# SPEC CPU®2017 Integer Rate Result

**Lenovo Global Technology**

**ThinkSystem SR570**

(2.10 GHz, Intel Xeon Gold 6230R)

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

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base = 290</th>
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<tbody>
<tr>
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<td>104</td>
</tr>
</tbody>
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<table>
<thead>
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<th>Hardware</th>
</tr>
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</table>
| **CPU Name:** Intel Xeon Gold 6230R  
| **Max MHz:** 4000  
| **Nominal:** 2100  
| **Enabled:** 52 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:** 35.75 MB I+D on chip per chip  
| **Other:** None  
| **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
| **Storage:** 1 x 960 GB SATA SSD  
| **Other:** None  |

<table>
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</table>
| **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  
| **Parallel:** No  
| **Firmware:** Lenovo BIOS Version TEE155L 2.61 released May-2020  
| **File System:** xfs  
| **System State:** Run level 3 (multi-user)  
| **Base Pointers:** 64-bit  
| **Peak Pointers:** Not Applicable  
| **Power Management:** BIOS set to prefer performance at the cost of additional power usage  

**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020
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Results Table

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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
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<tr>
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<td>859 193</td>
<td>858 193</td>
<td>861 192</td>
<td></td>
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<td>357 470</td>
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<td>104</td>
<td>307 594</td>
<td>307 593</td>
<td>306 595</td>
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<td>483 564</td>
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<td>104</td>
<td>632 178</td>
<td>631 178</td>
<td>631 178</td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/j"e5.0.1-32"
MALLOCONF = "retain:true"
### Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 290</th>
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<tr>
<td>SPECrate®2017_int_peak = Not Run</td>
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#### 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:
```bash
csync; echo 3 > /proc/sys/vm/drop_caches
```
runcpu command invoked through numactl i.e.:
```bash
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 295195f888a3d7ebdle6e46a485a0011 
running on linux-8n74 Sat Jun 6 11:05:30 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 6230R CPU @ 2.10GHz
2 "physical id"s (chips)
104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
```

(Continued on next page)
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**SPECrated®2017_int_base = 290**

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<th>Test Date:</th>
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<td>Test Sponsor:</td>
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<td>Hardware Availability:</td>
<td>Mar-2020</td>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```plaintext
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

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): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel (R) Xeon (R) Gold 6230R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3, 7-9, 13-15, 20-22, 52-55, 59-61, 65-67, 72-74
NUMA node1 CPU(s): 4-6, 10-12, 16-19, 23-25, 56-58, 62-64, 68-71, 75-77
NUMA node2 CPU(s): 26-29, 33-35, 39-41, 46-48, 78-81, 85-87, 91-93, 98-100
NUMA node3 CPU(s): 30-32, 36-38, 42-45, 49-51, 82-84, 88-90, 94-97, 101-103
Flags: fpu vme de pse tsc 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmrperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm 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
invpcid_single intel_pmm ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invvpidd rtm
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsaves xgetbv1 xsaves cqm_l1c cqm_occrap_l1c cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pkno ospke avx512_vnni md_clear flush_l1d
arch_capabilities
```

(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

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**Tested by:** Lenovo Global Technology

**Software Availability:** Apr-2020

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**CPU2017 License:** 9017

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**Hardware Availability:** Mar-2020

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**Platform Notes (Continued)**

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 4 nodes (0-3)

<table>
<thead>
<tr>
<th>Node</th>
<th>CPUs</th>
<th>Size</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 1 2 3 7 8 9 13 14 15 20 21 22 52 53 54 55 59 60 61 65 66 67 72 73 74</td>
<td>96085 MB</td>
<td>95716 MB</td>
</tr>
<tr>
<td>1</td>
<td>4 5 6 10 11 12 16 17 18 19 23 24 25 56 58 62 63 64 68 69 70 71 75 76 77</td>
<td>96763 MB</td>
<td>95930 MB</td>
</tr>
<tr>
<td>2</td>
<td>26 27 28 29 33 34 35 39 40 41 46 47 48 78 79 80 81 85 86 87 91 92 93 98 99 100</td>
<td>96763 MB</td>
<td>96555 MB</td>
</tr>
<tr>
<td>3</td>
<td>30 31 32 36 37 38 42 43 44 45 49 50 51 82 83 84 88 89 90 94 95 96 97 101 102 103</td>
<td>96732 MB</td>
<td>96532 MB</td>
</tr>
</tbody>
</table>

node distances:

node 0: 10 11 21 21
node 1: 11 10 21 21
node 2: 21 21 10 11
node 3: 21 21 11 10

From `/proc/meminfo`

```
MemTotal:       395616292 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
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:**

(Continued on next page)
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Platform Notes (Continued)
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 6 11:03
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 Samsung M393A4K40CB2-CVF 32 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)
(Continued on next page)
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Compiler Version Notes (Continued)

------------------------------------------------------------------------------
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 | 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
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### Base Optimization Flags

**C benchmarks:**
- `-m64 -qnextgen -std=c11`
- `-Wl,-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`
- `-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`
- `-Wl,-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 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-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:

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

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