# SPEC CPU®2017 Integer Speed Result



## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

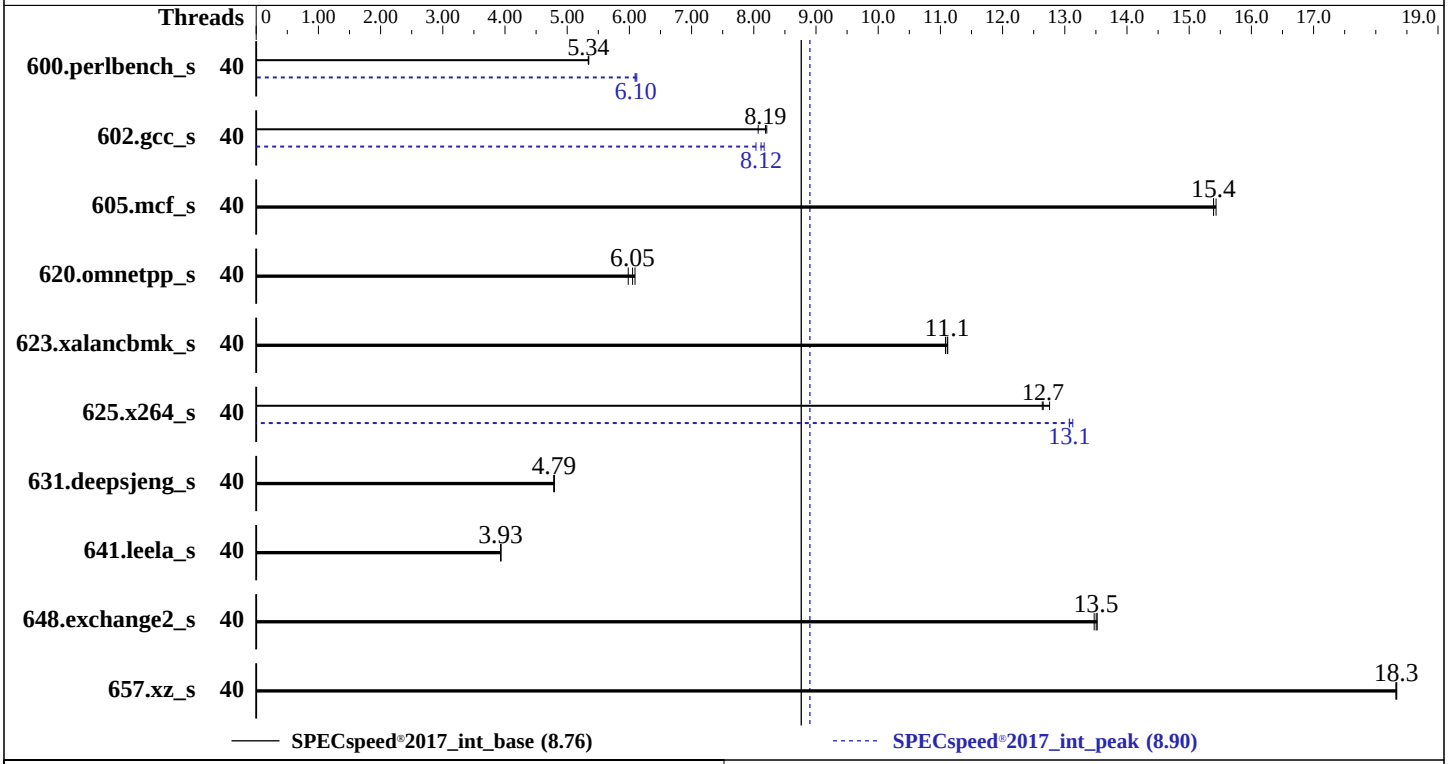
Tyrone Camarero DS400TN-55R
(2.20 GHz,Intel Xeon Silver 4210)

