## SPEC CPU®2017 Integer Speed Result

### Lenovo Global Technology

**ThinkSystem SR590**  
(2.60 GHz, Intel Xeon Gold 6240M)

**SPECspeed®2017_int_base** = 10.1  
**SPECspeed®2017_int_peak** = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Lenovo Global Technology</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 6240M</td>
<td>OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
</tr>
<tr>
<td>Max MHz: 3900</td>
<td>Kernel 4.12.14-94.41-default</td>
</tr>
<tr>
<td>Nominal: 2600</td>
<td>Compiler: C/C++: Version 19.0.4.227 of Intel</td>
</tr>
<tr>
<td>Enabled: 36 cores, 2 chips, 2 threads/core</td>
<td>C/C++ Compiler for Linux;</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
<td>Fortran: Version 19.0.4.227 of</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Intel Fortran</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td>L3: 24.75 MB I+D on chip per chip</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Other: None</td>
<td>Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019</td>
</tr>
<tr>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
<td>tested as TEE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>Storage: 1 x 960 GB SATA SSD</td>
<td>File System: btrfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td></td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td></td>
<td>Peak Pointers: Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td></td>
<td>Power Management: --</td>
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### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.1)</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>72</td>
<td>6.84</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>72</td>
<td>9.78</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>72</td>
<td>12.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>72</td>
<td>7.70</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>72</td>
<td>12.4</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>72</td>
<td>14.0</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>72</td>
<td>5.45</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>72</td>
<td>4.77</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>16.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>72</td>
<td>23.5</td>
</tr>
</tbody>
</table>
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**Lenovo Global Technology**  
ThinkSystem SR590  
(2.60 GHz, Intel Xeon Gold 6240M)  

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Aug-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019  

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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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<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>259</td>
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</tr>
</tbody>
</table>

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### 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-ic19.0u4/lib/intel64"
  - `LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
  - `OMP_STACKSIZE = "192M"

- Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
  - memory using Redhat Enterprise Linux 7.5
  - Transparent Huge Pages enabled by default

- Prior to runcpu invocation
  - `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

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(Continued on next page)
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SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = Not Run

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

Test Date: Aug-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

General Notes (Continued)

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
Memory Power Management set to Automatic
CPU P-state Control set to Cooperative
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-2uov Fri Aug 23 09:53:09 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) Gold 6240M CPU @ 2.60GHz
  2 "physical id"s (chips)
    72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture:           x86_64
CPU op-mode(s):         32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 72
On-line CPU(s) list:    0-71
Thread(s) per core:     2
Core(s) per socket:     18
Socket(s):              2
NUMA node(s):           2
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Gold 6240M CPU @ 2.60GHz
Stepping:               7
CPU MHz:                2600.000
CPU max MHz:            3900.000

(Continued on next page)
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Platform Notes (Continued)

CPU min MHz: 1000.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,36-53
NUMA node1 CPU(s): 18-35,54-71
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 aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcd 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_ppln ssbd ibrs ibpb stibp tpr_shadow vni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dt有色 ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni flush_lld arch_capabilities

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 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 0 size: 96323 MB
node 0 free: 95863 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 54 55 56 57 58 59 60
node 1 size: 96738 MB
node 1 free: 95908 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197694664 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

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

SuSE-release:
- SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 4
  # This file is deprecated and will be removed in a future service pack or release.
  # 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 Aug 23 09:52

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
- Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdb3 btrfs 740G 50G 690G 7% /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 -[TEE141E-2.30]- 07/02/2019
- Memory:
  - 4x NO DIMM NO DIMM
  - 12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)
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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 Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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

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**Base Portability Flags (Continued)**

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<thead>
<tr>
<th>Portability Flags</th>
<th>Definition</th>
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<tbody>
<tr>
<td>623.xalancbmk_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
</tr>
<tr>
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<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

**Base Optimization Flags**

**C benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=4 -gopenmp -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_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

**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

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

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