## Lenovo Global Technology

**ThinkSystem SR650**  
(3.90 GHz, Intel Xeon Gold 6137)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 91.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak = 90.2</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9017

**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

### Hardware

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (91.2)</th>
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<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
<td>603.bwaves_s</td>
<td>16</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>16</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>16</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
</tr>
</tbody>
</table>

### Software

| OS: SUSE Linux Enterprise Server 12 SP2 (x86_64) |
| Kernel 4.4.114-92.64-default |
| Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ |
| Compiler for Linux: |
| Fortran: Version 18.0.2.199 of Intel Fortran |
| Compiler for Linux |
| Parallel: Yes |
| Firmware: Lenovo BIOS Version IVE115U 1.22 released Mar-2018 |
| File System: xfs |
| System State: Run level 3 (multi-user) |
| Base Pointers: 64-bit |
| Peak Pointers: 64-bit |
| Other: jemalloc memory allocator V5.0.1, see general notes |
Lenovo Global Technology  
ThinkSystem SR650  
(3.90 GHz, Intel Xeon Gold 6137)

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

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>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>607.cactuBSSN_s</td>
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<td>167</td>
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<td>621.wrf_s</td>
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<td>51.7</td>
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<tr>
<td>628.pop2_s</td>
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<td>125</td>
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<td>187</td>
<td>63.6</td>
<td>187</td>
<td>63.6</td>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>654.roms_s</td>
<td>16</td>
<td>210</td>
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<td>199</td>
<td>105</td>
<td>199</td>
<td>105</td>
<td>199</td>
<td>105</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 91.2  
SPECspeed2017_fp_peak = 90.2

Operating System 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 i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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.
## Lenovo Global Technology

**ThinkSystem SR650**  
(3.90 GHz, Intel Xeon Gold 6137)

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>SPECspeed2017_fp_base</td>
<td>91.2</td>
</tr>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>90.2</td>
</tr>
</tbody>
</table>

---

### Platform Notes

**BIOS configuration:**
- Choose Operating Mode set to Custom Mode
- CPU P-state Control set to None
- C1 Enhance Mode set to Disable
- Energy Efficient Turbo set to Disable
- C-States set to Legacy
- Platform Controlled Type set to Maximum Performance
- Page Policy set to Adaptive
- Hyper-Threading set to Disable
- Adjacent Cache Prefetch set to Disable
- Stale AtoS set to Enable
- DCA set to Enable

**Sysinfo program** `/home/cpu2017.1.0.2.ic18.0u2/bin/sysinfo`

`Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c0f`

running on `suse12sp2 Fri Jun 22 14:47:21 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) Gold 6137 CPU @ 3.90GHz
  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 2 3 9 16 19 26 27
  physical 1: cores 1 3 4 6 7 18 20 22
```

**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
NUMA node(s):       2
Vendor ID:          GenuineIntel
CPU family:         6
Model:              85
Model name:         Intel(R) Xeon(R) Gold 6137 CPU @ 3.90GHz
Stepping:           4
CPU MHz:            3890.846
```
**SPEC CPU2017 Floating Point Speed Result**  
Copyright 2017-2018 Standard Performance Evaluation Corporation

### Lenovo Global Technology

#### ThinkSystem SR650  
(3.90 GHz, Intel Xeon Gold 6137)

<table>
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<tr>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
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</table>

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

### Platform Notes (Continued)

BogoMIPS: 7781.69  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 25344K  
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 ntopology nonstop_tsc aperfmpref eagerfpu pni pclmulqdq dtst64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrr pdcm pcd l dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb mcmpl rtm cqm cmx avx512f avx512dq avx512v1 avx512vl xsaveopt xsavex xgetbv1 xcm_llc xcm_occup_llc

/proc/cpuinfo cache data  
cache size: 25344 KB

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
nodule 0 cpus: 0 1 2 3 4 5 6 7  
nodule 0 size: 193109 MB  
nodule 0 free: 192275 MB  
nodule 1 cpus: 8 9 10 11 12 13 14 15  
nodule 1 size: 193504 MB  
nodule 1 free: 192721 MB  
nodule distances:  
nodule 0 1  
  0: 10 21  
  1: 21 10

From /proc/meminfo  
MemTotal: 395892380 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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(3.90 GHz, Intel Xeon Gold 6137)

SPECspeed2017_fp_base = 91.2
SPECspeed2017_fp_peak = 90.2

Platform Notes (Continued)

# 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 suse12sp2 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 Jun 22 10:03

SPEC is set to: /home/cpu2017.1.0.2.ic18.0u2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 743G 63G 680G 9% /

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 -[IVE115U-1.22]- 03/26/2018
Memory:
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(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) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC  619.lbm_s(peak)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
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SPECspeed2017_fp_base = 91.2
SPECspeed2017_fp_peak = 90.2

Compiler Version Notes (Continued)

FC 607.cactuBSSN_s(base, peak)

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---------------------------------------------------------------------
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
---------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---------------------------------------------------------------------
FC 603.bwaves_s(peak) 649.fotonik3d_s(peak)
---------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---------------------------------------------------------------------
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
---------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---------------------------------------------------------------------
CC 621.wrf_s(peak) 628.pop2_s(peak)
---------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Lenovo Global Technology
ThinkSystem SR650 (3.90 GHz, Intel Xeon Gold 6137)

**Base Compiler Invocation**

C benchmarks:

```bash
icc
```

Fortran benchmarks:

```bash
ifort
```

Benchmarks using both Fortran and C:

```bash
ifort icc
```

Benchmarks using Fortran, C, and C++:

```bash
icpc icc ifort
```

**Base Portability Flags**

```bash
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:

```bash
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```bash
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Benchmarks using both Fortran and C:

```bash
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

(Continued on next page)
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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

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

Peak Portability Flags

Same as Base Portability Flags
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SPECspeed2017_fp_base = 91.2
SPECspeed2017_fp_peak = 90.2

CPU2017 License: 9017
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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:

603.bwaves_s: -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

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

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

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

628.pop2_s: Same as 621.wrf_s

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
Lenovo Global Technology
ThinkSystem SR650
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jun-2018
Hardware Availability: May-2018
Software Availability: Feb-2018

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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Tested with SPEC CPU2017 v1.0.2 on 2018-06-22 02:47:20-0400.
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