## Lenovo Global Technology

**ThinkSystem SR650**  
(3.40 GHz, Intel Xeon Gold 6246R)

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>640.perlbench_s</th>
<th>602.gcc_s</th>
<th>605.mcf_s</th>
<th>620.omnetpp_s</th>
<th>623.xalancbmk_s</th>
<th>625.x264_s</th>
<th>631.deepsjeng_s</th>
<th>641.leea_s</th>
<th>648.exchange2_s</th>
<th>657.xz_s</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.00</td>
<td>5.00</td>
<td>7.00</td>
<td>9.00</td>
<td>11.0</td>
<td>13.0</td>
<td>15.0</td>
<td>17.0</td>
<td>19.0</td>
<td>21.0</td>
</tr>
<tr>
<td>1</td>
<td>2.00</td>
<td>10.8</td>
<td>11.1</td>
<td>14.3</td>
<td>16.6</td>
<td>20.0</td>
<td>22.0</td>
<td>24.6</td>
<td>26.0</td>
<td>28.0</td>
</tr>
<tr>
<td>2</td>
<td>2.00</td>
<td>10.8</td>
<td>11.1</td>
<td>14.3</td>
<td>16.6</td>
<td>20.0</td>
<td>22.0</td>
<td>24.6</td>
<td>26.0</td>
<td>28.0</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6246R  
- **Max MHz:** 4100  
- **Nominal:** 3400  
- **Enabled:** 32 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:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
- **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
**SPEC CPU®2017 Integer Speed Result**

Copyright 2017-2020 Standard Performance Evaluation Corporation

**Lenovo Global Technology**

ThinkSystem SR650
(3.40 GHz, Intel Xeon Gold 6246R)

**SPECspeed®2017_int_base = 11.7**

**SPECspeed®2017_int_peak = Not Run**

**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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>64</td>
<td>255</td>
<td>6.97</td>
<td>253</td>
<td>7.03</td>
<td>252</td>
<td>7.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>64</td>
<td>371</td>
<td>10.7</td>
<td>367</td>
<td>10.8</td>
<td>369</td>
<td>10.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>64</td>
<td>247</td>
<td>19.1</td>
<td>247</td>
<td>19.1</td>
<td>247</td>
<td>19.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>64</td>
<td>147</td>
<td>11.1</td>
<td>147</td>
<td>11.1</td>
<td>147</td>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>64</td>
<td>99.0</td>
<td>14.3</td>
<td>99.2</td>
<td>14.3</td>
<td>99.1</td>
<td>14.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>64</td>
<td>106</td>
<td>16.7</td>
<td>106</td>
<td>16.6</td>
<td>107</td>
<td>16.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>64</td>
<td>237</td>
<td>6.04</td>
<td>237</td>
<td>6.04</td>
<td>237</td>
<td>6.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>64</td>
<td>340</td>
<td>5.02</td>
<td>339</td>
<td>5.03</td>
<td>341</td>
<td>5.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>64</td>
<td>170</td>
<td>17.3</td>
<td>170</td>
<td>17.3</td>
<td>170</td>
<td>17.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>64</td>
<td>251</td>
<td>24.6</td>
<td>251</td>
<td>24.6</td>
<td>251</td>
<td>24.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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**

(3.40 GHz, Intel Xeon Gold 6246R)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_peak</th>
<th>Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_base</td>
<td>11.7</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

```bash
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.

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5


**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 295195f888a3d7ed6e6e46a485a0011
running on linux-xpyz Mon Jun  8 22:47:18 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

```bash
model name : Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz
d  "physical id"'s (chips)
64 "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 : 16
siblings : 32
physical 0: cores 1 2 3 5 6 9 10 12 13 16 18 20 21 24 27 29
physical 1: cores 1 2 3 6 9 12 13 16 17 18 19 20 21 26 27 29
```

From lscpu:

```bash
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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
```

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

**Lenovo Global Technology**  
ThinkSystem SR650  
(3.40 GHz, Intel Xeon Gold 6246R)

**SPECspeed®2017_int_base = 11.7**  
**SPECspeed®2017_int_peak = Not Run**

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

## Platform Notes (Continued)

- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz
- **Stepping:** 7
- **CPU MHz:** 3400.000
- **CPU max MHz:** 4100.0000
- **CPU min MHz:** 1200.0000
- **BogoMIPS:** 6800.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 36608K
- **NUMA node0 CPU(s):** 0-15,32-47
- **NUMA node1 CPU(s):** 16-31,48-63

| Flags: | fpu vme 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 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 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 epb cat_l3 cdp_l3 invpcid_single intel_pippin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdtd_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaveprec xsaves cmovsetc cmov_setcl cmov_setc cmov_mbm_total cmov_mbm_local dtherm ida arat pln pts pkup 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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
node 0 size: 386655 MB  
node 0 free: 385737 MB  
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63  
node 1 size: 387064 MB  
node 1 free: 386745 MB  
node distances:  
node 0: 10 21  
(Continued on next page)
Platform Notes (Continued)

1:  21  10

From /proc/meminfo
MemTotal:       792289604 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-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 8 22:36

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 -[7X05RCD2000]-
Product Family: ThinkSystem
Serial:  1234567890

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
Platform Notes (Continued)

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)

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)
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR650
(3.40 GHz, Intel Xeon Gold 6246R)

SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = Not Run

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

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 -qnextgen -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 -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 -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
ThinkSystem SR650
(3.40 GHz, Intel Xeon Gold 6246R)

SPECspeed®2017_int_base = 11.7
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

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml

SPEC CPU and SPECspeed are registered trademarks 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.

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-08 10:47:18-0400.
Originally published on 2020-07-07.