Lenovo Global Technology
ThinkSystem ST50
(3.30 GHz, Intel Xeon E-2124)

SPECrate2017_fp_base = 29.5
SPECrate2017_fp_peak = Not Run

Hardware
CPU Name: Intel Xeon E-2124
Max MHz.: 4300
Nominal: 3300
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: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 480 GB SATA SSD
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.5 (Maipo)
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Lenovo BIOS Version ITE101U released Sep-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
**Lenovo Global Technology**

**ThinkSystem ST50**

(3.30 GHz, Intel Xeon E-2124)

---

**CPU2017 License:** 9017  
**Test Date:** Nov-2018  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

---

**Results Table**

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</tbody>
</table>

**SPECrate2017_fp_base = 29.5**  
**SPECrate2017_fp_peak = Not Run**

---

**Submit Notes**

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

---

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

---

**General Notes**

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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.
Lenovo Global Technology
ThinkSystem ST50
(3.30 GHz, Intel Xeon E-2124)

SPECrates2017_fp_base = 29.5
SPECrates2017_fp_peak = Not Run

CPU2017 License: 9017
Test Date: Nov-2018
Test Sponsor: Lenovo Global Technology
Hardware Availability: Nov-2018
Tested by: Lenovo Global Technology
Software Availability: Aug-2018

General Notes (Continued)
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:
ICE Performance Mode set to 4HD Cooling Mode
Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on st50 Thu Nov 22 20:34:36 2018

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-2124 CPU @ 3.30GHz
  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
  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-2124 CPU @ 3.30GHz
  Stepping: 10
  CPU MHz: 4119.763
  CPU max MHz: 4300.000
  CPU min MHz: 800.000
  BogoMIPS: 6624.00

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST50
(3.30 GHz, Intel Xeon E-2124)

SPECraten2017_fp_base =  29.5
SPECraten2017_fp_peak =  Not Run

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

Platform Notes (Continued)

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 mca 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
aperfmpref perfmprefeugerfpnu 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 3nowprefetch epb intel_pt ssbd ibrs ibpb stibp
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust htl mle avx2 smep bmi2
erms invpcid rtm mp x2seed adx smap clflushopt xsaveopt xsaves opt xgetbv v dtherm ida
arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_lld

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
dphysical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3
node 0 size: 65412 MB
node 0 free: 61717 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal:  65850808 kB
HugePages_Total:  0
Hugepagesize:  2048 kB

From /etc/*release*/etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.5 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.5"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

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

**ThinkSystem ST50**

(3.30 GHz, Intel Xeon E-2124)

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**SPECrate2017_fp_base = 29.5**

**SPECrate2017_fp_peak = Not Run**

**Platform Notes (Continued)**

```
uname -a:
    Linux st50 3.10.0-862.11.6.el7.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64
    x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Mitigation: PTI
- CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Nov 22 11:07

SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2
```

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.

- BIOS LENOVO ITE101U 09/12/2018
- Memory:
  - 4x SK Hynix HMA82GU7CJR8N-VK 16 GB 2 rank 2667

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
  CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
  icc (ICC) 18.0.2 20180210
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST50
(3.30 GHz, Intel Xeon E-2124)

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

SPECrates

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Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Aug-2018

Compiler Version Notes (Continued)

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------
FC 507.cactuBSSN_r(base)
------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------
FC 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------
CC 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST50
(3.30 GHz, Intel Xeon E-2124)

SPECrate2017_fp_base = 29.5
SPECrate2017_fp_peak = Not Run

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

Base Compiler Invocation (Continued)

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

(Continued on next page)
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**SPECrate2017_fp_base = 29.5**

**SPECrate2017_fp_peak = Not Run**

**Base Optimization Flags (Continued)**

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CFL-A.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml

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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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