Lenovo Global Technology

ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8170M)

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

Hardware

<table>
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<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
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<td>554.roms_r</td>
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SPECrate2017_fp_base = 219
SPECrate2017_fp_peak = 224

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: No
Firmware: Lenovo BIOS Version IVE113W 1.12 released Feb-2018
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8170M)

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

Results Table

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</tbody>
</table>

SPECrate2017_fp_base = 219
SPECrate2017_fp_peak = 224

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.

For details, please see the config file.

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"
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
Filesystme page cache synced and cleared with:
 sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
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SPECrate2017_fp_base = 219
SPECrate2017_fp_peak = 224

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

General Notes (Continued)

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
SNC set to Enable
UPI Prefetcher set to Disable
MONITOR/MWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c4e4568ad54c135fd618bccc091c0f
running on Cable-SPECcpu2017-SUSE12SP2 Sat Jun 2 04:40:21 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) Platinum 8170M CPU @ 2.10GHz
  2 "physical id"s (chips)
    104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2

(Continued on next page)
Lenovo Global Technology
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SPECrate2017_fp_base = 219
SPECrate2017_fp_peak = 224

Platform Notes (Continued)

NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8170M CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2095.082
BogoMIPS: 4190.16
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3, 7-9, 13-15, 20-22, 52-55, 59-61, 65-67, 72-74
NUMA node1 CPU(s): 4-6, 10-12, 16-19, 23-25, 56-58, 62-64, 68-71, 75-77
NUMA node2 CPU(s): 26-29, 33-35, 39-41, 46-48, 78-81, 85-87, 91-93, 98-100
NUMA node3 CPU(s): 30-32, 36-38, 42-45, 49-51, 82-84, 88-90, 94-97, 101-103
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 aperfmperf 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_ctxtsw spec_ctrl retpoline kaiser tpr_shadow vnmi fxl preload vptid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xsavec xgetbv1 cmp_ql cmp_occup_ql

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

/proc/cpuinfo cache data
 cache size : 36608 KB

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology
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SPECrate2017_fp_base = 219
SPECrate2017_fp_peak = 224

CPU2017 License: 9017
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Tested by: Lenovo Global Technology

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

Platform Notes (Continued)

node 3 free: 96059 MB
node distances:
node 0 1 2 3
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10

From /proc/meminfo
MemTotal: 395891728 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"
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-SPECcpu2017-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 1 17:44

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

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 M393A2K43BB1-CTD 16 GB 2 rank 2666

(Continued on next page)
**Lenovo Global Technology**  
ThinkSystem SR630  
(2.10 GHz, Intel Xeon Platinum 8170M)  

---

**Platform Notes (Continued)**

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
==-------------------------------------------------------------------==
|                                                                     |
|                                                                     |
|  CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)     |
|                                                                     |
|  icc (ICC) 18.0.0 20170811                                        |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
|                                                                     |
|  CC  519.lbm_r(peak) 544.nab_r(peak)                              |
|                                                                     |
|  icc (ICC) 18.0.0 20170811                                        |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
|                                                                     |
|  CXXC 508.namd_r(base) 510.parest_r(base)                        |
|                                                                     |
|  icpc (ICC) 18.0.0 20170811                                       |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
|                                                                     |
|  CXXC 508.namd_r(peak) 510.parest_r(peak)                        |
|                                                                     |
|  icpc (ICC) 18.0.0 20170811                                       |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
|                                                                     |
|  CC  511.povray_r(base) 526.blender_r(base)                      |
|                                                                     |
|  icpc (ICC) 18.0.0 20170811                                       |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
|                                                                     |
|  CC  511.povray_r(peak) 526.blender_r(peak)                      |
|                                                                     |
|  icpc (ICC) 18.0.0 20170811                                       |
|  Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.  |
|                                                                     |
==-------------------------------------------------------------------==
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# SPEC CPU2017 Floating Point Rate Result

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<tbody>
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<tr>
<td>(2.10 GHz, Intel Xeon Platinum 8170M)</td>
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<tr>
<td><strong>SPECraten2017_fp_base</strong> = 219</td>
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<td>Test Sponsor: Lenovo Global Technology</td>
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<td>Software Availability: Feb-2018</td>
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## Compiler Version Notes (Continued)

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

-----------------------------------------------
FC  507.cactuBSSN_r(base)
-----------------------------------------------

```
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  507.cactuBSSN_r(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  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
-----------------------------------------------

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

-----------------------------------------------
FC  554.roms_r(peak)
-----------------------------------------------

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

-----------------------------------------------
CC  521.wrf_r(base) 527.cam4_r(base)
-----------------------------------------------

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64

(Continued on next page)
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SPECrater2017_fp_base = 219

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Base Portability Flags (Continued)

544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -n ostandard-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 -n ostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -n ostandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECrater2017_fp_base = 219
SPECrater2017_fp_peak = 224

Base Other Flags (Continued)

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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

**Lenovo Global Technology**  
ThinkSystem SR630  
(2.10 GHz, Intel Xeon Platinum 8170M)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
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<td>Lenovo Global Technology</td>
<td></td>
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**CPU2017 License:** 9017  
**Test Date:** Jun-2018  
**Hardware Availability:** Aug-2017

**SPECRate2017_fp_peak = 224**  
**SPECRate2017_fp_base = 219**

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**Peak Optimization Flags (Continued)**

538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -gopt-prefetch  
-ffinite-math-only -gopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

C++ benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -gopt-prefetch -ffinite-math-only  
-gopt-mem-layout-trans=3

Fortran benchmarks:

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -gopt-prefetch  
-ffinite-math-only -gopt-mem-layout-trans=3

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -gopt-prefetch -ffinite-math-only  
-gopt-mem-layout-trans=3

Benchmarks using both Fortran and C:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -gopt-prefetch -ffinite-math-only  
-gopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -gopt-prefetch -ffinite-math-only  
-gopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -gopt-prefetch -ffinite-math-only  
-gopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

---

**Peak Other Flags**

C benchmarks:
-m64 -std=c11

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR630**  
(2.10 GHz, Intel Xeon Platinum 8170M)

### SPECrate2017_fp_base = 219  
### SPECrate2017_fp_peak = 224

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### Peak Other Flags (Continued)

C++ benchmarks:  
\[-m64\]  

Fortran benchmarks:  
\[-m64\]  

Benchmarks using both Fortran and C:  
\[-m64 -std=c11\]  

Benchmarks using both C 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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Report generated on 2018-10-31 17:30:55 by CPU2017 PDF formatter v6067.  