Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero DS400TOG-424RT2
(2.40 GHz, Intel Xeon Gold 6240R)

| SPECrate®2017_int_base = 326 |
|-------------------------------|------------------|
| SPECrate®2017_int_peak = 338  |

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 6240R</td>
<td>OS: CentOS Linux release 8.2.2004 (Core)</td>
</tr>
<tr>
<td>Max MHz: 4000</td>
<td>Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux:</td>
</tr>
<tr>
<td>Nominal: 2400</td>
<td>Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux</td>
</tr>
<tr>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>Orderable: 1.2 (chip)s</td>
<td>Firmware: Version 3.3 released Feb-2020</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L3: 35.75 MB I+D on chip per chip</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Storage: 1 x 480 GB SATA SSD</td>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
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<th>Seconds</th>
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<th>Seconds</th>
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<tr>
<td>500.perlbench_r</td>
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<td>693</td>
<td>220</td>
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<td>578</td>
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<td>286</td>
<td>474</td>
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<td>473</td>
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<tr>
<td>505.mcf_r</td>
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<td>284</td>
<td>546</td>
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<td>283</td>
<td>548</td>
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<tr>
<td>520.omnetpp_r</td>
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<tr>
<td>523.xalancbmk_r</td>
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<tr>
<td>525.x264_r</td>
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<td>716</td>
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<tr>
<td>531.deepsjeng_r</td>
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<tr>
<td>541.leela_r</td>
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<tr>
<td>548.exchange2_r</td>
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<td>557.xz_r</td>
<td>96</td>
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<td>526</td>
<td>197</td>
</tr>
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**SPECrate®2017_int_base** = 326

**SPECrate®2017_int_peak** = 338

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

## Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.

The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

## 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/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
MALLOCCONF = "retain:true"
```
**General Notes**

Binaries compiled on a system with 2x Intel Cascade Lake CPU 4214R + 384 GB RAM memory using Centos 8.2 x86_64

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.

jemalloc, a general purpose malloc implementation built with the Centos 8.2 x86_64, and the system compiler gcc 4.8.5 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

**Platform Notes**

BIOS Settings:

Power Technology = Custom

Power Performance Tuning = BIOS Controls EPB

ENERGY_PERF_BIAS_CFG mode = Maximum Performance

SNC = Enable

Stale AtoS = Disable

IMC Interleaving = 1-way Interleave

Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c

running on localhost.localdomain Fri Feb 12 10:24:22 2021

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 6240R CPU @ 2.40GHz
  2 "physical id"s (chips)
  96 "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 : 24
 siblings : 48
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
```
**SPEC CPU®2017 Integer Rate Result**

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DS400TOG-424RT2  
(2.40 GHz, Intel Xeon Gold 6240R)

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</tr>
</tbody>
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**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Tyrone Systems  
**Test Date:** Feb-2021  
**Hardware Availability:** Aug-2020  
**Software Availability:** Jun-2020

---

**Platform Notes (Continued)**

From `lscpu`:

- **Architecture:** x86_64  
- **CPU op-mode(s):** 32-bit, 64-bit  
- **Byte Order:** Little Endian  
- **CPU(s):** 96  
- **On-line CPU(s) list:** 0-95  
- **Thread(s) per core:** 2  
- **Core(s) per socket:** 24  
- **Socket(s):** 2  
- **NUMA node(s):** 4  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6240R CPU @ 2.40GHz  
- **Stepping:** 7  
- **CPU MHz:** 2954.767  
- **CPU max MHz:** 4000.000  
- **CPU min MHz:** 1000.000  
- **BogoMIPS:** 4800.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 36608K  

 NUMA node0 CPU(s): 0-3, 7-9, 13-15, 19, 20, 24-31, 33-35, 39-41, 45-47, 49-51, 55-57, 61-63, 67, 68  
 NUMA node1 CPU(s): 4-6, 10-12, 16-18, 21-23, 52-54, 58-60, 64-66, 69-71  

**Flags:**

- fpu  
- vme  
- de  
- pse  
- tsc  
- msr  
- pae  
- mce  
- cx8  
- aperfmperf  
- mpx  
- mpxr  
- stibp  
- ibs  
- ibs-enhanced  
- tpr_shadow  
- vni  
- flexpriority  
- vpid  
- fsbgbase  
- tsc_adjust  
- bmi1  
- hle  
- avx2  
- smep  
- bmi2  
- invpcid  
- rdtscp  
- smap  
- cld  
- cldtrm  
- ida  
- arat  
- ida  
- arat  
- pt  
- pku  
- ospke  
- avx512_vnni  
- md_clear  
- flush_l1d  
- arch_capabilities

/proc/cpuinfo cache data

- cache size: 36608 KB

---

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a...
Tyrone Camarero DS400TOG-424RT2
(2.40 GHz, Intel Xeon Gold 6240R)

SPECrate®2017_int_base = 326
SPECrate®2017_int_peak = 338

CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Test Date: Feb-2021
Tested by: Tyrone Systems
Hardware Availability: Aug-2020
Software Availability: Jun-2020

