# SPEC CPU®2017 Integer Rate Result

**Lenovo Global Technology**  
ThinkSystem SR570  
(2.90 GHz, Intel Xeon Gold 6226R)

<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>
<tr>
<td>CPU2017 License:</td>
<td>9017</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base** = 228  
**SPECrate®2017_int_peak** = Not Run

## Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6226R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3900</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2900</td>
</tr>
<tr>
<td>Enabled:</td>
<td>32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 15 SP1 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 19.1.1.217 of Intel C/C++</td>
</tr>
<tr>
<td>Fortran:</td>
<td>Compiler for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 19.1.1.217 of Intel Fortran</td>
</tr>
<tr>
<td></td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version TEE155L 2.61 released May-2020</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

---

**Copies (228)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>228</td>
</tr>
</tbody>
</table>

---

**Hardware**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base (228)</th>
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<tr>
<td>228</td>
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</table>
Lenovo Global Technology
ThinkSystem SR570
(2.90 GHz, Intel Xeon Gold 6226R)

**SPEC CPU®2017 Integer Rate Result**

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**Lenovo Global Technology**

**ThinkSystem SR570**

(2.90 GHz, Intel Xeon Gold 6226R)

- **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

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>676</td>
<td>151</td>
<td>678</td>
<td>150</td>
<td>676</td>
<td>151</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>522</td>
<td>174</td>
<td>519</td>
<td>175</td>
<td>517</td>
<td>175</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>270</td>
<td>383</td>
<td>269</td>
<td>384</td>
<td>269</td>
<td>384</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>581</td>
<td>145</td>
<td>580</td>
<td>145</td>
<td>583</td>
<td>144</td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>64</td>
<td>226</td>
<td>299</td>
<td>226</td>
<td>299</td>
<td>226</td>
<td>299</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
<td>240</td>
<td>466</td>
<td>242</td>
<td>463</td>
<td>239</td>
<td>470</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>407</td>
<td>180</td>
<td>408</td>
<td>180</td>
<td>407</td>
<td>180</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>64</td>
<td>608</td>
<td>174</td>
<td>623</td>
<td>170</td>
<td>608</td>
<td>174</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>382</td>
<td>440</td>
<td>382</td>
<td>439</td>
<td>382</td>
<td>439</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>516</td>
<td>134</td>
<td>515</td>
<td>134</td>
<td>516</td>
<td>134</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

**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.

For details, please see the config file.

**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:

```
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/1
lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/je5.0.1-32"
MALLOCONF = "retain:true"
```
Lenovo Global Technology

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| SPECrate®2017_int_base = 228 |
| SPECrate®2017_int_peak = Not Run |

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:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Trusted Execution Technology set to Enable
SNC set to Enable
Patrol Scrub set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed81e6e46a485a0011
running on linux-rn74 Wed Jun 3 09:33:07 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

```plaintext
model name : Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
2 "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 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

(Continued on next page)
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECraten®2017_int_base = 228
SPECraten®2017_int_peak = Not Run

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
Stepping: 7
CPU MHz: 2900.000
CPU max MHz: 3900.0000
CPU min MHz: 1200.0000
BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3,8-11,32-35,40-43
NUMA node1 CPU(s): 4-7,12-15,36-39,44-47
NUMA node2 CPU(s): 16-19,24-27,48-51,56-59
NUMA node3 CPU(s): 20-23,28-31,52-55,60-63
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 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_pni ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrm invpcid tdcm tpr_shadow tse tcmovan sysenter syscall tsdir msr_dolly aesni txenvpd idapxsize arch_capabilities

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a

(Continued on next page)
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SPECrater®2017_int_base = 228
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Platform Notes (Continued)

physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
   node 0 size: 47704 MB
   node 0 free: 47405 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
   node 1 size: 48351 MB
   node 1 free: 48164 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
   node 2 size: 48380 MB
   node 2 free: 48169 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
   node 3 size: 48379 MB
   node 3 free: 47869 MB
   node distances:
      node   0   1   2   3
     0:  10  11  21  21
     1:  11  10  21  21
     2:  21  21  10  11
     3:  21  21  11  10

From /proc/meminfo
   MemTotal:       197444620 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-rn74 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

(Continued on next page)
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CPU2017 License: 9017
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Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

CPE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CPE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 3 09:27

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 892G 41G 851G 5% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE155L-2.61]- 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR570 -[7Y02RCZ000]-
Product Family: ThinkSystem
Serial: 1234567890

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:
4x NO DIMM NO DIMM
12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

C
---
500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
525.x264_r(base) 557.xz_r(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++
---
520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(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.

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

Fortran | 548.exchange2_r(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

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-W1, -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4

(Continued on next page)
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Base Optimization Flags (Continued)

C benchmarks (continued):
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX2 -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 -W1,-plugin-opt=-x86-branches-within-32B-boundaries -W1,-z,muldefs
-xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

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-H.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-H.xml

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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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