**Lenovo Global Technology**

ThinkSystem ST550  (2.20 GHz, Intel Xeon Gold 5120T)

**SPECspeed2017_int_base = 7.66**

**SPECspeed2017_int_peak = 7.86**

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

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### Hardware

**CPU Name:** Intel Xeon Gold 5120T  
**Max MHz.:** 3200  
**Nominal:** 2200  
**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 chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
**Storage:** 1 x 800 GB SAS SSD  
**Other:** None

---

### Software

**OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64)  
**Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
**Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran  
**Firmware:** Lenovo BIOS Version O0E107W 1.01 released Aug-2017  
**File System:** btrfs  
**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
Lenovo Global Technology
ThinkSystem ST550
(2.20 GHz, Intel Xeon Gold 5120T)

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

SPECspeed2017_int_base = 7.66
SPECspeed2017_int_peak = 7.86

Results Table

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</table>

SPECspeed2017_int_base = 7.66
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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 avalible from jemalloc.net or
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
No: 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.
No: 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.
<table>
<thead>
<tr>
<th>Lenovo Global Technology</th>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jan-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

### General Notes (Continued)

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page. The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

### Platform Notes

**BIOS configuration:**
Choose Operating Mode set to Maximum Performance  
Hyper-Threading set to Disable  
Adjacent Cache Prefetch set to Disable  
DCU Streamer Prefetcher set to Disable  
DCA set to Enable  
Uncore Frequency Scaling set to Disable  
MONITOR/MWAIT set to Enable  
XPT Prefetcher set to Enable  
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135c668b0c0f  
running on ST550 Fri Jan 12 01:16:13 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 5120T CPU @ 2.20GHz  
  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

(Continued on next page)
Lenovo Global Technology

ThinkSystem ST550
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SPECspeed2017_int_base = 7.66
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CPU2017 License: 9017
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Platform Notes (Continued)

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 5120T CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2194.842
BogoMIPS: 4389.68
Virtualization: VT-x
L1d cache: 32K
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 acp1 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
aperfmpref 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 idap eb tpm br m3tb mmi2
erms invpcid rtm cqm mpx avx512f avx512d avx512qd rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc
/cproc/info cache data
  cache size : 19712 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
node 0 size: 193110 MB
node 0 free: 192331 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: 192781 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10

(Continued on next page)
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Platform Notes (Continued)

From /proc/meminfo
- MemTotal: 395893848 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
- 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.

From /etc/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"

uname -a:
- Linux ST550 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64
- x86_64 x86_64 GNU/Linux
- run-level 3 Jan 12 01:13

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
- Filesystem Type Size Used Avail Use% Mounted on 
- /dev/sdb2 btrfs 744G 109G 634G 15% /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 -[00E107W-1.01]- 08/11/2017
- Memory: 12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666, configured at 2400

Compiler Version Notes

(Continued on next page)
**Lenovo Global Technology**

ThinkSystem ST550
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**CPU2017 License:** 9017  
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<tbody>
<tr>
<td>BASE</td>
<td>7.66</td>
<td>7.86</td>
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<tr>
<td>BASE</td>
<td>7.56</td>
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<td>BASE</td>
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</table>

**Compiler Version Notes (Continued)**

---

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

---

C benchmarks

---

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.

---

C++ benchmarks

---

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.

---

Fortran benchmarks

---

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
# SPEC CPU2017 Integer Speed Result

## Lenovo Global Technology

ThinkSystem ST550  
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### Base Portability Flags

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<th>Benchmark</th>
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<td>600.perlbench_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
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<td>648.exchange2_s</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
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### 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`
SPEC CPU2017 Integer Speed Result

Lenovo Global Technology
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Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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

(Continued on next page)
Lenovo Global Technology
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SPECspeed2017_int_base = 7.66
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Peak Optimization Flags (Continued)

625.x264_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:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -03 -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 -03 -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
## Lenovo Global Technology

ThinkSystem ST550  
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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/Intel-ic18.0-official-linux64.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/Intel-ic18.0-official-linux64.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 v1.0.2 on 2018-01-11 12:16:12-0500.  
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