# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

**ThinkSystem SR860 V2**  
(2.60 GHz, Intel Xeon Platinum 8376H)

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

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### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>224</td>
<td>7.37</td>
<td>Not Run</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>224</td>
<td>11.3</td>
<td>Not Run</td>
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<tr>
<td>605.mcf_s</td>
<td>224</td>
<td>19.7</td>
<td>Not Run</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>224</td>
<td>11.3</td>
<td>Not Run</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
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<td>15.3</td>
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</tr>
<tr>
<td>625.x264_s</td>
<td>224</td>
<td>17.8</td>
<td>Not Run</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>224</td>
<td>6.31</td>
<td>Not Run</td>
</tr>
<tr>
<td>641.leea_s</td>
<td>224</td>
<td>5.32</td>
<td>Not Run</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>224</td>
<td>18.1</td>
<td>Not Run</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>224</td>
<td>27.5</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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### Hardware

- **CPU Name:** Intel Xeon Platinum 8376H  
- **Max MHz:** 4300  
- **Nominal:** 2600  
- **Enabled:** 112 cores, 4 chips, 2 threads/core  
- **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:** 38.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.2 (Ootpa)  
- **Kernel:** 4.18.0-193.el8.x86_64  
- **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 M5E107H 1.00 released Oct-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
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SPECSpeed®2017_int_base = 12.4
SPECSpeed®2017_int_peak = Not Run

Results Table

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

SPECSpeed®2017_int_base = 12.4
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.

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Software Availability: Aug-2020

General Notes (Continued)

ejemalloc, 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 Enabled

Sysinfo program /home/cpu2017-1.1.0-ic19.1u2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed61e646a485a0011
running on localhost.localdomain Fri Nov 20 09:37:21 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 8376H CPU @ 2.60GHz
  4 "physical id"s (chips)
  224 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30

From lscpu:
  Architecture:          x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Byte Order:            Little Endian
  CPU(s):                224
  On-line CPU(s) list:   0-223
  Thread(s) per core:    2
  Core(s) per socket:    28
  Socket(s):             4
  NUMA node(s):          4
  Vendor ID:             GenuineIntel

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Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8376H CPU @ 2.60GHz
Stepping: 11
CPU MHz: 3893.227
CPU max MHz: 4300.000
CPU min MHz: 1000.000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27,112-139
NUMA node1 CPU(s): 28-55,140-167
NUMA node2 CPU(s): 56-83,168-195
NUMA node3 CPU(s): 84-111,196-223
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts ept vmm nonpae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts ept vmm nonpae mce cmov pat pse36 clflush dts ept vmm nonpae mce cmov pat
Cache size: 39424 KB

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

/proc/cpuinfo cache data

cache size : 39424 KB

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

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**Platform Notes (Continued)**

- node 2 size: 387059 MB
- node 2 free: 386549 MB
- node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 119 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223

From `/proc/meminfo`

- MemTotal: 1584945324 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
- 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

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Platform Notes (Continued)

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 Nov 20 09:33

SPEC is set to: /home/cpu2017-1.1.0-ic19.1u2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 839G 23G 816G 3% /home

From /sys/devices/virtual/dmi/id
BIOS: Lenovo M5E107H-1.00 10/18/2020
Vendor: Lenovo
Product: ThinkSystem SR860 V2
Product Family: ThinkSystem
Serial: none

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 M393A4K40DB3-CWE 32 GB 2 rank 3200

(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.

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Compiler Version Notes (Continued)

Fortran | 648.exchange2_s(base)
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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.

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 -mnextgen -std=c11
-W1, -plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
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Base Optimization Flags (Continued)

C benchmarks (continued):
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -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-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-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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