## SPEC CPU®2017 Integer Speed Result

**Lenovo Global Technology**  
ThinkSystem SR850  
(1.90 GHz, Intel Xeon Gold 5220T)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 10.1</td>
<td>= Not Run</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5220T  
- **Max MHz:** 3900  
- **Nominal:** 1900  
- **Enabled:** 72 cores, 4 chips, 2 threads/core  
- **Orderable:** 2.4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 24.75 MB I+D on chip per chip  
- **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 12 SP4 (x86_64)  
  Kernel 4.12.14-94.41-default  
- **Compiler:**  
  C/C++: Version 19.0.4.227 of Intel  
  C/C++ Compiler for Linux;  
  Fortran: Version 19.0.4.227 of Intel Fortran  
  Compiler for Linux
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE142E 2.30 released Aug-2019  
  tested as TEE141E 2.30 Jul-2019  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** --

---

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Sep-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>144</td>
<td>6.83</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>144</td>
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<td>605.mcf_s</td>
<td>144</td>
<td>12.4</td>
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<td>620.omnetpp_s</td>
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<tr>
<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
<td>144</td>
<td>14.3</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>144</td>
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<td>641.leea_s</td>
<td>144</td>
<td>4.77</td>
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<tr>
<td>648.exchange2_s</td>
<td>144</td>
<td>16.6</td>
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<tr>
<td>657.xz_s</td>
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<td>24.5</td>
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ThinkSystem SR850  
(1.90 GHz, Intel Xeon Gold 5220T)  
Copyright 2017-2019 Standard Performance Evaluation Corporation  
https://www.spec.org/
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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</tbody>
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**SPECspeed®2017_int_base** = 10.1  
**SPECspeed®2017_int_peak** = Not Run

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-ic19.0u4/lib/intel64"
  - LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
  - OMP_STACKSIZE = "192M"
- Binaries compiled on a system with 1x Intel Core i9-799X 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)
Lenovo Global Technology
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = Not Run

Test Date: Sep-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

General Notes (Continued)

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-States set to Legacy
Trusted Execution Technology set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-hxhl Fri Sep 20 16:27:46 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 5220T CPU @ 1.90GHz
  4 "physical id"s (chips)
  144 "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
  physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 3: 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): 144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220T CPU @ 1.90GHz
Stepping: 7
CPU MHz: 1900.000

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR850
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SPECspeak®2017_int_base = 10.1
SPECspeak®2017_int_peak = Not Run

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

Platform Notes (Continued)

CPU max MHz: 3900.0000
CPU min MHz: 800.0000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,72-89
NUMA node1 CPU(s): 18-35,90-107
NUMA node2 CPU(s): 36-53,108-125
NUMA node3 CPU(s): 54-71,126-143
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 rdtsscp
lm constant_tsc arch_perfmon pebs rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref perf counter monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pcd pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invVPcid_single intel_ppln ssbd mba ibrs ibpb stibp tpr_shadow vmx flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cmx mxrd a
vxv512f avx512dq rsei adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cmq _llc cmq _occup _llc cmq _mb _total cmq _mb _local
dtherm ida arat pts pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size: 25344 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 72 73 74 75 76 77 78 79 80 81
  82 83 84 85 86 87 88 89
  node 0 size: 193097 MB
  node 0 free: 192252 MB
  node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 90 91 92 93 94 95 96
  97 98 99 100 101 102 103 104 105 106 107
  node 1 size: 193097 MB
  node 1 free: 192252 MB
  node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 108 109 110 111 112
  113 114 115 116 117 118 119 120 121 122 123 124 125
  node 2 size: 193097 MB
  node 2 free: 193097 MB
  node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 126 127 128 129 130
  131 132 133 134 135 136 137 138 139 140 141 142 143
  node 3 size: 193097 MB
  node 3 free: 193097 MB
  node distances:

(Continued on next page)
# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

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<tr>
<th>SPECspeed®2017_int_base</th>
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<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Sep-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019

### Platform Notes (Continued)

```
node  0  1  2  3
 0:  10  21  21  31
 1:  21  10  31  21
 2:  21  31  10  21
 3:  31  21  21  10
```

From /proc/meminfo  
MemTotal: 792219312 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  
SuSE-release:  
  SUSE Linux Enterprise Server 12 (x86_64)  
  VERSION = 12  
  PATCHLEVEL = 4  
  # This file is deprecated and will be removed in a future service pack or release.  
  # Please check /etc/os-release for details about this release.  

os-release:  
  NAME="SLES"  
  VERSION="12-SP4"  
  VERSION_ID="12.4"  
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"  
  ID="sles"  
  ANSI_COLOR="0;32"  
  CPE_NAME="cpe:/o:suse:sles:12:sp4"

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 Sep 20 16:26

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4  
  Filesystem Type Size Used Avail Use% Mounted on  
  /dev/sda2 btrfs 744G 40G 704G 6% /home

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

(Continued on next page)
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CPU2017 License: 9017
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Test Date: Sep-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
BIOS Lenovo -[TEE141E-2.30]- 07/02/2019
Memory:
48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(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 Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-------------------------------------------------------------------------------

-------------------------------------------------------------------------------
Fortran 648.exchange2_s(base)
-------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-------------------------------------------------------------------------------

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,multidefs -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,multidefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/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-F.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-F.xml