Lenovo Global Technology
ThinkSystem SR570
(2.60 GHz, Intel Xeon Gold 6240L)

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

SPECspeed®2017_fp_base = 127
SPECspeed®2017_fp_peak = Not Run

Threads

<table>
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<th>threads</th>
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<tr>
<td>603.bwaves_s</td>
<td>36</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
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<td>619.lbm_s</td>
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<td>621.wrf_s</td>
<td>36</td>
<td>63.9</td>
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<tr>
<td>627.cam4_s</td>
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<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
<td>36</td>
<td>82.2</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
<td>116</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 6240L
Max MHz: 3900
Nominal: 2600
Enabled: 36 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: 24.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)
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 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019
tested as TEE141E 2.30 Jul-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: --
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Results Table

<table>
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<tr>
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<tr>
<td>654.roms_s</td>
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<td></td>
</tr>
</tbody>
</table>

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-ic19.0u1/lib/intel64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X 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
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)
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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SPEC®2017_fp_base = 127
SPEC®2017_fp_peak = Not Run

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-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-et90 Wed Aug 21 16:27:47 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 6240L CPU @ 2.60GHz
    2 "physical id"s (chips)
    36 "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: 18
  siblings: 18
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 36
  On-line CPU(s) list: 0-35
  Thread(s) per core: 1
  Core(s) per socket: 18
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Gold 6240L CPU @ 2.60GHz
  Stepping: 7
  CPU MHz: 2600.000
  BogoMIPS: 5200.00
  Virtualization: VT-x
  L1d cache: 32K
  L1i cache: 32K
  L2 cache: 1024K

(Continued on next page)
<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L3 cache: 25344K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-17</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 18-35</td>
</tr>
<tr>
<td>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 xtrm 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 intel_pdpin ssbd mbna ibrs ibpb tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bхи l1e avx2 smep bmi2 erness invpcid rtm cqm mpx rdtml a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaveopt xsaveopt xgetbv1 xsaves xcm_l1c xcm_l1d 9cm_mbb total xcm_mbb_local dtherm ida arat pim pts hwp_epp pku ospke avx512_vnni flush_l1d arch_capabilities</td>
</tr>
</tbody>
</table>

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 8 9 10 11 12 13 14 15 16 17 |
| node 0 size: 96058 MB |
| node 0 free: 95530 MB |
| node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 |
| node 1 size: 96712 MB |
| node 1 free: 96244 MB |
| node distances: |
| node 0 1 |
| 0: 10 21 |
| 1: 21 10 |

From `/proc/meminfo`
| MemTotal: 197397936 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" |
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:
 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 Aug 21 16:24

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
 Filesystem Type Size Used Avail Use% Mounted on
 /dev/sda3 xfs 892G 36G 857G 4% /

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 -[TEE141E-2.30]- 07/02/2019
Memory:
  4x NO DIMM NO DIMM
  12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
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<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</td>
<td>Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
</tr>
<tr>
<td>Intel(R) 64</td>
<td>Version 19.0.1.144 Build 20181018</td>
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<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
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<tr>
<th>C++, C, Fortran</th>
<th>607.cactuBSSN_s(base)</th>
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SPECSpeed®2017_fp_base = 127
SPECSpeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.1.144 Build 20181018
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.
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.

Fortran
    603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

Fortran, C
    621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

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
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| SPECspeed®2017_fp_peak = Not Run |

Test Date: Aug-2019
Hardware Availability: Jul-2019
Software Availability: Dec-2018

---

**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

**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-D.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-D.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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