## Lenovo Global Technology

**ThinkSystem SR850 V2**  
(3.90 GHz, Intel Xeon Platinum 8356H)

### SPECspeed®2017_int_base = 12.5  
**SPECspeed®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>SPEC CPU®2017 Integer Speed</th>
<th>Lenovo Global Technology</th>
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<tbody>
<tr>
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### Threads

<table>
<thead>
<tr>
<th>Specbenchmark</th>
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<th>SPECspeed®2017_int_peak</th>
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<tr>
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<td>12.5</td>
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<tr>
<td>602.gcc_s</td>
<td>32</td>
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<td>620.omnetpp_s</td>
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<td>6.43</td>
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<td>625.x264_s</td>
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<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
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<td>648.exchange2_s</td>
<td>32</td>
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<tr>
<td>657.xz_s</td>
<td>32</td>
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</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8356H  
- **Max MHz:** 4400  
- **Nominal:** 3900  
- **Enabled:** 32 cores, 4 chips  
- **Orderable:** 2.4 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:** 1536 GB (48 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.2  
  (Ootpa)  
- **Compiler:** C/C++: Version 19.1.2.275 of Intel C/C++ Compiler for Linux; Fortran: Version 19.1.2.275 of Intel Fortran Compiler for Linux  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version M5E107I 1.01 released Nov-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

**Lenovo Global Technology**

ThinkSystem SR850 V2  
(3.90 GHz, Intel Xeon Platinum 8356H)

---

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Dec-2020  
**Hardware Availability:** Nov-2020  
**Software Availability:** Aug-2020

---

## Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

**SPECspeed®2017_int_base =** 12.5  
**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
ThinkSystem SR850 V2
(3.90 GHz, Intel Xeon Platinum 8356H)

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

SPECSpeed®2017_int_base = 12.5
SPECSpeed®2017_int_peak = Not Run

Test Date: Dec-2020
Hardware Availability: Nov-2020
Software Availability: Aug-2020

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
C-States set to Autonomous
Hyper-Threading set to Disabled

Sysinfo program /home/cpu2017-1.1.0-ic19.1u2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1be6e46a485a0011
running on localhost.localdomain Mon Dec 28 09:41:29 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) Platinum 8356H CPU @ 3.90GHz
  4 "physical id"s (chips)
  32 "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 : 8
siblings : 8
physical 0: cores 1 2 3 6 13 18 28 29
physical 1: cores 2 6 8 10 12 17 19 28
physical 2: cores 3 6 10 13 17 18 28 29
physical 3: cores 1 2 3 5 6 10 20 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8356H CPU @ 3.90GHz

(Continued on next page)
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Platform Notes (Continued)

Stepping: 11
CPU MHz: 1983.334
CPU max MHz: 4400.0000
CPU min MHz: 1200.0000
BogoMIPS: 7800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
NUMA node2 CPU(s): 16-23
NUMA node3 CPU(s): 24-31

Flavors: fpu vme de pse tsc msr mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrmisc 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
invpcl_single intel_patin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
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 xsaves cqm_llc cqm_occchip llc cqm_mbim_total

cache size : 36608 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
node 0 size: 386659 MB
node 0 free: 386461 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 387069 MB
node 1 free: 386586 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 387042 MB
node 2 free: 386743 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 387069 MB
node 3 free: 386815 MB
node distances:
node 0 1 2 3

(Continued on next page)
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Platform Notes (Continued)

0:  10  20  20  20
1:  20  10  20  20
2:  20  20  10  20
3:  20  20  20  10

From /proc/meminfo
MemTotal:       1584988468 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
NAME="Red Hat Enterprise Linux"
VERSION="8.2 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

itlb_multihit:                               Not affected
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: usercopy/swapgs barriers and __user
                                                pointer sanitization
CVE-2017-5715 (Spectre variant 2):           Mitigation: Enhanced IBRS, IBPB: conditional,
                                                RSB filling
tsx_async_abort:                             Not affected

run-level 3 Dec 28 09:38

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

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   838G  35G  803G   5% /home

(Continued on next page)
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SPECspeed®2017_int_base = 12.5
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Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
  BIOS: Lenovo M5E107I-1.01 11/02/2020
  Vendor: Lenovo
  Product: ThinkSystem SR850 V2
  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 M393A4G43AB3-CWE 32 GB 2 rank 3200

(End of data from sysinfo program)
Memory on this system run at 2933 MHz due to CPU limitation.

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.
## SPEC CPU®2017 Integer Speed Result

### Lenovo Global Technology

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### 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

### 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 -ftlo -mfpmath=sse -funroll-loops
  - -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
  - -W1,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -ftlo -mfpmath=sse
  - -funroll-loops -qopt-mem-layout-trans=4
  - -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
  - -lqkmalloc

- **Fortran benchmarks:**  
  - -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX2
  - -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
  - -nostandard-realloc-lhs -align array32byte

(Continued on next page)
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**SPECspeed®2017_int_base** = 12.5
**SPECspeed®2017_int_peak** = Not Run

---

**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


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-Cooperlake-A.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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