Lenovo Global Technology

ThinkSystem SR850 V2
(2.00 GHz, Intel Xeon Gold 6330H)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
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**CPU2017 License:** 9017  
**Test Date:** Dec-2020

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Nov-2020

**Tested by:** Lenovo Global Technology  
**Software Availability:** Aug-2020

### Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>96</td>
<td>6.43</td>
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<tr>
<td>602.gcc_s</td>
<td>96</td>
<td>9.90</td>
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<tr>
<td>605.mcf_s</td>
<td>96</td>
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<tr>
<td>620.omnetpp_s</td>
<td>96</td>
<td>10.1</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>96</td>
<td>13.3</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>96</td>
<td>15.4</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>96</td>
<td>5.52</td>
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<tr>
<td>641.leea_s</td>
<td>96</td>
<td>4.55</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>96</td>
<td>15.9</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>96</td>
<td></td>
</tr>
</tbody>
</table>

---

**Hardware**

- **CPU Name:** Intel Xeon Gold 6330H
- **Max MHz:** 3700
- **Nominal:** 2000
- **Enabled:** 96 cores, 4 chips
- **Orderable:** 2.4 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:** 33 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)
- **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 = 10.8

SPECspeed®2017_int_peak = Not Run

Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>6.43</td>
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<tr>
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<td>405</td>
<td>9.83</td>
<td>402</td>
<td>9.90</td>
<td>401</td>
<td>9.93</td>
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<td>605.mcf_s</td>
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<td>271</td>
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<td>13.3</td>
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<td>107</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
<td>96</td>
<td>115</td>
<td>15.4</td>
<td>115</td>
<td>15.4</td>
<td>115</td>
<td>15.3</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>96</td>
<td>260</td>
<td>5.52</td>
<td>260</td>
<td>5.52</td>
<td>260</td>
<td>5.52</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>96</td>
<td>375</td>
<td>4.55</td>
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<td>648.exchange2_s</td>
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<td>15.9</td>
<td>184</td>
<td>15.9</td>
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<tr>
<td>657.xz_s</td>
<td>96</td>
<td>258</td>
<td>24.0</td>
<td>258</td>
<td>23.9</td>
<td>258</td>
<td>23.9</td>
</tr>
</tbody>
</table>

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.
### Lenovo Global Technology
ThinkSystem SR850 V2
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| SPECspeed®2017_int_base = 10.8 |
| SPECspeed®2017_int_peak = Not Run |

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**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 295195f888a3d7ed1e6e46a485a0011  
running on localhost.localdomain Wed Dec 30 22:59:33 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 6330H CPU @ 2.00GHz  
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) Gold 6330H CPU @ 2.00GHz

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

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**CPU2017 License:** 9017  
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<thead>
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<th>Platform Notes (Continued)</th>
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<tbody>
<tr>
<td>Stepping: 11</td>
</tr>
<tr>
<td>CPU MHz: 1403.576</td>
</tr>
<tr>
<td>CPU max MHz: 3700.0000</td>
</tr>
<tr>
<td>CPU min MHz: 1000.0000</td>
</tr>
<tr>
<td>BogoMIPS: 4000.00</td>
</tr>
<tr>
<td>Virtualization: VT-x</td>
</tr>
<tr>
<td>L1d cache: 32K</td>
</tr>
<tr>
<td>L1i cache: 32K</td>
</tr>
<tr>
<td>L2 cache: 1024K</td>
</tr>
<tr>
<td>L3 cache: 33792K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-23</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 24-47</td>
</tr>
<tr>
<td>NUMA node2 CPU(s): 48-71</td>
</tr>
<tr>
<td>NUMA node3 CPU(s): 72-95</td>
</tr>
<tr>
<td>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 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 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pipin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbse tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpdx rdts_a avx512f avx512dq rdrand adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavevc xsaves cqm_llc cqm_occpr_llc cqm_mbttotl cqm_mbttolc avx512_bf16 dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities</td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data  

cache size : 33792 KB

---

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 12 13 14 15 16 17 18 19 20 21 22 23  

node 0 size: 386655 MB  

node 0 free: 386437 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: 386540 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: 386839 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: 386534 MB  

node distances:  

node 0 1 2 3

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(Continued on next page)
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Platform Notes (Continued)

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<tr>
<th>0:</th>
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<th>20</th>
<th>20</th>
<th>20</th>
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<tbody>
<tr>
<td>1:</td>
<td>20</td>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
<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: 1584974584 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: 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 30 22:58

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>
</table>

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CPU2017 License: 9017
Test Sponsor: 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)
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.lee_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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SPECspeed®2017_int_base = 10.8
SPECspeed®2017_int_peak = Not Run

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 -flto -mfpmath=sse -funroll-loops
-qpopt-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 -flto -mfpmath=sse
-funroll-loops -qpopt-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 -qpopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte

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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

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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