**Lenovo Global Technology**

**ThinkSystem ST250 (4.00 GHz, Intel Xeon E-2274G)**

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**SPECspeed®2017_int_base = 12.0**

**SPECspeed®2017_int_peak = 12.4**

### 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
- **Other:** None
- **Memory:** 128 GB (4 x 32 GB 2Rx4 PC4-2666V-E)
- **Storage:** 1 x 960 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;
- **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 ST250
(4.00 GHz, Intel Xeon E-2274G)

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

SPECspeed®2017_int_base = 12.0
SPECspeed®2017_int_peak = 12.4

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

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/jre5.0.1-64"
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:

(Continued on next page)
General Notes (Continued)

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) is mitigated in the system as tested and documented.


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 295195f888a3d7ed1e6e46a485a0011
running on linux-bfbk Thu Jun 11 17:32:30 2020

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST250
(4.00 GHz, Intel Xeon E-2274G)

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

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
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 cx8 apic sep mtrr pge mca cmov
                     pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb
                     rdtdsc lm constant_tsc arch_perfmon pebs bts rep_good nopl tsc_known_freq
                     pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
                     sdbg fma cx16 xtpr pdcm pclid 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 bmi2 3dnow epmc cr4 ht pxrsvts mtmsr xsave capgov xsaveopt xsavec
                     xsavecf xmodrm vfpid vmprestd hwp hwph nevernmi mxrt smep pxrsvtslid msix cp博
                     ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp md_clear flush_lid

/cache/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: 128280 MB
  node distances:
    node 0
      0: 10

From /proc/meminfo
  MemTotal:            131960036 kB
  HugePages_Total:     0
  Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"

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

**ThinkSystem ST250**

(4.00 GHz, Intel Xeon E-2274G)

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<tr>
<td>Software Availability:</td>
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**Platform Notes (Continued)**

```plaintext
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

```plaintext
uname -a:
    Linux linux-bfbk 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

```plaintext
run-level 3 Jun 11 17:31
```

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

```plaintext
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   893G   63G  830G   8% /
```

From /sys/devices/virtual/dmi/id

- **BIOS:** Lenovo -[ISE115D-2.10]-  04/24/2020
- **Vendor:** Lenovo
- **Product:** ThinkSystem ST250 -[7Y45CT0WW]-
- **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 HMMA4GU7AJR8N-VK 32767 MB 2 rank 2666

(End of data from sysinfo program)
### Lenovo Global Technology

**ThinkSystem ST250**
(4.00 GHz, Intel Xeon E-2274G)

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**Compiler Version Notes**

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<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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**SPECspeed®2017_int_base = 12.0**

**SPECspeed®2017_int_peak = 12.4**

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(Continued on next page)
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem ST250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_int_base = 12.0
SPECspeed®2017_int_peak = 12.4

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 (Continued)

64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
--

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST250
(4.00 GHz, Intel Xeon E-2274G)

SPECspeed®2017_int_base = 12.0
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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

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX2
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64(*) -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

(*) Indicates a portability flag that was found in a non-portability variable.

Peak Optimization Flags

C benchmarks:

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST250
(4.00 GHz, Intel Xeon E-2274G)

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

SPECspeed\textsuperscript{®}2017\_int\_peak = 12.4
SPECspeed\textsuperscript{®}2017\_int\_base = 12.0

**Peak Optimization Flags (Continued)**

600.perlbench\_s: \texttt{-Wl, -z, muldefs, -prof-gen(pass 1), -prof-use(pass 2), -xCORE-AVX2, -ipo, -O3, -no-prec-div, -qopt-mem-layout-trans=4, -fno-strict-overflow, -mbranches-within-32B-boundaries, -L/usr/local/jemalloc64-5.0.1/lib, -ljemalloc}

602.gcc\_s: \texttt{-m64, -qnextgen, -std=c11, -fuse-ld=gold, -Wl, -plugin-opt=-x86-branches-within-32B-boundaries, -Wl, -z, muldefs, -fprofile-generate(pass 1), -fprofile-use=default.profdata(pass 2), -xCORE-AVX2, -flto, -Ofast(pass 1), -O3, -ffast-math, -qopt-mem-layout-trans=4, -L/usr/local/jemalloc64-5.0.1/lib, -ljemalloc}

605.mcf\_s: basepeak = yes

625.x264\_s: \texttt{-m64, -qnextgen, -std=c11, -Wl, -plugin-opt=-x86-branches-within-32B-boundaries, -Wl, -z, muldefs, -xCORE-AVX2, -flto, -O3, -ffast-math, -fuse-ld=gold, -qopt-mem-layout-trans=4, -fno-alias, -L/usr/local/jemalloc64-5.0.1/lib, -ljemalloc}

657.xz\_s: basepeak = yes

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: basepeak = yes

631.deepsjeng\_s: basepeak = yes

641.leela\_s: basepeak = yes

Fortran benchmarks:

648.exchange2\_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 ST250**  
(4.00 GHz, Intel Xeon E-2274G)

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

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