## Lenovo Global Technology

**ThinkSystem SR850**  
(2.20 GHz, Intel Xeon Platinum 8253)

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Nov-2019</th>
<th>Hardware Availability:</th>
<th>Apr-2019</th>
<th>Software Availability:</th>
<th>May-2019</th>
</tr>
</thead>
</table>

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_fp_peak</th>
<th>SPECspeed®2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>Not Run</td>
<td>0</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>155</td>
<td>930</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>158</td>
<td>40.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>116</td>
<td>80.0</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>52.5</td>
<td>160</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>139</td>
<td>200</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>270</td>
<td>240</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>113</td>
<td>280</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>292</td>
<td>320</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8253  
- **Max MHz:** 3000  
- **Nominal:** 2200  
- **Enabled:** 64 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:** 22 MB I+D on chip per chip  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 800 GB SATA SSD  
- **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  
- **Compiler for Linux:** C/C++  
- **Parallel:** Yes  
- **Compiler for Fortran:** Version 19.0.4.227 of Intel Fortran  
- **Compiler for Linux:** Compiler for Linux  
- **Firmware:** Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None  
- **Power Management:** Disable
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Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base 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>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>923</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = Not Run

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.0u4/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
Transparent Huge Pages disabled by default
echo never > /sys/kernel/mm/transparent_hugepage/enabled
echo never > /sys/kernel/mm/transparent_hugepage/defrag
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)
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General Notes (Continued)

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 and then set it to Custom Mode
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on linux-9o83 Fri Nov 1 18:46:48 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) Platinum 8253 CPU @ 2.20GHz
  4 "physical id"s (chips)
  64 "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 : 16
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
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Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
NUMA node2 CPU(s): 32-47
NUMA node3 CPU(s): 48-63
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi nx fpu mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xapic鲇 mb parserf 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 avx166 f16c rdrand lahf_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal_lm abal่าว

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
node 0 size: 386634 MB
node 0 free: 385968 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 387058 MB
node 1 free: 386767 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 2 size: 387058 MB
node 2 free: 386843 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 3 size: 387055 MB
node 3 free: 386838 MB
node distances:
node 0 1 2 3

(Continued on next page)
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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = Not Run

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Platform Notes (Continued)

0: 10 21 21 31
1: 21 10 31 21
2: 21 31 10 21
3: 31 21 21 10

From /proc/meminfo
MemTotal: 1584954948 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-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
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 Nov 1 18:43

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 146G 598G 20% /home

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SPECspeed\textsuperscript{\textregistered}2017\textsubscript{fp}_base = 168
SPECspeed\textsuperscript{\textregistered}2017\textsubscript{fp}_peak = \textit{Not Run}

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**Platform Notes (Continued)**

From /sys/devices/virtual/dmi/id
- BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
- Vendor: Lenovo
- Product: ThinkSystem SR850 -[7X1925Z000]-
- Product Family: ThinkSystem
- Serial: 1234567890

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.
- Memory: 48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
C               | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++, C, Fortran | 607.cactuBSSN_s(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran         | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

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---

**SPECspeed®2017_fp_base = 168**

**SPECspeed®2017_fp_peak = Not Run**

---

**Compiler Version Notes (Continued)**

---

**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
```
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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = Not Run

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -03 -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 -03 -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 -03 -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-F.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-F.xml

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