SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology

$SPECspeed®2017\_int\_base = 10.8$

ThinkSystem SR850P
(2.10 GHz, Intel Xeon Gold 6238)

$SPECspeed®2017_int_peak = $ Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Nov-2020
Hardware Availability: Jun-2020
Software Availability: Apr-2020

Threads

Benchmark	Threads	Score
600.perlbench_s	88	6.35
602.gcc_s	88	9.87
605.mcf_s	88	17.6
620.omnetpp_s	88	10.3
623.xalancbmk_s	88	12.8
625.x264_s	88	15.3
631.deepsjeng_s	88	5.49
641.leela_s	88	4.53
648.exchange2_s	88	15.6
657.xz_s	88	23.9

SPECspeed®2017_int_base (10.8)

Hardware

CPU Name: Intel Xeon Gold 6238
 Max MHz: 3700
 Nominal: 2100
Enabled: 88 cores, 4 chips
Orderable: 4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 30.25 MB I+D on chip per chip
 Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux 8.0
 (Ootpa)
 Kernel 4.18.0-80.el8.x86_64
Compiler: C/C++: Version 19.1.1.217 of Intel
 C/C++
 Compiler for Linux;
 Fortran: Version 19.1.1.217 of
 Intel Fortran
 Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE156L 2.61 released May-2020
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost of additional power usage

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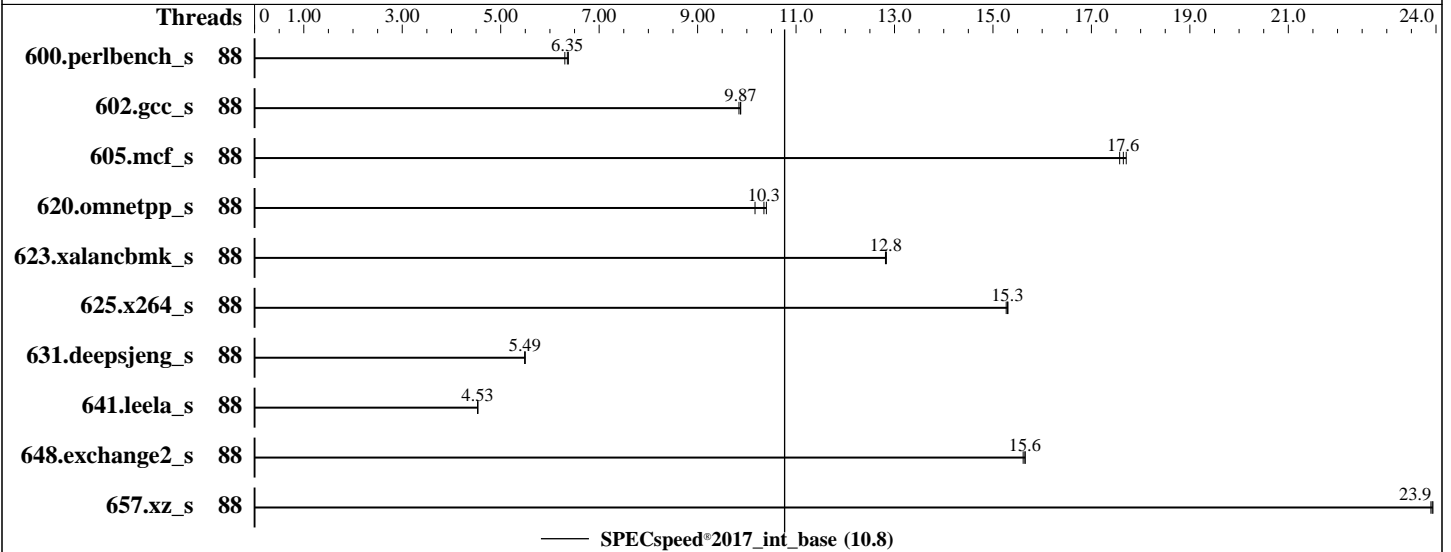
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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	88	**279**	**6.35**	282	6.30	278	6.37							
602.gcc_s	88	405	9.84	403	9.87	**403**	**9.87**							
605.mcf_s	88	269	17.6	267	17.7	**267**	**17.6**							
620.omnetpp_s	88	157	10.4	160	10.2	**158**	**10.3**							
623.xalancbmk_s	88	110	12.8	**110**	**12.8**	111	12.8							
625.x264_s	88	115	15.3	116	15.3	**115**	**15.3**							
631.deepsjeng_s	88	261	5.49	261	5.50	**261**	**5.49**							
641.leela_s	88	**376**	**4.53**	377	4.53	376	4.54							
648.exchange2_s	88	188	15.7	188	15.6	**188**	**15.6**							
657.xz_s	88	**258**	**23.9**	258	23.9	259	23.9							
SPECspeed®2017_int_base =		**10.8**												
SPECspeed®2017_int_peak =		**Not Run**												

