



# SPEC CPU®2017 Integer Rate Result

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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**Tyrone Camarero QS400TU-224R4**  
(2.00 GHz, Intel Xeon Gold 5117)

**SPECrate®2017\_int\_base = 286**

**SPECrate®2017\_int\_peak = 294**

**CPU2017 License:** 006042

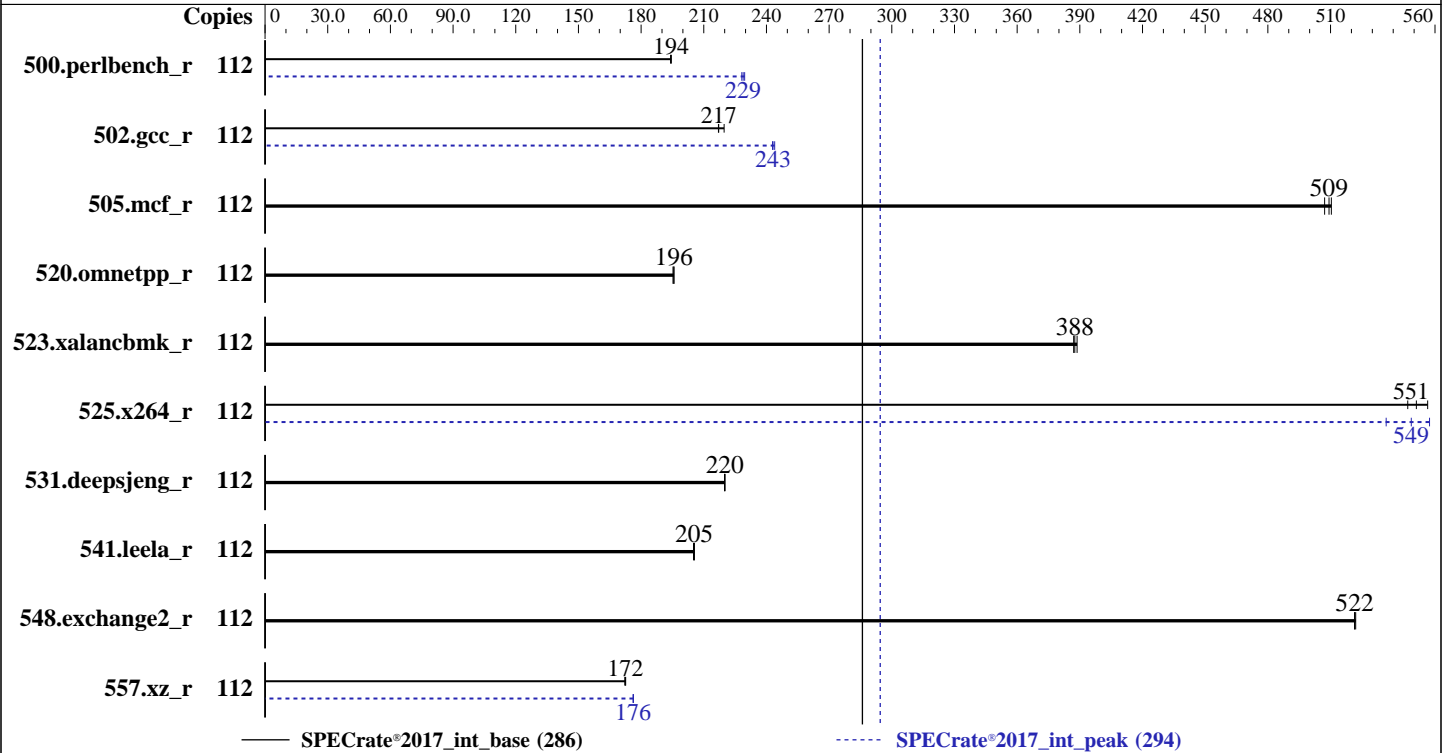
**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