Platform Notes (Continued)

physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0 1 2 3 7 8 9 13 14 15 19 20 48 49 50 51 55 56 57 61 62 63 67 68
   node 0 size: 95352 MB
   node 0 free: 94940 MB
   node 1 cpus: 4 5 6 10 11 12 16 17 18 22 23 52 53 54 58 59 60 64 65 66 69 70 71
   node 1 size: 96762 MB
   node 1 free: 96572 MB
   node 2 cpus: 24 25 26 27 31 32 36 37 38 42 43 44 72 73 74 75 79 80 84 85 86 90 91 92
   node 2 size: 96762 MB
   node 2 free: 95785 MB
   node 3 cpus: 28 29 30 33 34 35 39 40 41 45 46 47 76 77 78 81 82 83 87 88 89 93 94 95
   node 3 size: 96541 MB
   node 3 free: 96541 MB
   node distances:
   node 0 1 2 3
   0: 10 11 21 21
   1: 11 10 21 21
   2: 21 21 10 11
   3: 21 21 11 10

From /proc/meminfo
MemTotal: 394866976 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sbin/tuned-adm active
   Current active profile: throughput-performance
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
   performance

From /etc/*release* /etc/*version*
   centos-release: CentOS Linux release 8.2.2004 (Core)
   centos-release-upstream: Derived from Red Hat Enterprise Linux 8.2 (Source)
   os-release:
      NAME="CentOS Linux"
      VERSION="8 (Core)"
      ID="centos"
      ID_LIKE="rhel fedora"
      VERSION_ID="8"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="CentOS Linux 8 (Core)"
      ANSI_COLOR="0;31"
   redhat-release: CentOS Linux release 8.2.2004 (Core)
   system-release: CentOS Linux release 8.2.2004 (Core)
   system-release-cpe: cpe:/o:centos:centos:8

(Continued on next page)
Platform Notes (Continued)

uname -a:
    Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri May 8 10:59:10 UTC 2020
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
KVM: Vulnerable
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: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):
No status reported
CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Feb 12 10:22

SPEC is set to: /home/cpu2017
    Filesystem    Type  Size  Used Avail Use% Mounted on
    /dev/mapper/cl-home xfs   392G  146G  247G  38% /home

From /sys/devices/virtual/dmi/id
Vendor:   Tyrone Systems
Product:  Tyrone Camarero DS400TOG-424RT2
Product Family: SMC X11
Serial:   A309085X0907231

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

BIOS:
    BIOS Vendor: American Megatrends Inc.
    BIOS Version: 3.3
    BIOS Date: 02/21/2020
SPEC CPU®2017 Integer Rate Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
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Test Date: Feb-2021
Hardware Availability: Aug-2020
Software Availability: Jun-2020

Platform Notes (Continued)

BIOS Revision: 5.14

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 502.gcc_r(peak)
-----------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen
Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
 | 525.x264_r(base, peak) 557.xz_r(base)
-----------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C | 500.perlbench_r(peak) 557.xz_r(peak)
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(Continued on next page)
**Compiler Version Notes (Continued)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Benchmark(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>500.perlbench_r(peak) 557.xz_r(peak)</td>
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|          | Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
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| C        | 502gcc_r(peak)                       |
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|          | Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304  
|          | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| C        | 500.perlbench_r(peak) 557.xz_r(peak) |
|          | Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
|          | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak) |
|          | Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304  
|          | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| Fortran  | 548.exchange2_r(base, peak)          |

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

Copyright 2017-2021 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -mnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -mnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries

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

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### Base Optimization Flags (Continued)

C++ benchmarks (continued):
- `-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse`  
- `-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4`  
- `lqkmalloc`

Fortran benchmarks:
- `-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`  
- `-xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte -auto`  
- `-mbranches-within-32B-boundaries`  
- `lqkmalloc`

### Peak Compiler Invocation

C benchmarks:  
`icc`

C++ benchmarks:  
`icpc`

Fortran benchmarks:  
`ifort`

### Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64  
502.gcc_r: -D_FILE_OFFSET_BITS=64  
505.mcf_r: -DSPEC_LP64  
520.omnetpp_r: -DSPEC_LP64  
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX  
525.x264_r: -DSPEC_LP64  
531.deepsjeng_r: -DSPEC_LP64  
541.leela_r: -DSPEC_LP64  
548.exchange2_r: -DSPEC_LP64  
557.xz_r: -DSPEC_LP64
Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin
-std=gnu89
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4 -L/usr/local/je5.0.1-32/lib
-ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leelu_r: basepeak = yes

Fortran benchmarks:

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero DS400TOG-424RT2
(2.40 GHz, Intel Xeon Gold 6240R)

SPECrate®2017_int_base = 326
SPECrate®2017_int_peak = 338

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Peak Optimization Flags (Continued)

548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.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 v1.1.5 on 2021-02-11 23:54:21-0500.
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