**Lenovo Global Technology**

ThinkSystem SN850
(2.20 GHz, Intel Xeon Platinum 8276L)

<table>
<thead>
<tr>
<th>SPECspeed\textsuperscript{2017_int_peak}</th>
<th>SPECspeed\textsuperscript{2017_int_base}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Run</td>
<td>10.6</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8276L
- **Max MHz:** 4000
- **Nominal:** 2200
- **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
- **Orderable:** None
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)
- **Kernel:** 3.10.0-957.el7.x86_64
- **Compiler:**
  - C/C++: Version 19.0.4.227 of Intel
  - Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019
- **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:** --

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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019

**Hardware Availability:** Apr-2019

**Software Availability:** May-2019

---

### Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed\textsuperscript{2017_int_base}</th>
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<tr>
<td>600.perlbench_s</td>
<td>224</td>
<td>7.01</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>224</td>
<td>10.1</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>224</td>
<td>12.7</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>224</td>
<td>9.07</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>224</td>
<td>12.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>224</td>
<td>14.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>224</td>
<td>5.54</td>
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<tr>
<td>641.leela_s</td>
<td>224</td>
<td>4.89</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>224</td>
<td>17.1</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>224</td>
<td>22.4</td>
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</tbody>
</table>
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECSpeed®2017_int_base = 10.6
SPECSpeed®2017_int_peak = Not Run

Results Table

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<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<tr>
<td>602.gcc_s</td>
<td>224</td>
<td>390</td>
<td>10.2</td>
<td>394</td>
<td>10.1</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>224</td>
<td>371</td>
<td>12.7</td>
<td>371</td>
<td>12.7</td>
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<tr>
<td>620.omnetpp_s</td>
<td>224</td>
<td>180</td>
<td>9.07</td>
<td>180</td>
<td>9.04</td>
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<tr>
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<td>112</td>
<td>12.7</td>
<td>112</td>
<td>12.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>224</td>
<td>121</td>
<td>14.6</td>
<td>121</td>
<td>14.6</td>
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<td>224</td>
<td>259</td>
<td>5.54</td>
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<tr>
<td>641.leela_s</td>
<td>224</td>
<td>349</td>
<td>4.89</td>
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<td>4.88</td>
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<td>648.exchange2_s</td>
<td>224</td>
<td>172</td>
<td>17.1</td>
<td>172</td>
<td>17.1</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>224</td>
<td>235</td>
<td>26.3</td>
<td>232</td>
<td>26.6</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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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

Lenovo Global Technology
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SPECSpeed®2017_int_base = 10.6
SPECSpeed®2017_int_peak = Not Run

General Notes (Continued)

Platform Notes

BIOS configuration:
Choose Operating Mode set to Custom Mode
Page Policy set to Adaptive
Trusted Execution Technology set to Enable
CPU Frequency Limits set to Restrict Maximum Frequency
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Thu Sep 12 17:07:42 2019

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 8276L CPU @ 2.20GHz
  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
CPU family: 6

(Continued on next page)
## Lenovo Global Technology

### ThinkSystem SN850

---

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Sep-2019  
**Hardware Availability:** Apr-2019  
**Tested by:** Lenovo Global Technology  
**Software Availability:** May-2019

### SPEC CPU®2017 Integer Speed Result

**Lenovo Global Technology**  
**ThinkSystem SN850**  
*(2.20 GHz, Intel Xeon Platinum 8276L)*  

<table>
<thead>
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<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz  
- **Stepping:** 6  
- **CPU MHz:** 2200.000  
- **BogoMIPS:** 4400.00  
- **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 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 aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_13 cd8_l3 intel_pmlns intel_pt ssbd ibrs ibrd ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mxp rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occnpool_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts hwp epp pku ospke avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

---

**/proc/cpuinfo cache data**

```
cache size : 39424 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 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27  
- **node 1 cpus:** 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139  
- **node 2 cpus:** 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167  
- **node 3 cpus:** 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195  

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

| node 3 cpus: | 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 116 119 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 |
| node 3 size: | 393216 MB |
| node 3 free: | 384352 MB |
| node distances: |
| 0: 10 21 21 21 |
| 1: 21 10 21 21 |
| 2: 21 21 10 21 |
| 3: 21 21 21 10 |

From `/proc/meminfo`

- MemTotal: 1584959312 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

- os-release:
  - NAME="Red Hat Enterprise Linux Server"
  - VERSION="7.6 (Maipo)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VARIANT="Server"
  - VARIANT_ID="server"
  - VERSION_ID="7.6"
  - PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
- redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
- system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
- `uname -a`:

```
Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 Sep 12 17:06

SPEC is set to: `/home/cpu2017-1.0.5-ic19.0u4`

<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>839G</td>
<td>24G</td>
<td>815G</td>
<td>3%</td>
<td>/home</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SN850
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SPECSpeed®2017_int_base = 10.6
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Sep-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)
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.
BIOS Lenovo -[IVE141E-2.30]- 07/02/2019
Memory:
   48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

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 Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

(Continued on next page)
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Base Compiler Invocation (Continued)

Fortran benchmarks:
iftor -m64

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:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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-D.html
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You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.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 v1.0.5 on 2019-09-12 05:07:41-0400.


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