## Lenovo Global Technology

ThinkSystem SR850  
(2.40 GHz, Intel Xeon Platinum 8260L)

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
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<tbody>
<tr>
<td>CPU2017 License:</td>
<td>9017</td>
<td></td>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>Test Date:</td>
<td>Apr-2019</td>
<td></td>
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<td>Hardware Availability:</td>
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<tr>
<td>Software Availability:</td>
<td>Dec-2018</td>
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### Hardware

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base (10.2)</th>
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<tbody>
<tr>
<td>600.perlbench_s 192</td>
<td>6.73</td>
</tr>
<tr>
<td>602.gcc_s 192</td>
<td>9.93</td>
</tr>
<tr>
<td>605.mcf_s 192</td>
<td>12.6</td>
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<tr>
<td>620.omnetpp_s 192</td>
<td>8.84</td>
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<tr>
<td>623.xalancbmk_s 192</td>
<td>12.4</td>
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<tr>
<td>625.x264_s 192</td>
<td>14.2</td>
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<tr>
<td>631.deepsjeng_s 192</td>
<td>5.32</td>
</tr>
<tr>
<td>641.leea_s 192</td>
<td>4.76</td>
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<tr>
<td>648.exchange2_s 192</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s 192</td>
<td>25.3</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 12 SP4 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kernel:</td>
<td>4.12.14-94.41-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 19.0.1.144 of Intel C/C++</td>
</tr>
<tr>
<td>Fortran:</td>
<td>Version 19.0.1.144 of Intel Fortran</td>
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<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version TEE135T 2.10 released Mar-2019</td>
</tr>
<tr>
<td>File System:</td>
<td>tmpfs</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>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8260L  
  - Max MHz.: 3900  
  - Nominal: 2400  
  - Enabled: 96 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: 35.75 MB I+D on chip per core  
  - Other: None  
  - Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
  - Storage: 800 GB tmpfs  
  - Other: None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)  
  - Kernel: 4.12.14-94.41-default  
  - Compiler: C/C++: Version 19.0.1.144 of Intel C/C++  
  - Fortran: Version 19.0.1.144 of Intel Fortran  
  - Parallel: Yes  
  - Firmware: Lenovo BIOS Version TEE135T 2.10 released Mar-2019  
  - File System: tmpfs  
  - System State: Run level 3 (multi-user)  
  - Base Pointers: 64-bit  
  - Peak Pointers: Not Applicable  
  - Other: jemalloc memory allocator V5.0.1
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
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<td>605.mcf_s</td>
<td>192</td>
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<tr>
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<tr>
<td>657.xz_s</td>
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<td>243</td>
<td>244</td>
<td>25.3</td>
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</tr>
</tbody>
</table>

**SPECspeed2017_int_base** = 10.2

**SPECspeed2017_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"

Tmpfs filesystem can be set with:

```bash
mount -t tmpfs -o size=800g tmpfs /home
```

Process tuning setting:

```bash
echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us
echo 240000000 > /proc/sys/kernel/sched_latency_ns
echo 5000000 > /proc/sys/kernel/sched_migration_cost_ns
echo 100000000 > /proc/sys/kernel/sched_min_granularity_ns
echo 150000000 > /proc/sys/kernel/sched_wakeup_granularity_ns
```

## 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-ic19.0u1/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
OMP_STACKSIZE = "192M"
```

Binaries compiled on a system with 1x Intel Core i9-7900X 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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
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SPECspeed2017_int_base = 10.2
SPECspeed2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Apr-2019
Hardware Availability: Apr-2019
Tested by: Lenovo Global Technology
Software Availability: Dec-2018

General Notes (Continued)
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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-states set to Legacy
Trusted Execution Technology set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-9o83 Sun Apr 28 19:23:05 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 8260L CPU @ 2.40GHz
  4 "physical id"s (chips)
  192 "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 : 48
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 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 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 192
On-line CPU(s) list: 0-191
Thread(s) per core: 2
Core(s) per socket: 24

(Continued on next page)
Lenovo Global Technology
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SPEC CPU2017 Integer Speed Result

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SPECspeed2017_int_base = 10.2
SPECspeed2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Platform Notes (Continued)
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8260L CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2400.000
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23,96-119
NUMA node1 CPU(s): 24-47,120-143
NUMA node2 CPU(s): 48-71,144-167
NUMA node3 CPU(s): 72-95,168-191
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 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 ebp cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vmmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdtd_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat plat pts pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data

cache size : 36608 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 96 97 98 99
100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
node 0 size: 386659 MB
node 0 free: 373105 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
120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141
142 143
node 1 size: 387052 MB
node 1 free: 386740 MB

(Continued on next page)
## SPEC CPU2017 Integer Speed Result

### Lenovo Global Technology

**ThinkSystem SR850**  
(2.40 GHz, Intel Xeon Platinum 8260L)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
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### SPECspeed2017_int_base = 10.2  
SPECspeed2017_int_peak = Not Run

### Platform Notes (Continued)

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  
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 2 size: 387023 MB
node 2 free: 386708 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  
168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189  
190 191
node 3 size: 387049 MB
node 3 free: 386717 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: 1584932600 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-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,

(Continued on next page)
**SPEC CPU2017 Integer Speed Result**

**Lenovo Global Technology**

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**SPECspeed2017_int_base** = 10.2

**SPECspeed2017_int_peak** = Not Run

**Platform Notes (Continued)**

IBPB, IBRS_FW

run-level 3 Apr 28 19:19

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

Filesystem   Type   Size  Used Avail Use% Mounted on
tmpfs        tmpfs   800G   8.3G   792G 2% /home

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 -[TEE135T-2.10]- 03/21/2019
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

**Compiler Version Notes**

*****************************************************************************
CC  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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
*****************************************************************************
CXXC 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
*****************************************************************************
FC  648.exchange2_s(base)
*****************************************************************************
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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### 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_2019.1.144/linux/compiler/lib/intel64  
  -lqkmalloc
  ```

- **Fortran benchmarks**:  
  ```
  -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
  -nostandard-realloc-lhs
  ```
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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Apr-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Dec-2018

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-A.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-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 CPU2017 v1.0.5 on 2019-04-28 07:23:04-0400.


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