Lenovo Global Technology
ThinkSystem SD650 V2
(2.60 GHz, Intel Xeon Platinum 8358P)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>423</th>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
</table>
| **CPU Name:** Intel Xeon Platinum 8358P  
**Max MHz:** 3400  
**Nominal:** 2600  
**Enabled:** 64 cores, 2 chips  
**Orderable:** 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:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
**Storage:** 1 x 480 GB SATA SSD  
**Other:** None  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage | **OS:** Red Hat Enterprise Linux 8.3  
**(Ootpa)**  
**Kernel 4.18.0-240.el8.x86_64**  
**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;  
**Compilation:** C/C++: Version 2021.1 of Intel C/C++ Compiler  
Classic Build 20201112 for Linux  
**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 |
**SPEC CPU®2017 Floating Point Rate Result**

Lenovo Global Technology  
ThinkSystem SD650 V2  
(2.60 GHz, Intel Xeon Platinum 8358P)

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### Results Table

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**SPECrate®2017_fp_base =** 423  
**SPECrate®2017_fp_peak =** Not Run

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:

```
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic202
1.1-revB/jc5.0.1-64"
MALLOCONF = "retain:true"
```

---

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Red Hat Enterprise Linux 8.1  
Transparent Huge Pages enabled by default

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(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology
ThinkSystem SD650 V2
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SPECRate®2017_fp_base = 423
SPECRate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Date: May-2021
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Hardware Availability: Jul-2021
Software Availability: Feb-2021

General Notes (Continued)

Prior to runcpu invocation
Filesystem 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>
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
C-States set to Legacy
Hyper-Threading set to Disabled
CPU Frequency Limits set to Restrict maximum frequency
Patrol Scrub set to Disabled
SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d27d080afeaa89d4b38e2f1c
running on ip10-245-59-38.labs.lenovo.com Mon May 17 17:41:05 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 8358P CPU @ 2.60GHz
    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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Test Date: May-2021
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Software Availability: Feb-2021

Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
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 8358P CPU @ 2.60GHz
Stepping: 6
CPU MHz: 3188.140
BogoMIPS: 5200.00
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 rdtscp
lm constant-tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aes xsave
avx f16c rdrand lahf_l1i_abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_pmm ssbd mba ibrs ibpb ibrs enhanced tpr_shadow vmi flexpriority ept
vpid ept_ad fsxgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsaves xsaved xsaveopt xsavec xgetbv1 xsaves qcm llc qcm_occu llc
qcm_mb_local split_lock_detect wboinvd dtherm ida arat pin pts avx512vmbi umip pku
ospke avx512_vbmi2 gfn i vaes vpcm1mldq avx512_vnni avx512_bitalg tme
avx512_vpoppcntdq la57 rdpid md_clear pconfi flush_lld arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

(Continued on next page)
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Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Platform Notes (Continued)

node 0 size: 126252 MB
node 0 free: 128247 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 126864 MB
node 1 free: 128297 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 2 size: 126960 MB
node 2 free: 128637 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 3 size: 127241 MB
node 3 free: 128578 MB
node distances:
node 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: 528005908 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sbin/tuned-adm active
Current active profile: throughput-performance
/usr/bin/lsb_release -d
Red Hat Enterprise Linux release 8.3 (Ootpa)

From /etc/*release* /etc/*version*

os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.3"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux ip10-245-59-38.labs.lenovo.com 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64 x86_64 GNU/Linux

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
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Test Sponsor: Lenovo Global Technology
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SPECrater®2017_fp_base = 423
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Test Date: May-2021
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Software Availability: Feb-2021

Platform Notes (Continued)

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
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Not affected
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 May 17 17:38

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD650 V2
Product Family: ThinkSystem
Serial: 1234567890

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.

Memory:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Lenovo
BIOS Version: U8E109PT1-1.01
BIOS Date: 04/28/2021
BIOS Revision: 1.1
Firmware Revision: 1.40

(End of data from sysinfo program)
# SPEC CPU®2017 Floating Point Rate Result

## Lenovo Global Technology

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(2.60 GHz, Intel Xeon Platinum 8358P)

---

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
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### Compiler Version Notes

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<th>C</th>
<th>519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)</th>
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| 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. |

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Compiler Version Notes (Continued)

Fortran, C      |  521.wrf_r(base) 527.cam4_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.
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.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

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

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-fflto -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 -fflto
-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
-fflto -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
-fflto -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

(Continued on next page)
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</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-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`
- `-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:

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-D.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.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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