_base = 109
SPECraten®2017_fp_peak = Not Run

General Notes (Continued)

numactl --interleave=all runcpu <etc>
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:
Patrol Scrub = Disabled
WR CRC feature Control = Disabled
Fan Control = Full
Sysinfo program /home/Benchmark/speccpu2017-1.0.5/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on RX2540M5 Mon Jun 3 19:27:37 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) Gold 6209U CPU @ 2.10GHz
  1 "physical id"s (chips)
  40 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6209U CPU @ 2.10GHz

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

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Hardware Availability: May-2019
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Platform Notes (Continued)

Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 3900.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-2,5,6,10-12,15,16,20-22,25,26,30-32,35,36
NUMA node1 CPU(s): 3,4,7-9,13,14,17-19,23,24,27-29,33,34,37-39
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflush 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 cpuid
aperfmpref 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 cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnni flexpriority
ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xsavec1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni
flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 28160 KB

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 5 6 10 11 12 15 16 20 21 22 25 26 30 31 32 35 36
  node 0 size: 191967 MB
  node 0 free: 191479 MB
  node 1 cpus: 3 4 7 8 9 13 14 17 18 19 23 24 27 28 29 33 34 37 38 39
  node 1 size: 193290 MB
  node 1 free: 192963 MB
  node distances:
    node  0  1
    0: 10 11
    1: 11 10

From /proc/meminfo
  MemTotal: 394504696 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

(Continued on next page)
Platform Notes (Continued)

From /etc/*release* /etc/*version*

```bash
os-release:
  NAME="SLES"
  VERSION="15"
  VERSION_ID="15"
  PRETTY_NAME="SUSE Linux Enterprise Server 15"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15"
```

```
uname -a:
Linux RX2540M5 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

```
runtime 3 Jun 3 19:26
```

SPEC is set to: /home/Benchmark/speccpu2017-1.0.5

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda5      xfs   191G   57G  134G  30% /home
```

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. V5.0.0.14 R1.2.0 for D3384-B1x
02/28/2019
```

```
Memory:
  12x NO DIMM NO DIMM
  12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934
```

(End of data from sysinfo program)

Compiler Version Notes

```
==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 19.0.0.117 20180804
```

(Continued on next page)
<table>
<thead>
<tr>
<th>Compiler</th>
<th>Version</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++</td>
<td>508.namd_r(base) 510.parest_r(base)</td>
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</tbody>
</table>

| C++, C | 511.povray_r(base) 526.blender_r(base) |
| icpc (ICC) 19.0.0.117 20180804 |
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| icc (ICC) 19.0.0.117 20180804 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

| C++, C, Fortran | 507.cactuBSSN_r(base) |
| icpc (ICC) 19.0.0.117 20180804 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |
| icc (ICC) 19.0.0.117 20180804 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |
| ifort (IFORT) 19.0.0.117 20180804 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

| Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base) |
| ifort (IFORT) 19.0.0.117 20180804 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

| Fortran, C | 521.wrf_r(base) 527.cam4_r(base) |
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| icc (ICC) 19.0.0.117 20180804 |
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## Base Compiler Invocation

C benchmarks:
```bash
c -m64 -std=cl1
```

C++ benchmarks:
```bash
icpc -m64
```

Fortran benchmarks:
```bash
ifort -m64
```

Benchmarks using both Fortran and C:
```bash
ifort -m64 icc -m64 -std=cl1
```

Benchmarks using both C and C++:
```bash
icpc -m64 icc -m64 -std=cl1
```

Benchmarks using Fortran, C, and C++:
```bash
icpc -m64 icc -m64 -std=cl1 ifort -m64
```

## Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
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<td>519.lbm_r</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>521.wrf_r</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
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<td>526.blender_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX -funsigned-char</td>
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</table>

## Base Optimization Flags

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

C++ benchmarks:
```bash
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
```

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

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### Base Optimization Flags (Continued)

C++ benchmarks (continued):
- `-qopt-mem-layout-trans=3`

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

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 -auto -nostandard-realloc-lhs`

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:

---

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