## Lenovo Global Technology

ThinkSystem SR630
(1.70 GHz, Intel Xeon Bronze 3104)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>36.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>37.3</td>
</tr>
</tbody>
</table>

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

### Hardware

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Bronze 3104</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>1700</td>
</tr>
<tr>
<td>Nominal</td>
<td>1700</td>
</tr>
<tr>
<td>Enabled</td>
<td>12 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 800 GB SAS SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP2 (x86_64)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.4.21-69-default</td>
</tr>
<tr>
<td>Compiler C/C++</td>
<td>Version 18.0.0.128 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler Fortran</td>
<td>Version 18.0.0.128 of Intel Fortran</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version IVE113K 1.10 released Sep-2017</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
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</table>

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Specmean</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
<td>45.5</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>12</td>
<td>43.9</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>12</td>
<td>25.9</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>12</td>
<td>28.3</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>12</td>
<td>13.4</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>12</td>
<td>28.9</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>12</td>
<td>23.3</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>12</td>
<td>41.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>12</td>
<td>34.6</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>12</td>
<td>40.7</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base** (36.7)  
**SPECspeed2017_fp_peak** (37.3)
## 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

(Continued on next page)
**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
MONITOR/M/WAIT 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 96c45e4568ad54c135fd618bcc091c0f
running on Cable-SPECcpu2006-SUSE12SP2 Wed Jan 10 11:50:46 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 3104 CPU @ 1.70GHz
2 "physical id"s (chips)
12 "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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
physical 1: cores 0 1 2 3 4 5
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 2
```
**Platform Notes (Continued)**

NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Bronze 3104 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:              8448K
NUMA node0 CPU(s):     0-5
NUMA node1 CPU(s):     6-11
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 dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
                       fma cx16 xtpr pdcm pcid dca sse4_1_l sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
                       xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb pni dtlbcl dtherm intel_pt
                       tpr_shadow vmmi flexpriority ept fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
                       erms invpcid rdtsılo 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 : 8448 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
  node 0 size: 193110 MB
  node 0 free: 191266 MB
  node 1 cpus: 6 7 8 9 10 11
  node 1 size: 193504 MB
  node 1 free: 192326 MB
  node distances:
  node 0 1
   0: 10 21
   1: 21 10

From /proc/meminfo
  MemTotal: 395893876 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB
# SPEC CPU2017 Floating Point Speed Result

**Lenovo Global Technology**  
ThinkSystem SR630  
(1.70 GHz, Intel Xeon Bronze 3104)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Jan-2018</th>
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<tbody>
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<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Aug-2017</td>
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<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Sep-2017</td>
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</table>

**SPECspeed2017_fp_base** = 36.7  
**SPECspeed2017_fp_peak** = 37.3

## 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 Cable-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 10 01:05

SPEC is set to: /home/cpu2017.1.0.2.ic18.0  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda2 btrfs 744G 191G 552G 26% /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 -[IVE113K-1.10]- 09/06/2017  
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.  
==============================================================================

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
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**SPEC CPU2017 Floating Point Speed Result**

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**SPECspeed2017_fp_base = 36.7**

**SPECspeed2017_fp_peak = 37.3**

**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)

```
icp (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)

```
icp (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.
```

(Continued on next page)
Lenovo Global Technology
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**SPECspeed2017_fp_base** = 36.7
**SPECspeed2017_fp_peak** = 37.3

---

**Compiler Version Notes (Continued)**

```
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
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 SR630**  
(1.70 GHz, Intel Xeon Bronze 3104)

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<th>SPECspeed2017 fp_base</th>
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<td>36.7</td>
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**Software Availability:** Sep-2017

### 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)
Lenovo Global Technology
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SPECspeed2017_fp_base = 36.7
SPECspeed2017_fp_peak = 37.3

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 -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP

638.imagick_s: -xCORE-AVX512 -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-AVX512 -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-AVX512
-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-AVX512 -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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SPECspeed2017_fp_base = 36.7
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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-AVX512 -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

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