**SPEC® CPU2017 Integer Speed Result**

**Lenovo Global Technology**  
ThinkSystem SD650  
(2.60 GHz, Intel Xeon Gold 6132)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
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**CPU2017 License:** 9017  
**Test Date:** Jun-2018

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Mar-2018

**Tested by:** Lenovo Global Technology  
**Software Availability:** Feb-2018

<table>
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<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>
| **OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64)  
Kernel 4.4.114-92.64-default  
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++  
Compiler for Linux: Fortran: Version 18.0.0.128 of Intel Fortran  
Compiler for Linux: | **CPU Name:** Intel Xeon Gold 6132  
**Max MHz.:** 3700  
**Nominal:** 2600  
**Enabled:** 28 cores, 2 chips  
**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:** 19.25 MB I+D on chip per core  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None |
| **Firmware:** Lenovo BIOS Version OTE105K 1.00 released Mar-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** jemalloc: jemalloc memory allocator library V5.0.1 |

- **Threads**
- **SPECspeed2017_int_base** (8.58)
- **SPECspeed2017_int_peak** (8.89)
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Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>28</td>
<td>290</td>
<td>6.13</td>
<td>295</td>
<td>6.02</td>
<td>290</td>
<td>6.12</td>
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<td>602.gcc_s</td>
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<td>440</td>
<td>9.05</td>
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<td>9.04</td>
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<td>9.05</td>
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<td>428</td>
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<td>605.mcf_s</td>
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<td>10.8</td>
<td>437</td>
<td>10.8</td>
<td>435</td>
<td>10.9</td>
<td>28</td>
<td>430</td>
<td>11.0</td>
<td>429</td>
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<tr>
<td>620.omnetpp_s</td>
<td>28</td>
<td>294</td>
<td>5.54</td>
<td>303</td>
<td>5.39</td>
<td>305</td>
<td>5.34</td>
<td>28</td>
<td>284</td>
<td>5.75</td>
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<td>623.xalanchmk_s</td>
<td>28</td>
<td>151</td>
<td>9.38</td>
<td>151</td>
<td>9.37</td>
<td>150</td>
<td>9.45</td>
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<td>625.x264_s</td>
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<td>152</td>
<td>11.6</td>
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<td>11.6</td>
<td>152</td>
<td>11.6</td>
<td>28</td>
<td>152</td>
<td>11.6</td>
<td>152</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>28</td>
<td>284</td>
<td>5.04</td>
<td>285</td>
<td>5.04</td>
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<td>285</td>
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<td>286</td>
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<td>28</td>
<td>394</td>
<td>4.33</td>
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<td>4.33</td>
<td>394</td>
<td>4.33</td>
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<td>392</td>
<td>4.35</td>
<td>392</td>
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<tr>
<td>648.exchange2_s</td>
<td>28</td>
<td>222</td>
<td>13.2</td>
<td>222</td>
<td>13.4</td>
<td>220</td>
<td>13.3</td>
<td>28</td>
<td>220</td>
<td>13.3</td>
<td>220</td>
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SPECspeed2017_int_base = 8.58
SPECspeed2017_int_peak = 8.89

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:

LD_LIBRARY_PATH = "/home/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"

LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"

OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

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

jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;

jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;

jemalloc: sources available from jemalloc.net or

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.
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#### Platform Notes

BIOS configuration:
- Choose Operating Mode set to Maximum Performance
- Hyper-Threading set to Disable
- Trusted Execution Technology set to Enable
- Adjacent Cache Prefetch set to Disable
- DCU Streamer Prefetcher set to Disable
- MONITOR/MWAIT set to Enable
- DCA set to Enable
- Stale AtoS set to Enable

Sysinfo program: /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
runtime on linux-nlle Wed Jun 20 09:22:30 2018

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 6132 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 28 "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: 14
  - siblings: 14
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 28
- On-line CPU(s) list: 0-27
- Thread(s) per core: 1
- Core(s) per socket: 14
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6132 CPU @ 2.60GHz
- Stepping: 4
- CPU MHz: 2593.909
- BogoMIPS: 5187.81
- Virtualization: VT-x
- L1d cache: 32K

(Continued on next page)
Lenovo Global Technology
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**Tested by:** Lenovo Global Technology

---

**Platform Notes (Continued)**

| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 19712K |
| NUMA node0 CPU(s): | 0-13 |
| NUMA node1 CPU(s): | 14-27 |
| 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 rdtscp lm constant_tsc art 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 pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsavesrc xgetbv1 cqm_1l1c cqm_occmap_1l1c |

```
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
node 0 size: 193110 MB
node 0 free: 192741 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 1 size: 193504 MB
node 1 free: 192972 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10
```

```
From /proc/meminfo
MemTotal: 395893924 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2
```

```
From /etc/*release* /etc/*version*
SUSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
```

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

# Please check /etc/os-release for details about this release.

```bash
os-release:
   NAME="SLES"
   VERSION="12-SP2"
   VERSION_ID="12.2"
   PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
   ID="sles"
   ANSI_COLOR="0;32"
   CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```bash
uname -a:
   Linux linux-nlle 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
   x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Jun 20 09:21

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

<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/sda4</td>
<td>xfs</td>
<td>405G</td>
<td>8.4G</td>
<td>397G</td>
<td>3%</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 -[OTE105K-1.00]- 03/13/2018
Memory:
   12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666
   4x NO DIMM NO DIMM

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
```

---

**icc (ICC) 18.0.0 20170811**
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

```
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
```

---

**icc (ICC) 18.0.0 20170811**
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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***SPECspeed2017_int_base = 8.58***

***SPECspeed2017_int_peak = 8.89***

---

**Base Compiler Invocation**

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

---

**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`
- 623.xalancbmk_s: `-DSPEC_LP64 -DSPEC_LINUX`

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Base Portability Flags (Continued)

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 -qopenmp -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=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

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)
# SPEC CPU2017 Integer Speed Result

## Lenovo Global Technology

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---

## Peak Compiler Invocation (Continued)

**Fortran benchmarks:**  
`ifort`

---

## Peak 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  
623.xalancbmk_s: -D_FILE_OFFSET_BITS=64 -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

---

## Peak Optimization Flags

**C benchmarks:**  
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -fno-strict-overflow  
-L/usr/local/je5.0.1-64/lib -ljemalloc

---

(Continued on next page)
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Peak Optimization Flags (Continued)

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC/OpenMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk_s: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC/OpenMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

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

Peak Other Flags

C benchmarks:

-m64 -std=c11

C++ benchmarks (except as noted below):

-m64

623.xalancbnk_s: -m32

Fortran benchmarks:

-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.html
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You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.xml)

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