Tyrone Systems
(Test Sponsor: Netweb)
Tyrone Camarero QS400TU-224R4
(2.30 GHz, Intel Xeon Gold 6140)

CPU2017 License: 6011
Test Sponsor: Netweb
Tested by: Netweb

SPECrater2017_fp_base = 375
SPECrater2017_fp_peak = 380

| Test Date: | Jun-2019 |
| Hardware Availability: | Nov-2018 |
| Software Availability: | Dec-2018 |

**Hardware**

- CPU Name: Intel Xeon Gold 6140
- Max MHz: 3700
- Nominal: 2300
- Enabled: 72 cores, 4 chips, 2 threads/core
- Orderable: 2, 4 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: 24.75 MB I+D on chip per chip
- Other: None
- Memory: 768 GB (32 x 24 GB 2Rx8 PC4-2666P-R)
- Storage: 3 x 480GB SSD
- Other: None

**Software**

- OS: CentOS Linux Release 7.6.1810 (Core)
- Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
- Compiler Build 20181018 for Linux;
- Fortran: Version 19.0.1.144 of Intel Fortran
- Compiler Build 20181018 for Linux
- Parallel: No
- Firmware: Version 2.1 released Jul-2018
- File System: xfs
- System State: Run level 5 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: None
- Power Management: --
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SPEC CPU®2017 Floating Point Rate Result

SPECrate®2017_fp_base = 375
SPECrate®2017_fp_peak = 380

Results Table

<table>
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<td>277</td>
<td>2031</td>
<td>276</td>
<td>2032</td>
<td>276</td>
<td>2032</td>
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<td>554.roms_r</td>
<td>144</td>
<td>1390</td>
<td>165</td>
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<td>164</td>
<td>1394</td>
<td>164</td>
<td>1394</td>
<td>164</td>
</tr>
</tbody>
</table>

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

Compiler Notes

SPEC has learned that this result, which used an evaluation compiler, was submitted contrary to the compiler license terms.
Intel has granted a one-time waiver for this result.

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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/user/cpu2017/lib/ia32:/home/user/cpu2017/lib/intel64"
Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
Transparent Huge Pages enabled by default
Prior to runcpu invocation

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

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SPECrate®2017_fp_peak = 380

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Tested by: Netweb

General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
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

Sysinfo program /home/user/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on localhost.localdomain Sun Jun 2 14:52:08 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 6140 CPU @ 2.30GHz
        4 "physical id"s (chips)
        144 "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 : 18
        siblings : 36
          physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
          physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
          physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
          physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6

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

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</tbody>
</table>

**CPU2017 License:** 6011  
**Test Sponsor:** Netweb  
**Tested by:** Netweb

**Platform Notes (Continued)**

- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz  
- **Stepping:** 4  
- **CPU MHz:** 1000.000  
- **CPU max MHz:** 2301.0000  
- **CPU min MHz:** 1000.0000  
- **BogomIPS:** 4600.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 25344K  
- **NUMA node0 CPU(s):** 0-17,72-89  
- **NUMA node1 CPU(s):** 18-35,90-107  
- **NUMA node2 CPU(s):** 36-53,108-125  
- **NUMA node3 CPU(s):** 54-71,126-143

**Flags:** fpu vme de pse tsc msr pae 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 dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch ebpx cat_13 cdpl_13 intel_pinn intel_pt ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

**/proc/cpuinfo cache data**

```
cache size : 25344 KB
```

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

<table>
<thead>
<tr>
<th>Available</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>nodes (0-3)</td>
<td>11</td>
</tr>
</tbody>
</table>

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89
node 0 size: 195242 MB
node 0 free: 81765 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89
node 1 size: 195242 MB
node 1 free: 81765 MB
node 2 cpus: 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
node 2 size: 195242 MB
node 2 free: 81765 MB
node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89
node 3 size: 195242 MB
node 3 free: 81765 MB

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Platform Notes (Continued)

131 132 133 134 135 136 137 138 139 140 141 142 143
node 3 size: 196608 MB
node 3 free: 166190 MB
node distances:
node   0   1   2   3
 0:   10  21  21  21
 1:   21  10  21  21
 2:   21  21  10  21
 3:   21  21  21  10

From /proc/meminfo
  MemTotal:       791194380 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  centos-release: CentOS Linux release 7.6.1810 (Core)
  centos-release-upstream: Derived from Red Hat Enterprise Linux 7.6 (Source)
  os-release:
    NAME="CentOS Linux"
    VERSION="7 (Core)"
    ID="centos"
    ID_LIKE="rhel fedora"
    VERSION_ID="7"
    PRETTY_NAME="CentOS Linux 7 (Core)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:centos:centos:7"
  redhat-release: CentOS Linux release 7.6.1810 (Core)
  system-release: CentOS Linux release 7.6.1810 (Core)
  system-release-cpe: cpe:/o:centos:centos:7

uname -a:
  Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Nov 8 23:39:32 UTC 2018
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
  CVE-2017-5754 (Meltdown): No status reported
  CVE-2017-5753 (Spectre variant 1): No status reported
  CVE-2017-5715 (Spectre variant 2): No status reported

run-level 5 Jun 1 05:54

SPEC is set to: /home/user/cpu2017
  Filesystem Type  Size  Used Avail Use% Mounted on
  /dev/mapper/centos-home xfs 877G 96G 781G  11% /home

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

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<td>Test Sponsor: Netweb</td>
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</tbody>
</table>

**SPECRate®2017_fp_base = 375**

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### Platform Notes (Continued)

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.

(End of data from sysinfo program)

### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
</tr>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018 Copyright (C) 1985–2018 Intel Corporation. All rights reserved. icc: NOTE: The evaluation period for this product ends on 28-jun-2019 UTC.</td>
<td></td>
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<table>
<thead>
<tr>
<th>C++</th>
<th>508.namd_r(base, peak) 510.parest_r(base, peak)</th>
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<th>507.cactuBSSN_r(base, peak)</th>
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Compiler Version Notes (Continued)
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icc: NOTE: The evaluation period for this product ends on 28-jun-2019 UTC.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 28-jun-2019 UTC.
------------------------------------------------------------------------------
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
  | 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 28-jun-2019 UTC.
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Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 28-jun-2019 UTC.
------------------------------------------------------------------------------
Base Compiler Invocation
C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

(Continued on next page)
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Test Date: Jun-2019
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### Base Compiler Invocation (Continued)

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

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

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

### 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
521.wrf_r -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r -DSPEC_LP64 -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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4
```

C++ benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4
```

Fortran benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

(Continued on next page)
Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

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

519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

538.imagick_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

510.parest_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:

503.bwaves_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-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-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4
SPEC CPU®2017 Floating Point Rate Result

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Tyrone Systems
(Test Sponsor: Netweb)
Tyrone Camarero QS400TU-224R4
(2.30 GHz, Intel Xeon Gold 6140)

SPECrate®2017_fp_base = 375
SPECrate®2017_fp_peak = 380

CPU2017 License: 6011
Test Sponsor: Netweb
Tested by: Netweb

Peak Optimization Flags (Continued)

526.blender_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

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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