# SPEC® CPU2017 Integer Speed Result

**Lenovo Global Technology**  
ThinkSystem SR950  
(2.30 GHz, Intel Xeon Gold 5218N)

| SPEC Speed2017_int_base = 9.56 | SPEC Speed2017_int_peak = Not Run |

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jul-2019</th>
<th><strong>Hardware Availability:</strong> Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
<td></td>
</tr>
</tbody>
</table>

## Threads

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base (9.56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
</tr>
<tr>
<td>660.perlbench_s</td>
</tr>
<tr>
<td>602.gcc_s</td>
</tr>
<tr>
<td>605.mcf_s</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
</tr>
<tr>
<td>625.x264_s</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
</tr>
<tr>
<td>641.leela_s</td>
</tr>
<tr>
<td>648.exchange2_s</td>
</tr>
<tr>
<td>657.xz_s</td>
</tr>
</tbody>
</table>

## Hardware

**CPU Name:** Intel Xeon Gold 5218N  
**Max MHz.:** 3700  
**Nominal:** 2300  
**Enabled:** 64 cores, 4 chips  
**Orderable:** 2,3,4 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 22 MB I+D on chip per chip  
**Other:** None  
**Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)  
**Storage:** 1 x 800 GB SATA SSD  
**Other:** None

## Software

**OS:** SUSE Linux Enterprise Server 15 (x86_64)  
**Kernel:** 4.12.14-25.13-default  
**Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version PSE122N 1.50 released May-2019 tested as PSE121N 1.50 Apr-2019  
**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
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SPECspeed2017_int_base = 9.56
SPECspeed2017_int_peak = Not Run

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>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>9.07</td>
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<td>9.08</td>
<td>438</td>
<td>9.10</td>
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<td>605.mcf_s</td>
<td>64</td>
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<td>11.9</td>
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<td>12.0</td>
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<td>12.2</td>
<td>115</td>
<td>12.3</td>
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<tr>
<td>625.x264_s</td>
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<td>11.5</td>
<td>153</td>
<td>11.5</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>5.34</td>
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<td>5.34</td>
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<td>5.34</td>
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<tr>
<td>641.leela_s</td>
<td>64</td>
<td>359</td>
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<td>4.75</td>
<td>359</td>
<td>4.75</td>
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<tr>
<td>648.exchange2_s</td>
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<td>14.1</td>
<td>211</td>
<td>13.9</td>
<td>209</td>
<td>14.1</td>
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<tr>
<td>657.xz_s</td>
<td>64</td>
<td>260</td>
<td>23.8</td>
<td>270</td>
<td>22.9</td>
<td>271</td>
<td>22.8</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 9.56
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
OMP_STACKSIZE = "192M"

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

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) 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

(Continued on next page)
General Notes (Continued)


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Autonomous
Hyper-Threading set to Disable
Trusted Execution Technology set to Enable
DCU Streamer Prefetcher set to Disable
MONITOR/MWAIT set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0ul/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-ull8 Tue Jul 23 09:59:50 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) Gold 5218N CPU @ 2.30GHz
    4 "physical id"s (chips)
    64 "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 : 16
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
    Architecture:         x86_64
    CPU op-mode(s):       32-bit, 64-bit
    Byte Order:           Little Endian
    CPU(s):               64
    On-line CPU(s) list:  0-63
    Thread(s) per core:   1
    Core(s) per socket:   16
    Socket(s):            4
    NUMA node(s):         4
    Vendor ID:            GenuineIntel
    CPU family:           6
    Model:                85

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Hardware Availability: Apr-2019
Software Availability: Nov-2018

Model name: Intel(R) Xeon(R) Gold 5218N CPU @ 2.30GHz
Stepping: 6
CPU MHZ: 2300.000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
NUMA node2 CPU(s): 32-47
NUMA node3 CPU(s): 48-63

Flags: fpu vme de pse tsc msr pae mce 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

/proc/cpuinfo cache data
   cache size : 22528 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
   node 0 size: 193118 MB
   node 0 free: 189632 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
   node 1 size: 193515 MB
   node 1 free: 193280 MB
   node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
   node 2 size: 193515 MB
   node 2 free: 192954 MB
   node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
   node 3 size: 193483 MB
   node 3 free: 193258 MB
   node distances:
      node 0 1 2 3
      0: 10 31 21 21
      1: 31 10 21 21

(Continued on next page)
**Platform Notes (Continued)**

2: 21 21 10 31
3: 21 21 31 10

From /proc/meminfo
MemTotal: 792200080 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
  os-release:
  NAME="SLES"
  VERSION="15"
  VERSION_ID="15"
  PRETTY_NAME="SUSE Linux Enterprise Server 15"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,
IBPB, IBRS_FW

run-level 3 Jul 23 09:59

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
  Filesystem   Type      Size  Used Avail Use% Mounted on
  /dev/sda2      xfs   744G   33G  711G   5% /

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.
BIOS Lenovo -[PSE121N-1.50]- 04/22/2019
Memory:
  48x NO DIMM NO DIMM
  48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
     657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
     641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  648.exchange2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

600.perlbench_s: -D$SPEC_LP64 -D$SPEC_LINUX_X64
602.gcc_s: -D$SPEC_LP64
605.mcf_s: -D$SPEC_LP64
620.omnetpp_s: -D$SPEC_LP64

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Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leetcode_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_2019.1.144/linux/compiler/lib/intel64
- lqkmalloc

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.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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