### Lenovo Global Technology

ThinkSystem SD530  
(2.70 GHz, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Aug-2019</th>
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| SPECrate®2017_int_base = 331 | SPECrate®2017_int_peak = Not Run |

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<tr>
<td>505.mcf_r 112</td>
<td>520.omnetpp_r 112</td>
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<td>557.xz_r 112</td>
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</table>

#### 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: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
Storage: 1 x 800 GB SATA SSD  
Other: None

#### Software

OS: SUSE Linux Enterprise Server 15 (x86_64)  
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++  
Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran  
Compiler for Linux  
Parallel: No  
Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
Other: None  
Power Management: --
# SPEC CPU®2017 Integer Rate Result

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### Results Table

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**SPECrate®2017_int_base = 331**  
**SPECrate®2017_int_peak = Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### 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:

```
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
```

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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>
```

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)

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

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**General Notes (Continued)**

*is mitigated in the system as tested and documented.*  
*Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (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.*

### Platform Notes

** BIOS configuration:**
- Choose Operating Mode set to Maximum Performance  
- Choose Operating Mode set to Custom Mode  
- DCU Streamer Prefetcher set to Disable  
- MONITOR/MWAIT set to Enable  
- SNC set to Enable  
- Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo  
  Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
  running on linux-qxkw Thu Aug 29 09:09:41 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

(Continued on next page)
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SPECrate®2017_int_base = 331
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Test Date: Aug-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
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 mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
 lm constant_tsc art arch_perfmon pebs bts rep_good 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 3dnowprefetch cpuid_fault ebpx cat_l3 cdp_l3
 invpcid_single intel_ppln ssbd mba ibrs ibpib stibp tpr_shadow vnmi flexpriority ept
 vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rd_a
 avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
 xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occap_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni
 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: 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: 193087 MB
node 0 free: 189272 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: 193087 MB
node 1 free: 189272 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
   MemTotal:       395867880 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15"
      VERSION_ID="15"
      PRETTY_NAME="SUSE Linux Enterprise Server 15"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15"

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, IBPB, IBRS_FW

run-level 3 Aug 29 09:07

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sdb3      xfs     737G 98G 640G 14% /

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 SM BIOS" standard.
   BIOS Lenovo -[TEE141E-2.30]- 07/02/2019
   Memory:
      4x NO DIMM NO DIMM
      12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
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Compiler Version Notes
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(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++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(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 | 548.exchange2_r(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

Fortran benchmarks:
ifort -m64

Base Portability Flags
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
525.x264_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

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Base Portability Flags (Continued)

523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
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531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

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

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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

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

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 2019-08-28 21:09:40-0400.
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