## SPEC CPU®2017 Integer Speed Result

[Tyrone Systems](#)(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-48RL  
(2.20 GHz, Intel Xeon Gold 5220)

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**SPECspeed®2017_int_base** = 10.1  
**SPECspeed®2017_int_peak** = 10.4

---

### Hardware

- **CPU Name:** Intel Xeon Gold 5220  
- **Max MHz:** 3900  
- **Nominal:** 2200  
- **Enabled:** 36 cores, 2 chips, 2 threads/core  
- **Orderable:** 1, 2 (chip)s  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 24.75 MB I+D on chip per chip  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2667)  
- **Storage:** 1 x 480 GB SSD  
- **Other:** None

### 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  
- **Firmware:** Version V8.101 released Aug-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:** Default

---

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>72</td>
<td>6.84</td>
<td>7.96</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>72</td>
<td>9.78</td>
<td>10.3</td>
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<td>605.mcf_s</td>
<td>72</td>
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<td>620.omnetpp_s</td>
<td>72</td>
<td>7.91</td>
<td>8.90</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>72</td>
<td>12.4</td>
<td>13.5</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>72</td>
<td>14.3</td>
<td>15.4</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>72</td>
<td>5.46</td>
<td>5.46</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>72</td>
<td>4.74</td>
<td>4.75</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>16.2</td>
<td>16.2</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>72</td>
<td>23.3</td>
<td>23.3</td>
</tr>
</tbody>
</table>

---

**CPU2017 License:** 006042  
**Test Date:** Feb-2020  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019  
**Tested by:** Netweb
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DIT400TR-48RL

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>6.83</td>
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<td>407</td>
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<td>402</td>
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<td>207</td>
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<td>623.xalanchmk_s</td>
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<td>114</td>
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<tr>
<td>625.x264_s</td>
<td>72</td>
<td>123</td>
<td>14.3</td>
<td>123</td>
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<td>14.3</td>
<td></td>
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</tr>
<tr>
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<td>263</td>
<td>5.46</td>
<td>262</td>
<td>5.46</td>
<td>263</td>
<td>5.46</td>
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<tr>
<td>641.leela_s</td>
<td>72</td>
<td>359</td>
<td>4.75</td>
<td>360</td>
<td>4.74</td>
<td>360</td>
<td>4.74</td>
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</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>182</td>
<td>16.2</td>
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<td>16.2</td>
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<td>16.1</td>
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<tr>
<td>657.xz_s</td>
<td>72</td>
<td>266</td>
<td>23.2</td>
<td>265</td>
<td>23.3</td>
<td>266</td>
<td>23.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

(Continued on next page)
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SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.4

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.
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 295195f888a3d7edbe46a485a0011
running on NODE2 Thu Feb 6 04:54:41 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) Gold 5220 CPU @ 2.20GHz
   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
   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): 2
   Vendor ID: GenuineIntel
   CPU family: 6
   Model: 85
   Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz

(Continued on next page)
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**SPECspeed®2017_int_base = 10.1**  
**SPECspeed®2017_int_peak = 10.4**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License</td>
<td>006042</td>
</tr>
<tr>
<td>Test Sponsor</td>
<td>Netweb Pte Ltd</td>
</tr>
<tr>
<td>Tested by</td>
<td>Netweb</td>
</tr>
<tr>
<td>Test Date</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Sep-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
Stepping:              7
CPU MHz:               999.963
CPU max MHz:           3900.0000
CPU min MHz:           1000.0000
BogoMIPS:              4400.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              25344K
NUMA node0 CPU(s):     0-17,36-53
NUMA node1 CPU(s):     18-35,54-71
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
                        aperfmperf 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 f16c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 intel_pinn
                        intel_pt ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmm_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 avx512cd avx512bw avx512vl xsaveopt
                        xsaveopt xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln
                        pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear spec_ctrl
                        intel_stibp flush_l1d arch_capabilities
```

/cache size : 25344 KB

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

<table>
<thead>
<tr>
<th>Available</th>
<th>2 nodes (0-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 0 Cpus</td>
<td>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53</td>
</tr>
<tr>
<td>Node 0 Size</td>
<td>195228 MB</td>
</tr>
<tr>
<td>Node 0 Free</td>
<td>165749 MB</td>
</tr>
<tr>
<td>Node 1 Cpus</td>
<td>18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71</td>
</tr>
<tr>
<td>Node 1 Size</td>
<td>196608 MB</td>
</tr>
<tr>
<td>Node 1 Free</td>
<td>169205 MB</td>
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<tr>
<td>Node Distances:</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0: 10 21</td>
<td></td>
</tr>
<tr>
<td>1: 21 10</td>
<td></td>
</tr>
</tbody>
</table>

From /proc/meminfo

| MemTotal | 394858872 kB |
| HugePages_Total | 0 |

(Continued on next page)
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SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.4

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

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 NODE2 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86_64 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 Feb 4 13:47

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/centos-home xfs 392G 148G 245G 38% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. V8.101 08/02/2019
Vendor: Tyrone Systems
Product: DIT400TR-48RL
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 (Continued on next page)
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:
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

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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=c11

(Continued on next page)
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Peak Compiler Invocation (Continued)

C++ benchmarks:
  icpc -m64

Fortran benchmarks:
  ifort -m64

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlb benchmark_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
-/-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
-/-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
-/-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
-/-usr/local/je5.0.1-64/lib -ljemalloc

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

C++ benchmarks:

(Continued on next page)
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Tested by: Netweb

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.4

Peak Optimization Flags (Continued)

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
-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
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/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.

Tested with SPEC CPU®2017 v1.1.0 on 2020-02-06 04:54:40-0500.
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