



# SPEC CPU®2017 Integer Rate Result

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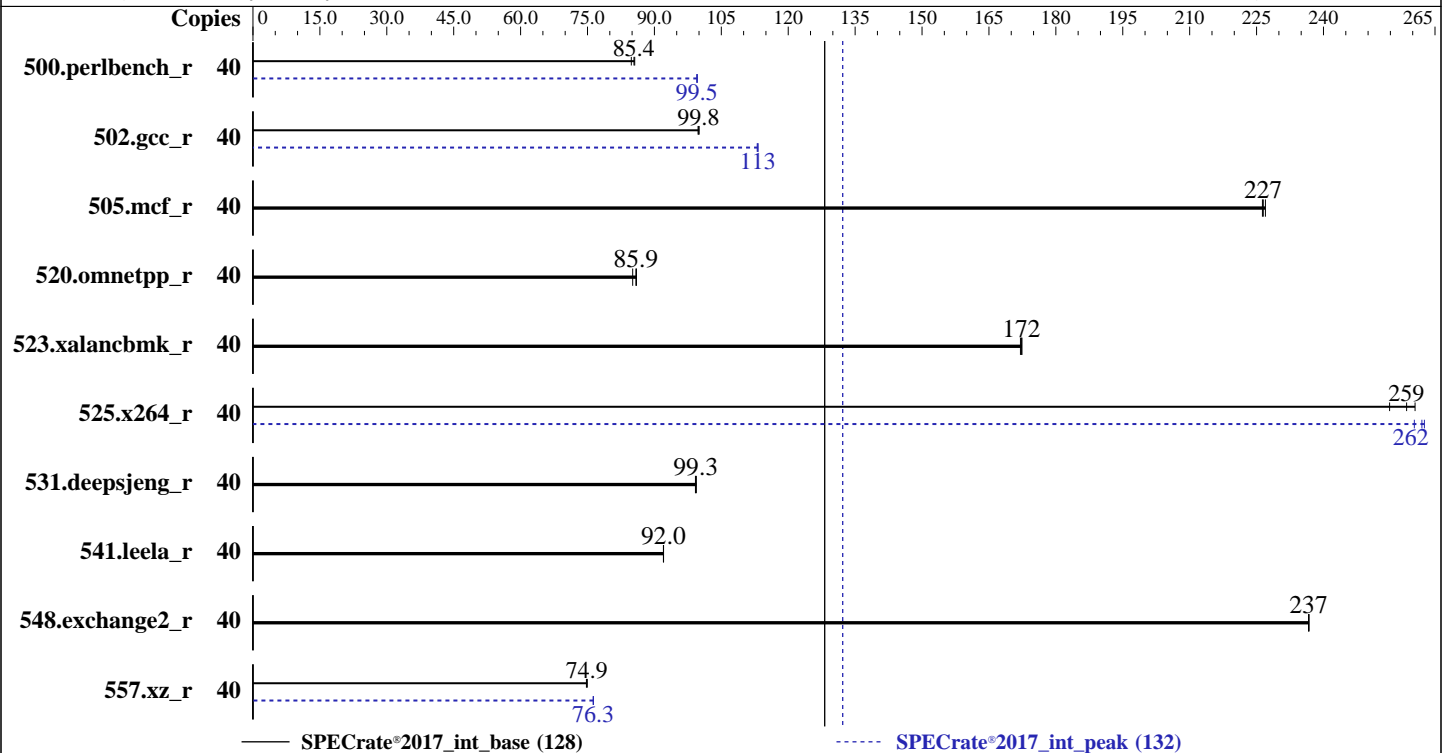
**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DS400TR-28RL  
(2.40 GHz, Intel Xeon Silver 4210R)

SPECrate®2017\_int\_base = 128

SPECrate®2017\_int\_peak = 132

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

**Test Date:** Oct-2020  
**Hardware Availability:** Aug-2020  
**Software Availability:** Jun-2020



## Hardware

CPU Name: Intel Xeon Silver 4210R  
Max MHz: 3200  
Nominal: 2400  
Enabled: 20 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: 13.75 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933P-R, running at 2400)  
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 Build 20200306 for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux  
Parallel: No  
Firmware: Version V8.102 released Jun-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: Default