**Test Date:** Feb-2021

**Hardware Availability:** Aug-2020

**Software Availability:** Dec-2020



## Hardware

CPU Name: Intel Xeon Gold 5117  
 Max MHz: 2800  
 Nominal: 2000  
 Enabled: 56 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: 19.25 MB I+D on chip per chip  
 Other: None  
 Memory: 384 GB (24 x 16 GB 1Rx4 PC4-2933Y-R, running at 2400)  
 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 Build 20200623 for Linux;  
 Fortran: Version 19.1.2.254 of Intel Fortran Compiler Build 20200623 for Linux  
 Parallel: No  
 Firmware: Version 3.4 released Nov-2020  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	112	917	194	919	194	<b>917</b>	<b>194</b>	112	781	228	777	230	<b>779</b>	<b>229</b>
502.gcc_r	112	722	220	<b>730</b>	<b>217</b>	731	217	112	653	243	650	244	<b>652</b>	<b>243</b>
505.mcf_r	112	355	510	<b>355</b>	<b>509</b>	357	507	112	355	510	<b>355</b>	<b>509</b>	357	507
520.omnetpp_r	112	751	196	<b>751</b>	<b>196</b>	753	195	112	751	196	<b>751</b>	<b>196</b>	753	195
523.xalancbmk_r	112	304	389	306	387	<b>305</b>	<b>388</b>	112	304	389	306	387	<b>305</b>	<b>388</b>
525.x264_r	112	359	547	<b>356</b>	<b>551</b>	352	556	112	365	537	<b>357</b>	<b>549</b>	352	557
531.deepsjeng_r	112	<b>583</b>	<b>220</b>	584	220	583	220	112	<b>583</b>	<b>220</b>	584	220	583	220
541.leela_r	112	<b>903</b>	<b>205</b>	904	205	902	206	112	<b>903</b>	<b>205</b>	904	205	902	206
548.exchange2_r	112	563	522	<b>563</b>	<b>522</b>	562	522	112	563	522	<b>563</b>	<b>522</b>	562	522
557.xz_r	112	701	173	702	172	<b>701</b>	<b>172</b>	112	686	176	686	176	<b>686</b>	<b>176</b>

**SPECrate®2017\_int\_base = 286**

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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

## 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"

MALLOC\_CONF = "retain:true"



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## 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>
```

Yes: 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 Mon Feb 22 00:15:05 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 5117 CPU @ 2.00GHz
```

```
4 "physical id"s (chips)
```

```
112 "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 : 14
```

```
siblings : 28
```

```
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
```

(Continued on next page)



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## Platform Notes (Continued)

```
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                112
On-line CPU(s) list:   0-111
Thread(s) per core:    2
Core(s) per socket:    14
Socket(s):              4
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5117 CPU @ 2.00GHz
Stepping:              4
CPU MHz:               1035.483
CPU max MHz:           2800.0000
CPU min MHz:           800.0000
BogoMIPS:              4000.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              19712K
NUMA node0 CPU(s):    0-13,56-69
NUMA node1 CPU(s):    14-27,70-83
NUMA node2 CPU(s):    28-41,84-97
NUMA node3 CPU(s):    42-55,98-111
```

```
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 fl6c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single pti intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority
ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm 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 md_clear flush_l1d
```

```
/proc/cpuinfo cache data
cache size : 19712 KB
```

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## Platform Notes (Continued)

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 56 57 58 59 60 61 62 63 64 65 66 67 68 69

node 0 size: 91466 MB

node 0 free: 94585 MB

node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80 81 82 83

node 1 size: 93133 MB

node 1 free: 96419 MB

node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94 95 96 97

node 2 size: 93105 MB

node 2 free: 96525 MB

node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105 106 107 108 109 110 111

node 3 size: 92597 MB

node 3 free: 96310 MB

node distances:

node 0 1 2 3

0: 10 21 31 21

1: 21 10 21 31

2: 31 21 10 21

3: 21 31 21 10

From /proc/meminfo

MemTotal: 394593460 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"

