### Lenovo Global Technology

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s 224</td>
<td>7.02</td>
<td>Not Run</td>
</tr>
<tr>
<td>602.gcc_s 224</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s 224</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s 224</td>
<td>9.12</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s 224</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>625.x264_s 224</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s 224</td>
<td>5.54</td>
<td></td>
</tr>
<tr>
<td>641.leela_s 224</td>
<td>4.88</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s 224</td>
<td>17.0</td>
<td></td>
</tr>
<tr>
<td>657.xz_s 224</td>
<td>25.3</td>
<td></td>
</tr>
</tbody>
</table>

---

### Hardware

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8276M</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled</td>
<td>112 cores, 4 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>2.4 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I+32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>38.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux Server release 7.6 (Maipo)</td>
</tr>
<tr>
<td>Kernel</td>
<td>3.10.0-957.el7.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.4.227 of Intel</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td></td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Platinum 8276M)

SPEC speed®2017_int_base = 10.6
SPEC speed®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>
<th>Ratio</th>
<th>Thread</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>224</td>
<td>253</td>
<td>7.02</td>
<td>252</td>
<td>7.05</td>
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<td>7.01</td>
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<tr>
<td>602.gcc_s</td>
<td>224</td>
<td>389</td>
<td>10.2</td>
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<td>10.1</td>
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<td>12.7</td>
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<td></td>
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<tr>
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<td>112</td>
<td>12.7</td>
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<td></td>
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<tr>
<td>625.x264_s</td>
<td>224</td>
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<td>14.6</td>
<td>121</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>224</td>
<td>259</td>
<td>5.54</td>
<td>259</td>
<td>5.54</td>
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<td>5.54</td>
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<td></td>
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</tr>
<tr>
<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
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<td>173</td>
<td>17.0</td>
<td>174</td>
<td>16.9</td>
<td>172</td>
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<tr>
<td>657.xz_s</td>
<td>224</td>
<td>233</td>
<td>26.5</td>
<td>236</td>
<td>26.2</td>
<td>236</td>
<td>26.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<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"

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

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

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

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 Tue Sep 10 19:25:18 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 8276M 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)
Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Platinum 8276M 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 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 xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_pni intel_pt ssbd mba ibrs ibpb stibp ibrsenhanced tpr_shadow vmmcore flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  1ms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512bw avx512vl xsaveopt xsaveopt xsavec xgetbv1 cqm_llc cqm_occphys_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 27 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
node 0 size: 392885 MB
node 0 free: 383862 MB
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 55 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167
node 1 size: 392885 MB
node 1 free: 383862 MB
node 2 cpus: 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 83 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195
node 2 size: 392885 MB
node 2 free: 383862 MB

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SN850
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

**Platform Notes (Continued)**

node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 116 119 179 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223

node 3 size: 393216 MB
node 3 free: 384171 MB
node distances:
node 0 1 2 3
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 10 19:23

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 839G 24G 815G 3% /home

(Continued on next page)
Lenovo Global Technology
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SPECSpeed®2017_int_base = 10.6
SPECSpeed®2017_int_peak = Not Run

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

(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 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)
Lenovo Global Technology
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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

**Base Compiler Invocation (Continued)**

Fortran benchmarks:
ifort -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:
-Wl,-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:
-Wl,-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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ThinkSystem SN850
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Test Sponsor: Lenovo Global Technology
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Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

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

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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 2019-09-10 07:25:17-0400.
Originally published on 2019-10-01.