# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

ThinkSystem SR850P  
(2.70 GHz, Intel Xeon Gold 6226)

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<table>
<thead>
<tr>
<th>Threads</th>
<th>Specspeed®2017_int_base =</th>
<th>10.4</th>
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</thead>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux 8.0 (Ootpa)</th>
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</table>

<table>
<thead>
<tr>
<th>Compiler:</th>
<th>C/C++: Version 19.1.2.275 of Intel C/C++</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Firmware:</th>
<th>Lenovo BIOS Version TEE156L 2.61 released May-2020</th>
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### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6226</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Max MHz:</th>
<th>3700</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Nominal:</th>
<th>2700</th>
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</table>

<table>
<thead>
<tr>
<th>Enabled:</th>
<th>48 cores, 4 chips</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Orderable:</th>
<th>4 chips</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cache L1:</th>
<th>32 KB I + 32 KB D on chip per core</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>L2:</th>
<th>1 MB I+D on chip per core</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>L3:</th>
<th>19.25 MB I+D on chip per chip</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Other:</th>
<th>None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Memory:</th>
<th>1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Storage:</th>
<th>1 x 960 GB SATA SSD</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Other:</th>
<th>None</th>
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</table>

| Power Management: | BIOS set to prefer performance at the cost of additional power usage |

---
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SPECspeed©2017_int_base = 10.4
SPECspeed©2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Peak</th>
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<th>Ratio</th>
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<td>600.perlbench_s</td>
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<td>9.57</td>
<td>420</td>
<td>9.48</td>
<td>413</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>8.18</td>
<td>202</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>48</td>
<td>108</td>
<td>13.1</td>
<td>107</td>
<td>13.2</td>
<td>107</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
<td>48</td>
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<td>15.1</td>
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<td>641.leela_s</td>
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<td>4.57</td>
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<tr>
<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
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<td>22.7</td>
<td>273</td>
<td>22.7</td>
<td>272</td>
<td>22.7</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

SPECspeed©2017_int_base = 10.4
SPECspeed©2017_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"

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-ic19.1u2/lib/intel64:/home/cpu2017-1.1.0-ic19.1u2/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:
    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.

(Continued on next page)
### Lenovo Global Technology

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<tr>
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<tr>
<th>CPU2017 License:</th>
<th>9017</th>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Nov-2020</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Aug-2020</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

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
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
Patrol Scrub set to Disable
LLC dead line alloc set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1u2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f88a3d7eddb1e6e46a485a0011
running on localhost.localdomain Fri Nov 27 18:03:06 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
```
model name         : Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz
  4 "physical id"s (chips)
  48 "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 : 12
siblings      : 12
physical 0: cores 0 2 3 4 5 6 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 6 8 9 11 12 13
physical 2: cores 0 1 2 3 4 5 8 10 11 12 13 14
physical 3: cores 0 2 3 4 5 6 8 9 10 11 13 14
```

From lscpu:
```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                48
On-line CPU(s) list:   0-47
Thread(s) per core:    1
Core(s) per socket:    12
Socket(s):             4
NUMA node(s):          4
Vendor ID:             GenuineIntel
```

*(Continued on next page)*
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SPECspeed®2017_int_base = 10.4
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Nov-2020
Tested by: Lenovo Global Technology
Hardware Availability: Jun-2020
Software Availability: Aug-2020

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz
Stepping: 7
CPU MHz: 2427.129
CPU max MHz: 3700.0000
CPU min MHz: 1200.0000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
NUMA node2 CPU(s): 24-35
NUMA node3 CPU(s): 36-47
Flags: fpu vme de pse tsc msr pae mca c8 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop tsc cpuid
aperfmperf fpi 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_ppln ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmni
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 avx512v1 xsaveopt xsaves cqsveq xgetbv1 xsaves cqm_11c cqm_occup_11c cqm_mbm_total

cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_lld
arch_capabilities

/proc/cpuinfo cache data
cache size : 19712 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
node 0 size: 386686 MB
node 0 free: 386350 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
node 1 size: 387069 MB
node 1 free: 386639 MB
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35
node 2 size: 387044 MB
node 2 free: 386748 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47
node 3 size: 387068 MB

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<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- node 3 free: 386343 MB
- node distances:
  - node 0 1 2 3
  - 0: 10 21 21 21
  - 1: 21 10 21 21
  - 2: 21 21 10 21
  - 3: 21 21 21 10

From /proc/meminfo

- MemTotal: 1585018132 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

- os-release:
  - NAME="Red Hat Enterprise Linux"
  - VERSION="8.0 (Ootpa)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VERSION_ID="8.0"
  - PLATFORM_ID="platform:el8"
  - PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
  - ANSI_COLOR="0;31"

- redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
- system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
- system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga

uname -a:

```
Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: No status reported
- 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 Nov 27 18:00

SPEC is set to: /home/cpu2017-1.1.0-ic19.1u2

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>839G</td>
<td>65G</td>
<td>774G</td>
<td>8%</td>
<td>/home</td>
</tr>
</tbody>
</table>

(Continued on next page)
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</table>

**Platform Notes (Continued)**

From /sys/devices/virtual/dmi/id  
BIOS: Lenovo -[TEE156L-2.61]- 05/20/2020  
Vendor: Lenovo  
Product: ThinkSystem SR850P -[7D2HCTO1WW]-  
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:  
48x 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  
19.1.2.275 Build 20200604  
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  
19.1.2.275 Build 20200604  
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 19.1.2.275 Build 20200623  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```
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<tr>
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<th>Test Date</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
</thead>
</table>

**Base Compiler Invocation**

C benchmarks:

icc

C++ benchmarks:

icpc

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

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Base Optimization Flags (Continued)
Fortran benchmarks (continued):
-mbranches-within-32B-boundaries

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

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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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