SPEC CPU®2017 Integer Speed Result

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Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

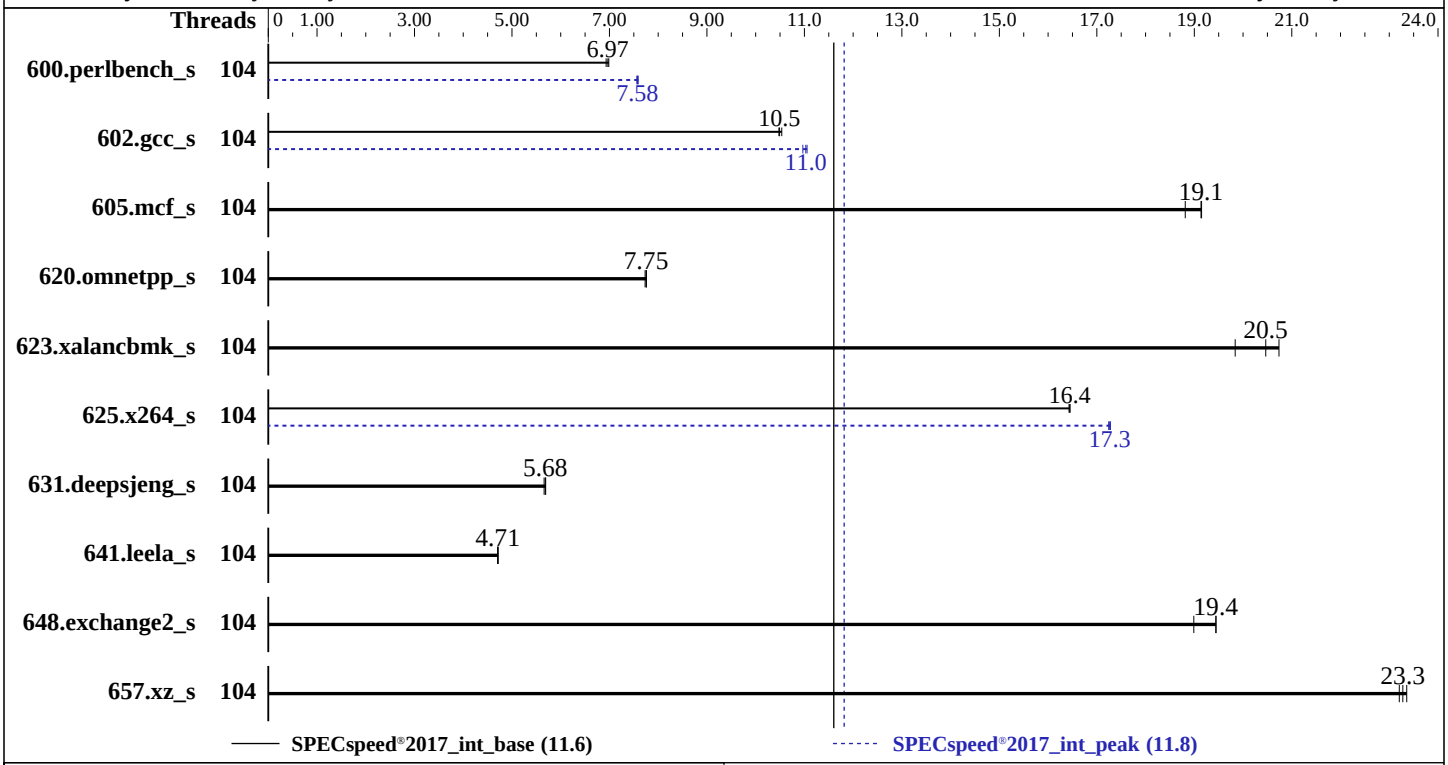
Tyrone Camarero IDI100C2R-28
(2.20 GHz,Intel Xeon Gold 5320)

SPECspeed®2017_int_base = 11.6

SPECspeed®2017_int_peak = 11.8

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

Test Date: Sep-2022
Hardware Availability: Apr-2021
Software Availability: May-2022



Hardware

CPU Name:	Intel Xeon Gold 5320
Max MHz:	3400
Nominal:	2200
Enabled:	52 cores, 2 chips, 2 threads/core
Orderable:	1,2 Chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1.25 MB I+D on chip per core
L3:	39 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
Storage:	1 x 512 GB NVMe SSD
Other:	None

Software

OS:	Red Hat Enterprise Linux release 8.5 (Ootpa) Kernel 4.18.0-348.el8.x86_64
Compiler:	C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel:	Yes
Firmware:	Version SE5C620.86B.01.01.0004.2110190142 released Oct-2021
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:	BIOS and OS set to prefer performance at the cost of additional power usage.

