



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero QS400TU-224R4  
(2.50 GHz, Intel Xeon Gold 6248)

SPECspeed®2017\_int\_base = 11.1

SPECspeed®2017\_int\_peak = 11.4

CPU2017 License: 006042

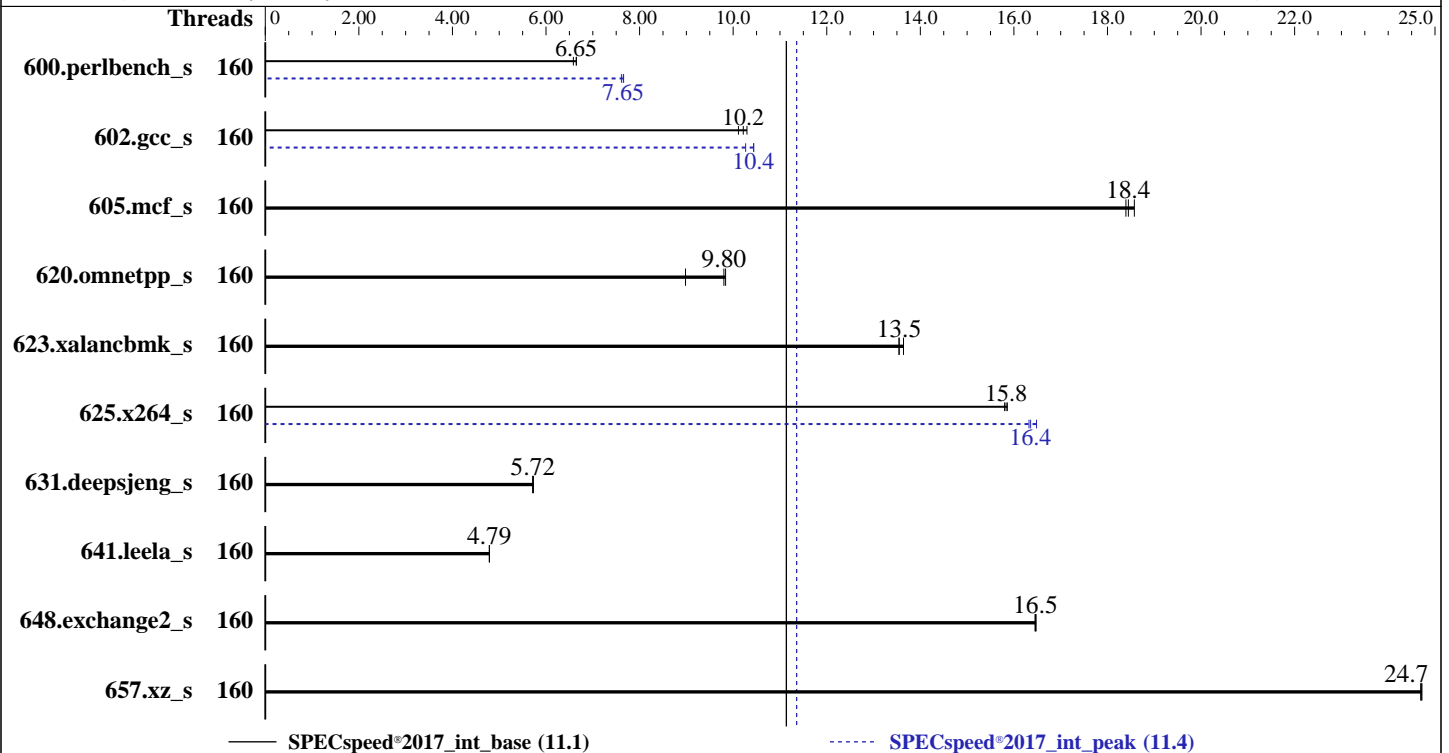
Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

