# Lenovo Global Technology

**ThinkSystem SD630 V2**  
(3.20 GHz, Intel Xeon Gold 5315Y)

## CPU2017 License:
9017

## Test Sponsor:
Lenovo Global Technology

## Tested by:
Lenovo Global Technology

## Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5315Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3600</td>
</tr>
<tr>
<td>Nominal:</td>
<td>3200</td>
</tr>
<tr>
<td>Enabled:</td>
<td>16 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>12 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

## Software

| OS:        | Red Hat Enterprise Linux 8.3  
            | (Ootp) 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; |
| Firmware:  | No |
| 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 |

## SPECrate®2017 fp base = 161

## Test Date: Jun-2021

## Hardware Availability: Jul-2021

## Software Availability: Dec-2020

## Hardware Availability: Jul-2021
Lenovo Global Technology
ThinkSystem SD630 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

CPU2017 License: 9017
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Results Table

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<td>687</td>
<td>74.0</td>
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</tbody>
</table>

SPECrate®2017_fp_base = 161
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/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic2021.1-revB/je5.0.1-64"

MALLOCC_CONF = "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
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.
jemalloc, a general purpose malloc implementation
   built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
   Choose Operating Mode set to Maximum Performance
   DCU Streamer Prefetcher set to Disabled
   SNC set to Enabled
   Adjacent Cache Prefetch set to Disabled

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Wed Jun 23 19:57:32 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) Gold 5315Y CPU @ 3.20GHz
   2 "physical id"s (chips)
   32 "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 : 16
   physical 0: cores 0 1 2 3 4 5 6 7
   physical 1: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:
   Architecture: x86_64
   CPU op-mode(s): 32-bit, 64-bit
   Byte Order: Little Endian

(Continued on next page)
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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

<table>
<thead>
<tr>
<th>CPU(s):</th>
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<tbody>
<tr>
<td>On-line CPU(s) list:</td>
<td>0-31</td>
</tr>
<tr>
<td>Thread(s) per core:</td>
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</tr>
<tr>
<td>Core(s) per socket:</td>
<td>8</td>
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<tr>
<td>Socket:</td>
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<tr>
<td>NUMA node(s):</td>
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</tr>
<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
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<tr>
<td>CPU family:</td>
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<tr>
<td>Model:</td>
<td>106</td>
</tr>
<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz</td>
</tr>
<tr>
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<td>L2 cache:</td>
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<td>L3 cache:</td>
<td>8-12,24-31</td>
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<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-7,16-23</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>8-15,24-31</td>
</tr>
<tr>
<td>Flags:</td>
<td>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 cpuid aperf perf看你d pni pclmulqdq dtes64 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_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase 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 xsaveopt xsave xsetbv1 xsaves cqm_llc cqm_occup llc cqm_mbmc_total cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pfn pts avx512vbm umip pku ospe avx512_vbmi2 gfn vaes vpcmimgd qavx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities</td>
</tr>
</tbody>
</table>

From numactl --hardware

**WARNING:** a numactl 'node' might or might not correspond to a physical chip.

```
/proc/cpuinfo cache data
  cache size : 12288 KB
```

(Continued on next page)
Lenovo Global Technology
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SPECrater®2017_fp_base = 161
SPECrater®2017_fp_peak = Not Run

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

Platform Notes (Continued)

node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 528013584 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: balanced

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

uname -a:
Linux localhost.localdomain 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

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): Not affected
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

(Continued on next page)
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SPEC®2017_fp_base = 161
SPEC®2017_fp_peak = Not Run

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

Platform Notes (Continued)

run-level 3 Jun 23 19:55

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5 xfs 372G 79G 293G 22% /home

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD630 V2
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:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Lenovo
BIOS Version: U8E111A-1.02
BIOS Date: 05/07/2021
BIOS Revision: 1.2
Firmware Revision: 1.40

(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,
    Version 2021.1 Build 20201113
Copyright (C) 1985-2020 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.
==============================================================================

(Continued on next page)
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Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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
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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)
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Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
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**Lenovo Global Technology**

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---

### 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
- 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

(Continued on next page)
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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

Base Optimization Flags (Continued)

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
-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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<th>SPECrate®2017_fp_base = 161</th>
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<th>Test Date:</th>
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<td>Lenovo Global Technology</td>
<td>Jun-2021</td>
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<th>Hardware Availability: Jul-2021</th>
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**SPECrate®2017_fp_peak = Not Run**

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Test Date:** Jun-2021

**Tested by:** Lenovo Global Technology

**Hardware Availability:** Jul-2021

**Software Availability:** Dec-2020

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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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