Lenovo Global Technology  
ThinkSystem SR850 V2  
(3.00 GHz, Intel Xeon Platinum 8360HL)  

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<thead>
<tr>
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<tr>
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<td>Hardware Availability: Nov-2020</td>
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<tr>
<td>Software Availability: Aug-2020</td>
<td></td>
</tr>
</tbody>
</table>

### SPEC CPU®2017 Integer Speed Result

**SPECspeed®2017_int_base = 12.1**  
**SPECspeed®2017_int_peak = Not Run**  

**Test Date:** Dec-2020  
**Hardware Availability:** Nov-2020  
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#### Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base (12.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>96.0</td>
</tr>
</tbody>
</table>

#### Hardware

**CPU Name:** Intel Xeon Platinum 8360HL  
**Max MHz:** 4200  
**Nominal:** 3000  
**Enabled:** 96 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:** 33 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1536 GB (48 x 32 GB 2Rx8 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 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
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SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>600/perlbench_s</td>
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<td>605.mcf_s</td>
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<td>245</td>
<td>19.3</td>
<td>245</td>
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</tr>
<tr>
<td>620.omnetpp_s</td>
<td>96</td>
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<tr>
<td>623.xmlt cbench_s</td>
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<td>94.3</td>
<td>15.0</td>
<td>95.1</td>
<td>14.9</td>
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<tr>
<td>625.x264_s</td>
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<td>17.6</td>
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<td>631.deepsjeng_s</td>
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<tr>
<td>648.exchange2_s</td>
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<td>18.2</td>
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<tr>
<td>657.xz_s</td>
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<td>26.4</td>
<td>234</td>
<td>26.5</td>
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<td></td>
</tr>
</tbody>
</table>

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)
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 Thu Dec 24 21:35:29 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 8360HL CPU @ 3.00GHz
    4 "physical id"s (chips)
    96 "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 : 24
    siblings : 24
    physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 96
  On-line CPU(s) list: 0–95
  Thread(s) per core: 1
  Core(s) per socket: 24
  Socket(s): 4
  NUMA node(s): 4
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Platinum 8360HL CPU @ 3.00GHz

(Continued on next page)
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SPECspeed®2017_int_base = 12.1
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Platform Notes (Continued)

Stepping: 11
CPU MHz: 2377.429
CPU max MHz: 4200.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 33792K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
NUMA node2 CPU(s): 48-71
NUMA node3 CPU(s): 72-95

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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16
xprt pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx fl64 rdrand lahf_lm abml3 fnrprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_puin ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hlxe avx2 smep bmi2 erms invpcid rtm
cqm mpxr rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavevc xvasaves cqm_llc cqm_occaps llc cqm_mbb_total
cqm_mbb_local avx512_bf16 dtherm ida arat p11 ptk ospke avx512_vnni md_clear
flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 33792 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
nnode 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
node 0 size: 386655 MB
node 0 free: 386286 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387066 MB
node 1 free: 386482 MB
node 2 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 2 size: 387038 MB
node 2 free: 386797 MB
node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 387065 MB
node 3 free: 386858 MB
node distances:
node 0 1 2 3

(Continued on next page)
### Platform Notes (Continued)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>0:</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>1:</td>
<td>20</td>
<td>10</td>
<td>20</td>
<td>20</td>
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<tr>
<td>2:</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>3:</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

From /proc/meminfo
- MemTotal: 1584974580 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"

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: userscopy/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 24 21:32

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/sda2</td>
<td>xfs</td>
<td>838G</td>
<td>41G</td>
<td>797G</td>
<td>5%</td>
<td>/home</td>
</tr>
</tbody>
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# SPEC CPU® 2017 Integer Speed Result

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

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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: 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 M393A4G43AB3-CWE 32 GB 2 rank 3200

(End of data from sysinfo program)

## Compiler Version Notes

### C

<table>
<thead>
<tr>
<th>600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)</th>
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</table>

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++

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<tr>
<th>620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)</th>
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</table>

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

<table>
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<tr>
<th>648.exchange2_s(base)</th>
</tr>
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</table>

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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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
-Wl,-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
-Wl,-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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### 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:
- [Intel ic19.1u1 official Linux64 revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html)  
- [Lenovo Platform SPECcpu2017 Flags V1.2 Cooperlake A.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Cooperlake-A.html)

You can also download the XML flags sources by saving the following links:
- [Intel ic19.1u1 official Linux64 revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml)  
- [Lenovo Platform SPECcpu2017 Flags V1.2 Cooperlake A.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.

Tested with SPEC CPU®2017 v1.1.0 on 2020-12-24 08:35:29-0500.  
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