## Lenovo Global Technology

**ThinkSystem SR950**  
(3.60 GHz, Intel Xeon Gold 6244)

<table>
<thead>
<tr>
<th>SPECsTapTest2017_int_base =</th>
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<tbody>
<tr>
<td>SPECsTapTest2017_int_peak =</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

### Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>32</td>
<td>0.741</td>
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<tr>
<td>602.gcc_s</td>
<td>32</td>
<td>10.5</td>
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<tr>
<td>605.mcf_s</td>
<td>32</td>
<td>13.8</td>
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<tr>
<td>620.omnetpp_s</td>
<td>32</td>
<td>8.47</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>32</td>
<td>13.8</td>
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<tr>
<td>625.x264_s</td>
<td>32</td>
<td>5.98</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>32</td>
<td>5.38</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>32</td>
<td>15.9</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>25.2</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
<td></td>
</tr>
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</table>

**SPECspeed2017_int_base (11.0)**

### Hardware

**CPU Name:** Intel Xeon Gold 6244  
**Max MHz.:** 4400  
**Nominal:** 3600  
**Enabled:** 32 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:** 24.75 MB I+D on chip per chip  
**Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R)  
**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 PSE121I 1.50 Mar-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
Lenovo Global Technology
ThinkSystem SR950
(3.60 GHz, Intel Xeon Gold 6244)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<tr>
<td>625.x264_s</td>
<td>32</td>
<td>116</td>
<td>15.3</td>
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<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
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<td>15.8</td>
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<td>15.9</td>
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<tr>
<td>657.xz_s</td>
<td>32</td>
<td>245</td>
<td>25.3</td>
<td>252</td>
<td>24.5</td>
<td>245</td>
<td>25.2</td>
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</tbody>
</table>

SPECSpeed2017_int_base = 11.0
SPECSpeed2017_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-ic19.0u1/lib/intel64"
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)
SPEC CPU2017 Integer Speed Result

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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/cpu2017-1.0.5-1c19.0ul/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64f8e458859ea9
running on linux-jdx4 Tue May 21 09:57:48 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 6244 CPU @ 3.60GHz
4 "physical id"s (chips)
32 "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 : 8
siblings : 8
physical 0: cores 4 8 17 18 19 24 25 27
physical 1: cores 2 3 4 8 17 20 24 26
physical 2: cores 2 4 9 20 24 25 26 27
physical 3: cores 2 3 17 18 19 20 24 25

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
### SPEC CPU2017 Integer Speed Result

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</tbody>
</table>

**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Gold 6244 CPU @ 3.60GHz  
- **Stepping:** 6  
- **CPU MHz:** 3600.000  
- **BogoMIPS:** 7200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 25344K  
- **NUMA node0 CPU(s):** 0-7  
- **NUMA node1 CPU(s):** 8-15  
- **NUMA node2 CPU(s):** 16-23  
- **NUMA node3 CPU(s):** 24-31  
- **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 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 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb 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 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pin pts hwp_epp pku ospke avx512_vnni flush_l1d arch_capabilities

```
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
  node 0 size: 193103 MB
  node 0 free: 189731 MB
  node 1 cpus: 8 9 10 11 12 13 14 15
  node 1 size: 193486 MB
  node 1 free: 193120 MB
  node 2 cpus: 16 17 18 19 20 21 22 23
  node 2 size: 193515 MB
  node 2 free: 193184 MB
  node 3 cpus: 24 25 26 27 28 29 30 31
  node 3 size: 193512 MB
  node 3 free: 193190 MB
  node distances:
    node 0 1 2 3
    0: 10 21 21 21
    1: 21 10 21 21
```

(Continued on next page)
Platform Notes (Continued)

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

From /proc/meminfo
MemTotal:       792184700 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 May 21 09:57

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   744G   22G  723G   3% /

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 -[PSE121I-1.50]- 03/01/2019
  Memory:
    48x NO DIMM NO DIMM
    48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933
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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: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

(Continued on next page)
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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.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 -gopenmp -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.

Tested with SPEC CPU2017 v1.0.5 on 2019-05-20 21:57:48-0400.
Report generated on 2019-08-21 12:09:04 by CPU2017 PDF formatter v6067.
Originally published on 2019-08-20.