SPECspeed®2017_int_base = 8.76

SPECspeed®2017_int_peak = 8.90

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

**Test Date:** Feb-2021
**Hardware Availability:** Aug-2020
**Software Availability:** Dec-2020




## 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 PC4-2933Y-R, running at 2400) |
| Storage: | 1 x 480 GB SATA SSD |
| Other: | None |

## Software

| | |
|---|---|
| OS: | CentOS Linux release 8.3.2011<br>Kernel 4.18.0-240.el8.x86_64<br>4.18.0-240.el8.x86_64 |
| Compiler: | C/C++: Version 19.1.2.254 of Intel C/C++ Compiler for Linux Build 20200623;<br>Fortran: Version 19.1.2.254 of Intel Fortran Compiler for Linux Build 20200623; |
| Parallel: | Yes |
| Firmware: | Version 3.4 released Nov-2020 |
| File System: | xfs |
| System State: | Run level 3 (multi user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | jemalloc memory allocator V5.0.1 |
| Power Management: | BIOS set to prefer performance at the cost of additional power usage. |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 600.perlbench_s | 40 | 333 | 5.34 | 332 | 5.35 | **332** | **5.34** | 40 | 290 | 6.12 | **291** | **6.10** | 291 | 6.09 |
| 602.gcc_s | 40 | 493 | 8.07 | 485 | 8.21 | **486** | **8.19** | 40 | **491** | **8.12** | 488 | 8.17 | 496 | 8.03 |
| 605.mcf_s | 40 | 307 | 15.4 | **307** | **15.4** | 306 | 15.4 | 40 | 307 | 15.4 | **307** | **15.4** | 306 | 15.4 |
| 620.omnetpp_s | 40 | 268 | 6.09 | 273 | 5.98 | **270** | **6.05** | 40 | 268 | 6.09 | 273 | 5.98 | **270** | **6.05** |
| 623.xalancbmk_s | 40 | **128** | **11.1** | 127 | 11.1 | 128 | 11.1 | 40 | **128** | **11.1** | 127 | 11.1 | 128 | 11.1 |
| 625.x264_s | 40 | **139** | **12.7** | 138 | 12.8 | 140 | 12.6 | 40 | 134 | 13.1 | **135** | **13.1** | 135 | 13.1 |
| 631.deepsjeng_s | 40 | **299** | **4.79** | 299 | 4.79 | 299 | 4.79 | 40 | **299** | **4.79** | 299 | 4.79 | 299 | 4.79 |
| 641.leela_s | 40 | **434** | **3.93** | 434 | 3.94 | 434 | 3.93 | 40 | **434** | **3.93** | 434 | 3.94 | 434 | 3.93 |
| 648.exchange2_s | 40 | **218** | **13.5** | 217 | 13.5 | 218 | 13.5 | 40 | **218** | **13.5** | 217 | 13.5 | 218 | 13.5 |
| 657.xz_s | 40 | 337 | 18.3 | 337 | 18.3 | **337** | **18.3** | 40 | 337 | 18.3 | 337 | 18.3 | **337** | **18.3** |

**SPECspeed®2017_int_base = 8.76**

**SPECspeed®2017_int_peak = 8.90**

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 19.1.2.254 Build 20200623 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.2.254 Build 20200623 Compiler for Linux
```

## 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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

## General Notes

```
Binaries compiled on a system with 2x Intel Cascade Lake 4214R CPU + 384 GB RAM
memory using Centos 8.2 x84_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
```

**(Continued on next page)**

## General Notes (Continued)

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 RedHat Enterprise 7.5, 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 Sat Feb 27 00:01:01 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) 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
```

**(Continued on next page)**

## Platform Notes (Continued)

```
      Thread(s) per core:  2
      Core(s) per socket:  10
      Socket(s):           2
      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:             1531.428
      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 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 cpuid
      aperfmperf 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 cpuid_fault epb cat_l3 cdp_l3
      invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
      flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms
      invpcid cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt
      avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
      cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear
      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: 185188 MB
    node 0 free: 166950 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: 186668 MB
    node 1 free: 179637 MB
    node distances:
    node   0   1
```

