Lenovo Global Technology
ThinkSystem SR550
(2.30 GHz, Intel Xeon Gold 5218B)

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

Threads

600.perbench_s 64
602.gcc_s 64
605.mcf_s 64
620.omnetpp_s 64
623.xalancbmk_s 64
625.x264_s 64
631.deepsjeng_s 64
641.fio_s 64
648.exchange2_s 64
657.xz_s 64

Threads Specspeed®2017_int_base = 9.91

Hardware
CPU Name: Intel Xeon Gold 5218B
Max MHz: 3900
Nominal: 3900
Enabled: 32 cores, 2 chips, 2 threads/core
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: 22 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 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 12 SP4 (x86_64)
Kernel 4.12.14-94.41-default
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++
Compiler for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran
Compiler 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: jemalloc memory allocator V5.0.1
Power Management: Disable

SPEC CPU®2017 Integer Speed Result
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Lenovo Global Technology
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECspeed®2017_int_base = 9.91
SPECspeed®2017_int_peak = Not Run

Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

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Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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Data Table:

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<th>Seconds</th>
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<th>Ratio</th>
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<td></td>
<td></td>
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<td></td>
<td></td>
<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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.0u4/lib/intel64:/home/cpu2017-1.1.0-ic19.0u4/j e5.0.1-64"
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 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)
Lenovo Global Technology
ThinkSystem SR550
(2.30 GHz, Intel Xeon Gold 5218B)

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

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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
Memory Power Management set to Automatic
CPU P-state Control set to Cooperative
MONITOR/MWAIT set to Enable
LLC dead line alloc set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1c6e46a485a0011
running on linux-dogi Tue Nov 5 09:24:02 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 5218 CPU @ 2.30GHz
    2 "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 : 32
    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

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: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR550
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**Platform Notes (Continued)**

```plaintext
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
Stepping:              6
CPU MHz:               2300.000
CPU max MHz:           3900.000
CPU min MHz:           1000.000
BogoMIPS:              4600.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              22528K
NUMA node0 CPU(s):     0-15,32-47
NUMA node1 CPU(s):     16-31,48-63
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                       pat pse36 clflush dts acpi nix fmmx nx pdm1gb 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
                       xtpr 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_pni ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept
                       vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 romeInvpcid rtm cmpo mpx rdt_a
                       avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
                       xsaveopt xsaves xsavec xgetbv1 xsaves ccq_mib_total ccq_mib_local dtherm ida arat pln pts hwp
data wnpw_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni flush_l1d arch_capabilities
```

From numactl --hardware

```
      available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43
                          44 45 46 47
node 0 size: 193092 MB
node 0 free: 192268 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
                          44 55 56 57 58 59 60 61 62 63
node 1 size: 193506 MB
node 1 free: 193207 MB
node distances:
    node 0 1
      0: 10 21
      1: 21 10
```

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
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CPU2017 License: 9017
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Test Date: Nov-2019
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Software Availability: May-2019

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 395878064 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 5 09:07

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 892G 85G 807G 10% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
Vendor: Lenovo
Product: ThinkSystem SR550 -[7X03RCZ000]-
Product Family: ThinkSystem

(Continued on next page)
**Platform Notes (Continued)**

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:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

The marketing name for the processor in this result, which appears in the CPU name and hardware model areas, is different from sysinfo because a pre-production processor was used. The pre-production processor differs from the production processor in name only.

**Compiler Version Notes**

```
C     | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
     | 625.x264_s(base) 657.xz_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++   | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
      | 641.leela_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.
---------------------------------------------------------------------

Fortran | 648.exchange2_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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**Lenovo Global Technology**

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**Base Compiler Invocation**

- **C benchmarks:**
  - icc -m64 -std=c11

- **C++ benchmarks:**
  - icpc -m64

- **Fortran benchmarks:**
  - ifort -m64

**Base Portability Flags**

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<tr>
<td>gcc</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>mcf</td>
<td>-DSPEC_LP64</td>
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<td>omnetpp</td>
<td>-DSPEC_LP64</td>
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<td>xalancbmk</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
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<td>x264</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>deepsjeng</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>leela</td>
<td>-DSPEC_LP64</td>
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<td>exchange2</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>xz</td>
<td>-DSPEC_LP64</td>
</tr>
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</table>

**Base Optimization Flags**

- **C benchmarks:**
  - -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  - -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
  - -L/usr/local/je5.0.1-64/lib -ljemalloc

- **C++ benchmarks:**
  - -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  - -qopt-mem-layout-trans=4  
  - -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
  - -lqkmalloc

- **Fortran benchmarks:**
  - -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
  - -nostandard-realloc-lhs
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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.

Tested with SPEC CPU®2017 v1.1.0 on 2019-11-04 20:24:01-0500.