# SPEC CPU®2017 Integer Speed Result

## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

**DS400TR-54/R**

(2.20 GHz, Intel Xeon Silver 4210)

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### CPU2017 License: 006042

### Test Sponsor: Netweb Pte Ltd

### Tested by: Netweb

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### SPECspeed®2017_int_base = 7.83

### SPECspeed®2017_int_peak = 8.02

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>5.56</td>
<td>6.33</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>7.45</td>
<td>7.78</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>5.14</td>
<td>10.1</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>5.16</td>
<td>10.4</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>10.1</td>
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</tr>
<tr>
<td>625.x264_s</td>
<td>11.2</td>
<td>17.2</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4.51</td>
<td>4.31</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>3.81</td>
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<tr>
<td>648.exchange2_s</td>
<td>11.3</td>
<td>11.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>18.4</td>
<td>18.6</td>
</tr>
</tbody>
</table>

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### Hardware

**CPU Name:** Intel Xeon Silver 4210

**Max MHz:** 3200

**Nominal:** 2200

**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 SSD

**Other:** None

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### Software

**OS:** CentOS Linux release 7.7.1908 (Core)

**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

**Parallel:** Yes

**Compiler:** Version 3.1a released Jun-2019

**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:** None
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(2.20 GHz, Intel Xeon Silver 4210)

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**CPU2017 License:** 006042  **Test Sponsor:** Netweb Pte Ltd  **Hardware Availability:** Sep-2019

**Tested by:** Netweb  **Software Availability:** Aug-2019

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<td>648.exchange2_s</td>
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<td>18.4</td>
<td>331</td>
<td>18.7</td>
<td>333</td>
<td>18.6</td>
</tr>
</tbody>
</table>

### Compiler Notes

SPEC has learned that this result, which used an evaluation compiler, was submitted contrary to the compiler license terms. Intel has granted a one-time waiver for this result.

### 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/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
- `OMP_STACKSIZE = "192M"

### 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
```
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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**DS400TR-54/R**  
(2.20 GHz, Intel Xeon Silver 4210)

**SPECspeed®2017_int_base = 7.83**  
**SPECspeed®2017_int_peak = 8.02**

<table>
<thead>
<tr>
<th>CPU2017 License: 006042</th>
<th>Test Date: Nov-2019</th>
</tr>
</thead>
<tbody>
<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>
</tr>
</tbody>
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---

**General Notes (Continued)**

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.


---

**Platform Notes**

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011  
running on NODE2 Mon Nov 4 02:49:39 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz  
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: LittleEndian  
CPU(s): 40  
On-line CPU(s) list: 0-39  
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 4210 CPU @ 2.20GHz

(Continued on next page)
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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Netweb

Platform Notes (Continued)

Stepping: 7
CPU MHz: 999.963
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
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 apic gov tsc_monomies nonstop_tsc
aperfmpref eagerfpu 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 fl64c rdrand lahf_lm abm 3dnowprefetch cpb cat_13 cd p_l3 intel_pni
intel_pt ssbd mba ibrs ibpb ibrs_enhanced hypervisor vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsaves xgetbv1 clqm_llc clqm_occup_llc clqm_mbbm_total clqm_mbbm_local dtherm ida arat pln
pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_lld arch_capabilities

/proc/cpuinfo cache data
  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: 195229 MB
  node 0 free: 190373 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: 196608 MB
  node 1 free: 191955 MB
  node distances:
    node 0  1
    0: 10  21
    1: 21  10

From /proc/meminfo
  MemTotal: 394864784 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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

(Continued on next page)
Tyrone Systems  
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(2.20 GHz, Intel Xeon Silver 4210)  

CENTOS Linux release 7.7.1908 (Core)  

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Platform Notes (Continued)

- 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 NODE2 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86_64 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 3 20:12

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/centos-home xfs 392G 134G 259G 35% /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 hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SM BIOS" standard.

Memory:

(Continued on next page)
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SPECspeed®2017_int_base = 7.83
SPECspeed®2017_int_peak = 8.02

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Test Sponsor: Netweb Pte Ltd
Tested by: Netweb

Platform Notes (Continued)

4x NO DIMM NO DIMM
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933
(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C  Intel(R) 64 Compiler for applications running on Intel(R) 64,
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++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++  Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.243 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

(Continued on next page)
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Test Sponsor: Netweb Pte Ltd
Hardware Availability: Sep-2019
Tested by: Netweb
Software Availability: Aug-2019

Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort -m64

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -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

Base Optimization Flags

C benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

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

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=cl1

C++ benchmarks:
icpc -m64
## Peak Compiler Invocation (Continued)

Fortran benchmarks:

```bash
ifort -m64
```

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -gopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -gopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -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)
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SPECspeed®2017_int_base = 7.83
SPECspeed®2017_int_peak = 8.02

Peak Optimization Flags (Continued)

620.omnetpp_s (continued):
-DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at

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