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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	40	751	84.8	<b><u>746</u></b>	<b><u>85.4</u></b>	744	85.6	40	639	99.6	<b><u>640</u></b>	<b><u>99.5</u></b>	640	99.5
502.gcc_r	40	<b><u>567</u></b>	<b><u>99.8</u></b>	567	99.8	566	100	40	<b><u>500</u></b>	<b><u>113</u></b>	501	113	500	113
505.mcf_r	40	285	227	286	226	<b><u>285</u></b>	<b><u>227</u></b>	40	285	227	286	226	<b><u>285</u></b>	<b><u>227</u></b>
520.omnetpp_r	40	610	86.0	616	85.1	<b><u>611</u></b>	<b><u>85.9</u></b>	40	610	86.0	616	85.1	<b><u>611</u></b>	<b><u>85.9</u></b>
523.xalancbmk_r	40	245	172	<b><u>245</u></b>	<b><u>172</u></b>	245	172	40	245	172	<b><u>245</u></b>	<b><u>172</u></b>	245	172
525.x264_r	40	275	255	269	261	<b><u>271</u></b>	<b><u>259</u></b>	40	269	260	<b><u>267</u></b>	<b><u>262</u></b>	267	263
531.deepsjeng_r	40	462	99.2	461	99.4	<b><u>462</u></b>	<b><u>99.3</u></b>	40	462	99.2	461	99.4	<b><u>462</u></b>	<b><u>99.3</u></b>
541.leela_r	40	720	92.0	<b><u>720</u></b>	<b><u>92.0</u></b>	720	92.0	40	720	92.0	<b><u>720</u></b>	<b><u>92.0</u></b>	720	92.0
548.exchange2_r	40	443	237	<b><u>443</u></b>	<b><u>237</u></b>	443	237	40	443	237	<b><u>443</u></b>	<b><u>237</u></b>	443	237
557.xz_r	40	577	74.9	<b><u>577</u></b>	<b><u>74.9</u></b>	578	74.8	40	<b><u>566</u></b>	<b><u>76.3</u></b>	566	76.3	566	76.3

SPECrate®2017\_int\_base = 128

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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 19.1.1.217 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"



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## General Notes

Binaries compiled on a system with 2x Intel Xeon 4214R 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

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011

running on localhost.localdomain Sat Oct 3 04:19:58 2020

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) Silver 4210R CPU @ 2.40GHz

2 "physical id"s (chips)

40 "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 : 10

siblings : 20

physical 0: cores 0 1 2 3 4 8 9 10 11 12

physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:

Architecture: x86\_64

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

Byte Order: Little Endian

CPU(s): 40

On-line CPU(s) list: 0-39

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## Platform Notes (Continued)

```

Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2832.900
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
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 intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid 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 hwp hwp_act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni md_clear flush_lld arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 14080 KB

```

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

```

available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 192108 MB
node 0 free: 182158 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 193503 MB
node 1 free: 185729 MB
node distances:
node 0 1

```

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## Platform Notes (Continued)

```
0: 10 21
1: 21 10
```

From /proc/meminfo

```
MemTotal:      394867024 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

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:

```
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/swaps barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional,
RSB filling
tsx_async_abort:       Mitigation: Clear CPU buffers; SMT vulnerable
```

run-level 3 Sep 26 05:50

SPEC is set to: /home/cpu2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/cl-home xfs   392G   72G  321G  19% /home
```

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## Platform Notes (Continued)

```
From /sys/devices/virtual/dmi/id
  BIOS:      American Megatrends Inc. V8.102 06/09/2020
  Vendor:    Tyrone Systems
  Product:   TP12XH-L2I
  Product Family: empty
  Serial:    empty
```

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 Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(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.  
=====

=====  
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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-----  
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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.  
-----

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

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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-----

=====  
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)

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,  
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## Compiler Version Notes (Continued)

```
=====
C++      | 520.omnetpp_r(base, peak) 523.xalanbmk_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
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
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalanbmk_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
```





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## 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
-lqkmallocc
```

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
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmallocc
```

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
-lqkmallocc
```

## 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
```

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## Peak Portability Flags (Continued)

```
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_2020.1.217/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)
-fprofile-use=default.profddata(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:

(Continued on next page)



# SPEC CPU®2017 Integer Rate Result

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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DS400TR-28RL  
(2.40 GHz, Intel Xeon Silver 4210R)

SPECrate®2017\_int\_base = 128

SPECrate®2017\_int\_peak = 132

**CPU2017 License:** 006042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

**Test Date:** Oct-2020

**Hardware Availability:** Aug-2020

**Software Availability:** Jun-2020

## Peak Optimization Flags (Continued)

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-ic19.1u1-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html)

[http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX\\_revA.html](http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX_revA.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/Intel-ic19.1u1-official-linux64_revA.xml)

[http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX\\_revA.xml](http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX_revA.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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