Lenovo Global Technology
ThinkSystem SD530
(2.40 GHz, Intel Xeon Platinum 8260L)

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

SPECrate2017_int_base = 277
SPECrate2017_int_peak = Not Run

Hardware
CPU Name: Intel Xeon Platinum 8260L
Max MHz.: 3900
Nominal: 2400
Enabled: 48 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: 35.75 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 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: No
Firmware: Lenovo BIOS Version TEE135R 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

**SPECrate2017_int_base = 277**

**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>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>96</td>
<td>705</td>
<td>217</td>
<td>705</td>
<td>217</td>
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<tr>
<td>502.gcc_r</td>
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<td>607</td>
<td>224</td>
<td>614</td>
<td>221</td>
<td>604</td>
<td>225</td>
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<tr>
<td>505.mcf_r</td>
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<td>428</td>
<td>362</td>
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<td>363</td>
<td>428</td>
<td>363</td>
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<tr>
<td>520.omnetpp_r</td>
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<td>717</td>
<td>176</td>
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<td>176</td>
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<tr>
<td>523.xalanbmkm_r</td>
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<td>304</td>
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<td>303</td>
<td>334</td>
<td>304</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>96</td>
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<td>563</td>
<td>297</td>
<td>565</td>
<td>297</td>
<td>566</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
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<td>466</td>
<td>236</td>
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<td>236</td>
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<td>236</td>
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<tr>
<td>541.leela_r</td>
<td>96</td>
<td>700</td>
<td>227</td>
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<td>226</td>
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<td>225</td>
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<td>548.exchange2_r</td>
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<td>503</td>
<td>500</td>
<td>502</td>
<td>501</td>
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<tr>
<td>557.xz_r</td>
<td>96</td>
<td>556</td>
<td>186</td>
<td>555</td>
<td>187</td>
<td>556</td>
<td>187</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base = 277**

**SPECrate2017_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-ic19.0u1/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
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Tested by: Lenovo Global Technology
Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

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-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-qxkw Wed Apr 17 23:08:59 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
  2 "physical id"s (chips)
  96 "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 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
SPEC CPU2017 Integer Rate Result

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<table>
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<th>9017</th>
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<td>Test Date:</td>
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<td>Hardware Availability:</td>
<td>Apr-2019</td>
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<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

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):    0-3, 7, 8, 12-14, 18-20, 48-51, 55, 56, 60-62, 66-68
NUMA node1 CPU(s):    4-6, 9-11, 15-17, 21-23, 52-54, 57-59, 63-65, 69-71
NUMA node2 CPU(s):    24-27, 30-32, 36-38, 43, 44, 72-75, 78-80, 84-86, 91, 92
NUMA node3 CPU(s):    28, 29, 33-35, 39-42, 45-47, 76, 77, 81-83, 87-90, 93-95
Flags:                fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi sep mtrr pge mca cmov
                      lm constant_tsc art 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 rdrsc rdtscp lm两级 cached whl lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
                      invpcid_single ssbd mba ibrs ibpb tpr_shadow vmvx flexpriority ept vpid
                      fsgsbase tsck_adjust bmi1 hle avx2 smep bmi2 ibrms invpcid ridt_a avx512f
                      avx512dq rdscter adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
                      xsaves xsaveopt xsavec xgetbv1 xsave cqm_llc cqm_occupa llc cqm_mbm_total cqm_mbm_local
                      dtherm ida arat pln pts pkp ospke avx512_vnni flush_lld arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

<table>
<thead>
<tr>
<th>node</th>
<th>cpus</th>
<th>size</th>
<th>free</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0-1</td>
<td>96335 MB</td>
<td>92822 MB</td>
</tr>
<tr>
<td>1</td>
<td>4-6</td>
<td>96753 MB</td>
<td>96403 MB</td>
</tr>
<tr>
<td>2</td>
<td>24-25</td>
<td>96753 MB</td>
<td>96526 MB</td>
</tr>
<tr>
<td>3</td>
<td>28-29</td>
<td>96750 MB</td>
<td>96513 MB</td>
</tr>
</tbody>
</table>

Node distances:
node 0 1 2 3

(Continued on next page)
## Platform Notes (Continued)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>0:</td>
<td>10</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>1:</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>2:</td>
<td>21</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>3:</td>
<td>21</td>
<td>21</td>
<td>11</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- MemTotal: 395870600 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 Apr 17 23:06

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

<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/sda3</td>
<td>xfs</td>
<td>737G</td>
<td>79G</td>
<td>659G</td>
<td>11%</td>
<td>/</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 -[TEE135R-2.10]- 02/26/2019
- Memory:
  - 4x NO DIMM NO DIMM
  - 12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

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(End of data from sysinfo program)

Compiler Version Notes

===============================================
CC  500.perlibench_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

Fortran benchmarks:
ifort -m64
**Lenovo Global Technology**  
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### 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.leea_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_2019.1.144/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_2019.1.144/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_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

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:  
# SPEC CPU2017 Integer Rate Result

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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 2019-04-17 11:08:58-0400.  