## Lenovo Global Technology

### ThinkSystem SR630 V2
(2.30 GHz, Intel Xeon Platinum 8352M)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>402</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
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</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jul-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Dec-2020

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tr>
<td>503.bwaves_r</td>
<td>64</td>
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<td>507.caactuBSSN_r</td>
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</tr>
<tr>
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<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>64</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8352M  
- **Max MHz:** 3500  
- **Nominal:** 2300  
- **Enabled:** 64 cores, 2 chips  
- **Orderable:** 1,2 chips  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **L2:** 1.25 MB I+D on chip per core  
- **L3:** 48 MB I+D on chip per chip  
- **Memory:** 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP2 (x86_64)  
- **Kernel:** 5.3.18-22-default  
- **Compiler:** C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version AFE111A 1.02 released May-2021  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
Lenovo Global Technology
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SPECrate®2017_fp_base = 402
SPECrate®2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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</table>

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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
MALLOC_CONF = "retain:true"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7940X CPU + 64GB RAM memory using openSUSE Leap 15.2
Transparent Huge Pages enabled by default

(Continued on next page)
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</tbody>
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General Notes (Continued)

Prior to runcpu invocation
Filesystem page cache synced and cleared with:
```
sync; echo 3>/proc/sys/vm/drop_caches
```
numactl command invoked through numactl i.e.:
```
numactl --interleave=all runcpu <etc>
```
NA: 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 Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enabled
Hyper-Threading set to Disabled
Intel Virtualization Technology set to Disabled
SNC set to Enabled
XPT Prefetcher set to Disabled

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revA-update1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca61ec64d
running on localhost Sat Jul 3 06:38:45 2021

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 8352M CPU @ 2.30GHz
  2 "physical id"s (chips)
  64 "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 : 32
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
```

(Continued on next page)
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SPECrate®2017_fp_base = 402
SPECrate®2017_fp_peak = Not Run

Platform Notes (Continued)

From lscpu from util-linux 2.33.1:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  Address sizes: 46 bits physical, 57 bits virtual
  CPU(s): 64
  On-line CPU(s) list: 0-63
  Thread(s) per core: 1
  Core(s) per socket: 32
  Socket(s): 2
  NUMA node(s): 4
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 106
  Model name: Intel(R) Xeon(R) Platinum 8352M CPU @ 2.30GHz
  Stepping: 6
  CPU MHz: 2800.000
  BogoMIPS: 4600.00
  Virtualization: VT-x
  L1d cache: 48K
  L1i cache: 32K
  L2 cache: 1280K
  L3 cache: 49152K
  NUMA node0 CPU(s): 0-15
  NUMA node1 CPU(s): 16-31
  NUMA node2 CPU(s): 32-47
  NUMA node3 CPU(s): 48-63
  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 rdtsscp
  lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
  aperfmperf 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 cpuid_fault epb cat_13 invpcid_single ssbd
  mba ibpb stibp ibrs Enhanced tpr_shadow vnumi flexpriority ept vpid ept_ad
  fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3rms invpcid rtm cqm rdt_a avx512f
  avx512dq rdseed adx smap ibrs Enhance tprs_shadow vnumi flexpriority ept vpid ept_ad
  fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3rms invpcid rtm cqm rdt_a avx512f
  avx512dq rdseed adx smap ibrs Enhance tprs_shadow vnumi flexpriority ept vpid ept_ad
  fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3rms invpcid rtm cqm rdt_a avx512f

/proc/cpuinfo cache data
  cache size: 49152 KB

From numactl --hardware
  WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)

(Continued on next page)
Lenovo Global Technology
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SPECrated®2017_fp_base = 402
SPECrated®2017_fp_peak = Not Run

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

Platform Notes (Continued)

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 257600 MB
node 0 free: 257353 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 258043 MB
node 1 free: 257703 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 2 size: 258043 MB
node 2 free: 257796 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 3 size: 258040 MB
node 3 free: 257714 MB
node distances:
node 0 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 1056491172 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 15 SP2

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP2"
VERSION_ID="15.2"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected

(Continued on next page)
Lenovo Global Technology
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SPECrater®2017_fp_base = 402
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Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jul 3 05:12
SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revA-update1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdc3 xfs 891G 33G 858G 4% /

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR630 V2 MB
Product Family: ThinkSystem
Serial: 1234567890

Additional information from dmidecode 3.2 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.
Memory:
32x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Lenovo
BIOS Version: AFE111A-1.02
BIOS Date: 05/07/2021
BIOS Revision: 1.2
Firmware Revision: 1.10

(End of data from sysinfo program)

Compiler Version Notes

=================================================================================
C | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
=================================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Lenovo Global Technology
ThinkSystem SR630 V2
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Compiler Version Notes (Continued)

Copyright 2021 Intel Corporation. All rights reserved.

==============================================================================
| C++             | 508.namd_r(base) 510.parest_r(base) |
|==============================================================================
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
|==============================================================================
| C++, C       | 511.povray_r(base) 526.blender_r(base) |
|==============================================================================
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
|==============================================================================
| C++, C, Fortran | 507.cactuBSSN_r(base) |
|==============================================================================
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
| Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on |
| Intel(R) 64, Version 2021.1 Build 20201112_000000 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
|==============================================================================
| Fortran       | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base) |
|==============================================================================
| Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on |
| Intel(R) 64, Version 2021.1 Build 20201112_000000 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
|==============================================================================
| Fortran, C   | 521.wrf_r(base) 527.cam4_r(base) |
|==============================================================================

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### Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

### Base Compiler Invocation

- C benchmarks:  
  icx

- C++ benchmarks:  
  icpx

- Fortran benchmarks:  
  ifort

- Benchmarks using both Fortran and C:  
  ifort icx

- Benchmarks using both C and C++:  
  icpx icx

- Benchmarks using Fortran, C, and C++:  
  icpx icx 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.ibm_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
- 544.nab_r: -DSPEC_LP64
- 549.fotonik3d_r: -DSPEC_LP64

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

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
- mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
- qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles
- mbranches-within-32B-boundaries -nostandard-realloc-lhs
- align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles
- mbranches-within-32B-boundaries -nostandard-realloc-lhs

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630 V2
(2.30 GHz, Intel Xeon Platinum 8352M)

SPECrater®2017_fp_base = 402
SPECrater®2017_fp_peak = Not Run

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

Test Date: Jul-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-E.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-E.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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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