## SPEC CPU®2017 Integer Speed Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**Tyrone Camarero DS400TOG-424RT2**  
(2.20 GHz, Intel Xeon Gold 5220R)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tr>
<td>11.1</td>
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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

<table>
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<tr>
<td>600.perlbench_s</td>
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<tr>
<td>657.xz_s</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5220R  
- **Max MHz:** 4000  
- **Nominal:** 2200  
- **Enabled:** 48 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 (chip)  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

### Software

- **OS:** CentOS Linux release 8.2.2004 (Core)  
4.18.0-193.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux Build 20200306; Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux Build 20200306;  
- **Parallel:** Yes  
- **Firmware:** Version 3.3 released Feb-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
## SPEC CPU®2017 Integer Speed Result

### Tyrone Systems

(1) Test Sponsor: Netweb Pte Ltd

(2) Tyrone Camarero DS400TOG-424RT2 (2.20 GHz, Intel Xeon Gold 5220R)

---

### SPEC CPU®2017 Int_base = 11.1

### SPEC CPU®2017 Int_peak = 11.3

---

### Results Table

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### 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

### 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"
- MALLOCONF = "retain=true"
- OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 2x Intel Cascade Lake CPU 4214R + 384GB 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

(Continued on next page)
General Notes (Continued)

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 Wed Feb  3 12:14:32 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 5220R CPU @ 2.20GHz
  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
  physical 1: cores 0 1 2 3 4 5 6 8 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

(Continued on next page)
Platform Notes (Continued)

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 5220R CPU @ 2.20GHz
Stepping: 7
CPU MHz: 1529.925
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7-9,13-15,19,20,48-51,55-57,61-63,67,68
NUMA node1 CPU(s): 4-6,10-12,16-18,21-23,52-54,58-60,64-66,69-71
NUMA node2 CPU(s): 24-27,31,32,36-38,42-44,72-75,79,80,84-86,90-92
NUMA node3 CPU(s): 28-30,33-35,39-41,45-47,76-78,81-83,87-89,93-95
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 pdpelpgb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm 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_ppga sbbd mba ibrs ibp bts ibs_enhanced tpr_shadow vmni
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpdx rdt_a avx512f avx512dq rdsed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavev cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pkp ospk avx512_vnni md_clear flush_lld
arch_capabilities

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 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: 79243 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 21 22 23 52 53 54 58 59 60 64 65 66 69 70 71

(Continued on next page)
Platform Notes (Continued)

node 1 size: 96762 MB
node 1 free: 82204 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: 96735 MB
node 2 free: 82453 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: 96762 MB
node 3 free: 81815 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

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:

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero DS400TOG-424RT2
(2.20 GHz, Intel Xeon Gold 5220R)

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

SPECspeed®2017_int_base = 11.1
SPECspeed®2017_int_peak = 11.3

Platform Notes (Continued)

CVE-2018-12207 (iTLB Multihit):
KVM: Vulnerable
CVE-2018-3620 (L1 Terminal Fault):
Not affected
Microarchitectural Data Sampling:
Not affected
CVE-2017-5754 (Meltdown):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swaps 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 1 11:21
SPEC is set to: /home/cpu2017
Filesistem Type Size Used Avail Use% Mounted on
/dev/mapper/cl-home xfs 392G 142G 250G 37% /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 2666

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 3.3
BIOS Date: 02/21/2020
BIOS Revision: 5.14

(End of data from sysinfo program)
## SPEC CPU®2017 Integer Speed Result

**SPEC CPU®2017 int_base = 11.1**

**SPEC CPU®2017 int_peak = 11.3**

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<tr>
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<tr>
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<td>Netweb Pte Ltd</td>
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<td>Tested by:</td>
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<tr>
<td>Software Availability:</td>
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### Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

**Tyrone Camarero DS400TOG-424RT2**
(2.20 GHz, Intel Xeon Gold 5220R)

### Compiler Version Notes

<table>
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<tr>
<th>Language</th>
<th>Benchmark(s)</th>
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<td>perlbench_s(base), gcc_s(base, peak), mcf_s(base, peak), x264_s(base, peak), xz_s(base, peak)</td>
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<tr>
<td>C++</td>
<td>omnetpp_s(base, peak), xalancbmk_s(base, peak), deepsjeng_s(base, peak), leela_s(base, peak)</td>
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<tr>
<td>Fortran</td>
<td>exchange2_s(base, peak)</td>
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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.

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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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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
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---

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
### Compiler Version Notes (Continued)

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Flags</th>
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<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<td>gcc_s</td>
<td>-DSPEC_LP64</td>
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<td>mcf_s</td>
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<td>omnetpp_s</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>xalancbmk_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
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<tr>
<td>x264_s</td>
<td>-DSPEC_LP64</td>
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<td>deepsjeng_s</td>
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<td>-DSPEC_LP64</td>
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<tr>
<td>xz_s</td>
<td>-DSPEC_LP64</td>
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</tbody>
</table>

### Base Optimization Flags

- **C benchmarks:**  

- **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` `-fuse-ld=gold` `-qopt-mem-layout-trans=4`
## Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/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.

## Peak Optimization Flags

C benchmarks:

(Continued on next page)
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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
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| SPECspeed®2017_int_peak = 11.3 |

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

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#### Peak Optimization Flags (Continued)

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 -fuse-ld=gold  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
-O3 -Ofast -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  
-fuse-ld=gold -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/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/Tyrone-Platform-Settings-V1.2-CLX-revB.xml

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### SPEC CPU®2017 Integer Speed Result

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**SPECspeed®2017_int_base = 11.1**

**SPECspeed®2017_int_peak = 11.3**

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Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero DS400TOG-424RT2

(2.20 GHz, Intel Xeon Gold 5220R)

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**CPU2017 License:** 006042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

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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 2021-02-03 01:44:32-0500.