**Lenovo Global Technology**

**ThinkSystem SR650**
(2.40 GHz, Intel Xeon Silver 4214R)

| SPECspeed®2017_int_base = 9.71 | SPECspeed®2017_int_peak = Not Run |

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<td>Lenovo Global Technology</td>
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<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

---

### Hardware

- **CPU Name:** Intel Xeon Silver 4214R
- **Max MHz:** 3500
- **Nominal:** 2400
- **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
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 800 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 IVE155L 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

---

### Performance Results

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base (9.71)</th>
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<tr>
<td>Threads</td>
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<td>605.mcf_s</td>
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<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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**Lenovo Global Technology**

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**SPEC CPU®2017 Integer Speed Result**

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**Lenovo Global Technology**

ThinkSystem SR650

(2.40 GHz, Intel Xeon Silver 4214R)

---

**SPECspeed®2017_int_base = 9.71**

**SPECspeed®2017_int_peak = Not Run**

---

**Results Table**

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---

**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/j e5.0.1-64"
- **MALLOC_CONF** = "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:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(2.40 GHz, Intel Xeon Silver 4214R)

SPECspeed®2017_int_base = 9.71
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.


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed6e64e485a0011
running on linux-xpyz Sat Jun 20 07:02:22 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) Silver 4214R CPU @ 2.40GHz
  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 lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2

(Continued on next page)
Platform Notes (Continued)

NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4124R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2400.000
CPU max MHz: 3500.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
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 vmx de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc aarch64 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid apicpu 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 ebpx cat_l3 cdp_l3 invpcid_single intel_powerperformance monitors ibrs ibpb ibrs_enhanced tpr_shadow vnmi fwpriorities opt vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mxrt rdt_a avx512fq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512v1 xsaveopt xsaveprec xsaves xsavec xgetbv1 xsavec cqm_llc cqm_occurrence cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pkku ospke avx512_vnni md_clear flush_lld arch_capabilities

/proc/cpuinfo cache data
    cache size: 16896 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 26 27 28 29 30 31 32 33 34 35
    node 0 size: 386658 MB
    node 0 free: 385592 MB
    node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
    node 1 size: 387066 MB
    node 1 free: 386316 MB
    node distances:
    node 0 1
    0: 10 21
    1: 21 10
Lenovo Global Technology
ThinkSystem SR650
(2.40 GHz, Intel Xeon Silver 4214R)

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

SPECspeed®2017_int_base = 9.71
SPECspeed®2017_int_peak = Not Run

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

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 792293660 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
o-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-xpyz 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 (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: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 20 02:11

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 737G 63G 675G 9% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR650 -[7X05RCZ000]-
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

(Continued on next page)
Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
   24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
This system support 12 DIMMs per processor, total 24 DIMMs.
24 DIMM slots installed with 32 GB DIMM for this run,
and running at 2400 due to CPU limitation.

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.

Base Compiler Invocation

C benchmarks:
   icc

C++ benchmarks:
   icpc

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR650**  
(2.40 GHz, Intel Xeon Silver 4214R)

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**Hardware Availability:** Mar-2020  
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**Software Availability:** Apr-2020

### Base Compiler Invocation (Continued)

**Fortran benchmarks:**

```
ifort
```

### Base Portability Flags

<table>
<thead>
<tr>
<th>Base Portability Flags</th>
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<tbody>
<tr>
<td>600.perlibbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<td>657.xz_s: -DSPEC_LP64</td>
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</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**

```
-m64 -qnextgen -std=c11
-W1, -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld.gold -gopt-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 -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -gopt-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 -gopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
```
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**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

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