Lenovo Global Technology
ThinkSystem SR850P
(2.50 GHz, Intel Xeon Gold 5215)

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

Test Date: Dec-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

SPECspeed®2017_fp_base = 125
SPECspeed®2017_fp_peak = Not Run

Threads
603.bwaves_s 40
607.cactuBSSN_s 40
619.lbm_s 40
621.wrf_s 40
627.cam4_s 40
628.pop2_s 40
638.imagick_s 40
644.nab_s 40
649.fotonik3d_s 40
654.roms_s 40

Hardware
CPU Name: Intel Xeon Gold 5215
Max MHz: 3400
Nominal: 2500
Enabled: 40 cores, 4 chips
Orderable: 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
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
Storage: 1 x 960 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
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
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Power Management: BIOS set to prefer performance at the cost of additional power usage
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**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>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>104</td>
<td>567</td>
<td>105</td>
<td>562</td>
<td>103</td>
<td>574</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>133</td>
<td>126</td>
<td>131</td>
<td>127</td>
<td>131</td>
<td>128</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>40</td>
<td>50.9</td>
<td>103</td>
<td>44.3</td>
<td>118</td>
<td>44.3</td>
<td>118</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>40</td>
<td>126</td>
<td>105</td>
<td>128</td>
<td>104</td>
<td>125</td>
<td>106</td>
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<tr>
<td>627.cam4_s</td>
<td>40</td>
<td>110</td>
<td>80.9</td>
<td>110</td>
<td>80.8</td>
<td>110</td>
<td>80.7</td>
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<tr>
<td>628.pop2_s</td>
<td>40</td>
<td>219</td>
<td>54.3</td>
<td>218</td>
<td>54.4</td>
<td>219</td>
<td>54.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>40</td>
<td>130</td>
<td>111</td>
<td>128</td>
<td>113</td>
<td>128</td>
<td>112</td>
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<tr>
<td>644.nab_s</td>
<td>40</td>
<td>82.4</td>
<td>212</td>
<td>82.5</td>
<td>212</td>
<td>82.4</td>
<td>212</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>123</td>
<td>74.3</td>
<td>119</td>
<td>76.7</td>
<td>116</td>
<td>78.7</td>
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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"

**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.
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</table>

**Platform Notes**

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 295195f888a3d7edeb1e6e46a485a0011
running on linux-z1c1 Sat Dec 26 19:08:42 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 5215 CPU @ 2.50GHz
  4 "physical id"s (chips)
  40 "processors"
core, 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
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
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

(Continued on next page)
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SPECSpeed\textsuperscript{\tiny®\textsuperscript{\tiny 2017}} \textsuperscript{\tiny fp\_peak} = \textit{Not Run}

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Platform Notes (Continued)

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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm pcid dca sse4_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
cqm mpx rdt\_a lahf\_lm abm 3nowprefetch cpuid\_fault epb cat\_l3 cdp\_l3
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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
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
node 0 size: 386687 MB
node 0 free: 386266 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19
node 1 size: 387069 MB
node 1 free: 386724 MB
node 2 cpus: 20 21 22 23 24 25 26 27 28 29
node 2 size: 387040 MB
node 2 free: 385725 MB
node 3 cpus: 30 31 32 33 34 35 36 37 38 39
node 3 size: 387068 MB
node 3 free: 386919 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

(Continued on next page)
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Tested by: Lenovo Global Technology

Platform Notes (Continued)

MemTotal: 1585015148 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-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 Dec 26 17:39

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5-2
Filesystem  Type Size Used Avail Use% Mounted on
/dev/sdb3  xfs 892G 30G 863G 4% /

From /sys/devices/virtual/dmi/id
   BIOS: Lenovo -[TEE156L-2.61]- 05/20/2020
   Vendor: Lenovo
   Product: ThinkSystem SR850P -[7D2HCT01FW]-
   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.

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

**Lenovo Global Technology**  
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## Platform Notes (Continued)

Memory:  
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933  
(End of data from sysinfo program)  
Memory on this system run at 2666 MHz due to CPU limitation.

## Compiler Version Notes

### C

<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815</td>
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<tr>
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### C++, C, Fortran

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<th>607.cactuBSSN_s(base)</th>
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### Fortran

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### Fortran, C

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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
-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:
-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)
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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
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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-I.xml

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

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