## Lenovo Global Technology

**ThinkSystem SR950 (2.20 GHz, Intel Xeon Platinum 8276L)**

<table>
<thead>
<tr>
<th>Software Availability: Nov-2018</th>
<th>Test Sponsor: Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Test Date: May-2019</td>
</tr>
<tr>
<td>CPU2017 License: 9017</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
</tbody>
</table>

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>112</td>
<td>27.0</td>
<td>2.00</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>112</td>
<td>10.5</td>
<td>112</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>112</td>
<td>12.6</td>
<td>14.7</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>112</td>
<td>9.34</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>112</td>
<td>5.54</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>112</td>
<td>4.89</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>112</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>112</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8276L
- **Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R)
- **Storage:** 1 x 800 GB SATA SSD

### Software

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)
- **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
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
### Lenovo Global Technology

**ThinkSystem SR950**  
(2.20 GHz, Intel Xeon Platinum 8276L)

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

**SPECspeed2017_int_base = 10.5**  
**SPECspeed2017_int_peak = Not Run**

<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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>112</td>
<td>257</td>
<td>6.91</td>
<td>256</td>
<td>6.92</td>
<td>257</td>
<td>6.91</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>112</td>
<td>385</td>
<td>10.3</td>
<td>390</td>
<td>10.2</td>
<td>397</td>
<td>10.0</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>112</td>
<td>366</td>
<td>12.9</td>
<td>367</td>
<td>12.9</td>
<td>365</td>
<td>12.9</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>112</td>
<td>176</td>
<td>9.27</td>
<td>175</td>
<td>9.34</td>
<td>173</td>
<td>9.44</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>112</td>
<td>112</td>
<td>12.7</td>
<td>113</td>
<td>12.6</td>
<td>112</td>
<td>12.6</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>112</td>
<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>112</td>
<td>258</td>
<td>5.55</td>
<td>259</td>
<td>5.54</td>
<td>259</td>
<td>5.54</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>112</td>
<td>349</td>
<td>4.89</td>
<td>349</td>
<td>4.88</td>
<td>349</td>
<td>4.89</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>112</td>
<td>203</td>
<td>14.5</td>
<td>203</td>
<td>14.5</td>
<td>203</td>
<td>14.5</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>112</td>
<td>242</td>
<td>25.6</td>
<td>236</td>
<td>26.2</td>
<td>243</td>
<td>25.5</td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 10.5**  
**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 = "$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)
Lenovo Global Technology
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECspeed2017_int_base = 10.5
SPECspeed2017_int_peak = Not Run

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-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-jdx4 Thu May 16 08:57:40 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) Platinum 8276L CPU @ 2.20GHz
  4 "physical id"s (chips)
  112 "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 : 28
siblings : 28
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
  physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture:       x86_64
CPU op-mode(s):     32-bit, 64-bit
Byte Order:         Little Endian
CPU(s):             112
On-line CPU(s) list: 0-111
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s):          4

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

**Lenovo Global Technology**  
ThinkSystem SR950  
(2.20 GHz, Intel Xeon Platinum 8276L)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>10.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**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

**Platform Notes (Continued)**

| NUMA node(s): | 4 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz |
| Stepping: | 6 |
| CPU MHz: | 2200.000 |
| BogoMIPS: | 4400.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 39424K |
| NUMA node0 CPU(s): | 0-27 |
| NUMA node1 CPU(s): | 28-55 |
| NUMA node2 CPU(s): | 56-83 |
| NUMA node3 CPU(s): | 84-111 |
| Flags: | fpu vme de pse tsc msr pae mca 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 ssbd mba ibrs ibpb tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

From `numactl --hardware`  
Warning: a numactl 'node' might or might not correspond to a physical chip.

```plaintext
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 22 23 24 25 26 27  
node 0 size: 193103 MB  
node 0 free: 189732 MB  
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55  
node 1 size: 193155 MB  
node 1 free: 193170 MB  
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83  
node 2 size: 193155 MB  
node 2 free: 192793 MB  
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105  
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8276L)

SPEC CPU2017 Integers Speed Result

SPECspeed2017_int_base = 10.5
SPECspeed2017_int_peak = Not Run

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

Platform Notes (Continued)

106 107 108 110 111
node 3 size: 193483 MB
node 3 free: 193203 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: 792184700 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
NAME="SLES"
VERSION="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
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 16 08:55

SPEC is set to: /home/cpu2017-1.0.5-i1c19.0u1
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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECspeed2017_int_base = 10.5
SPECspeed2017_int_peak = Not Run

Platform Notes (Continued)

BIOS Lenovo -[PSE121I-1.50]- 03/01/2019
Memory:
48x NO DIMM NO DIMM
48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
Lenovo Global Technology
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECspeed2017_int_base = 10.5
SPECspeed2017_int_peak = Not Run

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

### 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, 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-A.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-A.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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