## SPEC® CPU2017 Integer Speed Result

**Lenovo Global Technology**

**ThinkSystem SR650**

(2.20 GHz, Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base = 7.97</th>
<th>SPECspeed2017_int_peak = Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>0.00 1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0</td>
<td></td>
</tr>
<tr>
<td>600.perlbench_s</td>
<td>5.45</td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>7.88</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>5.22</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4.55</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>3.91</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>18.6</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4210  
- **Max MHz.:** 3200  
- **Nominal:** 2200  
- **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:** 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  
- **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
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>40</td>
<td>326</td>
<td>5.45</td>
<td>326</td>
<td>5.45</td>
<td>325</td>
<td>5.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>40</td>
<td>507</td>
<td>7.86</td>
<td>505</td>
<td>7.89</td>
<td>505</td>
<td>7.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>40</td>
<td>451</td>
<td>10.5</td>
<td>446</td>
<td>10.6</td>
<td>450</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>40</td>
<td>313</td>
<td>5.22</td>
<td>312</td>
<td>5.23</td>
<td>312</td>
<td>5.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>40</td>
<td>139</td>
<td>10.2</td>
<td>139</td>
<td>10.2</td>
<td>138</td>
<td>10.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>40</td>
<td>156</td>
<td>11.3</td>
<td>156</td>
<td>11.3</td>
<td>155</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>40</td>
<td>314</td>
<td>4.56</td>
<td>315</td>
<td>4.55</td>
<td>315</td>
<td>4.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>40</td>
<td>436</td>
<td>3.91</td>
<td>436</td>
<td>3.91</td>
<td>436</td>
<td>3.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>40</td>
<td>255</td>
<td>11.5</td>
<td>255</td>
<td>11.5</td>
<td>257</td>
<td>11.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>40</td>
<td>332</td>
<td>18.6</td>
<td>332</td>
<td>18.6</td>
<td>331</td>
<td>18.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 7.97
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
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

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

SPECspeed2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

Test Date: May-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
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-gf3m Thu May 9 17:43:37 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 4210 CPU @ 2.20GHz
  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
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210 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)
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

SPECspeed2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

Platform Notes (Continued)

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 mce 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 aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 dcp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
fsigsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmiddl ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
labs base tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3
invmidd
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

SPECspeed2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

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

# 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 9 17:35

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 31G 712G 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 -[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)
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

SPECspeed2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

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
Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

SPECspeak2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

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 intell64
-lqkmalloc

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

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-A.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.