### Lenovo Global Technology

**ThinkSystem SR650 V2**  
(2.10 GHz, Intel Xeon Gold 5318Y)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>172</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

#### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Gold 5318Y</td>
</tr>
<tr>
<td><strong>Max MHz:</strong></td>
<td>3400</td>
</tr>
<tr>
<td><strong>Nominal:</strong></td>
<td>2100</td>
</tr>
<tr>
<td><strong>Enabled:</strong></td>
<td>48 cores, 2 chips</td>
</tr>
<tr>
<td><strong>Orderable:</strong></td>
<td>1.2 chips</td>
</tr>
<tr>
<td><strong>Cache L1:</strong></td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td><strong>Cache L2:</strong></td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>Cache L3:</strong></td>
<td>36 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td>1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td><strong>Storage:</strong></td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
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</table>

#### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS:</strong></td>
<td>SUSE Linux Enterprise Server 15 SP2 (x86_64)</td>
</tr>
<tr>
<td><strong>Kernel:</strong></td>
<td>5.3.18-22-default</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>Fortran: Version 2021.1 of Intel Fortran Compiler</td>
</tr>
<tr>
<td><strong>C/C++:</strong></td>
<td>Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td><strong>Parallel:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Firmware:</strong></td>
<td>Lenovo BIOS Version AFE111A 1.02 released May-2021</td>
</tr>
<tr>
<td><strong>File System:</strong></td>
<td>xfs</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td><strong>Power Management:</strong></td>
<td>BIOS and OS set to prefer performance at the cost</td>
</tr>
<tr>
<td></td>
<td>of additional power usage</td>
</tr>
</tbody>
</table>

---

**Threads**

- 603.bwaves_s 48  
- 607.cactuBSSN_s 48  
- 619.lbm_s 48  
- 621.wrf_s 48  
- 627.cam4_s 48  
- 628.pop2_s 48  
- 638.imagick_s 48  
- 644.nab_s 48  
- 649.fotonik3d_s 48  
- 654.roms_s 48  

**Results**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result (Threads)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>214</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>742</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>124</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>132</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>118</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>105</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>183</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>299</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>132</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>215</td>
</tr>
</tbody>
</table>
SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology
ThinkSystem SR650 V2
(2.10 GHz, Intel Xeon Gold 5318Y)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>92.2</td>
<td>640</td>
<td>92.5</td>
<td>638</td>
<td>91.8</td>
<td>643</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>77.9</td>
<td>214</td>
<td>76.4</td>
<td>218</td>
<td>78.0</td>
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<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>41.2</td>
<td>127</td>
<td>42.3</td>
<td>124</td>
<td>42.4</td>
<td>124</td>
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<tr>
<td>621.wrf_s</td>
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<td>101</td>
<td>132</td>
<td>99.6</td>
<td>133</td>
<td>100</td>
<td>132</td>
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<td>627.cam4_s</td>
<td>48</td>
<td>75.0</td>
<td>118</td>
<td>74.8</td>
<td>118</td>
<td>75.0</td>
<td>118</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>160</td>
<td>74.2</td>
<td>161</td>
<td>73.9</td>
<td>160</td>
<td>74.4</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>78.9</td>
<td>183</td>
<td>79.5</td>
<td>181</td>
<td>78.9</td>
<td>183</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>60.5</td>
<td>289</td>
<td>60.5</td>
<td>289</td>
<td>60.5</td>
<td>289</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>86.8</td>
<td>105</td>
<td>86.9</td>
<td>105</td>
<td>87.5</td>
<td>104</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>73.3</td>
<td>215</td>
<td>73.4</td>
<td>215</td>
<td>73.7</td>
<td>214</td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 172
SPECspeed®2017_fp_peak = Not Run

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

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:
KMP_AFFINITY = "granularity=fine,compact"
Malloc_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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
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.

(Continued on next page)
General Notes (Continued)

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 and then set it to Custom Mode
C-States set to Legacy
Adjacent Cache Prefetch set to Disabled
Hyper-Threading set to Disabled
LLC Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revA-update1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost Wed Jul 21 21:54:52 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 5318Y CPU @ 2.10GHz
  2 "physical id"s (chips)
  48 "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 : 24
  siblings : 24
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
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

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): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106

(Continued on next page)
## Lenovo Global Technology

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<table>
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<tr>
<th>SPECspeed\textsuperscript{2017_fp_base}</th>
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</tr>
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<tr>
<td>SPECspeed\textsuperscript{2017_fp_peak}</td>
<td>Not Run</td>
</tr>
</tbody>
</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

---

### Platform Notes (Continued)

- **Model name:** Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
- **Stepping:** 6
- **CPU MHz:** 2368.958
- **BogoMIPS:** 4200.00
- **Virtualization:** VT-x
- **L1d cache:** 48K
- **L1i cache:** 32K
- **L2 cache:** 1280K
- **L3 cache:** 36864K
- **NUMA node0 CPU(s):** 0-23
- **NUMA node1 CPU(s):** 24-47
- **Flags:** fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc 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 xtrm 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 ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vmlinux flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cpqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xsaveopt xsaves cmx_lsc cmx_occup_llc cmx_mbb_total cmx_mbb_local wbnoinvd dtherm ida arat pln pts avx512vmbmi umip pku ospke avx512_vmbmi2 gfn vi vaes vpcmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data  
cache size : 36864 KB

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
node 0 size: 515646 MB  
node 0 free: 514717 MB  
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
node 1 size: 516086 MB  
node 1 free: 514865 MB  
node distances:  
node 0 1  
0: 10 20  
1: 20 10

From /proc/meminfo  
MemTotal: 1056495472 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR650 V2**  
(2.10 GHz, Intel Xeon Gold 5318Y)

<table>
<thead>
<tr>
<th>Spec CPU2017 License:</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>CPU2017 License:</td>
<td>9017</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

```
/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
- **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/swapgs 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 21 17:20

**SPEC is set to:** /home/cpu2017-1.1.8-ic2021.1-revA-update1

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdb3      xfs  891G   54G  838G   6% /
```

```
From /sys/devices/virtual/dmi/id
  Vendor: Lenovo
  Product: ThinkSystem SR650 V2 MB
  Product Family: ThinkSystem
  Serial: 1234567890
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(2.10 GHz, Intel Xeon Gold 5318Y)

SPECSpeed®2017_fp_peak = Not Run
SPECSpeed®2017_fp_base = 172

Platform Notes (Continued)
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, configured at 2933

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

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)</td>
<td>64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>
|==============================================================================

<table>
<thead>
<tr>
<th>C++, C, Fortran</th>
<th>607.cactuBSSN_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
<td></td>
</tr>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Fortran</th>
<th>603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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</tbody>
</table>

(Continued on next page)
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**Compiler Version Notes (Continued)**

Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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) C 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.  

**Base 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  

**Base Portability Flags**

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
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Base Optimization Flags

C benchmarks:
-m64 -std=c11 -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nstandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nstandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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-F.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-F.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.

Tested with SPEC CPU®2017 v1.1.8 on 2021-07-21 09:54:52-0400.
Report generated on 2021-08-19 10:52:51 by CPU2017 PDF formatter v6442.
Originally published on 2021-08-17.