# SPEC® CPU2017 Integer Speed Result

Lenovo Global Technology  
ThinkSystem SR650  
(2.20 GHz, Intel Xeon Silver 4214)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.20</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
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<td>0</td>
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<tr>
<td>1</td>
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<tr>
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<td>3</td>
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<td>4</td>
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<td>5</td>
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<td>11</td>
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<td>12</td>
<td>18.24</td>
</tr>
<tr>
<td>13</td>
<td>19.24</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:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
- **Storage:** 1 x 800 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 IVE135R 2.10 released Feb-2019  
- **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>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>657.xz_s</td>
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</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 8.20**  
**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`

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.

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)
General Notes (Continued)


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-states set to Legacy
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-txz5 Tue May 7 11:47:21 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 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
CPU min MHz:               1000.0000
BogoMIPS:                  4400.00

(Continued on next page)
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#### CPU2017 License:
9017

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**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Dec-2018

#### Platform Notes (Continued)

- **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 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 art 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 xtracpcmd pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
- **/proc/cpuinfo cache data**
  - **cache size:** 16896 KB
- **From numactl --hardware**
  - **WARNING:** 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:** 193123 MB
  - **node 0 free:** 192704 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:** 193479 MB
  - **node 1 free:** 192611 MB
  - **node distances:**
  - **node 0 1**
  - **0:** 10 21
  - **1:** 21 10

- **From /proc/meminfo**
  - **MemTotal:** 395881192 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**

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Platform Notes (Continued)

# 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-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 May 7 11:39

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Files
system Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 446G 49G 398G 11% /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 SMI BIOS" standard.
BIOS Lenovo -[IVE135R-2.10]- 02/27/2019
Memory:
24x Samsung M393A2K43CB2-CVF 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)
==============================================================================

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.

(Continued on next page)
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**Compiler Version Notes (Continued)***

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

**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.

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