Lenovo Global Technology
ThinkSystem SR650 V2
(3.00 GHz, Intel Xeon Gold 5317)

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
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<tr>
<td>619.ibm_s</td>
<td>24</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Gold 5317
Max MHz: 3600
Nominal: 3000
Enabled: 24 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: 18 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_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
### 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>
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<tr>
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<td>Peak</td>
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<tr>
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<td>83.1</td>
<td>107</td>
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<tr>
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<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>96.7</td>
<td>94.3</td>
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<tr>
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<td>127</td>
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<td>128</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base** = 136

**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"
- 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.
Lenovo Global Technology
ThinkSystem SR650 V2
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jul-2021

Tested by: Lenovo Global Technology
Hardware Availability: Jul-2021

Software Availability: Dec-2020

(SPECspeed®2017_fp_base = 136)
SPECspeed®2017_fp_peak = Not Run

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 982a61ec0915b55891ef0e16acafc64d
running on localhost Mon Jul 5 04:32:10 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 5317 CPU @ 3.00GHz
  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 : 12
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

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: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz

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**SPEC CPU®2017 Floating Point Speed Result**

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**CPU2017 License:** 9017

**Test Date:** Jul-2021

**Hardware Availability:** Jul-2021

**Software Availability:** Dec-2020

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**SPECspeed®2017_fp_base = 136**

**SPECspeed®2017_fp_peak = Not Run**

**Platform Notes (Continued)**

- Stepping: 6
- CPU MHz: 3609.326
- BogoMIPS: 6000.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 18432K
- NUMA node0 CPU(s): 0-11,24-35
- NUMA node1 CPU(s): 12-23,36-47
- 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 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 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512sw avx512vl xsaveopt xsaves xsaveprec xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local wbnoivnd dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

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 24 25 26 27 28 29 30 31 32 33 34 35
- node 0 size: 515680 MB
- node 0 free: 515079 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
- node 1 size: 516053 MB
- node 1 free: 515589 MB
- node distances:
  - node 0: 10 20
  - node 1: 20 10

From `/proc/meminfo`

- MemTotal: 1056495428 KB
- HugePages_Total: 0
- Hugepagesize: 2048 KB

From `/usr/bin/lsb_release -d`

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Platform Notes (Continued)

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
ox86_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 swapping 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 04:31

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

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you

(Continued on next page)
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

C               | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
---------------|-----------------------------------------------------
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.

C++, C, Fortran | 607.cactuBSSN_s(base)
---------------|-----------------------------------------------------
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.

Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_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.
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SPECspeed®2017_fp_base = 136
SPECspeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

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

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

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<table>
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<tr>
<th>SPECspeed®2017_fp_base</th>
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<tr>
<td>SPECspeed®2017_fp_peak</td>
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</table>

### Base Optimization Flags

**C benchmarks:**
- `--m64`  
- `--std=c11`  
- `--xcore-avx2`  
- `--ipo`  
- `--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`  
- `--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`  
- `--no-prec-div`  
- `--qopt-prefetch`  
- `--ffinite-math-only`  
- `--qopt-mem-layout-trans=4`  
- `--qopenmp`  
- `--DSPEC_OPENMP`  
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- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

**Benchmarks using Fortran, C, and C++:**
- `--m64`  
- `--std=c11`  
- `--Wl,-z,muldefs`  
- `--xcore-avx2`  
- `--ipo`  
- `--no-prec-div`  
- `--qopt-prefetch`  
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- `--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:


You can also download the XML flags sources by saving the following links:


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