Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6230N)

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 198</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>204</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>172</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>140</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>136</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>143</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>63.4</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>103</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>352</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>110</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>318</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Gold 6230N
Max MHz: 3500
Nominal: 2300
Enabled: 80 cores, 4 chips
Orderable: 4 chips
Cache L1: 32 KBI + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 27.5 MB I+D on chip per chip
Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
Kernel 4.12.14-195-default
Compiler: C/C++: Version 19.0.5.281 of Intel C/C++
Compiler for Linux;
Fortran: Version 19.0.5.281 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE156L 2.61 released May-2020
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage
Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6230N)

SPECspeed®2017 fp_base = 198
SPECspeed®2017 fp_peak = Not Run

Results Table

<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>603.bwaves_s</td>
<td>80</td>
<td>66.9</td>
<td>882</td>
<td>67.0</td>
<td>881</td>
<td>66.3</td>
<td>890</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>80</td>
<td>81.8</td>
<td>204</td>
<td>81.8</td>
<td>204</td>
<td>81.3</td>
<td>205</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>80</td>
<td>30.3</td>
<td>173</td>
<td>30.4</td>
<td>172</td>
<td>30.4</td>
<td>172</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>80</td>
<td>95.3</td>
<td>139</td>
<td>94.8</td>
<td>140</td>
<td>94.7</td>
<td>140</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>80</td>
<td>61.9</td>
<td>143</td>
<td>62.0</td>
<td>143</td>
<td>62.1</td>
<td>143</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>80</td>
<td>188</td>
<td>63.3</td>
<td>185</td>
<td>64.0</td>
<td>187</td>
<td>63.4</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>80</td>
<td>75.6</td>
<td>191</td>
<td>74.6</td>
<td>193</td>
<td>73.8</td>
<td>195</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>80</td>
<td>49.7</td>
<td>352</td>
<td>49.7</td>
<td>351</td>
<td>49.7</td>
<td>352</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>80</td>
<td>83.2</td>
<td>110</td>
<td>83.1</td>
<td>110</td>
<td>83.2</td>
<td>110</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>80</td>
<td>49.3</td>
<td>319</td>
<td>49.4</td>
<td>318</td>
<td>49.8</td>
<td>316</td>
</tr>
</tbody>
</table>

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-ic19.0u5-2/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-9900K CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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.
Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6230N)

SPECspeed®2017_fp_base = 198
SPECspeed®2017_fp_peak = Not Run

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5-2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-z1c1 Thu Nov 19 17:59:13 2020

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 6230N CPU @ 2.30GHz
  - 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 : 20
  - siblings : 20
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- Address sizes: 46 bits physical, 48 bits virtual
- CPU(s): 80
- On-line CPU(s) list: 0-79
- Thread(s) per core: 1
- Core(s) per socket: 20
- Socket(s): 4
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6230N CPU @ 2.30GHz
- Stepping: 7
- CPU MHz: 2300.000
- CPU max MHz: 3500.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4600.00
- Virtualization: VT-x

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6230N)

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

SPECspeed®2017_fp_base = 198
SPECspeed®2017_fp_peak = Not Run

Test Date: Nov-2020
Hardware Availability: Jun-2020
Software Availability: Sep-2019

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39
NUMA node2 CPU(s): 40-59
NUMA node3 CPU(s): 60-79

Flags: fpu vme de pse tsc msr pae mce 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_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmx mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 28160 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
node 0 size: 386684 MB
node 0 free: 386329 MB
node 0 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
node 0 size: 387067 MB
node 0 free: 386860 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
node 2 size: 387067 MB
node 2 free: 386876 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 3 size: 387037 MB
node 3 free: 386386 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

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR850P**
(2.30 GHz, Intel Xeon Gold 6230N)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Nov-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Jun-2020</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Sep-2019</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_fp_base = 198

### SPECspeed®2017_fp_peak = Not Run

---

### Platform Notes (Continued)

- **MemTotal:** 1585005976 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

---

From `/etc/*release*`:

```
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

```
uname -a:
Linux linux-z1c1 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **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: Enhanced IBRS, IBPB: conditional, RSB filling

**run-level 3 Nov 19 17:54**

**SPEC is set to:** `/home/cpu2017-1.1.0-ic19.0u5-2`

---

**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 SM BIOS" standard.**

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850P
(2.30 GHz, Intel Xeon Gold 6230N)

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

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

(End of data from sysinfo program)

Platform Notes (Continued)

Compiler Version Notes

C

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++, C, Fortran

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran, C

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR850P**  
(2.30 GHz, Intel Xeon Gold 6230N)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>198</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Compiler Version Notes (Continued)

#### Base Compiler Invocation

- **C benchmarks:**  
  icc

- **Fortran benchmarks:**  
  ifort

- **Benchmarks using both Fortran and C:**  
  ifort icc

- **Benchmarks using Fortran, C, and C++:**  
  icpc icc ifort

#### 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
- 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:**  
  -m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
  -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

- **Fortran benchmarks:**  
  -m64 -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
  -nostandard-realloc-lhs

(Continued on next page)
**Lenovo Global Technology**  
ThinkSystem SR850P  
(2.30 GHz, Intel Xeon Gold 6230N)  

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPECspeed²017_fp_base</strong></td>
<td>198</td>
</tr>
<tr>
<td><strong>SPECspeed²017_fp_peak</strong></td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License</strong></td>
<td>9017</td>
</tr>
<tr>
<td><strong>Test Sponsor</strong></td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td><strong>Tested by</strong></td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td><strong>Test Date</strong></td>
<td>Nov-2020</td>
</tr>
<tr>
<td><strong>Hardware Availability</strong></td>
<td>Jun-2020</td>
</tr>
<tr>
<td><strong>Software Availability</strong></td>
<td>Sep-2019</td>
</tr>
</tbody>
</table>

**Base Optimization Flags (Continued)**

Benchmarks using both Fortran and C:
- `m64 -std=c11 -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++:
- `m64 -std=c11 -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:

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-I.xml

SPEC CPU and SPECspeed are registered trademarks 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.