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

Compiler Notes

```
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
```

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/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j
    e5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
```

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Test Date: Nov-2020
Hardware Availability: Jun-2020
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General Notes (Continued)

```
 sync; echo 3>      /proc/sys/vm/drop_caches
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

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
Patrol Scrub set to Disable
LLC dead line alloc set to Disable

 Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on localhost.localdomain Thu Nov  5 21:19:41 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 6238 CPU @ 2.10GHz
       4  "physical id"s (chips)
       88 "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 : 22
       siblings  : 22
       physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
       physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
       physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
       physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

 From lscpu:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
     Byte Order:          Little Endian
```

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Platform Notes (Continued)

```
          CPU(s):              88
          On-line CPU(s) list: 0-87
          Thread(s) per core:  1
          Core(s) per socket:  22
          Socket(s):           4
          NUMA node(s):        4
          Vendor ID:           GenuineIntel
          CPU family:          6
          Model:               85
          Model name:          Intel(R) Xeon(R) Gold 6238 CPU @ 2.10GHz
          Stepping:            7
          CPU MHz:             1391.252
          CPU max MHz:         3700.0000
          CPU min MHz:         1000.0000
          BogoMIPS:            4200.00
          Virtualization:      VT-x
          L1d cache:           32K
          L1i cache:           32K
          L2 cache:            1024K
          L3 cache:            30976K
          NUMA node0 CPU(s):   0-21
          NUMA node1 CPU(s):   22-43
          NUMA node2 CPU(s):   44-65
          NUMA node3 CPU(s):   66-87
          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 cdp_l3
          invpcid_single intel_ppin 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 intel_pt avx512cd
          avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
          cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d
          arch_capabilities

 /proc/cpuinfo cache data
    cache size : 30976 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 13 14 15 16 17 18 19 20 21
    node 0 size: 386683 MB
    node 0 free: 386110 MB
    node 1 cpus: 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
```

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CPU2017 License: 9017
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Test Date: Nov-2020
Hardware Availability: Jun-2020
Software Availability: Apr-2020

Platform Notes (Continued)

```
   node 1 size: 387042 MB
   node 1 free: 386601 MB
   node 2 cpus: 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
   node 2 size: 387067 MB
   node 2 free: 385988 MB
   node 3 cpus: 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
   node 3 size: 387066 MB
   node 3 free: 386157 MB
   node distances:
   node   0   1   2   3
     0:  10  21  21  21
     1:  21  10  21  21
     2:  21  21  10  21
     3:  21  21  21  10

 From /proc/meminfo
    MemTotal:       1585009152 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.0 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.0"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga

 uname -a:
    Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 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:         No status reported
 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: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2):        Mitigation: Enhanced IBRS, IBPB: conditional,
```

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Platform Notes (Continued)

```
                              RSB filling

  run-level 3 Nov 5 18:43

  SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda4       xfs   839G   22G  817G   3% /home

  From /sys/devices/virtual/dmi/id
     BIOS:    Lenovo -[TEE156L-2.61]- 05/20/2020
     Vendor:  Lenovo
     Product: ThinkSystem SR850P -[7D2HCTO1WW]-
     Product Family: ThinkSystem
     Serial:  1234567890


  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:
       48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C        | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
         | 625.x264_s(base) 657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++      | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
         | 641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base)
```

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CPU2017 License: 9017	**Test Date:** Nov-2020
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Jun-2020
Tested by: Lenovo Global Technology	**Software Availability:** Apr-2020

Compiler Version Notes (Continued)

```
-------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
-------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icc`

C++ benchmarks:
`icpc`

Fortran benchmarks:
`ifort`

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 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:
```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
```

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml

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

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