



# SPEC CPU®2017 Integer Speed Result

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## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

### AD400TR-28/R/T

(2.20 GHz, Intel Xeon Silver 4210)

SPECspeed®2017\_int\_base = 7.88

SPECspeed®2017\_int\_peak = 8.06

CPU2017 License: 006042

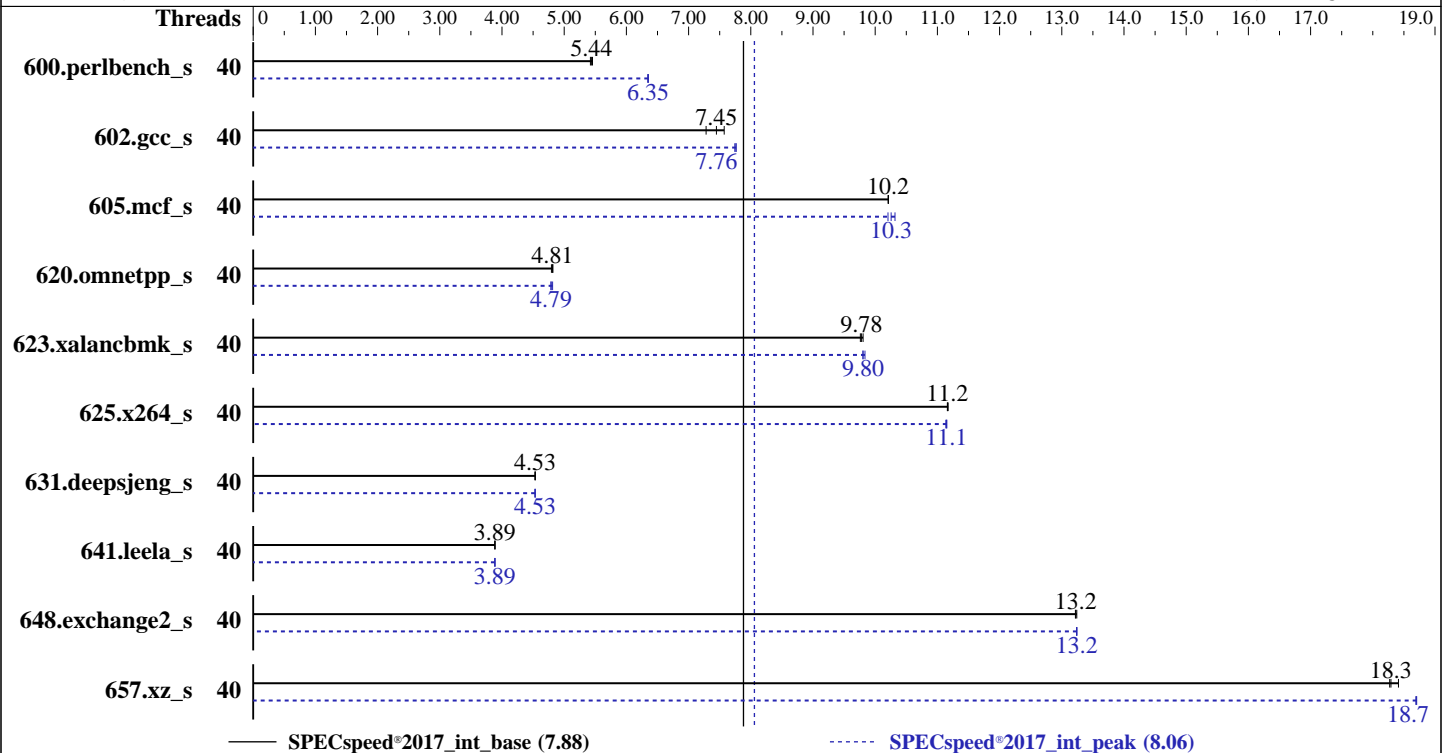
Test Sponsor: Netweb Pte Ltd

Tested by: Netweb

Test Date: Oct-2019

Hardware Availability: Sep-2019

Software Availability: Aug-2019



### 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

### Software

OS: CentOS Linux release 7.7.1908 (Core) 3.10.0-1062.el7.x86\_64  
 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 5.14 released May-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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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	40	<b>326</b>	<b>5.44</b>	325	5.46	327	5.42	40	280	6.34	279	6.35	<b>280</b>	<b>6.35</b>
602.gcc_s	40	<b>535</b>	<b>7.45</b>	526	7.57	547	7.28	40	<b>513</b>	<b>7.76</b>	513	7.76	514	7.74
605.mcf_s	40	<b>462</b>	<b>10.2</b>	462	10.2	462	10.2	40	458	10.3	463	10.2	<b>460</b>	<b>10.3</b>
620.omnetpp_s	40	340	4.79	338	4.82	<b>339</b>	<b>4.81</b>	40	<b>340</b>	<b>4.79</b>	341	4.79	339	4.81
623.xalancbmk_s	40	145	9.76	145	9.81	<b>145</b>	<b>9.78</b>	40	<b>145</b>	<b>9.80</b>	145	9.80	144	9.84
625.x264_s	40	<b>158</b>	<b>11.2</b>	158	11.2	158	11.2	40	<b>158</b>	<b>11.1</b>	158	11.1	158	11.2
631.deepsjeng_s	40	316	4.53	316	4.53	<b>316</b>	<b>4.53</b>	40	316	4.53	316	4.53	<b>316</b>	<b>4.53</b>
641.leela_s	40	<b>439</b>	<b>3.89</b>	439	3.89	439	3.89	40	439	3.89	<b>439</b>	<b>3.89</b>	439	3.89
648.exchange2_s	40	222	13.2	222	13.2	<b>222</b>	<b>13.2</b>	40	222	13.2	222	13.2	<b>222</b>	<b>13.2</b>
657.xz_s	40	<b>338</b>	<b>18.3</b>	338	18.3	336	18.4	40	331	18.7	<b>331</b>	<b>18.7</b>	330	18.7

SPECspeed®2017\_int\_base = **7.88**

SPECspeed®2017\_int\_peak = **8.06**

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

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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.  
jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, 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 NODE2 Sun Oct 13 04:46:00 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) 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: Little Endian  
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

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## 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 xtopology nonstop_tsc
aperfperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 sse3 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 3dnowprefetch epb cat_l3 cdp_l3 intel_ppin
intel_pt 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 avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_l1d 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: 195240 MB
node 0 free: 174050 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: 177487 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

```
From /proc/meminfo
MemTotal: 394858364 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

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

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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
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 Oct 11 15:48

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. 5.14 05/16/2019

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
```

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## Platform Notes (Continued)

(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

Fortran benchmarks:  
ifort -m64



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## 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:

```
-Wl,-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:

```
-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
```

### 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
```

### C++ benchmarks:

```
icpc -m64
```

### Fortran benchmarks:

```
ifort -m64
```



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## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -w1, -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 -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
602.gcc_s: -w1, -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: -w1, -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 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
625.x264_s: -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
```

```
657.xz_s: -w1, -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 -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
620.omnetpp_s: -w1, -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: -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
```

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## Peak Optimization Flags (Continued)

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/Intel-ic19.0u1-official-linux64.2019-07-15.html>

<http://www.spec.org/cpu2017/flags/Default-Platform-Flags.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-15.xml>

<http://www.spec.org/cpu2017/flags/Default-Platform-Flags.xml>

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