Lenovo Global Technology
ThinkSystem SR650
(1.70 GHz, Intel Xeon Bronze 3106)

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

**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 Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version IVE111C 1.00 released Jul-2017
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None

**Hardware**
- **CPU Name:** Intel Xeon Bronze 3106
- **Max MHz.:** 1700
- **Nominal:** 1700
- **Enabled:** 16 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:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)
- **Storage:** 1 x 800 GB SAS SSD
- **Other:** None

**SPECspeed2017_fp_base = 46.5**
**SPECspeed2017_fp_peak = 47.5**

### Threads

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<tr>
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<tr>
<td>619.lbm_s</td>
<td>29.8</td>
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<td>621.wrf_s</td>
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<td>627.cam4_s</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>654.roms_s</td>
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**SPECspeed2017_fp_base (46.5) **
**SPECspeed2017_fp_peak (47.5) **
### Results Table

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<tr>
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<td>51.3</td>
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<td>280</td>
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</tbody>
</table>

**SPECspeed2017_fp_base = 46.5**  
**SPECspeed2017_fp_peak = 47.5**

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

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SPECspeed2017_fp_base = 46.5
SPECspeed2017_fp_peak = 47.5

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

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
MONITORMWAIT set to Enable
Adjacent Cache Prefetch set to Disable
XPT Prefetcher set to Enable
Stale AtoS set to Enable
DCA set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce091c0f
running on Cyborg-SPECcpu2006-SUSE12SP2 Tue Jan 2 22:55:21 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) Bronze 3106 CPU @ 1.70GHz
   2 "physical id"s (chips)
      16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2

(Continued on next page)
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SPECspeed2017_fp_base = 46.5
SPECspeed2017_fp_peak = 47.5

CPU2017 License: 9017
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NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1696.017
BogoMIPS: 3392.03
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge 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 dtc64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch arat epb pln pts dtherm intel_pt
tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cmp mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cmp_l1c cmp_occu_plcc

From /proc/cpuinfo cache data
   cache size : 11264 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
   node 0 size: 193111 MB
   node 0 free: 191663 MB
   node 1 cpus: 8 9 10 11 12 13 14 15
   node 1 size: 193504 MB
   node 1 free: 192184 MB
   node distances:
      node 0 1
      0: 10 21
      1: 21 10

From /proc/meminfo
   MemTotal: 395894464 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

(Continued on next page)
## Lenovo Global Technology

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<table>
<thead>
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<th>SPEC Speed2017_fp_base</th>
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### Platform Notes (Continued)

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 Cyborg-SPECcpu2006-SUSE12SP2 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 2 19:56

**SPEC is set to:** /home/cpu2017.1.0.2.ic18.0  
**/dev/sdb2**  

Filesystem | Type | Size  | Used | Avail  | Use% | Mounted on  
----- |----- |------ |----- |------- |----- |------------
/dev/sdb2  | btrfs | 744G  | 174G | 569G   | 24% | /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 -[IVE111C-1.00]- 07/17/2017**

**Memory:**

- 24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2133

(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.

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(Continued on next page)
## Lenovo Global Technology

**Model:** ThinkSystem SR650  
**CPU:** (1.70 GHz, Intel Xeon Bronze 3106)  
**License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Jan-2018  
**Hardware Availability:** Aug-2017  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Sep-2017

### SPEC Speed 2017 Floating Point Result

**SPECspeed2017_fp_peak = 47.5**  
**SPECspeed2017_fp_base = 46.5**

## Compiler Version Notes (Continued)

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## Lenovo Global Technology

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<td>47.5</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

cci (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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
<td>621.wrf_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
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<tr>
<td>627.cam4_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG</td>
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<tr>
<td>628.pop2_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl</td>
</tr>
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<td>638.imagick_s</td>
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| SPECspeed2017_fp_base | 46.5 |
| SPECspeed2017_fp_peak  | 47.5 |

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Test Date: Jan-2018
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`

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SPECspeed2017_fp_base = 46.5
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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-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:
-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:
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 -nostandard-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 -nostandard-realloc-lhs -align array32byte

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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
- lipo -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

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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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