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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	104	254	6.99	256	6.93	**255**	**6.97**	104	235	7.56	234	7.59	**234**	**7.58**
602.gcc_s	104	380	10.5	**380**	**10.5**	378	10.5	104	**361**	**11.0**	360	11.1	363	11.0
605.mcf_s	104	**247**	**19.1**	247	19.1	251	18.8	104	**247**	**19.1**	247	19.1	251	18.8
620.omnetpp_s	104	210	7.76	211	7.73	**210**	**7.75**	104	210	7.76	211	7.73	**210**	**7.75**
623.xalancbmk_s	104	71.4	19.8	**69.2**	**20.5**	68.3	20.7	104	71.4	19.8	**69.2**	**20.5**	68.3	20.7
625.x264_s	104	107	16.4	107	16.4	**107**	**16.4**	104	102	17.2	102	17.3	**102**	**17.3**
631.deepsjeng_s	104	252	5.69	253	5.66	**252**	**5.68**	104	252	5.69	253	5.66	**252**	**5.68**
641.leela_s	104	362	4.71	**362**	**4.71**	362	4.72	104	362	4.71	**362**	**4.71**	362	4.72
648.exchange2_s	104	155	19.0	**151**	**19.4**	151	19.4	104	155	19.0	**151**	**19.4**	151	19.4
657.xz_s	104	266	23.2	265	23.4	**266**	**23.3**	104	266	23.2	265	23.4	**266**	**23.3**

SPECspeed®2017_int_base = **11.6**

SPECspeed®2017_int_peak = **11.8**

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

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
 Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
 memory using Red Hat Enterprise Linux 8.4
 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>
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.
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.
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 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

```
BIOS Settings:
Power Technology = Custom
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
KTI Prefetch = Enable
LLC Dead Line Alloc = Disable
Hyper-Threading = Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on icelakespec Thu Sep 29 00:45:35 2022

 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 5320 CPU @ 2.20GHz
       2  "physical id"s (chips)
       104 "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 : 26
       siblings  : 52
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
       25
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
       25

 From lscpu from util-linux 2.32.1:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              104
      On-line CPU(s) list: 0-103
      Thread(s) per core:  2
      Core(s) per socket:  26
      Socket(s):           2
      NUMA node(s):        4
      Vendor ID:           GenuineIntel
```

(Continued on next page)

Platform Notes (Continued)

```
      BIOS Vendor ID:      Intel(R) Corporation
      CPU family:          6
      Model:               106
      Model name:          Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
      BIOS Model name:     Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
      Stepping:            6
      CPU MHz:             2201.000
      CPU max MHz:         2201.0000
      CPU min MHz:         800.0000
      BogoMIPS:            4400.00
      Virtualization:      VT-x
      L1d cache:           48K
      L1i cache:           32K
      L2 cache:            1280K
      L3 cache:            39936K
      NUMA node0 CPU(s):   0-12,52-64
      NUMA node1 CPU(s):   13-25,65-77
      NUMA node2 CPU(s):   26-38,78-90
      NUMA node3 CPU(s):   39-51,91-103
      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
      aperfmperf 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 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd
      mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust sgx bmi1 hle avx2 smep bmi2
      erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
      intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
      cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat
      pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
      avx512_bitalg tme avx512_vpopcntdq la57 rdpid sgx_lc fsrm md_clear pconfig flush_l1d
      arch_capabilities

  /proc/cpuinfo cache data
     cache size : 39936 KB

  From numactl --hardware
  WARNING: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 52 53 54 55 56 57 58 59 60 61 62 63 64
    node 0 size: 257629 MB
    node 0 free: 239898 MB
    node 1 cpus: 13 14 15 16 17 18 19 20 21 22 23 24 25 65 66 67 68 69 70 71 72 73 74 75 76
    77
    node 1 size: 258042 MB
    node 1 free: 243264 MB
    node 2 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 78 79 80 81 82 83 84 85 86 87 88 89
    90
    node 2 size: 258042 MB
    node 2 free: 242569 MB
    node 3 cpus: 39 40 41 42 43 44 45 46 47 48 49 50 51 91 92 93 94 95 96 97 98 99 100 101
    102 103
    node 3 size: 258039 MB
    node 3 free: 242926 MB
    node distances:
    node   0   1   2   3
      0:  10  11  20  20
      1:  11  10  20  20
      2:  20  20  10  11
      3:  20  20  11  10
```

(Continued on next page)

Platform Notes (Continued)

```
From /proc/meminfo
   MemTotal:       1056515928 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/sbin/tuned-adm active
    Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
   performance

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.5 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.5"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.5 (Ootpa)"
      ANSI_COLOR="0;31"
   redhat-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
   system-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

uname -a:
   Linux icelakespec 4.18.0-348.el8.x86_64 #1 SMP Mon Oct 4 12:17:22 EDT 2021 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                        Not affected
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/swapgs
                                                       barriers and __user pointer
                                                       sanitization
CVE-2017-5715 (Spectre variant 2):                     Mitigation: Enhanced IBRS, IBPB:
                                                       conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

run-level 3 Sep 28 01:35

SPEC is set to: /home/cpu2017
   Filesystem           Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   402G  214G  189G  54% /home

From /sys/devices/virtual/dmi/id
    Vendor:         Tyrone_Systems
    Product:        Tyrone_Camarero_IDI100C2R-28
    Product Family: Family
    Serial:         2X22462203

Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you
```

(Continued on next page)

Platform Notes (Continued)

```
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:
    16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933

BIOS:
   BIOS Vendor:       Intel Corporation
   BIOS Version:      SE5C620.86B.01.01.0004.2110190142
   BIOS Date:         10/19/2021

(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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
        | 641.leela_s(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 648.exchange2_s(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

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:
`-m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

C++ benchmarks:
`-m64 -g -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Fortran benchmarks:
`-m64 -g -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Peak Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -m64 -g -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-strict-overflow -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

602.gcc_s: -m64 -g -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-ICX-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-ICX-revA.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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