## SPEC CPU®2017 Floating Point Rate Result

### Tyrone Systems

- **CPU2017 License:** 006042
- **Test Sponsor:** Netweb Pte Ltd
- **Tested by:** Netweb
- **Hardware Availability:** Sep-2019
- **Software Availability:** Aug-2019
- **Test Sponsor:** Netweb
- **Test Date:** Oct-2019

### Software

- **OS:** CentOS Linux release 7.7.1908 (Core) 3.10.0-1062.el7.x86_64
- **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
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Power Management:** None

### Hardware

- **CPU Name:** Intel Xeon Silver 4216
- **Max MHz:** 3200
- **Nominal:** 2100
- **Enabled:** 32 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:** 22 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933P-R, running at 2400)
- **Storage:** 1 x 1 TB SATA
- **Other:** None

### SPEC CPU®2017 Floating Point Rate

- **SPECrate®2017_fp_base = 164**
- **SPECrate®2017_fp_peak = 167**

### SPEC Copy Results

<table>
<thead>
<tr>
<th>Application</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>64</td>
<td>130</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>510.parest_r</td>
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<td>511.povray_r</td>
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<td>527.cam4_r</td>
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<td>544.nab_r</td>
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<tr>
<td>554.roms_r</td>
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</table>

---

**Note:** All measurements are rounded to the nearest integer.
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-28RL
(2.10 GHz, Intel Xeon Silver 4216)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-28RL
(2.10 GHz, Intel Xeon Silver 4216)

SPECrate®2017_fp_base = 164
SPECrate®2017_fp_peak = 167

Results Table

<table>
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</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"

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-28RL
(2.10 GHz, Intel Xeon Silver 4216)

SPECrate®2017_fp_base = 164
SPECrate®2017_fp_peak = 167

CPU2017 License: 006042
Test Date: Oct-2019
Test Sponsor: Netweb Pte Ltd
Hardware Availability: Sep-2019
Tested by: Netweb
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
Files system 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 295195f888a3d7edb1e6e46a485a0011
running on NODE7 Wed Oct 9 10:18:06 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) Silver 4216 CPU @ 2.10GHz
    2 "physical id"s (chips)
    64 "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 : 16
    siblings : 32
    physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 64
    On-line CPU(s) list: 0-63
    Thread(s) per core: 2
    Core(s) per socket: 16
    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) Silver 4216 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 799.932
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15,32-47
NUMA node1 CPU(s): 16-31,48-63

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 vmitm vsx f16c rdrnd ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 1rmv pdcm cmx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xsaveopt xgetbv1 cqm_1qc cqm_1qcp cqm_1qc cp hepat dtherm ida arat pln pts hwp hwpact_window hwp epp hwp_pkg_req pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_lld arch_capabilities

From numacli --hardware WARNING: a numacli '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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 0 size: 195229 MB
node 0 free: 154069 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 1 size: 196608 MB
node 1 free: 173492 MB
node distances:
node 0 1
0: 10 21

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Tested by: Netweb

Platform Notes (Continued)

1:  21  10

From /proc/meminfo
MemTotal: 394860588 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)
oss-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 NODE7 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 Oct 8 13:02

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/centos-home xfs 849G 85G 764G 11% /home

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

(Continued on next page)
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Platform Notes (Continued)

Product: TP12XH-L2I
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.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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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
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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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icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
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)
==============================================================================
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, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
==============================================================================
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.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
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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 -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

(Continued on next page)
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Test Date: Oct-2019
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-28RL
(2.10 GHz, Intel Xeon Silver 4216)

SPECrate®2017_fp_base = 164
SPECrate®2017_fp_peak = 167

CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Netweb

Test Date: Oct-2019
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

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

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-28RL  
(2.10 GHz, Intel Xeon Silver 4216)  

| SPECrate®2017_fp_base = 164 |
| SPECrate®2017_fp_peak = 167 |

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Netweb

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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

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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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Tested with SPEC CPU®2017 v1.1.0 on 2019-10-09 00:48:05-0400.  