Lenovo Global Technology

Thinksystem SR250
(3.70 GHz, Intel Xeon E-2176G)

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

SPECrated2017_fp_base = 36.9
SPECrated2017_fp_peak = Not Run

Test Date: Nov-2018
Hardware Availability: Jan-2019
Software Availability: May-2018

Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
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</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
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<td>36.1</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>12</td>
<td>33.9</td>
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<tr>
<td>508.namd_r</td>
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<tr>
<td>510.parest_r</td>
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<td>511.povray_r</td>
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<td>538.imagick_r</td>
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<td>544.nab_r</td>
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SPECrated2017_fp_base (36.9)

Software

<table>
<thead>
<tr>
<th>Software</th>
<th>OS</th>
<th>Compiler</th>
<th>Parallel</th>
<th>Firmware</th>
<th>System State</th>
<th>Base Pointers</th>
<th>Peak Pointers</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64)</td>
<td>C/C++: Version 18.0.2.199 of Intel C/C++</td>
<td>No</td>
<td>Lenovo BIOS Version ISE105G 1.01 released Oct-2018</td>
<td>Run level 3 (multi-user)</td>
<td>64-bit</td>
<td>Not Applicable</td>
<td>None</td>
</tr>
</tbody>
</table>

CPU Name: Intel Xeon E-2176G
Max MHz.: 4700
Nominal: 3700
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
## Lenovo Global Technology

**Thinksystem SR250**
(3.70 GHz, Intel Xeon E-2176G)

### CPU2017 License: 9017

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- **Hardware Availability:** Jan-2019
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### SPEC CPU2017 Floating Point Rate Result

**SPECrate2017_fp_base = 36.9**

**SPECrate2017_fp_peak = Not Run**

### Results Table

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 36.9**

**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.

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.

(Continued on next page)
### SPEC CPU2017 Floating Point Rate Result

**Lenovo Global Technology**  
Thinksystem SR250  
(3.70 GHz, Intel Xeon E-2176G)

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

**Test Date:** Nov-2018  
**Hardware Availability:** Jan-2019  
**Software Availability:** May-2018

### General Notes (Continued)

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
- Choose Operating Mode set to Custom Mode
- CPU P-state Control set to Legacy
- Execute Disable Bit set to Disable
- Per Core P-state set to Disable
- Adjacent Cache Prefetch set to Disable

Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-ys4m Wed Nov 21 13:19:28 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-2176G CPU @ 3.70GHz
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-2176G CPU @ 3.70GHz
Stepping: 10
CPU MHz: 4549.853
```
Lenovo Global Technology

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SPECrater2017_fp_base = 36.9
SPECrater2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Test Date: Nov-2018
Hardware Availability: Jan-2019
Software Availability: May-2018

Platform Notes (Continued)

CPU max MHz: 4700.0000
CPU min MHz: 800.0000
BogoMIPS: 7391.99
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-11

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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpre pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm hwp hwp_notify hwp_act_window hwp-epp intel_pt rsb_ctxsw spec_ctrl stibp ssbd
retople kaiser tpr_shadow vnmf lexpiority ept pfd fsgsbase tsc_adjust bml hle
avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec
xgetbv1

/proc/cpuinfo cache data
  cache size : 12288 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 8 9 10 11
  node 0 size: 64380 MB
  node 0 free: 63079 MB
  node distances:
    node 0
    node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 65925192 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"

(Continued on next page)
Leonardo Global Technology

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Tested by: Leonardo Global Technology

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Software Availability: May-2018

Platform Notes (Continued)

VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux linux-ys4m 4.4.131-94.29-default #1 SMP Mon May 21 14:41:34 UTC 2018 (f49bc78)
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Nov 21 09:25

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 446G 19G 427G 5% /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 -[ISE105G-1.01]- 10/25/2018
Memory:
4x Micron 18ASF2G72AZ-2G6D1 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC 519.ibm_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

(Continued on next page)
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Compiler Version Notes (Continued)
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------------------------------------------------------------------------------
CC  511.povray_r(base)  526.blender_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.

------------------------------------------------------------------------------
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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------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
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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

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

**Lenovo Global Technology**
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| SPECrate2017_fp_base | 36.9 |
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### Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort -m64

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

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
Lenovo Global Technology

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-\texttt{qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs}

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

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

Benchmarks using Fortran, C, and C++:
-\texttt{xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only}
-\texttt{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/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.xml