Lenovo Global Technology
ThinkSystem SR590
(2.20 GHz, Intel Xeon Silver 4214)

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

Specspeed2017_int_base = 8.19
Specspeed2017_int_peak = Not Run

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Specspeed2017_int_base</th>
<th>Specspeed2017_int_peak</th>
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<tr>
<td>600.perlenbench_s</td>
<td>48</td>
<td>5.55</td>
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</tr>
<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>8.18</td>
<td>Not Run</td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>10.7</td>
<td>Not Run</td>
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<td>620.omnetpp_s</td>
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<tr>
<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
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<td>11.5</td>
<td>Not Run</td>
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<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>19.6</td>
<td>Not Run</td>
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<tr>
<td>657.xz_s</td>
<td>48</td>
<td>19.6</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Silver 4214
Max MHz.: 3200
Nominal: 2200
Enabled: 24 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: 16.5 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
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 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: jemalloc memory allocator V5.0.1
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Results Table

<table>
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<tr>
<th>Benchmark</th>
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SPECspeed2017_int_base = 8.19
SPECspeed2017_int_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,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
- LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
- 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
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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
SPEC CPU2017 Integer Speed Result

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

General Notes (Continued)

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
Memory Power Management set to Automatic
CPU P-state Control set to Cooperative
MONITOR/MWAIT set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on SR590-sles12sp4 Tue Apr 9 18:03:48 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) Silver 4214 CPU @ 2.20GHz
   2 "physical id"s (chips)
   48 "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 : 12
   siblings : 24
   physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
   physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From /usr/include/linux/limits.h

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4214 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3200.0000

(Continued on next page)
## SPEC CPU2017 Integer Speed Result

**Lenovo Global Technology**

**ThinkSystem SR590**

(2.20 GHz, Intel Xeon Silver 4214)

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**Test Date:** Apr-2019  
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### Platform Notes (Continued)

- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 4400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 16896K
- **NUMA node0 CPU(s):** 0-11, 24-35
- **NUMA node1 CPU(s):** 12-23, 36-47
- **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
  - aperfmperf
  - pni
  - pclmulqdq
  - dtes64
  - monitor
dt
  - smx
  - sse2
  - 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
  - ssbd
  - mba
  - ibrs
  - ibpb
  - 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
  - xsaves
  - gshare
  - 32
  - 64
  - svm
  - cqm_occup_llc
  - cqm_mbm_total
  - cqm_mbm_local
  - dtherm
  - ida
  - arat
  - pfn
  - ht
  - wwp
  - hwp
  - act_window
  - hwp_epp
  - hwp_pkg_req
  - pku
  - 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 8 9 10 11 24 25 26 27 28 29 30 31 32 33 34 35
- node 0 size: 96326 MB
- node 0 free: 95762 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
- node 1 size: 96740 MB
- node 1 free: 96202 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From `/proc/meminfo`

- MemTotal: 197700836 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release` /`/etc/*version`:

- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)

(Continued on next page)
SPEC CPU2017 Integer Speed Result

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</table>

SPECspeed2017_int_base = 8.19
SPECspeed2017_int_peak = Not Run

Platform Notes (Continued)

```
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:
  (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 9 18:02

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 btrfs 740G 36G 704G 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 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
   657.xz_s(base)
==============================================================================
(Continued on next page)
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**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.

CXXC 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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base)

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.

---

**Base Compiler Invocation**

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

---

**Base Portability Flags**

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64

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# SPEC CPU2017 Integer Speed Result

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**Base Portability Flags (Continued)**

- 641.leela_s: -DSPEC_LP64
- 648.exchange2_s: -DSPEC_LP64
- 657.xz_s: -DSPEC_LP64

**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_2019.1.144/linux/compiler/lib/intel64
- -lqkmalloc

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

---

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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 2019-04-09 06:03:47-0400.
