# SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DS400TR-54/R/T  
(2.30 GHz, Intel Xeon Gold 5218)

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base = 181</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r 64</td>
<td>SPECrate®2017_int_peak = 188</td>
</tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

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

---

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Gold 5218</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Nominal: 2300</td>
</tr>
<tr>
<td>Enabled: 32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1, 2 (chip)s</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933P-R, running at 2666)</td>
</tr>
<tr>
<td>Storage: 1 x 480 GB SSD</td>
</tr>
<tr>
<td>Other: none</td>
</tr>
</tbody>
</table>

---

**Software**

<table>
<thead>
<tr>
<th>OS: CentOS Linux release 7.7.1908 (Core)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler: C/C++: Version 19.0.4.243 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.243 of Intel Fortran Compiler Build 20190416 for Linux</td>
</tr>
<tr>
<td>Parallel: No</td>
</tr>
<tr>
<td>Firmware: Version 3.1a released Jun-2019</td>
</tr>
<tr>
<td>File System: xfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management: None</td>
</tr>
</tbody>
</table>
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SPECrate®2017_int_base = 181
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<td>611</td>
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<td>609</td>
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<td>168</td>
<td>537</td>
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<tr>
<td>505.mcf_r</td>
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<td>64</td>
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<td>706</td>
<td>119</td>
<td>705</td>
<td>119</td>
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<td>64</td>
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<td>119</td>
<td>579</td>
<td>119</td>
<td>579</td>
<td>119</td>
</tr>
</tbody>
</table>

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/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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.:
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<th>CPU2017 License: 006042</th>
<th>Test Date: Nov-2019</th>
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<tr>
<td>Test Sponsor: Netweb Pte Ltd</td>
<td>Hardware Availability: Sep-2019</td>
</tr>
<tr>
<td>Tested by: Netweb</td>
<td>Software Availability: Aug-2019</td>
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</tbody>
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**SPECrate®2017_int_base = 181**  
**SPECrate®2017_int_peak = 188**

---

**General Notes (Continued)**

```bash	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 RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

---

**Platform Notes**

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011  
running on NODE6 Tue Nov 5 21:31:16 2019

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 5218 CPU @ 2.30GHz  
2 "physical id"s (chips)  
64 "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 : 16  
siblings : 32  
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 64  
On-line CPU(s) list: 0-63  
Thread(s) per core: 2  
Core(s) per socket: 16  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85

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

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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
Stepping: 7
CPU MHz: 999.932
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15, 32-47
NUMA node1 CPU(s): 16-31, 48-63

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 ntoppsc aperfmprefp eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx ext tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcd cgc sse4_1 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch eb x86_64 amd64 smt cmx8技术和 others

From /proc/cpuinfo
cache data
  cache size : 22528 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 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43
  node 0 size: 195229 MB
  node 0 free: 189930 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56
  node 1 size: 196608 MB
  node 1 free: 191946 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
MemTotal: 394672056 kB
HugePages_Total: 0

(Continued on next page)
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---

**Platform Notes (Continued)**

**Hugepagesize:** 2048 kB

From `/etc/*release*` `/etc/*version*`

```
centos-release: CentOS Linux release 7.7.1908 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.7 (Source)
os-release:
  NAME="CentOS Linux"
  VERSION="7 (Core)"
  ID="centos"
  ID_LIKE="rhel fedora"
  VERSION_ID="7"
  PRETTY_NAME="CentOS Linux 7 (Core)"
  ANSI_COLOR="0;31"
  CPE_NAME="cpe:/o:centos:centos:7"
redhat-release: CentOS Linux release 7.7.1908 (Core)
system-release: CentOS Linux release 7.7.1908 (Core)
system-release-cpe: cpe:/o:centos:centos:7
```

```
uname -a:
  Linux NODE6 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **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: Load fences, __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Full retpoline, IBPB

```
run-level 3 Nov 5 21:27
```

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

```
Filesystem  Type  Size  Used  Avail  Use% Mounted on  
/dev/mapper/centos-home xfs  392G  196G  197G  50% /home
```

```
From /sys/devices/virtual/dmi/id
  BIOS: American Megatrends Inc. 3.1a 06/11/2019
  Vendor: Tyrone Systems
  Product: X11DAi-N
  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
Platform Notes (Continued)

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:

4x NO DIMM NO DIMM
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 Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

==============================================================================
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
   | 525.x264_r(base, peak) 557.xz_r(base, peak)

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==============================================================================
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
   | 525.x264_r(base, peak) 557.xz_r(base, peak)

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Hardware Availability: Sep-2019
Software Availability: Aug-2019

Compiler Version Notes (Continued)

==============================================================================
<p>| C++ | 523.xalancbmk_r(peak) |
|-------------------------------|
| Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.243 Build 20190416 |
| Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |</p>
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</table>

==============================================================================
<p>| C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) |
|-------------------------------|</p>
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<tr>
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<tr>
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==============================================================================
<p>| C++ | 523.xalancbmk_r(peak) |
|-------------------------------|
| Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.243 Build 20190416 |
| Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |</p>
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<p>| Fortran | 548.exchange2_r(base, peak) |
|-------------------------------|
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| Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |</p>
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Test Date: Nov-2019
Hardware Availability: Sep-2019
Software Availability: Aug-2019

Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-1qkmalloc

C++ benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-1qkmalloc

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Base Optimization Flags (Continued)

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11


C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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: -D_FILE_OFFSET_BITS=64 -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) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass1) -prof-use(pass2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-quantum-size-handle-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-quantum-size-handle-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-quantum-size-handle-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass1) -prof-use(pass2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -quantum-size-handle-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-quantum-size-handle-trans=4 -nstatic-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

The flags files that were used to format this result can be browsed at
### SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DS400TR-54/R/T  
(2.30 GHz, Intel Xeon Gold 5218)  

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You can also download the XML flags sources by saving the following links:


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Tested with SPEC CPU®2017 v1.1.0 on 2019-11-05 11:01:15-0500.  