# SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DS400TR-212R4  
(3.00 GHz, Intel Xeon Gold 6248R)

| SPECrate®2017_int_base = 348 | SPECrate®2017_int_peak = 362 |

<table>
<thead>
<tr>
<th>CPU2017 License: 006042</th>
<th>Test Date: Jan-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Netweb Pte Ltd</td>
<td>Hardware Availability: Dec-2020</td>
</tr>
<tr>
<td>Tested by: Tyrone Systems</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 6248R</td>
<td>OS: CentOS Linux release 8.3.2011 4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td>Nominal: 3000</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
<td>Firmware: Version 3.4 released Oct-2020</td>
</tr>
<tr>
<td>Orderable: 1.2 (chip)s</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>L3: 35.75 MB I+D on chip per chip</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)</td>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
<tr>
<td>Storage: 1 x 480 GB SATA SSD</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td></td>
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</tbody>
</table>

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## Copies

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base (348)</th>
<th>SPECrate®2017_int_peak (362)</th>
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<tbody>
<tr>
<td>500.perlbench_r 96</td>
<td>502.gcc_r 96</td>
</tr>
<tr>
<td>243</td>
<td>250</td>
</tr>
</tbody>
</table>

---

## Test Results

- **500.perlbench_r**: 243 copies
- **502.gcc_r**: 250 copies
- **505.mcf_r**: 306 copies
- **520.omnetpp_r**: 194 copies
- **523.xalancbmk_r**: 462 copies
- **525.x264_r**: 725 copies
- **531.deepsjeng_r**: 289 copies
- **541.leela_r**: 275 copies
- **548.exchange2_r**: 692 copies
- **557.xz_r**: 207 copies

---

## CPU Name: Intel Xeon Gold 6248R
- Max MHz: 4000
- Nominal: 3000
- Enabled: 48 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: 35.75 MB I+D on chip per chip
- Other: None
- Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
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Results Table

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<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
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<tbody>
<tr>
<td></td>
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<td>Seconds</td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>96</td>
<td>628</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>96</td>
<td>543</td>
</tr>
<tr>
<td>505.mcf_r</td>
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<td>270</td>
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<tr>
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<td>96</td>
<td>648</td>
</tr>
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<td>523.xalanbmk_r</td>
<td>96</td>
<td>219</td>
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<td>96</td>
<td>232</td>
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<td>382</td>
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<tr>
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<td>96</td>
<td>579</td>
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<tr>
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<td>96</td>
<td>364</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>96</td>
<td>502</td>
</tr>
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</table>

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 19.1.1.217 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/jem5.0.1-32"
MALLOCONF = "retain:true"
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<td>= 348</td>
<td>= 362</td>
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**Test Sponsor:** Netweb Pte Ltd  
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## General Notes

Binaries compiled on a system with 2x Intel Cascade Lake CPU + 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>  
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  

## Platform Notes

BIOS Settings:  
Power Technology = Custom  
Power Performance Tuning = BIOS Controls EPB  
ENERGY_PERF_BIAS_CFG mode = Extreme 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  
runtime on spec Mon Jan 25 14:26:51 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 6248R CPU @ 3.00GHz  
  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 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
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CPU2017 License: 006042
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Tested by: Tyrone Systems

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Platform Notes (Continued)

physical 1: cores 0 1 2 3 4 5 6 9 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
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 6248R CPU @ 3.00GHz
Stepping: 7
CPU MHz: 3599.966
CPU max MHz: 4000.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1l cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7,8,12-14,18-20,48-51,55,56,60-62,66-68
NUMA node1 CPU(s): 4-6,9-11,15-17,21-23,52-54,57-59,63-65,69-71
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 vmx de pse tsc msr pdm cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pd Hierarchical PBE

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

/proc/cpuinfo cache data
cache size: 36608 KB

(Continued on next page)
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### Platform Notes (Continued)

- **available:** 4 nodes (0-3)  
- **node 0 cpus:** 0 1 2 3 7 8 12 13 14 18 19 20 48 49 50 51 55 56 60 61 62 66 67 68  
- **node 0 size:** 90049 MB  
- **node 0 free:** 94896 MB  
- **node 1 cpus:** 4 5 6 9 10 11 15 16 17 21 22 23 52 53 54 57 58 59 63 64 65 69 70 71  
- **node 1 size:** 91864 MB  
- **node 1 free:** 96373 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:** 92318 MB  
- **node 2 free:** 96331 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:** 92051 MB  
- **node 3 free:** 96398 MB  

**node distances:**

- **node 0:** 10 11 21 21  
- **node 1:** 11 10 21 21  
- **node 2:** 21 21 10 11  
- **node 3:** 21 21 11 10  

From `/proc/meminfo`

- **MemTotal:** 394855232 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

(Continued on next page)
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Platform Notes (Continued)

uname -a:
    Linux spec 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):
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

KVM: Mitigation: Split huge pages
Not affected
Not affected
Not affected
Mitigation: Speculative Store
Bypass disabled via prctl and seccomp
Mitigation: usercopy/swapgs barriers and __user pointer
sanitization
Mitigation: Enhanced IBRS, IBPB:
conditional, RSB filling
Not affected
Mitigation: TSX disabled

run-level 3 Jan 25 14:25

SPEC is set to: /home/cpu2017
    Filesystem   Type  Size  Used Avail Use% Mounted on
    /dev/mapper/cl-home xfs   372G  155G  218G  42% /home

From /sys/devices/virtual/dmi/id
Vendor:  Tyrone Systems
Product: Tyrone Camarero DS400E1
Serial:  S263875X9527668

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: 3.4
    BIOS Date: 10/30/2020
    BIOS Revision: 5.14

(End of data from sysinfo program)

(Continued on next page)
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Platform Notes (Continued)
Sysinfo incorrectly parsed dmidecode output. Configured memory speed is 2933.

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.

==============================================================
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)
---
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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)
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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)
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------------------------------------------------------------------------------

C       | 500.perlbench_r(peak) 557.xz_r(peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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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)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306

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

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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 -qnextgen -std=c11
-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
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-1qkmalloc

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

(Continued on next page)
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### 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 -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`

### Peak Optimization Flags

C benchmarks:

(Continued on next page)
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**SPECrate®2017_int_base = 348**  
**SPECrate®2017_int_peak = 362**

**CPU2017 License:** 006042  
**Test Date:** Jan-2021

**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Dec-2020

**Tested by:** Tyrone Systems  
**Software Availability:** Dec-2020

---

### Peak Optimization Flags (Continued)

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_2020.1.217/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-generator(pass 1)  
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold  
-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  
-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`  
-qopt-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.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

**Fortran benchmarks:**

548.exchange2_r: basepeak = yes
**SPEC CPU®2017 Integer Rate Result**

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DS400TR-212R4  
(3.00 GHz, Intel Xeon Gold 6248R)  

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<thead>
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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/Intel-ic19.1u1-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.

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