**Lenovo Global Technology**

**ThinkSystem SR590**

(3.00 GHz, Intel Xeon Gold 5217)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>88.4</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>46.8</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>92.2</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>69.3</td>
<td></td>
</tr>
<tr>
<td>128</td>
<td>82.3</td>
<td></td>
</tr>
<tr>
<td>256</td>
<td>60.6</td>
<td></td>
</tr>
<tr>
<td>512</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>1024</td>
<td>66.4</td>
<td></td>
</tr>
<tr>
<td>2048</td>
<td>76.1</td>
<td></td>
</tr>
</tbody>
</table>

---

**Hardware**

**CPU Name:** Intel Xeon Gold 5217  
**Max MHz.:** 3700  
**Nominal:** 3000  
**Enabled:** 16 cores, 2 chips  
**Orderable:** 1,2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 11 MB I+D on chip per core  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)  
**Storage:** 1 x 960 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 19.0.0.117 of Intel C/C++  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version TEE135L 2.10 released Jan-2019  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None
Lenovo Global Technology
ThinkSystem SR590
(3.00 GHz, Intel Xeon Gold 5217)

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

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>16</td>
<td>171</td>
<td>344</td>
<td>172</td>
<td>342</td>
<td>172</td>
<td>343</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>189</td>
<td>88.3</td>
<td>188</td>
<td>88.7</td>
<td>189</td>
<td>88.4</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>16</td>
<td>75.5</td>
<td>69.4</td>
<td>75.6</td>
<td>69.3</td>
<td>75.6</td>
<td>69.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>143</td>
<td>92.2</td>
<td>144</td>
<td>92.0</td>
<td>144</td>
<td>92.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>191</td>
<td>46.5</td>
<td>190</td>
<td>46.8</td>
<td>189</td>
<td>46.8</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>204</td>
<td>58.2</td>
<td>203</td>
<td>58.5</td>
<td>204</td>
<td>58.3</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>238</td>
<td>60.7</td>
<td>238</td>
<td>60.6</td>
<td>238</td>
<td>60.6</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>16</td>
<td>152</td>
<td>115</td>
<td>151</td>
<td>116</td>
<td>151</td>
<td>116</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
<td>138</td>
<td>66.2</td>
<td>137</td>
<td>66.4</td>
<td>137</td>
<td>66.4</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>201</td>
<td>78.2</td>
<td>202</td>
<td>77.9</td>
<td>201</td>
<td>78.1</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 84.8
SPECspeed2017_fp_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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19/lib/intel64"
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
Yes: 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) 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.
Lenovo Global Technology

ThinkSystem SR590
(3.00 GHz, Intel Xeon Gold 5217)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>84.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Automatic
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to disable
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bced8f2999c33d61f64985e45859ea9
running on SR590-sles12sp4 Sun Apr 21 06:13:25 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 5217 CPU @ 3.00GHz
  2 "physical id"s (chips)
  16 "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: 8
  siblings: 8
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 16
- On-line CPU(s) list: 0-15
- Thread(s) per core: 1
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
- Stepping: 6
- CPU MHz: 3000.000
- BogoMIPS: 6000.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
(3.00 GHz, Intel Xeon Gold 5217)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base =</th>
<th>84.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

| L3 cache: 11264K |
| NUMA node0 CPU(s): 0-7 |
| NUMA node1 CPU(s): 8-15 |
| 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
erpfmperf 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 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsavec cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pni pts hw_epp pkul ospke avx512_vnni flush_l1d arch_capabilities |

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
| available: 2 nodes (0-1) |
| node 0 cpus: 0 1 2 3 4 5 6 7 |
| node 0 size: 96359 MB |
| node 0 free: 95972 MB |
| node 1 cpus: 8 9 10 11 12 13 14 15 |
| node 1 size: 96714 MB |
| node 1 free: 96225 MB |
| node distances:
  node 0 1
  0: 10 21
  1: 21 10 |

From /proc/meminfo
| MemTotal: 197707304 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" |

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
(3.00 GHz, Intel Xeon Gold 5217)

SPECspeed2017_fp_base = 84.8
SPECspeed2017_fp_peek = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Apr-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Platform Notes (Continued)

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:
  (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 Apr 21 06:12

SPEC is set to: /home/cpu2017-1.0.5-ic19
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 btrfs 740G 35G 706G 5% /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 -[TEE135L-2.10]- 01/10/2019
Memory:
  4x NO DIMM NO DIMM
  12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666

(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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

FC 607.cactuBSSN_s(base)

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
(3.00 GHz, Intel Xeon Gold 5217)

SPECspeed2017_fp_base = 84.8
SPECspeed2017_fp_peak = Not Run

Compiler Version Notes (Continued)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
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
Lenovo Global Technology  
ThinkSystem SR590  
(3.00 GHz, Intel Xeon Gold 5217)  

| SPECspeed2017_fp_base = 84.8 |
| SPECspeed2017_fp_peak = Not Run |

**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=3 -qopenmp -DSPEC_OPENMP

**Fortran benchmarks:**
- -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
- -nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs -align array32byte

**Benchmarks using Fortran, C, and C++:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs -align array32byte

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
Lenovo Global Technology  
ThinkSystem SR590  
(3.00 GHz, Intel Xeon Gold 5217)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 84.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak = Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Dec-2018</td>
</tr>
</tbody>
</table>

SPEC is a registered trademark 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.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-20 18:13:24-0400.