Tyrone Systems
(Test Sponsor: Netweb)
DIT400TR-28RL
(2.20 GHz, Intel Xeon Silver 4210)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 117
SPECrate®2017_fp_peak = 118

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

Hardware
CPU Name: Intel Xeon Silver 4210
Max MHz: 3200
Nominal: 2200
Enabled: 20 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: 13.75 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 480 GB SSD
Other: None

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
Other: None
Power Management: None
## Tyrone Systems

**Test Sponsor:** Netweb  
**DIT400TR-28RL**  
**(2.20 GHz, Intel Xeon Silver 4210)**

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

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### Results Table

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</table>

**SPECrate**\textsuperscript{\textregistered}2017\_fp\_base = 117  
**SPECrate**\textsuperscript{\textregistered}2017\_fp\_peak = 118

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### 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"
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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 295195f888a3d7edb1e6e46a485a0011
running on NODE2 Tue Oct 8 20:02:48 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 4210 CPU @ 2.20GHz
  2 "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 : 10
    siblings : 20
    physical 0: cores 0 1 2 3 4 8 9 10 11 12
    physical 1: cores 0 1 2 3 4 8 9 10 11 12

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: 10
Socket(s): 2

(Continued on next page)
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**SPECrater®2017_fp_base = 117**  
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**Platform Notes (Continued)**

```plaintext
NUMA node(s):          2  
Vendor ID:             GenuineIntel  
CPU family:            6  
Model:                 85  
Model name:            Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz  
Stepping:              7  
CPU MHz:               999.963  
CPU max MHz:           3200.0000  
CPU min MHz:           1000.0000  
BogoMIPS:              4400.00  
Virtualization:        VT-x  
L1d cache:             32K  
L1i cache:             32K  
L2 cache:              1024K  
L3 cache:              14080K  
NUMA node0 CPU(s):     0-9,20-29  
NUMA node1 CPU(s):     10-19,30-39  
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 ebgoogle cat_13 cdp_l3 intel_ppln intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpd fsgsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xsaveopt xgetbv1 cqm_l1c cqm_occuser_l1c cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
node 0 size: 195229 MB
node 0 free: 177309 MB

node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 196608 MB
node 1 free: 182251 MB

distance:

0: 10 21
1: 21 10

(Continued on next page)
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Platform Notes (Continued)

From /proc/meminfo
MemTotal:       394864496 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 NODE2 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 10:00

SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. V8.101 08/02/2019
Vendor: Tyrone Systems
Product: TP12XH-L2I
Serial: empty

(Continued on next page)
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.

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

(End of data from sysinfo program)

Compiler Version Notes

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<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
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<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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<td>icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.</td>
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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,  
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.  
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.

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**Fortran**  
| 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak) |

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**Base Compiler Invocation**

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

C++ benchmarks:  
`icpc -m64`

(Continued on next page)
Base Compiler Invocation (Continued)

Fortran benchmarks:

```bash
ifort -m64
```

Benchmarks using both Fortran and C:

```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:

```bash
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```bash
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
```

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
```

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Base Optimization Flags (Continued)

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

Peak Portability Flags

Same as Base Portability Flags
# Peak Optimization Flags

## C benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>519.lbm_r</td>
<td>-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</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>-ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>Same as 538.imagick_r</td>
</tr>
</tbody>
</table>

## C++ benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>508.namd_r</td>
<td>-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</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>-ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4</td>
</tr>
</tbody>
</table>

## Fortran benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>-ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>Same as 503.bwaves_r</td>
</tr>
</tbody>
</table>

## Benchmarks using both Fortran and C:

<table>
<thead>
<tr>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>-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</td>
</tr>
</tbody>
</table>

## Benchmarks using both C and C++:

<table>
<thead>
<tr>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>-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</td>
</tr>
</tbody>
</table>
SPEC CPU®2017 Floating Point Rate Result

Tyrone Systems
(Test Sponsor: Netweb)
DIT400TR-28RL
(2.20 GHz, Intel Xeon Silver 4210)

SPECrate®2017_fp_base = 117
SPECrate®2017_fp_peak = 118

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

Test Date: Oct-2019
Hardware Availability: Sep-2019
Software Availability: Aug-2019

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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.