## Lenovo Global Technology

ThinkSystem SR860  
(2.50 GHz, Intel Xeon Gold 5215)  

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed(^\text{2017_int_base}) = 8.68</th>
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<tbody>
<tr>
<td>Test Date:</td>
<td>Jul-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
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<tr>
<td>Software Availability:</td>
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<table>
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<tr>
<th>CPU2017 License:</th>
<th>9017</th>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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### threads

<table>
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<tr>
<th>Benchmark</th>
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<th>SPECspeed(^\text{2017_int_peak})</th>
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<tr>
<td>600.perbench_s</td>
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<tr>
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<td>11.3</td>
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<td>641.leela_s</td>
<td>4.16</td>
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<tr>
<td>648.exchange2_s</td>
<td>14.5</td>
<td>Not Run</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>20.9</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Hardware

- CPU Name: Intel Xeon Gold 5215
- Max MHz: 3400
- Nominal: 2500
- Enabled: 40 cores, 4 chips
- 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: 13.75 MB I+D on chip per chip
- Other: None
- Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- Storage: 800 GB tmpfs
- 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  
    Fortran: Version 19.0.4.227 of Intel Fortran
- Parallel: Yes
- Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE135T 2.10 Mar-2019
- File System: tmpfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: jemalloc memory allocator V5.0.1
- Power Management: --
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR860
(2.50 GHz, Intel Xeon Gold 5215)

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

SPECspeed®2017_int_base = 8.68
SPECspeed®2017_int_peak = Not Run

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

Results Table

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<tr>
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</table>

SPECspeed®2017_int_base = 8.68
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"
Tmpfs filesystem can be set with:
  mount -t tmpfs -o size=800g tmpfs /home
Process tuning setting:
  echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us
  echo 240000000 > /proc/sys/kernel/sched_latency_ns
  echo 5000000 > /proc/sys/kernel/sched_migration_cost_ns
  echo 100000000 > /proc/sys/kernel/sched_min granularity_ns
  echo 150000000 > /proc/sys/kernel/sched_wakeup granularity_ns

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_TASK = "$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.

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

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<table>
<thead>
<tr>
<th>SPECspeed²017_int_base</th>
<th>8.68</th>
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<tbody>
<tr>
<td>SPECspeed²017_int_peak</td>
<td>Not Run</td>
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</table>

#### General Notes (Continued)

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.  

#### Platform Notes

**BIOS configuration:**  
Choose Operating Mode set to Maximum Performance  
Choose Operating Mode set to Custom Mode  
Hyper-Threading set to Disable  
Adjacent Cache Prefetch set to Disable  
MONITOR/MWAIT set to Enable  
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
runtime on linux-700n Tue Jul 16 02:48:49 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)
  40 "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 : 10
  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): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR860
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Specspeed\textsuperscript{2017} \textsuperscript{int\_peak} = Not Run
Specspeed\textsuperscript{2017} \textsuperscript{int\_base} = 8.68

Platform Notes (Continued)

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
CPU max MHz: 3400.0000
CPU min MHz: 1000.0000
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9
NUMA node1 CPU(s): 10-19
NUMA node2 CPU(s): 20-29
NUMA node3 CPU(s): 30-39
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 rdtscp lm constant_tsc artarch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid single ssmi ibs ibt stibp tpr_shadow vni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erva 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 ssmi ibs ibt stibp tpr_shadow vni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erva 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

From /proc/cpuinfo cache data
cache size: 14080 KB

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
node 0 size: 386671 MB
node 0 free: 383666 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19
node 1 size: 387030 MB
node 1 free: 386727 MB
node 2 cpus: 20 21 22 23 24 25 26 27 28 29
node 2 size: 387059 MB

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

```
node 2 free: 376843 MB
node 3 cpu: 30 31 32 33 34 35 36 37 38 39
node 3 size: 387056 MB
node 3 free: 386785 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
```

From `/proc/meminfo`

```
MemTotal:       1584966168 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 Jul 16 02:43
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
Filesystem Type  Size  Used Avail Use% Mounted on
```

(Continued on next page)
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SPECspeed®2017_int_base = 8.68
SPECspeed®2017_int_peak = Not Run

Platform Notes (Continued)

tmpfs tmpfs 800G 8.3G 792G 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 -[TEE135T-2.10]- 03/21/2019
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<p>| C     | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)       |</p>
<table>
<thead>
<tr>
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<td>Version 19.0.4.227 Build 20190416</td>
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

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

- **SPECspeed®2017_int_base = 8.68**
- **SPECspeed®2017_int_peak = Not Run**

### Base Compiler Invocation (Continued)

**C++ benchmarks:**
```bash
icpc -m64
```

**Fortran benchmarks:**
```bash
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`
- `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:**
```bash
-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:**
```bash
-Wl,-z,muldefs -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:**
```bash
-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](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.html)
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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 CPU®2017 v1.0.5 on 2019-07-15 14:48:48-0400.
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