# SPEC CPU®2017 Integer Rate Result

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

**SPECrater®2017_int_base = 250**  
**SPECrater®2017_int_peak = 261**

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<tr>
<td>557.xz_r 72</td>
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**CPU2017 License:** 006042  
**Test Date:** Feb-2021  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Aug-2020  
**CPU Name:** Intel Xeon Gold 6240  
**Max MHz:** 3900  
**Nominal:** 2600  
**Enabled:** 36 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:** 24.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 480 GB SATA SSD  
**Other:** None  

**Software**  
**OS:** CentOS Linux release 8.2.2004 (Core)  
**Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux  
**Parallel:** No  
**Compiler:** No  
**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
# SPEC CPU®2017 Integer Rate Result

## CPU2017 License: 006042

Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

### SPECrate®2017_int_base = 250

### SPECrate®2017_int_peak = 261

---

### 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

---

### 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"
```
**SPEC CPU®2017 Integer Rate Result**

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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>
  ```

**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 10 10:36:17 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 6240 CPU @ 2.60GHz
  2 "physical id"s (chips)
  72 "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 : 18
  siblings : 36
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  ```

(Continued on next page)
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Tested by: Tyrone Systems

Platform Notes (Continued)

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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
Stepping: 7
CPU MHz: 1842.731
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-2,5,6,9,10,14,15,16-38,41,42,45,46,50,51
NUMA node1 CPU(s): 3,4,7,8,11-13,16,17,39,40,43,44,47-49,52,53
NUMA node2 CPU(s): 18-20,23,24,27,28,32,33,34-56,59,60,63,64,68,69
NUMA node3 CPU(s): 21,22,25,26,29-31,34,35,57,58,61,62,65-67,70,71
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
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
def phys螈 ldr xtr enforcing tsc_deadline_timer aes xsave avx f16c rcrand lahf_lm abm
3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_patin ssbd mba ibrs ibbp stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ep vpid fsgsb base tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaves cxsetbx1 xsavec cqm_llc cqm_occu_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pkup ospe avx512_vnni md_clear flush_lld
arch_capabilities

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

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

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Tested by: Tyrone Systems

Test Date: Feb-2021
Hardware Availability: Aug-2020
Software Availability: Jun-2020

Platform Notes (Continued)

physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51
node 0 size: 95353 MB
node 0 free: 95025 MB
node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
node 1 size: 96736 MB
node 1 free: 96535 MB
node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
node 2 size: 96763 MB
node 2 free: 95881 MB
node 3 cpus: 21 22 25 26 29 30 34 35 57 58 61 62 66 67 70 71
node 3 size: 96763 MB
node 3 free: 96548 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: 394872264 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)
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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):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
Mitigation: Clear CPU buffers; SMT vulnerable
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 10 10:34

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**

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---

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---

**Platform Notes (Continued)**

- BIOS Revision: 5.14

(End of data from sysinfo program)

---

**Compiler Version Notes**

```plaintext
---
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)
---
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  | 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.
---
```

(Continued on next page)
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**Compiler Version Notes (Continued)**

```plaintext
---

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       | 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)

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)
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Test Sponsor: Netweb Pte Ltd
Hardware Availability: Aug-2020
Software Availability: Jun-2020

Tyrone Systems
(2.60 GHz, Intel Xeon Gold 6240)

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
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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
-W1,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -03 -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)
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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`  
- `-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 -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_2020.1.217/linux/compiler/lib/intel64_lin -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`
### SPEC CPU®2017 Integer Rate Result

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

<table>
<thead>
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<th>SPECrate®2017_int_base = 250</th>
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<tbody>
<tr>
<td>SPECrate®2017_int_peak = 261</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

#### 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`  
  `-gopt-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)`  
  `-fp老爸-use=default.profdata(pass 2) -xCORE-AVX512 -flto`  
  `-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold`  
  `-gopt-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`  
  `-gopt-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.xulancbmk_r: basepeak = yes

- 531.deepsjeng_r: basepeak = yes

- 541.leela_r: basepeak = yes

**Fortran benchmarks:**

(Continued on next page)
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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](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](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.

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