## Lenovo Global Technology

**ThinkSystem SR850**  
(2.00 GHz, Intel Xeon Gold 6138T)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>148</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>148</td>
</tr>
</tbody>
</table>

### CPU2017 Floating Point Speed Result

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Apr-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** Feb-2018

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<thead>
<tr>
<th>Threads</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>80</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
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<td>47.6</td>
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<tr>
<td>628.pop2_s</td>
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<td>112</td>
</tr>
<tr>
<td>638.imagick_s</td>
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<td>319</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>115</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>80</td>
<td>172</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6138T  
- **Max MHz:** 3700  
- **Nominal:** 2000  
- **Enabled:** 80 cores, 4 chips  
- **Orderable:** 2,4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 27.5 MB I+D on chip per chip  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 1 x 800 GB SAS SSD  
- **Other:** None

### 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++  
- **Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE119R 1.22 released Feb-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SR850
(2.00 GHz, Intel Xeon Gold 6138T)

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

SPECspeed2017_fp_base = 148
SPECspeed2017_fp_peak = 148

Results Table

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<td>649.fotonik3d_s</td>
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<td>87.1</td>
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<td>81.1</td>
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</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 148
SPECspeed2017_fp_peak = 148

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

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable

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

DCU Streamer Prefetcher set to Disable  
MONITORWAIT set to Enable  
Trusted Execution Technology 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  
running on Electron-node-01 Sun Apr 8 15:34:08 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 6138T CPU @ 2.00GHz
 4 "physical id"s (chips)
 80 "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 : 20
  siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                80
On-line CPU(s) list:   0-79
Thread(s) per core:    1
Core(s) per socket:    20
Socket(s):             4
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6138T CPU @ 2.00GHz
Stepping:              4
CPU MHz:               1995.315
BogoMIPS:              3990.63
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
```

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

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<td>148</td>
</tr>
</tbody>
</table>

#### Platform Notes (Continued)

L3 cache: 28160K

NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39
NUMA node2 CPU(s): 40-59
NUMA node3 CPU(s): 60-79

Flags: 

```
  fpu vme de pse tsc msr pae mca cmov
  apic cpuid fpu vme de pse tsc msr pae 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
  aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
  fma cx16 xtopr 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 vnmi 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 xsaveopt
  xsavec xgetbv1 cqm_llc cqm_occup_llc
```

From `/proc/cpuinfo`

- cache data
  - cache size : 28160 KB

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

```
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
node 0 size: 386658 MB
node 0 free: 386324 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
node 1 size: 387057 MB
node 1 free: 386604 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
node 2 size: 387057 MB
node 2 free: 386660 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 3 size: 387054 MB
node 3 free: 386307 MB
node distances:
  node 0 1 2 3
  0: 10 21 21 31
  1: 21 10 31 21
  2: 21 31 10 21
  3: 31 21 21 10
```

From `/proc/meminfo`

```
MemTotal: 1584974952 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From `/etc/*release* /etc/*version*

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

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**Test Date:** Apr-2018  
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#### Platform Notes (Continued)

**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 Electron-node-01 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 8 10:31**

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

**Filesystem**  
**Type**  
**Size**  
**Used**  
**Avail**  
**Use%**  
**Mounted on**

<table>
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<th>Use%</th>
<th>Mounted on</th>
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<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>688G</td>
<td>274G</td>
<td>415G</td>
<td>40%</td>
<td>/home</td>
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</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 -[TEE119R-1.22]- 02/06/2018**  
**Memory:**
- 48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

#### Compiler Version Notes

```
-------------- 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.
```

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Compiler Version Notes (Continued)

---

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

FC 607.cactuBSSN_s(base)

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

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

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FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)

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CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

ifort (IFORT) 18.0.0 20170811
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SPECspeed2017_fp_base = 148
SPECspeed2017_fp_peak = 148

Compiler Version Notes (Continued)
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
==============================================================================
CC   621.wrf_s(peak) 628.pop2_s(peak)
------------------------------------------------------------------------------
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.cactusBSSN_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
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<td>Feb-2018</td>
<td>Lenovo Global Technology</td>
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</table>

### Base Optimization Flags

**C benchmarks:**
- -xCORE-AVX512
- -ipo
- -O3
- -no-prec-div
- -qopt-prefetch
- -ffinite-math-only
- -qopt-mem-layout-trans=3
- -qopenmp
- -DSPEC_OPENMP

**Fortran benchmarks:**
- -DSPEC_OPENMP
- -xCORE-AVX512
- -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-AVX512
- -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-AVX512
- -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)
Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
- ifort icc

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
- 619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -03 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
- 638.imagick_s: -xCORE-AVX512 -ipo -03 -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:
- -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -02 -xCORE-AVX512 -qopt-prefetch -ipo -03 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
- 621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -03 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
- 627.cam4_s: -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
Lenovo Global Technology
ThinkSystem SR850
(2.00 GHz, Intel Xeon Gold 6138T)

SPECspeed2017_fp_peak = 148
SPECspeed2017_fp_base = 148

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

Test Date: Apr-2018
Hardware Availability: Aug-2017
Software Availability: Feb-2018

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-AVX512 -qopt-prefetch
-ipo -03 -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
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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