# Lenovo Global Technology

**ThinkSystem SR650**

*(2.70 GHz, Intel Xeon Platinum 8280)*

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### SPECspeed2017_int_base = 9.87

### SPECspeed2017_int_peak = Not Run

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>6.75</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>10.1</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>11.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>8.01</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>10.1</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>13.9</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>5.53</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>4.85</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>14.5</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>25.2</td>
</tr>
</tbody>
</table>

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### Hardware

- **CPU Name**: Intel Xeon Platinum 8280
- **Max MHz.**: 4000
- **Nominal**: 2700
- **Enabled**: 56 cores, 2 chips, 2 threads/core
- **Orderable**: 1,2 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
- **Other**: None
- **Memory**: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage**: 1 x 800 GB SATA SSD
- **Other**: None

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### Software

- **OS**: SUSE Linux Enterprise Server 12 SP4 (x86_64)
- **Kernel**: 4.12.14-94.41-default
- **Compiler**: C/C++: Version 19.0.0.117 of Intel C/C++
- **Compiler for Linux**: Intel Fortran
- **Compiler for Linux**: Compiler for Linux
- **Parallel**: Yes
- **Firmware**: Lenovo BIOS Version IVE135K 2.10 released Jan-2019
- **File System**: btrfs
- **System State**: Run level 3 (multi-user)
- **Base Pointers**: 64-bit
- **Peak Pointers**: Not Applicable
- **Other**: jemalloc memory allocator V5.0.1
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(2.70 GHz, Intel Xeon Platinum 8280)

SPEC CPU2017 Integer Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Oct-2018

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<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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<td>625.x264_s</td>
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<td>127</td>
<td>13.9</td>
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<td>13.9</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
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<td>4.86</td>
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<tr>
<td>657.xz_s</td>
<td>112</td>
<td>245</td>
<td>25.2</td>
<td>245</td>
<td>25.2</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 9.87
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"

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/lib/ia32:/home/cpu2017-1.0.5-ic19/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19/je5.0.1-32:/home/cpu2017-1.0.5-ic19/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

Yes: 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

(Continued on next page)
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SPECspeed2017_int_base = 9.87
SPECspeed2017_int_peak = Not Run

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

General Notes (Continued)

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
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-nr46 Sun Mar 17 14:39:35 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 8280 CPU @ 2.70GHz
 2 "physical id"s (chips)
112 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000

(Continued on next page)
**Lenovo Global Technology**

ThinkSystem SR650  
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---

**SPEC CPU2017 Integer Speed Result**

Specspeed2017_int_base = 9.87  
Specspeed2017_int_peak = Not Run

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**Platform Notes (Continued)**

CPU max MHz: 4000.0000  
CPU min MHz: 1000.0000  
BogoMIPS: 5400.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 39424K  
NUMA node0 CPU(s): 0-27,56-83  
NUMA node1 CPU(s): 28-55,84-111  
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 nopt xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xsave rcx rdx r8 r16 rax rax64 rbx rdx8 rbtx rcx8 rdx64 rxbx rd16v64  
From /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: 2 nodes (0-1)  
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 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  
node 0 size: 386563 MB  
node 0 free: 385227 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 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  
node 1 size: 387038 MB  
node 1 free: 385777 MB  
node distances:  
node 0  1  
0: 10  21  
1: 21  10  
From /proc/meminfo  
MemTotal: 792168472 kB  
MemFree: 12365597 kB  
MemAvailable: 668512495 kB  
SwapTotal: 0kB  
SwapFree: 0kB  
(Continued on next page)
## Lenovo Global Technology

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<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

**SPEC CPU2017 Integer Speed Result**

| SPECspeed2017_int_base = | 9.87 |
| SPECspeed2017_int_peak = | Not Run |

| Test Date: | Mar-2019 |
| Hardware Availability: | Apr-2019 |
| Software Availability: | Oct-2018 |

### Platform Notes (Continued)

From `/etc/*release* /etc/*version*`
- **SuSE-release:**
  - Name: 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:**
```plaintext
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, IBPB, IBRS_PW

**run-level 3 Mar 17 14:36**

**SPEC is set to:** /home/cpu2017-1.0.5-ic19

<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/sdb2</td>
<td>btrfs</td>
<td>744G</td>
<td>23G</td>
<td>721G</td>
<td>4%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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** -[IVE135K-2.10]- 01/04/2019
- **Memory:**
  - 24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
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SPECSpeed2017_int_base = 9.87

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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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 19.0.0.117 Build 20180804
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 19.0.0.117 Build 20180804
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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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(Continued on next page)
Lenovo Global Technology

Test Date: Mar-2019
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Base Portability Flags (Continued)

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=3 -gopenmp -DSPEC_OPENGL
-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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

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:

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Tested with SPEC CPU2017 v1.0.5 on 2019-03-17 02:39:34-0400.
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