**Lenovo Global Technology**  
ThinkSystem ST550  
(2.20 GHz, Intel Xeon Gold 5120T)  

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s 28</td>
<td>0</td>
<td>SPECspeed2017_fp_base (86.9)</td>
</tr>
<tr>
<td>607.cactuBSSN_s 28</td>
<td>0</td>
<td>SPECspeed2017_fp_peak (88.0)</td>
</tr>
<tr>
<td>619.lbm_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>644.nab_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s 28</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>654.roms_s 28</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**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 core  
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)  
Kernel 4.4.21-69-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  
Parallel: Yes  
Firmware: Lenovo BIOS Version 00E107W 1.01 released Aug-2017  
File System: btrfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: None
Lenovo Global Technology
ThinkSystem ST550 (2.20 GHz, Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

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>603.bwaves_s</td>
<td>28</td>
<td>140</td>
<td>420</td>
<td>140</td>
<td>422</td>
<td>140</td>
<td>421</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>28</td>
<td>150</td>
<td>111</td>
<td>151</td>
<td>111</td>
<td>151</td>
<td>110</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>28</td>
<td>140</td>
<td>37.3</td>
<td>140</td>
<td>37.4</td>
<td>140</td>
<td>37.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>28</td>
<td>199</td>
<td>66.5</td>
<td>199</td>
<td>66.3</td>
<td>189</td>
<td>66.1</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>28</td>
<td>150</td>
<td>59.0</td>
<td>150</td>
<td>59.0</td>
<td>150</td>
<td>59.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>28</td>
<td>231</td>
<td>51.4</td>
<td>228</td>
<td>52.0</td>
<td>228</td>
<td>52.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>28</td>
<td>189</td>
<td>76.4</td>
<td>191</td>
<td>75.5</td>
<td>189</td>
<td>76.3</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>28</td>
<td>126</td>
<td>138</td>
<td>126</td>
<td>138</td>
<td>126</td>
<td>138</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>28</td>
<td>131</td>
<td>69.6</td>
<td>128</td>
<td>71.1</td>
<td>129</td>
<td>70.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
<td>170</td>
<td>92.5</td>
<td>169</td>
<td>93.0</td>
<td>170</td>
<td>92.9</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

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
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.

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

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

General Notes (Continued)

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/WAIT 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 96c45e4568ad54c135fd618bccc91c0f
running on ST550 Sat Oct 28 16:25:34 2017

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
CPU(s):                28
On-line CPU(s) list:   0-27
Thread(s) per core:    1
Lenovo Global Technology
ThinkSystem ST550
(2.20 GHz, Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

CPU2017 License: 9017
Test Date: Oct-2017
Test Sponsor: Lenovo Global Technology
Hardware Availability: Aug-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

Platform Notes (Continued)

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: 2194.845
BogoMIPS: 4389.69
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 sse mmmx fsb cpl parse pse36 clflush dts acpi mpx cmov pat pse36 clflush dts acpi mpx cflush mmx svm xmov sxex mmxex fens xsave pxring sole smep synd件事

Flags: fpu vme de pse sse mmmx fsb cpl parse pse36 clflush dts acpi mpx cmov pat pse36 clflush dts acpi mpx cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mpx cx8 apic sep mtrr pge mca cmov

 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: 193100 MB
node 0 free: 192390 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: 192753 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 395883648 kB
HugePages_Total: 0

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.20 GHz, Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

Platform Notes (Continued)

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"
  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 Oct 28 16:20

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

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 -[O0E107W-1.01]- 08/11/2017
Memory:
  12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC 619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
Lenovo Global Technology
ThinkSystem ST550
(2.20 GHz, Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Hardware Availability: Aug-2017
Test Date: Oct-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

Compiler Version Notes (Continued)

==============================================================================
CC  619.lbm_s(peak)
-----------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
FC  607.cactuBSSN_s(base)
-----------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
FC  607.cactuBSSN_s(peak)
-----------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
-----------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
-----------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
-----------------------------------------------------------------------------
(Continued on next page)
Lenovo Global Technology
ThinkSystem ST550
(2.20 GHz, Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 86.9
SPECspeed2017_fp_peak = 88.0

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

Test Date: Oct-2017
Hardware Availability: Aug-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

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

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
### Lenovo Global Technology

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

### SPEC CPU2017 Floating Point Speed Result

<table>
<thead>
<tr>
<th><strong>SPECspeed2017_fp_base</strong></th>
<th>86.9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPECspeed2017_fp_peak</strong></td>
<td>88.0</td>
</tr>
</tbody>
</table>

- **CPU2017 License:** 9017  
- **Test Sponsor:** Lenovo Global Technology  
- **Tested by:** Lenovo Global Technology  
- **Test Date:** Oct-2017  
- **Hardware Availability:** Aug-2017  
- **Software Availability:** Sep-2017

### Base Optimization Flags

#### C benchmarks:

- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`

#### Fortran benchmarks:

- `-DSPEC_OPENMP`  
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

#### Benchmarks using both Fortran and C:

- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

#### Benchmarks using Fortran, C, and C++:

- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

### Base Other Flags

#### C benchmarks:

- `-m64`  
- `-std=c11`

#### Fortran benchmarks:

- `-m64`

#### Benchmarks using both Fortran and C:

- `-m64`  
- `-std=c11`

#### Benchmarks using Fortran, C, and C++:

- `-m64`  
- `-std=c11`

### Peak Compiler Invocation

#### C benchmarks:

- `icc`

#### Fortran benchmarks:

- `ifort`

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

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

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>86.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>88.0</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Oct-2017  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

---

### Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```plaintext
ifort icc
```

Benchmarks using Fortran, C, and C++:

```plaintext
icpc icc ifort
```

---

### Peak Portability Flags

Same as Base Portability Flags

---

### Peak Optimization Flags

**C benchmarks:**

```plaintext
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2  
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div  
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
-DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s
```

**Fortran benchmarks:**

```plaintext
-wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP  
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3  
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp  
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:

```plaintext
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2  
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div  
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -nstandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
-DSPEC_OPENMP -nstandard-realloc-lhs -align array32byte
```

---

(Continued on next page)
Lenovo Global Technology

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

Peak Optimization Flags (Continued)

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

-align array32byte

Peak Other Flags

C benchmarks:
-m64 -std=c11

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

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

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-A.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2017-10-28 04:25:33-0400.
Originally published on 2018-03-06.