**SPEC® CPU2017 Integer Speed Result**

**Lenovo Global Technology**

ThinkSystem SN850  
(2.50 GHz, Intel Xeon Gold 5215)

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>Lenovo Global Technology</th>
<th>Hardware Availability:</th>
<th>Apr-2019</th>
</tr>
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<tbody>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base = 8.48</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>80</td>
<td>3.86</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>80</td>
<td>8.38</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>80</td>
<td>11.2</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>80</td>
<td>5.43</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>80</td>
<td>11.0</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>80</td>
<td>11.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>80</td>
<td>4.75</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>80</td>
<td>4.15</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>80</td>
<td>12.2</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

---

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5215</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.:</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2500</td>
</tr>
<tr>
<td>Enabled:</td>
<td>40 cores, 4 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>2.4 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>13.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux Server release 7.6 (Maipo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version IVE135L 2.10 released Jan-2019</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SN850
(2.50 GHz, Intel Xeon Gold 5215)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>80</td>
<td>305</td>
<td>5.81</td>
<td>303</td>
<td>5.86</td>
<td>303</td>
<td>5.87</td>
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<tr>
<td>602.gcc_s</td>
<td>80</td>
<td>471</td>
<td>8.45</td>
<td>475</td>
<td>8.38</td>
<td>476</td>
<td>8.36</td>
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<tr>
<td>605.mcf_s</td>
<td>80</td>
<td>422</td>
<td>11.2</td>
<td>422</td>
<td>11.2</td>
<td>418</td>
<td>11.3</td>
<td></td>
<td></td>
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<tr>
<td>620.omnetpp_s</td>
<td>80</td>
<td>301</td>
<td>5.43</td>
<td>301</td>
<td>5.42</td>
<td>300</td>
<td>5.43</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>80</td>
<td>129</td>
<td>11.0</td>
<td>129</td>
<td>11.0</td>
<td>129</td>
<td>10.9</td>
<td></td>
<td></td>
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<tr>
<td>625.x264_s</td>
<td>80</td>
<td>150</td>
<td>11.7</td>
<td>150</td>
<td>11.8</td>
<td>150</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>80</td>
<td>302</td>
<td>4.75</td>
<td>301</td>
<td>4.75</td>
<td>302</td>
<td>4.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>80</td>
<td>411</td>
<td>4.15</td>
<td>411</td>
<td>4.15</td>
<td>411</td>
<td>4.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>80</td>
<td>240</td>
<td>12.2</td>
<td>241</td>
<td>12.2</td>
<td>240</td>
<td>12.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>80</td>
<td>296</td>
<td>20.9</td>
<td>298</td>
<td>20.8</td>
<td>290</td>
<td>21.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 8.48**
**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

Yes: 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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<tr>
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<th>SPECspeed2017_int_base = 8.48</th>
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<tr>
<td>(2.50 GHz, Intel Xeon Gold 5215)</td>
<td></td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

**General Notes (Continued)**


**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Custom Mode  
Page Policy set to Adaptive  
Trusted Execution Technology set to Enable  
CPU Frequency Limits set to Restrict Maximum Frequency  
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on localhost.localdomain Mon Apr 22 08:00:24 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 5215 CPU @ 2.50GHz  
4 "physical id"s (chips)  
80 "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 : 10  
siblings : 20  
physical 0: cores 0 1 2 3 4 8 9 10 11 12  
physical 1: cores 0 1 2 3 4 8 9 10 11 12  
physical 2: cores 0 1 2 3 4 8 9 10 11 12  
physical 3: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 80  
On-line CPU(s) list: 0-79  
Thread(s) per core: 2  
Core(s) per socket: 10  
Socket(s): 4  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 5215 CPU @ 2.50GHz  
Stepping: 6  
CPU MHz: 2500.000

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

**Lenovo Global Technology**

**ThinkSystem SN850**

*(2.50 GHz, Intel Xeon Gold 5215)*

**SPECspeed2017_int_base = 8.48**

**SPECspeed2017_int_peak = Not Run**

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**Platform Notes (Continued)**

BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0–9, 40–49
NUMA node1 CPU(s): 10–19, 50–59
NUMA node2 CPU(s): 20–29, 60–69
NUMA node3 CPU(s): 30–39, 70–79
Flags: fpu vme de pse tsc msr pae 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 aperfmperf eagerfpu 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 flac rdrand lahf_lm abm 3dnowprefetch cpb cat13 cdp13 intel_pt ssbd mba ibpb ibs ibrs ibs_enhanced tpr_shadow vmni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt cwb avx512cd avx512bw avx512vl xsaveopt xsavecov xgetbv1 cqm_llc cqm_occu llc cqm_mb m_total cqm_mb m_local dtherm ida arat pln pts hwp_epp pku ospke avx512_vnni spec_ctrl intel_stibp flush_lld 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 8 9 40 41 42 43 44 45 46 47 48 49
node 0 size: 392886 MB
node 0 free: 384036 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 50 51 52 53 54 55 56 57 58 59
node 1 size: 393216 MB
node 1 free: 384420 MB
node 2 cpus: 20 21 22 23 24 25 26 27 28 29 60 61 62 63 64 65 66 67 68 69
node 2 size: 393216 MB
node 2 free: 383843 MB
node 3 cpus: 30 31 32 33 34 35 36 37 38 39 70 71 72 73 74 75 76 77 78 79
node 3 size: 393216 MB
node 3 free: 384480 MB
node distances:
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
```

(Continued on next page)
### Lenovo Global Technology

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<tr>
<th>CPU2017 License:</th>
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#### SPEC CPU2017 Integer Speed Result

**SPECspeed2017_int_base = 8.48**  
**SPECspeed2017_int_peak = Not Run**

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### Platform Notes (Continued)

From `/proc/meminfo`
- MemTotal: 1584960420 kB  
- HugePages_Total: 0  
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`
- `os-release`:
  - NAME="Red Hat Enterprise Linux Server"  
  - VERSION="7.6 (Maipo)"  
  - ID="rhel"  
  - ID_LIKE="fedora"  
  - VARIANT="Server"  
  - VARIANT_ID="server"  
  - VERSION_ID="7.6"  
  - PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"

- `redhat-release`: Red Hat Enterprise Linux Server release 7.6 (Maipo)  
- `system-release`: Red Hat Enterprise Linux Server release 7.6 (Maipo)  

- `uname -a`:
  - Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018  
  - 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: Load fences, __user pointer sanitization  
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

- `run-level 3 Apr 22 07:57`
- `SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1`
- `Filesystem Type Size Used Avail Use% Mounted on`
  - `/dev/sdb2` xfs 839G 14G 826G 2% /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 frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS Lenovo -[IVE135L-2.10]- 01/10/2019  
- Memory:  
  - 48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(End of data from `sysinfo` program)
Lenovo Global Technology
ThinkSystem SN850
(2.50 GHz, Intel Xeon Gold 5215)

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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

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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.leea_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
-1/usr/local/je5.0.1-64/lib -1jemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-1qkmalloc

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

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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 2019-04-21 20:00:23-0400.