## Lenovo Global Technology

ThinkSystem ST50  
(3.80 GHz, Intel Xeon E-2174G)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>31.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Hardware

- CPU Name: Intel Xeon E-2174G
- Max MHZ.: 4700
- Nominal: 3800
- Enabled: 4 cores, 1 chip, 2 threads/core
- 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++: Version 18.0.2.199 of Intel 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

### Test Details

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<thead>
<tr>
<th>Copies</th>
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<tr>
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### Results Table

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</tbody>
</table>

SPECrate2017_fp_base = 31.8
SPECrate2017_fp_peak = Not Run

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

### 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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"

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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST50
(3.80 GHz, Intel Xeon E-2174G)

SPECrate2017_fp_base = 31.8
SPECrate2017_fp_peak = Not Run

CPU2017 License: 9017
Test Date: Oct-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 Oct 25 06:18:20 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-2174G CPU @ 3.80GHz
  1 "physical id"s (chips)
  8 "processors"
core, 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 : 8
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): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
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-2174G CPU @ 3.80GHz
Stepping: 10
CPU MHz: 4394.213
CPU max MHz: 4700.0000
CPU min MHz: 800.0000
BogoMIPS: 7584.00

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem ST50**  
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### SPEC CPU2017 Floating Point Rate Result

**SPECRate2017_fp_base** = 31.8  
**SPECRate2017_fp_peak** = Not Run

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### Platform Notes (Continued)

- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 256K
- **L3 cache:** 8192K
- **NUMA node0 CPU(s):** 0-7
- **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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu 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 f16c rdrand lahf_lm abm 3dnowprefetch cpb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust hle avx smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_lld

```
From /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 4 5 6 7  
node 0 size: 65372 MB  
node 0 free: 61652 MB
```

```
From /proc/meminfo  
MemTotal: 65809220 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

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

```
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)
**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 Oct 24 19:34

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.
```

```
CXXC 508.namd_r(base) 510.parest_r(base)
```

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

```
CC  511.povray_r(base) 526.blender_r(base)
```

(Continued on next page)
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SPECrater2017_fp_base = 31.8
SPECrater2017_fp_peak = Not Run

**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.

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CC  521.wrf_r(base) 527.cam4_r(base)

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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)
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**SPECrate2017_fp_base = 31.8**
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**Test Date:** Oct-2018  
**Hardware Availability:** Nov-2018  
**Software Availability:** Aug-2018

### Base Compiler Invocation (Continued)

**Benchmarks using both C and C++:**

```bash
icpc -m64 icc -m64 -std=c11
```

**Benchmarks using Fortran, C, and C++:**

```bash
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 = 31.8

**SPECrate2017_fp_peak = Not Run**

### Test Details

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

### 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

### Flags Sources

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.

Tested with SPEC CPU2017 v1.0.5 on 2018-10-24 18:18:19-0400.  
Originally published on 2018-11-27.