Lenovo Global Technology
ThinkSystem SD530
(2.10 GHz, Intel Xeon Gold 5218T)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Sep-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>64</td>
<td>9.62</td>
<td>Not Run</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>64</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>64</td>
<td>7.10</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>64</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>64</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>64</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>64</td>
<td>4.64</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>64</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 9.63**

**SPECspeed®2017_int_peak = Not Run**

**Hardware**

CPU Name: Intel Xeon Gold 5218T
Max MHz: 3800
Nominal: 2100
Enabled: 32 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: 22 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
Storage: 1 x 800 GB SATA SSD
Other: None

**Software**

OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
Kernel 4.12.14-94.41-default
Compiler: C/C++: Version 19.0.4.227 of Intel
C/C++
Compiler for Linux;
Fortran: Version 19.0.4.227 of
Intel Fortran
Compiler for Linux
Parallel: Yes
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: jemalloc memory allocator V5.0.1
Power Management: --
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SPECSpeed®2017_int_base = 9.63
SPECSpeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>64</td>
<td>270</td>
<td>6.56</td>
<td>265</td>
<td>6.69</td>
<td>267</td>
<td>6.65</td>
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<tr>
<td>gcc_s</td>
<td>64</td>
<td>413</td>
<td>9.64</td>
<td>414</td>
<td>9.62</td>
<td>418</td>
<td>9.52</td>
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<tr>
<td>mcf_s</td>
<td>64</td>
<td>381</td>
<td>12.4</td>
<td>383</td>
<td>12.3</td>
<td>387</td>
<td>12.2</td>
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<tr>
<td>omnetpp_s</td>
<td>64</td>
<td>230</td>
<td>7.11</td>
<td>231</td>
<td>7.07</td>
<td>230</td>
<td>7.10</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>64</td>
<td>117</td>
<td>12.1</td>
<td>117</td>
<td>12.1</td>
<td>116</td>
<td>12.2</td>
</tr>
<tr>
<td>x264_s</td>
<td>64</td>
<td>157</td>
<td>11.3</td>
<td>157</td>
<td>11.2</td>
<td>156</td>
<td>11.3</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>64</td>
<td>269</td>
<td>5.32</td>
<td>269</td>
<td>5.33</td>
<td>269</td>
<td>5.33</td>
</tr>
<tr>
<td>leela_s</td>
<td>64</td>
<td>367</td>
<td>4.64</td>
<td>367</td>
<td>4.64</td>
<td>367</td>
<td>4.64</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>64</td>
<td>182</td>
<td>16.2</td>
<td>181</td>
<td>16.2</td>
<td>183</td>
<td>16.1</td>
</tr>
<tr>
<td>xz_s</td>
<td>64</td>
<td>276</td>
<td>22.4</td>
<td>277</td>
<td>22.3</td>
<td>276</td>
<td>22.4</td>
</tr>
</tbody>
</table>

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-ic19.0u4/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/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
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)
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

(Continued on next page)
**General Notes (Continued)**


**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
Stale AtoS set to Disable
CPU P-state Control set to Cooperative
C-States set to Legacy
C1 Enhanced Mode set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-rofd Wed Sep 11 09:12:21 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) Gold 5218T CPU @ 2.10GHz
  2 "physical id"s (chips)
  64 "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 : 16
  siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From lscpu:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5218T CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
```

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

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<thead>
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<table>
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<tr>
<th>SPECspeed®2017_int_base =</th>
<th>9.63</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
CPU max MHz:           3800.0000
CPU min MHz:           1000.0000
BogoMIPS:              4200.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              22528K
NUMA node0 CPU(s):     0-15,32-47
NUMA node1 CPU(s):     16-31,48-63
Flags:                 fpu vme de pse tsc msr pae mca cmov
                       pat pse36 clflush dts acli mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                       lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
                       aperfmperf pni pclmulqdq dtex64 monitor ds_cpl vmx est tm2 ssse3 sdbg
                       fma cx16 xtpcr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
                       avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
                       invpcid_single intel_ppn ssbd mba ibrs ibpb tpr_shadow vnumi flexpriority ept
                       vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdt_a
                       avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
                       xsaveopt xsavec xgetbv1 xsavec qm_occupa llc qm_mbm_total qm_mbm_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 : 22528 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 32 33 34 35 36 37 38 39 40 41 42 43
   node 0 size: 96353 MB
   node 0 free: 95891 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56
   node 1 size: 96709 MB
   node 1 free: 96088 MB
   node distances:
      node 0 1
         0: 10 21
         1: 21 10

From /proc/meminfo
   MemTotal:       197697236 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB
```

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Platform Notes (Continued)

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, IBPB, IBRS_FW

run-level 3 Sep 11 09:09

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/md126p3 xfs 743G 43G 701G 6% /

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 -[TEE141E-2.30]- 07/02/2019
  Memory:
    4x NO DIMM NO DIMM
    12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)
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SPEC CPU®2017 Integer Speed Result

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Compiler Version Notes
==============================================================================
C       | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

------------------------------------------------------------------------------
C++     | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

------------------------------------------------------------------------------
Fortran | 648.exchange2_s(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

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

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Base Portability Flags (Continued)

623.xalanckmks: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_: -DSPEC_LP64  
631.deepsjeng_: -DSPEC_LP64  
641.leela_: -DSPEC_LP64  
648.exchange2_: -DSPEC_LP64  
657.xz_: -DSPEC_LP64

Base Optimization Flags

C benchmarks:  
-Wl,-z,muldefs -xcORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -gopenmp -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_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc

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

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.

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