## Lenovo Global Technology

**ThinkSystem SR650**  
(2.00 GHz, Intel Xeon Gold 5117)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>28</td>
<td>79.2</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>77.8</td>
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<tr>
<td>619.1bm_s</td>
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<td>621.wrf_s</td>
<td>28</td>
<td>54.5</td>
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<tr>
<td>627.cam4_s</td>
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<td>46.4</td>
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<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
<td>91.7</td>
</tr>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5117  
- **Max MHz.:** 2800  
- **Nominal:** 2000  
- **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:** 768 GB (24 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:** 4.4.114-92.64-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 IVE113W 1.12 released Feb-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
Lenovo Global Technology
ThinkSystem SR650
(2.00 GHz, Intel Xeon Gold 5117)

SPECspeed2017_fp_base = 77.8
SPECspeed2017_fp_peak = 79.2

Results Table

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<tr>
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<th>Ratio</th>
<th>Seconds</th>
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<td>172</td>
<td>172</td>
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<td>172</td>
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</tbody>
</table>

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 Custom Mode
CPU Pstate Control set to None
## Lenovo Global Technology

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

### Platform Notes (Continued)

- C1 Enhance Mode set to Disable
- C-states set to Legacy
- Hyper-Threading set to Disable
- MONITOR/MWAIT set to Enable
- Adjacent Cache Prefetch set to Disable
- Stale AtoS set to Enable
- DCA set to Enable
- Patrol Scrub set to Enable

Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-mudv Mon May 21 16:54:12 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 5117 CPU @ 2.00GHz
- 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 5117 CPU @ 2.00GHz
- Stepping: 4
- CPU MHz: 1995.318
- BogoMIPS: 3990.63
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K

(Continued on next page)
Lenovo Global Technology

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CPU2017 License: 9017
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Software Availability: Feb-2018

Platform Notes (Continued)

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 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 ntopology 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 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 iple msrs invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsavex
xsavec xgetbv1 cqm_llc cqm_occup_llc

/proc/cpuinfo cache data

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: 386646 MB
node 0 free: 385284 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 1 size: 387040 MB
node 1 free: 385499 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 792255392 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"
        VERSION="12-SP2"

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

**Lenovo Global Technology**
ThinkSystem SR650 (2.00 GHz, Intel Xeon Gold 5117)

<table>
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**SPECspeed2017_fp_base = 77.8**
**SPECspeed2017_fp_peak = 79.2**

---

**Platform Notes (Continued)**

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 linux-mudv 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 May 18 11:14

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 445G 20G 426G 5% /

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 -[IVE113W-1.12]- 02/06/2018
Memory:
    24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

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**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.
-----------------------------

-----------------------------
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
```

(Continued on next page)
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Compiler Version Notes (Continued)

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)
==============================================================================
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.

==============================================================================
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

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

Compiler Version Notes (Continued)
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

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

(Continued on next page)
Lenovo Global Technology
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**Base Optimization Flags (Continued)**

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

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort
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SPECspeed2017_fp_base = 77.8
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

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:
-no-prec-div -qopt-mem-layout-trans=3 -qopenmp

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

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte
## SPEC CPU2017 Floating Point Speed Result

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### 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/Intel-ic18.0-official-linux64.html)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.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/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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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 2018-05-21 04:54:11-0400.  
Report generated on 2018-10-31 17:29:06 by CPU2017 PDF formatter v6067.  