## Lenovo Global Technology

ThinkSystem SR630
(2.70 GHz, Intel Xeon Platinum 8280L)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>CPU2017 License</td>
<td>9017</td>
</tr>
<tr>
<td>Test Date</td>
<td>Mar-2019</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Apr-2019</td>
</tr>
<tr>
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<td>Nov-2018</td>
</tr>
<tr>
<td>SPECrate2017_int_base</td>
<td>328</td>
</tr>
<tr>
<td>SPECrate2017_int_peak</td>
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</tbody>
</table>

### Copies

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>112</td>
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<tr>
<td>502.gcc_r</td>
<td>237</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>392</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>203</td>
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<tr>
<td>523.xalancbk_r</td>
<td>333</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>717</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>294</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>283</td>
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<tr>
<td>548.exchange2_r</td>
<td>625</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>277</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8280L
- **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

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;
  Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
- **Firmware:** Lenovo BIOS Version IVE135P 2.10 released Feb-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
Lenovo Global Technology
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SPEC CPU2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 328
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</thead>
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<td>662</td>
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<td>270</td>
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<td>235</td>
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<td>505.mcf_r</td>
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<td>462</td>
<td>392</td>
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<tr>
<td>523.xalancbmk_r</td>
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<tr>
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<td>227</td>
<td>534</td>
<td>226</td>
<td>534</td>
<td>227</td>
</tr>
</tbody>
</table>

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-ic19.0u1/lib/intel64"

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

(Continued on next page)
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CPU2017 License: 9017  
Test Sponsor: Lenovo Global Technology  
Tested by: Lenovo Global Technology

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
C-states set to Legacy
SNC set to Enable
Hardware Prefetcher set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Thu Mar 28 19:52:47 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 8280L 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

(Continued on next page)
## Lenovo Global Technology

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### SPEC CPU2017 Integer Rate Result

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### Platform Notes (Continued)

- **Socket(s):** 2
- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Platinum 8280L CPU @ 2.70GHz
- **Stepping:** 6
- **CPU MHz:** 2700.000
- **BogoMIPS:** 5400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-3, 7-9, 14-17, 21-23, 56-59, 70-73, 77-79
- **NUMA node1 CPU(s):** 4-6, 10-13, 18-20, 24-27, 60-62, 66-69, 74-76, 80-83
- **NUMA node2 CPU(s):** 28-31, 35-37, 42-45, 49-51, 84-87, 91-93, 98-101, 105-107
- **NUMA node3 CPU(s):** 32-34, 38-41, 46-48, 80-83, 94-97, 102-104, 108-111
- **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 tsart 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 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpb cat _13 intel_pt ssvd mba ibrs ibpb stibp ibrs_enhanced trp_shadow vnni flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdla_avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mmb_total cqm_mmb_local dtherm ida arat pln pts 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.

<table>
<thead>
<tr>
<th>Available:</th>
<th>4 nodes (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0 cpus:</td>
<td>0 1 2 3 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78 79</td>
</tr>
<tr>
<td>node 0 size:</td>
<td>196280 MB</td>
</tr>
<tr>
<td>node 0 free:</td>
<td>191242 MB</td>
</tr>
<tr>
<td>node 1 cpus:</td>
<td>4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81 82 83</td>
</tr>
<tr>
<td>node 1 size:</td>
<td>196608 MB</td>
</tr>
<tr>
<td>node 1 free:</td>
<td>192091 MB</td>
</tr>
<tr>
<td>node 2 cpus:</td>
<td>28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100 101 105 106 107</td>
</tr>
<tr>
<td>node 2 size:</td>
<td>196608 MB</td>
</tr>
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**CPU2017 License:** 9017  
**Test Date:** Mar-2019  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

**Platform Notes (Continued)**

```plaintext
node 2 free: 192102 MB  
node 3 cpus: 32 33 34 38 39 40 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104 108 109 110 111  
node 3 size: 196608 MB  
node 3 free: 191643 MB  
node distances:  
  node 0 1 2 3  
   0: 10 11 21 21  
   1: 11 10 21 21  
   2: 21 21 10 11  
   3: 21 21 11 10  

From /proc/meminfo  
MemTotal: 792239064 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 Mar 28 19:51

**SPEC is set to:** /home/cpu2017-1.0.5-ic19.0u1  
```
  Filesystem  Type  Size  Used Avail Use% Mounted on  
  /dev/sdb2   xfs   689G  27G   662G   4%  /home
```

(Continued on next page)
**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 -[IVE135P-2.10]- 02/13/2019
- Memory: 24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

*(End of data from sysinfo program)*

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**Compiler Version Notes**

```
CC  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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC  548.exchange2_r(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.
```

**Base Compiler Invocation**

- C benchmarks:
  - icc -m64 -std=c11
- C++ benchmarks:
  - icpc -m64

*(Continued on next page)*
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SPECrater2017_int_base = 328
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Test Sponsor: Lenovo Global Technology
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Base Compiler Invocation (Continued)

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
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
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:
-W1, -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

C++ benchmarks:
-W1, -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:
-W1, -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_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
| Lenovo Global Technology
ThinkSystem SR630 (2.70 GHz, Intel Xeon Platinum 8280L) | SPECrate2017_int_base = 328 |
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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 2019-03-28 07:52:46-0400.
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