## Lenovo Global Technology

**ThinkSystem SR850**
(2.60 GHz, Intel Xeon Gold 6240)

<table>
<thead>
<tr>
<th>Software Availability: May-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date: Nov-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9017

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed\textsuperscript{\textregistered}2017_int_base = 10.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>144</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>144</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>144</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>144</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>144</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>144</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>144</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>144</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>144</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>144</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Gold 6240</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Nominal: 2600</td>
</tr>
<tr>
<td>Enabled: 72 cores, 4 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 2.4 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage: 1 x 800 GB SATA SSD</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS: SUSE Linux Enterprise Server 12 SP4 (x86, 64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler: C/C++: Version 19.0.4.227 of Intel</td>
</tr>
<tr>
<td>Compiler for Linux;</td>
</tr>
<tr>
<td>Fortran: Version 19.0.4.227 of</td>
</tr>
<tr>
<td>Intel Fortran</td>
</tr>
<tr>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>File System: btrfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management: Disable</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SR850
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Threads</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>144</td>
<td>261</td>
<td>6.79</td>
<td>261</td>
<td>6.81</td>
<td>260</td>
<td>6.82</td>
<td></td>
<td></td>
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<tr>
<td>602.gcc_s</td>
<td>144</td>
<td>412</td>
<td>9.66</td>
<td>403</td>
<td>9.89</td>
<td>406</td>
<td>9.80</td>
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<td>605.mcf_s</td>
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<td>379</td>
<td>12.4</td>
<td>382</td>
<td>12.4</td>
<td>379</td>
<td>12.4</td>
<td></td>
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<tr>
<td>620.omnetpp_s</td>
<td>144</td>
<td>211</td>
<td>7.74</td>
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<td>7.73</td>
<td>213</td>
<td>7.66</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>144</td>
<td>114</td>
<td>12.4</td>
<td>114</td>
<td>12.4</td>
<td>115</td>
<td>12.3</td>
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<td></td>
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<tr>
<td>625.x264_s</td>
<td>144</td>
<td>126</td>
<td>14.0</td>
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<td>14.0</td>
<td>126</td>
<td>14.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>144</td>
<td>268</td>
<td>5.34</td>
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<td>5.34</td>
<td>269</td>
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<tr>
<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
<td>144</td>
<td>176</td>
<td>16.7</td>
<td>177</td>
<td>16.6</td>
<td>177</td>
<td>16.6</td>
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<tr>
<td>657.xz_s</td>
<td>144</td>
<td>250</td>
<td>24.7</td>
<td>250</td>
<td>24.7</td>
<td>250</td>
<td>24.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 10.2
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-ic19.0u4/lib/intel64:/home/cpu2017-1.1.0-ic19.0u4/j
   e5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

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)

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
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SPECSpeed®2017_int_base = 10.2
SPECSpeed®2017_int_peak = Not Run

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

Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

General Notes (Continued)

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy
Trusted Execution Technology set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl1e6e46a485a0011
running on linux-9083 Wed Nov  6 22:54:20 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) Gold 6240 CPU @ 2.60GHz
  4 "physical id"s (chips)
  144 "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 : 18
  siblings : 36
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From /dev/cpuinfo:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel

(Continued on next page)
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SPECspeed®2017_int_base = 10.2
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Nov-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 2600.000
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,72-89
NUMA node1 CPU(s): 18-35,90-107
NUMA node2 CPU(s): 36-53,108-125
NUMA node3 CPU(s): 54-71,126-143

Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acp1 mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl x87nop mce cx8 apa mmxex mmxplus xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrmm qdax sce xsaveopt xsavec xgetbv1 xsaves cqm_l1c cqm_occup_l1c cqm_mbb_total cqm_mbb local dtherm ida arat pin pts pkup ospe avx512_vnni flush_l1d arch_capabilities

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 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 node 0 size: 386659 MB node 0 free: 386196 MB node 1 cpus: 18 19 20 21 22 23 24 25 26 27 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 53 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 node 1 size: 387025 MB node 1 free: 386392 MB node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 109 101 102 103 104 105 106 107 node 2 size: 387054 MB node 2 free: 386810 MB

(Continued on next page)
Lenovo Global Technology

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SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

Platform Notes (Continued)

node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140 141 142 143
node 3 size: 387052 MB
node 3 free: 386787 MB
node distances:
node 0 1 2 3
0: 10 21 21 31
1: 21 10 31 21
2: 21 31 10 21
3: 31 21 21 10

From /proc/meminfo
MemTotal: 1584938836 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 4
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted
Speculation, IBPB, IBRS_FW

(Continued on next page)
Lenovo Global Technology
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SPECspeak®2017_int_base = 10.2
SPECspeak®2017_int_peak = Not Run

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

Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

run-level 3 Nov 6 22:34
SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 146G 598G 20% /home

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
Vendor: Lenovo
Product: ThinkSystem SR850 -[7X1925Z000]-
Product Family: ThinkSystem
Serial: 1234567890

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 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) |

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
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SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

Compiler Version Notes (Continued)

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

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

(Continued on next page)
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<td>Not Run</td>
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</table>

### CPU2017 License:
9017

### Test Sponsor:
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### Tested by:
Lenovo Global Technology

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**Base Optimization Flags (Continued)**

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-F.html

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-F.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 2019-11-06 09:54:19-0500.