## Lenovo Global Technology

**ThinkSystem SR590**  
(2.10 GHz, Intel Xeon Gold 6230R)

<table>
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<th>Test Sponsor</th>
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### SPECspeed®2017_int_base = 11.5

### SPECspeed®2017_int_peak = Not Run

**CPU2017 License:** 9017  
**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Test Sponsor:** Lenovo Global Technology  
**Software Availability:** Apr-2020

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### Hardware

- **CPU Name:** Intel Xeon Gold 6230R  
- **Max MHz:** 4000  
- **Nominal:** 2100  
- **Enabled:** 52 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:** 35.75 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 15 SP1 (x86_64)  
- **Kernel:** 4.12.14-195-default  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE155L 2.61 released May-2020  
- **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:** BIOS set to prefer performance at the cost of additional power usage
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(2.10 GHz, Intel Xeon Gold 6230R)

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

Results Table

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux.

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-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/jee5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE 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:
Lenovo Global Technology

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(2.10 GHz, Intel Xeon Gold 6230R)

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

General Notes (Continued)

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.

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

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe36e6e46a485a0011
running on linux-cnti Mon Jun 1 09:29:38 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 6230R CPU @ 2.10GHz
  2 "physical id"s (chips)
  104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

From lscpu:
Architecture: x86_64

(Continued on next page)
Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-25, 52-77
NUMA node1 CPU(s): 26-51, 78-103
Flags: fpu vme de pse mce 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 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtr Wich pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abr3nowprefetch cpuid_fault ebpx cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 rome invpcid_rtm cmq mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx51cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaes cmq_llc cmq_occup_llc cmq_mbb_total cmq_mbb_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear flush_lld arch_capabilities

/proc/cpuinfo cache data
cache size: 36608 KB

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 18 19 20 21 22 23 24 25 52 53
54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77
node 0 size: 96377 MB

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

node 0 free: 95919 MB  
node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103  
node 1 size: 96727 MB  
node 1 free: 95914 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10  

From /proc/meminfo  
MemTotal: 197739396 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-cnti 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: 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 Jun 1 09:28  

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 743G 69G 674G 10% /  

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
(2.10 GHz, Intel Xeon Gold 6230R)

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

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

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE155L-2.61] - 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR590 -[7X98RCZ000]-
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.
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

==============================================================================
| C     | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) |
|       | 625.x264_s(base) 657.xz_s(base)                        |
==============================================================================

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 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++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
## Lenovo Global Technology

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### Base Compiler Invocation

**C benchmarks:**

```
icc
```

**C++ benchmarks:**

```
icpc
```

**Fortran benchmarks:**

```
ifort
```

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

### Base Optimization Flags

**C benchmarks:**

```
-m64 -qnextgen -std=c11  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs  
-xCORE-AVX512 -O3 -ffast-math -ftlo -mfpmath=sse -funroll-loops  
-fuse-ld=gold -gomp-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

**C++ benchmarks:**

```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -ftlo -mfpmath=sse  
-funroll-loops -fuid=gold -gomp-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin  
-lqkmalloc
```

**Fortran benchmarks:**

```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512  
-O3 -ipo -no-prec-div -gomp-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte
```

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

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

- `-mbranches-within-32B-boundaries`

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:

- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-H.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-H.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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