Lenovo Global Technology
ThinkSystem ST50
(3.50 GHz, Intel Xeon E-2146G)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Nov-2018</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
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<table>
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<tr>
<th>SPECrate2017_int_base</th>
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<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
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### Hardware
- **CPU Name:** Intel Xeon E-2146G
- **Max MHz.:** 4500
- **Nominal:** 3500
- **Enabled:** 6 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:** 12 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:** jemalloc memory allocator V5.0.1
Lenovo Global Technology
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Results Table

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<td>25.3</td>
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</tbody>
</table>

SPECrate2017_int_base = 39.6
SPECrate2017_int_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.
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)
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#### 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:  
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 9bcd8f2999c33d61f64985e45859ea9  
running on st50 Wed Nov 14 23:19:39 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-2146G CPU @ 3.50GHz  
  1 "physical id"s (chips)  
  12 "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: 6  
  siblings: 12  
  physical 0: cores 0 1 2 3 4 5

From lscpu:  
- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 12  
- On-line CPU(s) list: 0-11  
- Thread(s) per core: 2  
- Core(s) per socket: 6  
- Socket(s): 1  
- NUMA node(s): 1  
- Vendor ID: GenuineIntel  
- CPU family: 6  
- Model: 158  
- Model name: Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz  
- Stepping: 10  
- CPU MHz: 1405.212  
- CPU max MHz: 4500.0000  
- CPU min MHz: 800.0000  
- BogoMIPS: 7008.00  
- Virtualization: VT-x

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

<table>
<thead>
<tr>
<th>Cache Size</th>
<th>12288 KB</th>
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</table>

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

```
available: 1 nodes (0)
nodes 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
node 0 size: 65371 MB
node 0 free: 61776 MB
node distances:
  node 0: 10
```

From `/proc/meminfo`

```
MemTotal: 65807636 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)"
```

(Continued on next page)
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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 14 16:37
SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   381G   14G  367G   4% /home

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  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
      557.xz_r(base)
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC  548.exchange2_r(base)

(Continued on next page)
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

500.perlbrent_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div

(Continued on next page)
# SPEC CPU2017 Integer Rate Result

## Lenovo Global Technology

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### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `-qopt-mem-layout-trans=3` `-nostandard-realloc-lhs`  
  `-L/usr/local/je5.0.1-64/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.

Tested with SPEC CPU2017 v1.0.5 on 2018-11-14 10:19:38-0500.  
Report generated on 2018-12-11 14:57:40 by CPU2017 PDF formatter v6067.  
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