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## Platform Notes (Continued)

```
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):

CVE-2018-3620 (L1 Terminal Fault):

KVM: Mitigation: Split huge pages

Mitigation: PTE Inversion; VMX:  
conditional cache flushes, SMT  
vulnerable

Microarchitectural Data Sampling:

Mitigation: Clear CPU buffers; SMT  
vulnerable

CVE-2017-5754 (Meltdown):

CVE-2018-3639 (Speculative Store Bypass):

Mitigation: PTI

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: Full generic  
retpoline, IBPB: conditional,  
IBRS\_FW, STIBP: conditional, RSB  
filling

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

CVE-2019-11135 (TSX Asynchronous Abort):

Mitigation: Clear CPU buffers; SMT  
vulnerable

```
run-level 3 Feb 22 00:14
```

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

```
Filesystem      Type  Size  Used Avail Use% Mounted on  
/dev/mapper/cl-home xfs   372G  107G  266G  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

(Continued on next page)



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## Platform Notes (Continued)

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 2400

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)

## 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.

icc (NextGen): command line warning #10006: ignoring unknown option

'-i\_version=19.1.2.254' [-Woption-ignored]

=====  
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.

icc (NextGen): command line warning #10006: ignoring unknown option

'-i\_version=19.1.2.254' [-Woption-ignored]

=====  
C | 500.perlbench\_r(peak) 557.xz\_r(peak)

-----  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.2.254 Build 20200623

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
C | 502.gcc\_r(peak)

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icc (NextGen): command line warning #10006: ignoring unknown option  
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=====  
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.  
icc (NextGen): command line warning #10006: ignoring unknown option  
'-i\_version=19.1.2.254' [-Woption-ignored]

=====  
C | 500.perlbench\_r(peak) 557.xz\_r(peak)

-----  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.2.254 Build 20200623

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
C | 502.gcc\_r(peak)

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icc (NextGen): command line warning #10006: ignoring unknown option  
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=====  
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.  
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 | 500.perlbench\_r(peak) 557.xz\_r(peak)  
=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.2.254 Build 20200623  
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.  
icpc (NextGen): command line warning #10006: ignoring unknown option  
'-i\_version=19.1.2.254' [-Woption-ignored]  
-----

=====  
Fortran | 548.exchange2\_r(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

500.perlbench\_r: -DSPEC\_LP64 -DSPEC\_LINUX\_X64  
502.gcc\_r: -DSPEC\_LP64

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## Base Portability Flags (Continued)

```
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 -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
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.2.254/linux/compiler/lib/intel64_lin
-lqkmalloc
```

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 -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
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.2.254/linux/compiler/lib/intel64_lin
-lqkmalloc
```

## Peak Compiler Invocation

C benchmarks:

```
icc
```

C++ benchmarks:

```
icpc
```

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(2.00 GHz, Intel Xeon Gold 5117)

**SPECrate®2017\_int\_base = 286**

**SPECrate®2017\_int\_peak = 294**

**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 Compiler Invocation (Continued)

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_2020.2.254/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.2.254/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.profddata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qnextgen
-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
```

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# SPEC CPU®2017 Integer Rate Result

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**Tyrone Systems**

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**Tyrone Camarero QS400TU-224R4**  
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## Peak Optimization Flags (Continued)

525.x264\_r (continued):

```
-qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.2.254/linux/compiler/lib/intel64_lin  
-lqkmallo
```

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_2020.2.254/linux/compiler/lib/intel64_lin  
-lqkmallo
```

C++ benchmarks:

520.omnetpp\_r: basepeak = yes

523.xalancbmk\_r: basepeak = yes

531.deepsjeng\_r: basepeak = yes

541.leela\_r: basepeak = yes

Fortran benchmarks:

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/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>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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