Lenovo Global Technology
ThinkSystem SR650 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

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

**threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed\textsuperscript{2017\textunderscore fp_base}</th>
<th>SPECspeed\textsuperscript{2017\textunderscore fp_peak}</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>16</td>
<td>Not Run</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>127</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>16</td>
<td>86.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>106</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>59.3</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>67.6</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>88.2</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>16</td>
<td>148</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
<td>82.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>103</td>
</tr>
</tbody>
</table>

**SPECspeed\textsuperscript{2017\textunderscore fp\_base} (108)**

**Hardware**

- **CPU Name:** Intel Xeon Gold 5315Y
- **Max MHz:** 3600
- **Nominal:** 3200
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **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:** 12 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP2 (x86\textunderscore 64)
- **Kernel:** 5.3.18-22-default
- **Compiler:** Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
  C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** Yes
- **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
ThinkSystem SR650 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

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>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>16</td>
<td>145</td>
<td></td>
<td>145</td>
<td></td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>131</td>
<td></td>
<td>130</td>
<td></td>
<td>137</td>
<td>121</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>16</td>
<td>60.7</td>
<td>86.3</td>
<td>60.7</td>
<td>86.3</td>
<td>60.7</td>
<td>86.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>126</td>
<td>105</td>
<td>125</td>
<td>106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>149</td>
<td>59.3</td>
<td>149</td>
<td>59.6</td>
<td>150</td>
<td>59.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>176</td>
<td>67.6</td>
<td>176</td>
<td>67.4</td>
<td>175</td>
<td>68.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>164</td>
<td>88.2</td>
<td>164</td>
<td>88.1</td>
<td>164</td>
<td>88.2</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>16</td>
<td>118</td>
<td>148</td>
<td>118</td>
<td>148</td>
<td>118</td>
<td>148</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
<td>111</td>
<td>82.5</td>
<td>110</td>
<td>83.1</td>
<td>110</td>
<td>82.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>152</td>
<td>104</td>
<td>152</td>
<td>103</td>
<td>153</td>
<td>103</td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 108
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,1,0"
MALLOCONF = "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
LLC Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revA-updatel/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6f4d6
running on localhost Mon Jul  5 04:38:30 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
excerpt 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 2.33.1:
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):                32
On-line CPU(s) list:   0-31
Thread(s) per core:    2
Core(s) per socket:    8
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 106
Model name:            Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

SPECspeed®2017_fp_base = 108
SPECspeed®2017_fp_peak = Not Run

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

Platform Notes (Continued)

Stepping: 6
CPU MHz: 1413.705
BogoMIPS: 6400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 12288K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 cpuid
        aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sse2 ssse
        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 ibpb stibp ibrs_enhanced tpr_shadow vmm_nonsp ept vpid fsgsbase tsc_adjust bmi1
        hle avx2 smep bmi2  elems invpcid rtm cqm rdt_a avx512f
        avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
        avx512bw avx512vl xsaveopt xsavec xSAVE XSNV xSAVEC XSNV cqm_llc cqm_occupy_llc cqm_mbb_total
        cqm_mbb_local wbinvd dtherm ida arat pln pts avx512vbmi umip pku ospke
        avx512_vbmi2 gfni vaes vpcmtdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq
        la57 rdrpid md_clear pconfig flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 12288 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 16 17 18 19 20 21 22 23
   node  0 size: 515648 MB
   node  0 free: 515082 MB
   node  1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
   node  1 size: 516089 MB
   node  1 free: 515572 MB
   node distances:
     node  0 1
   0:  10  20
   1:  20  10

From /proc/meminfo
  MemTotal:      1056499576 kB
  HugePages_Total:      0
  Hugepagesize:       2048 kB

/usr/bin/lsb_release -d

(Continued on next page)
### Lenovo Global Technology

ThinkSystem SR650 V2  
(3.20 GHz, Intel Xeon Gold 5315Y)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base =</th>
<th>108</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®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)

SUSE Linux Enterprise Server 15 SP2

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

```plaintext
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 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2018-12207 (iTLB Multithit):** 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 5 04:36**

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

**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>891G</td>
<td>53G</td>
<td>838G</td>
<td>6%</td>
<td>/</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

**Vendor:** Lenovo  
**Product:** ThinkSystem SR650 V2 MB  
**Product Family:** ThinkSystem  
**Serial:** 1234567890

**Additional information from dmidecode 3.2 follows.** WARNING: Use caution when you...
Platform Notes (Continued)

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</td>
<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>-----------------</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++</td>
<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>Intel(R) C</td>
<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>Intel(R) Fortran</td>
<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</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</td>
<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

SPECSpeed®2017_fp_base = 108
SPECSpeed®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

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
Lenovo Global Technology
ThinkSystem SR650 V2
(3.20 GHz, Intel Xeon Gold 5315Y)

SPECspeed®2017_fp_base = 108
SPECspeed®2017_fp_peak = Not Run

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

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 -nostandard-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 -nostandard-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-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

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2021-07-04 16:38:30-0400.
Originally published on 2021-07-20.