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

**Lenovo Global Technology**

ThinkSystem ST650 V2  
(2.80 GHz, Intel Xeon Silver 4309Y)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 101</td>
<td>= Not Run</td>
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**CPU2017 License:** 9017  
**Test Date:** Sep-2021

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Jul-2021

**Tested by:** Lenovo Global Technology  
**Software Availability:** Dec-2020

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>
| OS: Red Hat Enterprise Linux 8.3 (Ootpa)  
Kernel 4.18.0-240.el8.x86_64 | CPU Name: Intel Xeon Silver 4309Y  
Max MHz: 3600  
Nominal: 2800 |
| 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 | Orderable: 1,2 chips |
| Parallel: Yes | Cache L1: 32 KB I + 48 KB D on chip per core |
| Firmware: Lenovo BIOS Version U8E113E 1.10 released Aug-2021 | L2: 1.25 MB I+D on chip per core |
| File System: xfs | L3: 12 MB I+D on chip per chip |
| System State: Run level 3 (multi-user) | Other: None |
| Base Pointers: 64-bit | Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R, running at 2666) |
| Peak Pointers: Not Applicable | Storage: 1 x 960 GB SATA SSD |
| Other: jemalloc memory allocator V5.0.1 | Other: None |
| Power Management: BIOS and OS set to prefer performance at the cost of additional power usage |

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
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<tr>
<td>619.lbm_s</td>
<td>16</td>
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<td>621.wrf_s</td>
<td>16</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
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<tr>
<td>644.nab_s</td>
<td>16</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
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<table>
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<th>SPECspeed®2017_fp_base (101)</th>
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<tr>
<td>Threads 55.0 75.0 95.0</td>
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<tr>
<td>101 75.2 56.2 64.1</td>
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</table>

**Threads table:**

- **Threads:**
  - 0 15.0 35.0 55.0 75.0 95.0 110 125 140 155 170 185 200 215 230 245 260 275 290 305 320 335 350 375
- **Lenovo Global Technology:**
  - **CPU Name:** Intel Xeon Silver 4309Y  
  - **Max MHz:** 3600  
  - **Nominal:** 2800  
  - **Enabled:** 16 cores, 2 chips  
  - **Orderable:** 1.2 chips  
  - **Cache L1:** 32 KB I + 48 KB D on chip per core  
  - **Cache L2:** 1.25 MB I+D on chip per core  
  - **Cache L3:** 12 MB I+D on chip per chip  
  - **Other:** None  
  - **Memory:** 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R, running at 2666)  
  - **Storage:** 1 x 960 GB SATA SSD  
  - **Other:** None

**Test Sponsor:** Lenovo Global Technology  
**Software Availability:** Dec-2020

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

**CPU2017 License:** 9017  
**Test Date:** Sep-2021

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**Hardware Availability:** Jul-2021

**CPU2017 License:** 9017  
**Test Date:** Sep-2021
Lenovo Global Technology

ThinkSystem ST650 V2
(2.80 GHz, Intel Xeon Silver 4309Y)

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

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

Results Table

<table>
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<th>Seconds</th>
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</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 101
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"
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"
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)
Lenovo Global Technology
ThinkSystem ST650 V2
(2.80 GHz, Intel Xeon Silver 4309Y)

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

SPECspeed®2017_fp_base = 101
SPECspeed®2017_fp_peak = Not Run

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

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

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca64d
running on localhost.localdomain Sat Sep 4 00:51:18 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) Silver 4309Y CPU @ 2.80GHz
  2 "physical id"s (chips)
  16 "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 : 8
  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
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
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) Silver 4309Y CPU @ 2.80GHz
Stepping: 6

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST650 V2
(2.80 GHz, Intel Xeon Silver 4309Y)

SPECspeed®2017_fp_base = 101
SPECspeed®2017_fp_peak = Not Run

Platform Notes (Continued)

CPU MHz: 2385.896
BogoMIPS: 5600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 12288K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15

Flags: fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush dtst msr mrxr mcr pse ept sbs gse 

/cache/data

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
node 0 size: 510832 MB
node 0 free: 515070 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 510912 MB
node 1 free: 515408 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 1056499120 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

(Continued on next page)
**Platform Notes (Continued)**

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

```bash
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
```

```bash
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): 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 sanitation
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 Sep 4 00:41

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

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>818G</td>
<td>108G</td>
<td>710G</td>
<td>14%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

```bash
Vendor: Lenovo
Product: ThinkSystem ST650V2
Product Family: ThinkSystem
Serial: 1234567890
```

(Continued on next page)
**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 2666

BIOS:
- BIOS Vendor: Lenovo
- BIOS Version: U8E113E-1.10
- BIOS Date: 08/31/2021
- BIOS Revision: 1.10
- Firmware Revision: 1.41

(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.
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.
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         | 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
```

(Continued on next page)
Lenovo Global Technology
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SPECspeed®2017_fp_base = 101
SPECspeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
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.cactusBSSN_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 ST650 V2  
(2.80 GHz, Intel Xeon Silver 4309Y)

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

### SPECspeed®2017 fp_base = 101

### SPECspeed®2017 fp_peak = Not Run

#### 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:


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


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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.