# Lenovo Global Technology

## ThinkSystem SR860

(2.40 GHz, Intel Xeon Platinum 8260L)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
<td>96</td>
<td>201</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
<td>155</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>96</td>
<td>127</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>96</td>
<td>156</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>96</td>
<td>51.4</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>96</td>
<td>251</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
<td>436</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
<td>117</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
<td>182</td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Platinum 8260L</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Firmware: Lenovo BIOS Version TEE135T 2.10 released Mar-2019</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
</tr>
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</table>

## Hardware

<table>
<thead>
<tr>
<th>Max MHz.: 3900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal: 2400</td>
</tr>
<tr>
<td>Enabled: 46 cores, 4 chips</td>
</tr>
<tr>
<td>Orderable: 2,4 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 35.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage: 800 GB tmpfs</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

## Test Results

- **CPU2017 License:** 9017
- **Test Date:** Oct-2018
- **Test Sponsor:** Lenovo Global Technology
- **Testing by:** Lenovo Global Technology
- **Hardware Availability:** Apr-2019
- **Software Availability:** Dec-2018
- **SPECspeed2017_fp_base:** 193
- **SPECspeed2017_fp_peak:** Not Run
Lenovo Global Technology
ThinkSystem SR860
(2.40 GHz, Intel Xeon Platinum 8260L)
Lenovo Global Technology
ThinkSystem SR860 (2.40 GHz, Intel Xeon Platinum 8260L)

**SPEC CPU2017 Floating Point Speed Result**

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

---

**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.

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**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-ic19.0u1/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-61sv Tue Oct 2 04:53:18 2018

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 8260L CPU @ 2.40GHz  
- 4 "physical id"s (chips)  
- 96 "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: 24  
- siblings: 24  
- physical 0: cores 0 1 2 3 4 5 6 8 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29  
- physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29  
- physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29  
- physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:

- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 96  
- On-line CPU(s) list: 0-95  
- Thread(s) per core: 1  
- Core(s) per socket: 24  
- Socket(s): 4  
- NUMA node(s): 4

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<table>
<thead>
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<th>Specification</th>
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**SPEC CPU2017 Floating Point Speed Result**

**Lenovo Global Technology**

**ThinkSystem SR860**

(2.40 GHz, Intel Xeon Platinum 8260L)

**SPECspeed2017_fp_base =** 193

**SPECspeed2017_fp_peak =** Not Run

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**Platform Notes (Continued)**

Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8260L CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2400.000
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
NUMA node2 CPU(s): 48-71
NUMA node3 CPU(s): 72-95

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 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 stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vtpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3

/proc/cpuinfo cache data
cache size : 36608 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 18 19 20 21 22 23
node 0 size: 386667 MB
node 0 free: 386288 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387056 MB
node 1 free: 373841 MB
node 2 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 2 size: 387056 MB
node 2 free: 386840 MB
node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 387025 MB

(Continued on next page)
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SPECspeed2017_fp_base = 193
SPECspeed2017_fp_peak = Not Run

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

Platform Notes (Continued)

node 3 free: 386822 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: 1584954496 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:
Linux linux-6lsv 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)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 Oct 2 02:33

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
  Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 800G 8.3G 792G 2% /home

Additional information from dmidecode follows. WARNING: Use caution when you interpret
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(2.40 GHz, Intel Xeon Platinum 8260L)

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**Test Date** = Oct-2018  
**Hardware Availability** = Apr-2019  
**Software Availability** = Dec-2018

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**Platform Notes (Continued)**

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

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_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  607.cactuBSSN_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.

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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.

---

FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_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.

---

CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
```

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### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
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.

---

### Base Compiler Invocation

**C benchmarks:**  
`icc -m64 -std=c11`

**Fortran benchmarks:**  
`ifort -m64`

**Benchmarks using both Fortran and C:**  
`ifort -m64 icc -m64 -std=c11`

**Benchmarks using Fortran, C, and C++:**  
`icpc -m64 icc -m64 -std=c11 ifort -m64`

### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64  
- 607.cactuBSSN_s: -DSPEC_LP64  
- 619.lbm_s: -DSPEC_LP64  
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG  
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl  
- 638.imagick_s: -DSPEC_LP64  
- 644.nab_s: -DSPEC_LP64  
- 649.fotonik3d_s: -DSPEC_LP64  
- 654.roms_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**  
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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Test Sponsor: Lenovo Global Technology
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Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: Dec-2018

### Base Optimization Flags (Continued)

**Fortran benchmarks:**
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

**Benchmarks using both Fortran and C:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

**Benchmarks using Fortran, C, and C++:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-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 2018-10-01 16:53:17-0400.
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