Test Date: Feb-2021

Hardware Availability: Aug-2020

Software Availability: Dec-2020



### Hardware

CPU Name: Intel Xeon Gold 6248  
 Max MHz: 3900  
 Nominal: 2500  
 Enabled: 80 cores, 4 chips, 2 threads/core  
 Orderable: 1,2,4 (chip)s  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 27.5 MB I+D on chip per chip  
 Other: None  
 Memory: 384 GB (24 x 16 GB 1Rx4 PC4-2933Y-R)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: CentOS Linux release 8.3.2011  
 Kernel 4.18.0-240.el8.x86\_64  
 4.18.0-240.el8.x86\_64  
 Compiler: C/C++: Version 19.1.2.254 of Intel C/C++ Compiler for Linux Build 20200623;  
 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 | 160     | <b><u>267</u></b> | <b><u>6.65</u></b> | 270               | 6.58               | 267               | 6.65               | 160     | 233               | 7.61               | <b><u>232</u></b> | <b><u>7.65</u></b> | 232               | 7.66               |
| 602.gcc_s       | 160     | 394               | 10.1               | <b><u>390</u></b> | <b><u>10.2</u></b> | 387               | 10.3               | 160     | 388               | 10.3               | <b><u>382</u></b> | <b><u>10.4</u></b> | 381               | 10.4               |
| 605.mcf_s       | 160     | 254               | 18.6               | <b><u>256</u></b> | <b><u>18.4</u></b> | 257               | 18.4               | 160     | 254               | 18.6               | <b><u>256</u></b> | <b><u>18.4</u></b> | 257               | 18.4               |
| 620.omnetpp_s   | 160     | <b><u>166</u></b> | <b><u>9.80</u></b> | 182               | 8.98               | 166               | 9.84               | 160     | <b><u>166</u></b> | <b><u>9.80</u></b> | 182               | 8.98               | 166               | 9.84               |
| 623.xalancbmk_s | 160     | 105               | 13.5               | <b><u>105</u></b> | <b><u>13.5</u></b> | 104               | 13.6               | 160     | 105               | 13.5               | <b><u>105</u></b> | <b><u>13.5</u></b> | 104               | 13.6               |
| 625.x264_s      | 160     | 112               | 15.8               | <b><u>111</u></b> | <b><u>15.8</u></b> | 111               | 15.9               | 160     | <b><u>108</u></b> | <b><u>16.4</u></b> | 107               | 16.5               | 108               | 16.3               |
| 631.deepsjeng_s | 160     | 251               | 5.72               | 250               | 5.73               | <b><u>250</u></b> | <b><u>5.72</u></b> | 160     | 251               | 5.72               | 250               | 5.73               | <b><u>250</u></b> | <b><u>5.72</u></b> |
| 641.leela_s     | 160     | <b><u>356</u></b> | <b><u>4.79</u></b> | 356               | 4.79               | 356               | 4.79               | 160     | <b><u>356</u></b> | <b><u>4.79</u></b> | 356               | 4.79               | 356               | 4.79               |
| 648.exchange2_s | 160     | 179               | 16.5               | <b><u>179</u></b> | <b><u>16.5</u></b> | 178               | 16.5               | 160     | 179               | 16.5               | <b><u>179</u></b> | <b><u>16.5</u></b> | 178               | 16.5               |
| 657.xz_s        | 160     | 250               | 24.7               | 250               | 24.7               | <b><u>250</u></b> | <b><u>24.7</u></b> | 160     | 250               | 24.7               | 250               | 24.7               | <b><u>250</u></b> | <b><u>24.7</u></b> |

SPECspeed®2017\_int\_base = **11.1**

SPECspeed®2017\_int\_peak = **11.4**

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)



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## 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 Fri Feb 26 23:54:20 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 6248 CPU @ 2.50GHz

4 "physical id"s (chips)

160 "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 : 20

siblings : 40

physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

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## Platform Notes (Continued)

```

CPU(s): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz
Stepping: 7
CPU MHz: 1753.900
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19,80-99
NUMA node1 CPU(s): 20-39,100-119
NUMA node2 CPU(s): 40-59,120-139
NUMA node3 CPU(s): 60-79,140-159
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
aperfmpperf 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 bmil 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_lld arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 28160 KB

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```

available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 80 81 82 83 84 85 86 87
88 89 90 91 92 93 94 95 96 97 98 99
node 0 size: 89997 MB
node 0 free: 70714 MB

```

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## Platform Notes (Continued)

```

node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 100 101 102
103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
node 1 size: 91695 MB
node 1 free: 74318 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 120 121 122
123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
node 2 size: 92701 MB
node 2 free: 74282 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 140 141 142
143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
node 3 size: 91950 MB
node 3 free: 73968 MB
node distances:
node  0  1  2  3
  0:  10  21  21  21
  1:  21  10  21  21
  2:  21  21  10  21
  3:  21  21  21  10

```

From /proc/meminfo

```

MemTotal:      394580636 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:

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## Platform Notes (Continued)

```
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: 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 01:57
```

```
SPEC is set to: /home/cpu2017
```

| Filesystem          | Type | Size | Used | Avail | Use% | Mounted on |
|---------------------|------|------|------|-------|------|------------|
| /dev/mapper/cl-home | xfs  | 372G | 106G | 267G  | 29%  | /home      |

```
From /sys/devices/virtual/dmi/id
```

|                 |                               |
|-----------------|-------------------------------|
| Vendor:         | Tyrone Systems                |
| Product:        | Tyrone Camarero DS400TU-224R4 |
| 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:

|  |
|--|
| 24x NO DIMM NO DIMM  |
| 24x Samsung M393A2K40DB2-CVF 16 GB 1 rank 2933, configured at 2934 |

BIOS:

|                |                          |
|----------------|--------------------------|
| BIOS Vendor:   | American Megatrends Inc. |
| BIOS Version:  | 3.4                      |
| BIOS Date:     | 11/04/2020               |
| BIOS Revision: | 5.14                     |

(End of data from sysinfo program)



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## 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]
=====

```

```

=====
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)
=====

```

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=====

```

```

=====
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]
=====

```

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## Compiler Version Notes (Continued)

-----  
=====  
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

(Continued on next page)





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## Base Optimization Flags (Continued)

C benchmarks (continued):

`-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`

`-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.



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(2.50 GHz, Intel Xeon Gold 6248)

SPECspeed®2017\_int\_base = 11.1

SPECspeed®2017\_int\_peak = 11.4

**CPU2017 License:** 006042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

**Test Date:** Feb-2021

**Hardware Availability:** Aug-2020

**Software Availability:** Dec-2020

## 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
```

```
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-ic19.1ul-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-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-ic19.1ul-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64_revA.xml)

<http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.xml>



# SPEC CPU®2017 Integer Speed Result

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**Tyrone Systems**

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Tested with SPEC CPU®2017 v1.1.5 on 2021-02-26 23:54:20-0500.  
Report generated on 2021-03-16 15:28:55 by CPU2017 PDF formatter v6255.  
Originally published on 2021-03-16.