**Lenovo Global Technology**  
**ThinkSystem SR630**  
(2.30 GHz, Intel Xeon Silver 4210T)

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<td>Mar-2020</td>
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**SPECspeak\textsuperscript{2017}\textunderscore int\textunderscore base = 8.77**  
**SPECspeak\textsuperscript{2017}\textunderscore int\textunderscore peak = Not Run**

### Hardware

- **CPU Name:** Intel Xeon Silver 4210T  
- **Max MHz:** 3200  
- **Nominal:** 2300  
- **Enabled:** 20 cores, 2 chips, 2 threads/core  
- **Orderable:** 1,2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 13.75 MB I+D on chip per chip  
- **Other:** None  
- **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++  
- **Fortran Compiler:** Intel Fortran  
- **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
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td><strong>15.5</strong></td>
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<td>15.5</td>
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<td><strong>11.1</strong></td>
<td>127</td>
<td>11.2</td>
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<td>625.x264_s</td>
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<td><strong>12.8</strong></td>
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<td>12.8</td>
<td>138</td>
<td>12.8</td>
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<td>631.deepsjeng_s</td>
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<td><strong>4.81</strong></td>
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<tr>
<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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<td>18.1</td>
<td>342</td>
<td>18.1</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 8.77
SPECspeed®2017_int_peak = Not Run

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/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:
## Lenovo Global Technology

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<td>Not Run</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

```
sync; echo 3>       /proc/sys/vm/drop_caches
```

**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 295195f888a3d7eddb1e6e46a485a0011
running on linux-tthl Tue Jul 7 02:49:11 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 4210T CPU @ 2.30GHz
2  "physical id"s (chips)
40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

```
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):              40
On-line CPU(s) list: 0-39
Thread(s) per core:  2
Core(s) per socket:  10
Socket(s):           2
```

(Continued on next page)
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CPU2017 License: 9017
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Test Date: Jul-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210T CPU @ 2.30GHz
Stepping: 7
CPU MHz: 2300.000
CPU max MHz: 3200.000
CPU min MHz: 1000.000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acp lmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc vmpingset pmr pae cmov
pat pse36 clflush dts acp lmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc vmpingset pmr

/proc/cpuinfo cache data
  cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
  node 0 size: 386658 MB
  node 0 free: 386065 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
  node 1 size: 387067 MB
  node 1 free: 385889 MB
  node distances:
    0: 10 21
    1: 21 10

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

From `/proc/meminfo`
- MemTotal: 792294872 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

`/usr/bin/lsb_release -d`
- SUSE Linux Enterprise Server 15 SP1

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`:
- 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 Jul 6 22:55

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

From `/sys/devices/virtual/dmi/id`
- BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020
- Vendor: Lenovo
- Product: ThinkSystem SR630 -[7X01RCZ000]-
- Product Family: ThinkSystem
- Serial: 1234567890

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

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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Memory on this system run at 2400 MHz due to CPU limitation.

## Compiler Version Notes

```plaintext
<table>
<thead>
<tr>
<th>Language</th>
<th>Benchmark Names</th>
</tr>
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<tbody>
<tr>
<td>C</td>
<td>600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)</td>
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</tbody>
</table>
|           | 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)
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Base Compiler Invocation (Continued)

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

C++ benchmarks:
-m64 -gnextrgen -Wl, -plugin-opt=-x86-branches-within-32B-boundaries
-Wl, -z, muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-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 -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

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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-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.

Tested with SPEC CPU®2017 v1.1.0 on 2020-07-06 14:49:10-0400.
Report generated on 2020-08-04 14:39:03 by CPU2017 PDF formatter v6255.
Originally published on 2020-08-04.