Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-55R/55RL
(2.20 GHz, Intel Xeon Gold 5220)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 189</th>
<th>SPECrate®2017_fp_peak = 191</th>
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<tr>
<td>503.bwaves_r</td>
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<td>507.cactuBSSN_r</td>
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<td>508.namd_r</td>
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<td>510.parest_r</td>
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<td>519.lbm_r</td>
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<td>554.roms_r</td>
<td>72</td>
<td>86.2</td>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 5220
- **Max MHz:** 3900
- **Nominal:** 2200
- **Enabled:** 36 cores, 2 chips, 2 threads/core
- **Orderable:** 1, 2 (chip)s
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 24.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2667)
- **Storage:** 1 x 480 GB SSD
- **Other:** None

**Software**

- **OS:** CentOS Linux release 7.7.1908 (Core)
- **Compiler:** C/C++: Version 19.0.4.243 of Intel C/C++ Compiler Build 20190416 for Linux;
  Fortran: Version 19.0.4.243 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** No
- **Firmware:** Version V8.101 released Aug-2019
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** Default
SPEC CPU®2017 Floating Point Rate Result

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(2.20 GHz, Intel Xeon Gold 5220)

SPECrate®2017_fp_base = 189
SPECrate®2017_fp_peak = 191

Results Table

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</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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"
## SPEC CPU®2017 Floating Point Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-55R/55RL  
(2.20 GHz, Intel Xeon Gold 5220)

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<tr>
<td>189</td>
<td>191</td>
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**CPU2017 License:** 006042  
**Test Date:** Feb-2020  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Netweb  
**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019

---

### General Notes

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  
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>

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

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7ed6b1e6e46a485a0011  
running on NODE5 Sat Feb 15 21:03:54 2020

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 5220 CPU @ 2.20GHz  
- 2 "physical id"s (chips)  
- 72 "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

From lscpu:  
- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 72  
- On-line CPU(s) list: 0-71  
- Thread(s) per core: 2  
- Core(s) per socket: 18  
- Socket(s): 2

(Continued on next page)
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Platform Notes (Continued)

NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
Stepping: 7
CPU MHz: 999.963
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,36-53
NUMA nodel CPU(s): 18-35,54-71

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 aperffperf 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 ebpx cat_13 cdp_13 intel_pmap intel_pt ssbd mba ibrs ibp ibsp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3msrs invvpicid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqmm l1c cqmm_occup llc cqmm_mmb_total cqmm_mmb_local dtherm ida arat pln pts hwp hwp_act_window hwp-epq hwp-pkg-req pklu ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_lld arch_capabilities

/proc/cpuinfo cache data
   cache size: 25344 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 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
      node 0 size: 195228 MB
      node 0 free: 179978 MB
      node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
      node 1 size: 196608 MB
      node 1 free: 176234 MB
      node distances:
         node 0: 1
         node 0: 10 21

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
MemTotal: 394670412 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
centos-release: CentOS Linux release 7.7.1908 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.7 (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 7.7.1908 (Core)
system-release: CentOS Linux release 7.7.1908 (Core)
system-release-cpe: cpe:/o:centos:centos:7

uname -a:
 Linux NODE5 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
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: Full retpoline, IBPB

run-level 3 Feb 15 11:00

SPEC is set to: /home/cpu2017
 Filesystem Type Size Used Avail Use% Mounted on
 /dev/mapper/centos-home xfs 392G 144G 249G 37% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. V8.101 08/02/2019
Vendor: Tyrone Systems

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

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CPU2017 License: 006042
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Tested by: Netweb

Test Date: Feb-2020
Hardware Availability: Sep-2019
Software Availability: Aug-2019

Platform Notes (Continued)

Product: DIT400TR-55R
Serial: empty

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:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
|                 | 544.nab_r(base, peak)
---
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
---

==============================================================================
| C++              | 508.namd_r(base, peak) 510.parest_r(base, peak)
---
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
---

==============================================================================
| C++, C           | 511.povray_r(base, peak) 526.blender_r(base, peak)
---
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
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Test Date: Feb-2020
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Hardware Availability: Sep-2019
Software Availability: Aug-2019

Compiler Version Notes (Continued)

C++, C, Fortran | 507.cactuBSSN_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 2-nov-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)
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ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

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)
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
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CPU2017 License: 006042
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Tested by: Netweb

Base Compiler Invocation (Continued)

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

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_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 -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=4

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

(Continued on next page)
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Hardware Availability: Sep-2019
Software Availability: Aug-2019

Base Optimization Flags (Continued)

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
-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
## SPEC CPU®2017 Floating Point Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-55R/55RL  
(2.20 GHz,Intel Xeon Gold 5220)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
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<tr>
<td>SPECrate®2017_fp_peak</td>
<td>191</td>
</tr>
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**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Netweb  
**Test Date:** Feb-2020  
**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019

### 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`
**SPEC CPU®2017 Floating Point Rate Result**

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**Peak Optimization Flags (Continued)**

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

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:

http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX-revA.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX-revA.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 2020-02-15 10:33:53-0500.  
Originally published on 2020-03-17.