## SPEC® CPU2017 Integer Speed Result

**Lenovo Global Technology**  
ThinkSystem SD530  
(2.30 GHz, Intel Xeon Gold 6140M)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
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</thead>
<tbody>
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<td>Tested by</td>
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<tr>
<td>CPU2017 License</td>
<td>9017</td>
</tr>
<tr>
<td>Test Date</td>
<td>Apr-2018</td>
</tr>
<tr>
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<td>Aug-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

### Software

- **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++  
  Fortran: Version 18.0.0.128 of Intel Fortran  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE121Q 1.30 released Feb-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator library V5.0.1

### Hardware

- **CPU Name:** Intel Xeon Gold 6140M  
  Max MHz.: 3700  
  Nominal: 2300  
  Enabled: 36 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: 24.75 MB I+D on chip per chip  
  Other: None  
  Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
  Storage: 1 x 800 GB SAS SSD  
  Other: None

### Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
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<tr>
<td>600.perlbench_s</td>
<td>6.17</td>
<td>9.07</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>9.19</td>
<td>10.9</td>
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<tr>
<td>605.mcf_s</td>
<td>6.44</td>
<td>11.0</td>
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<td>620.omnetpp_s</td>
<td>6.58</td>
<td>11.7</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>9.46</td>
<td>13.4</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>10.0</td>
<td>17.8</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>5.04</td>
<td>13.4</td>
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<tr>
<td>641.leela_s</td>
<td>4.33</td>
<td>13.4</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>4.35</td>
<td>17.8</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>21.8</td>
<td>21.8</td>
</tr>
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</table>

**Notes:**  
- Software: jemalloc memory allocator library V5.0.1

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---
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**SPECspeed2017_int_base** = 8.80  
**SPECspeed2017_int_peak** = 9.07

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th></th>
<th></th>
<th></th>
<th>Peak</th>
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<td>6.18</td>
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<td>6.15</td>
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<tr>
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<td>220</td>
<td>13.4</td>
<td>220</td>
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**SPECspeed2017_int_base** = 8.80  
**SPECspeed2017_int_peak** = 9.07

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;  
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.
Lenovo Global Technology
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**SPECspeed2017_int_peak = 9.07**
**SPECspeed2017_int_base = 8.80**

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**Platform Notes**

BIOS configuration:
- Choose Operating Mode set to Maximum Performance
- Hyper-Threading set to Disable
- DCU Streamer Prefetcher set to Disable
- MONITOR/MWAIT set to Enable
- Trusted Execution Technology set to Enable
- DCA set to Enable
- Stale AtoS set to Enable
- LLC dead line alloc set to Disable

Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on stark-04 Thu Apr 26 04:52:47 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 6140M CPU @ 2.30GHz
  - 2 "physical id"s (chips)
  - 36 "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: 18
  - siblings: 18
  - physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  - physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 36
- On-line CPU(s) list: 0-35
- Thread(s) per core: 1
- Core(s) per socket: 18
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6140M CPU @ 2.30GHz
- Stepping: 4
- CPU MHz: 2294.606
- BogoMIPS: 4589.21
- Virtualization: VT-x
- L1d cache: 32K

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**Platform Notes (Continued)**

- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 25344K
- NUMA node0 CPU(s): 0-17
- NUMA node1 CPU(s): 18-35
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- /proc/cpuinfo cache data
  - cache size : 25344 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
  - node 0 size: 193109 MB
  - node 0 free: 192646 MB
  - node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
  - node 1 size: 193504 MB
  - node 1 free: 193073 MB
  - node distances:
    - node 0: 10 21
    - node 1: 21 10
- From /proc/meminfo
  - MemTotal: 395892448 kB
  - HugePages_Total: 0
  - Hugepagesize: 2048 kB
- 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.
    - # Please check /etc/os-release for details about this release.
    - os-release:
      - NAME="SLES"

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Platform Notes (Continued)

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"

uname -a:
    Linux stark-04 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 Apr 26 04:39

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 689G 16G 674G 3% /home

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 -[TEE121Q-1.30]- 02/07/2018
    Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(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
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Compiler Version Notes (Continued)

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(base)

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

-----------------------------
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)
641.leela_s(peak)

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

-----------------------------
FC 648.exchange2_s(base, peak)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64

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SPECspeed2017_int_base = 8.80
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Base Portability Flags (Continued)

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
-1/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
-1/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

Fortran benchmarks:
ifort
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### Peak Portability Flags

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<td>600.perlbench_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<tr>
<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<tr>
<td>620.omnetpp_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_LINUX</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>-DSPEC_LP64</td>
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<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
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### Peak Optimization Flags

#### C benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
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</table>
| 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 |
| 602.gcc_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 -\L/usr/local/je5.0.1-64/lib -ljemalloc |
| 605.mcf_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 |
| 620.omnetpp_s      | -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 |
| 657.xz_s           | Same as 602.gcc_s                           |

#### C++ benchmarks:

<table>
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| 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  
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Peak Optimization Flags (Continued)

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.xalancbmk_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

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.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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