Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_fp_base = 27.5
SPECspeed®2017_fp_peak = 27.8

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

## Hardware

- **CPU Name:** Intel Xeon E-2274G
- **Max MHz:** 4900
- **Nominal:** 4000
- **Enabled:** 4 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 256 KB I+D on chip per core
- **L3:** 8 MB I+D on chip per chip
- **Memory:** 128 GB (4 x 32 GB 2Rx4 PC4-2666V-E)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

## Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)
- **Kernel:** 4.12.14-195-default
- **Compiler:** C/C++: Version 19.1.1.217 of Intel
  Compiler for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version ISE115D 2.10 released Apr-2020
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

<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>4</td>
<td>749</td>
<td>78.7</td>
<td>750</td>
<td>78.7</td>
<td>749</td>
<td>78.8</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>394</td>
<td>42.3</td>
<td>396</td>
<td>42.1</td>
<td>396</td>
<td>42.1</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>4</td>
<td>326</td>
<td>16.1</td>
<td>325</td>
<td>16.1</td>
<td>325</td>
<td>16.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>4</td>
<td>411</td>
<td>32.2</td>
<td>413</td>
<td>32.0</td>
<td>411</td>
<td>32.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>4</td>
<td>458</td>
<td>19.4</td>
<td>458</td>
<td>19.4</td>
<td>458</td>
<td>19.4</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>364</td>
<td>32.6</td>
<td>364</td>
<td>32.6</td>
<td>364</td>
<td>32.6</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>683</td>
<td>21.1</td>
<td>682</td>
<td>21.2</td>
<td>683</td>
<td>21.1</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>4</td>
<td>449</td>
<td>38.9</td>
<td>449</td>
<td>38.9</td>
<td>449</td>
<td>38.9</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td>508</td>
<td>17.9</td>
<td>508</td>
<td>17.9</td>
<td>508</td>
<td>17.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td>1019</td>
<td>15.5</td>
<td>1016</td>
<td>15.5</td>
<td>1018</td>
<td>15.5</td>
</tr>
</tbody>
</table>

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Threads</td>
<td>Seconds</td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td>4</td>
<td>749</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>4</td>
<td>394</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>4</td>
<td>326</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>4</td>
<td>411</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>4</td>
<td>458</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>4</td>
<td>364</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>683</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>4</td>
<td>449</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td>508</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td>1019</td>
</tr>
</tbody>
</table>

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/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j
e5.0.1-64"
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
Yes: 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)
SPEC CPU®2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_fp_base = 27.5
SPECspeed®2017_fp_peak = 27.8

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

General Notes (Continued)
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
Hyper-Threading set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7db1e6e46a485a0011
running on linux-jecn Thu Feb 14 23:50:05 2019

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) E-2274G CPU @ 4.00GHz
  1 "physical id"s (chips)
  4 "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 : 4
siblings : 4
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2274G CPU @ 4.00GHz
Stepping: 10
CPU MHz: 4000.000

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

.spec

Copyright 2017-2020 Standard Performance Evaluation Corporation

Lenovo Global Technology

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

CPU max MHz: 4900.0000
CPU min MHz: 800.0000
BogoMIPS: 8016.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-3
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 tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdtscp pdcm pcid smp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdtscp pdcm pcid smp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdtscp pdcm pcid smp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust

/proc/cpuinfo cache data
  cache size : 8192 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3
  node 0 size: 128867 MB
  node 0 free: 128371 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 131960244 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 15 SP1

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"

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

```plaintext
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:spl"
```

```plaintext
uname -a:
Linux linux-jecn 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Mitigation: PTE Inversion; VMX: conditional cache flushes, SMT disabled
- **Microarchitectural Data Sampling:** Mitigation: Clear CPU buffers; SMT disabled
- **CVE-2017-5754 (Meltdown):** Mitigation: PTI
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Indirect Branch Restricted Speculation, IBPB: conditional, IBRS_FW, RSB filling

run-level 3 Feb 14 22:21

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

```plaintext
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 446G 82G 364G 19% /
```

From /sys/devices/virtual/dmi/id
- **BIOS:** Lenovo -[ISE115D-2.10]- 04/24/2020
- **Vendor:** Lenovo
- **Product:** ThinkSystem SR250 -[7Y51CT00WW]-
- **Product Family:** ThinkSystem
- **Serial:** 1234567890

Additional information from dmidecode 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:**
  - 4x SK Hynix HMAA4GU7AJR8N-VK 32767 MB 2 rank 2666

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_fp_base = 27.5
SPECspeed®2017_fp_peak = 27.8

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

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Compiler Version Notes

==================================================================================================
C                               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==================================================================================================
C++, C, Fortran                 | 607.cactuBSSN_s(base, peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==================================================================================================
Fortran                        | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==================================================================================================
Fortran, C                     | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
SPEC CPU®2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_fp_base = 27.5
SPECspeed®2017_fp_peak = 27.8

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

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

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

(Continued on next page)
**Lenovo Global Technology**  
ThinkSystem SR250  
(4.00 GHz, Intel Xeon E-2274G)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 27.5</th>
<th>SPECspeed®2017_fp_peak = 27.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 9017</td>
<td>Test Date: Jun-2020</td>
</tr>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Mar-2020</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Apr-2020</td>
</tr>
</tbody>
</table>

### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-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

### Peak 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

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: -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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR250
(4.00 GHz, Intel Xeon E-2274G)

**Peak Optimization Flags (Continued)**

644.nab_s (continued):
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -gopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -ipo -xCORE-AVX2 -03 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

---

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-SKL-J.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-J.xml
### Lenovo Global Technology

**ThinkSystem SR250**  
(4.00 GHz, Intel Xeon E-2274G)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>27.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>27.8</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

---

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 v1.1.0 on 2019-02-14 10:50:05-0500.  
Originally published on 2020-07-07.