**(Continued on next page)**

## Platform Notes (Continued)

```
     0:  10  21
     1:  21  10

From /proc/meminfo
   MemTotal:       394870792 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 8.3.2011
   centos-release-upstream: Derived from Red Hat Enterprise Linux 8.3
   os-release:
      NAME="CentOS Linux"
      VERSION="8"
      ID="centos"
      ID_LIKE="rhel fedora"
      VERSION_ID="8"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="CentOS Linux 8"
      ANSI_COLOR="0;31"
   redhat-release: CentOS Linux release 8.3.2011
   system-release: CentOS Linux release 8.3.2011
   system-release-cpe: cpe:/o:centos:centos:8

uname -a:
   Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Fri Sep 25 19:48:47 UTC 2020
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                    KVM: Mitigation: Split huge pages
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:
```

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## Platform Notes (Continued)

```
                                                  conditional, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):               Mitigation: TSX disabled

 run-level 3 Feb 25 02:33

 SPEC is set to: /home/cpu2017
    Filesystem          Type  Size  Used Avail Use% Mounted on
    /dev/mapper/cl-home xfs   372G   35G  338G  10% /home

 From /sys/devices/virtual/dmi/id
     Vendor:         Tyrone Systems
     Product:        X11DPi-N(T)
     Product Family: SMC X11
     Serial:         123456789

 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:
     4x NO DIMM NO DIMM
     12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2400

 BIOS:
    BIOS Vendor:       American Megatrends Inc.
    BIOS Version:      3.4
    BIOS Date:         11/23/2020
    BIOS Revision:     5.14

 (End of data from sysinfo program)
```

## Compiler Version Notes

```
==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
        | 625.x264_s(base, peak) 657.xz_s(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.
icc (NextGen): command line warning #10006: ignoring unknown option
  '-i_version=19.1.2.254' [-Woption-ignored]
------------------------------------------------------------------------------

==============================================================================
```

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## Compiler Version Notes (Continued)

```
C       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.1.2.254 Build 20200623
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
        | 625.x264_s(base, peak) 657.xz_s(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.
icc (NextGen): command line warning #10006: ignoring unknown option
  '-i_version=19.1.2.254' [-Woption-ignored]
------------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.1.2.254 Build 20200623
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
        | 631.deepsjeng_s(base, peak) 641.leela_s(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.
icpc (NextGen): command line warning #10006: ignoring unknown option
  '-i_version=19.1.2.254' [-Woption-ignored]
------------------------------------------------------------------------------

==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.2.254 Build 20200623
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

## Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.2.254/linux/compiler/lib/intel64_lin
-lqkmalloc

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

**(Continued on next page)**

## Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-mbranches-within-32B-boundaries

## Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

## Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64(*) -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

(*) Indicates a portability flag that was found in a non-portability variable.

## Peak Optimization Flags

C benchmarks:

600.perlbench_s: -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/je5.0.1-64/lib -ljemalloc

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## Peak Optimization Flags (Continued)

602.gcc_s: `-m64 -qnextgen -std=c11 -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 -qopt-mem-layout-trans=4 -L/usr/local/je5.0.1-64/lib -ljemalloc`

605.mcf_s: `basepeak = yes`

625.x264_s: `-m64 -qnextgen -std=c11 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias -L/usr/local/je5.0.1-64/lib -ljemalloc`

657.xz_s: `basepeak = yes`

C++ benchmarks:

620.omnetpp_s: `basepeak = yes`

623.xalancbmk_s: `basepeak = yes`

631.deepsjeng_s: `basepeak = yes`

641.leela_s: `basepeak = yes`

Fortran benchmarks:

648.exchange2_s: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html`
`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`



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

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