**SPEC® CPU2017 Integer Rate Result**

Lenovo Global Technology
ThinkSystem SN550  
(1.80 GHz, Intel Xeon Silver 4108)

<table>
<thead>
<tr>
<th>CPU2017 License:  9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:          Lenovo Global Technology</td>
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<tr>
<td>Tested by:             Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date:             Jan-2018</td>
</tr>
<tr>
<td>Hardware Availability: Aug-2017</td>
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<tr>
<td>Software Availability: Sep-2017</td>
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<tr>
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<th>SPECrate2017_int_base</th>
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<td>exchange2_r</td>
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</tr>
<tr>
<td>xz_r</td>
<td>32</td>
<td>49.6</td>
<td>118</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4108  
- **Max MHz.:** 3000  
- **Nominal:** 1800  
- **Enabled:** 16 cores, 2 chips, 2 threads/core  
- **Orderable:** 1,2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 11 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 800 GB SAS SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64)  
- **Kernel:** 4.4.21-69-default  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran  
- **Compiler for Linux:**  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version IVE1111 1.01 released Aug-2017  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1
Lenovo Global Technology
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SPECrate2017_int_base = 66.1
SPECrate2017_int_peak = 70.0

Results Table

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</tbody>
</table>

Submit Notes
The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
jemalloc: configured and built at default for
32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;
jemalloc: sources available from jemalloc.net or

(Continued on next page)
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SPECrate2017_int_peak = 70.0

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

Test Date: Jan-2018
Hardware Availability: Aug-2017
Software Availability: Sep-2017

General Notes (Continued)
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.
This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.
The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html
This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes
BIOS configuration:
Choose Operating Mode set to Maximum Performance
SNC set to Enable
Hardware Prefetcher set to Disable
MONITORM/WAIT set to Enable
Execute Disable Bit set to Disable
Intel Virtualization Technology set to Disable
DCA set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce091c0f
running on SN550 Mon Jan  8 15:39:18 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) Silver 4108 CPU @ 1.80GHz
   2 "physical id"'s (chips)
   32 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

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Platform Notes (Continued)

From lsctpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4108 CPU @ 1.80GHz
Stepping: 4
CPU MHz: 1795.778
BogoMIPS: 3591.55
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pni pclmulqdq dvtup intel_pt
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavevc xgetbv1 cqm_11c cqm_occup_llc

/proc/cpuinfo cache data
  cache size : 11264 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
  node 0 size: 38637 MB
  node 0 free: 385232 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 387040 MB
  node 1 free: 385715 MB

(Continued on next page)
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Platform Notes (Continued)

node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 792246052 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # 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"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
    Linux SN550 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64
    x86_64 x86_64 GNU/Linux

  run-level 3 Jan 8 13:25

  SPEC is set to: /home/cpu2017.1.0.2.ic18.0
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda4 xfs 687G 136G 552G 20% /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 -[IVE111I-1.01]- 08/11/2017
  Memory:
    24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
**Lenovo Global Technology**  
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**SPECrust2017_int_base = 66.1**  
**SPECrust2017_int_peak = 70.0**

---

**Compiler Version Notes**

```plaintext
==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)  
    525.x264_r(base, peak) 557.xz_r(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CC  500.perlbench_r(peak) 502.gcc_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
    541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)  
    541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
FC  548.exchange2_r(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
```

---

**Base Compiler Invocation**

**C benchmarks:**

- `icc`

**C++ benchmarks:**

- `icpc`

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### Base Compiler Invocation (Continued)

**Fortran benchmarks:**

```
ifort
```

### Base Portability Flags

- **500.perlbench_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
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

### Base Other Flags

**C benchmarks:**

```
-m64 -std=c11
```

**C++ benchmarks:**

```
-m64
```
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Copyright 2017-2018 Standard Performance Evaluation Corporation

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Base Other Flags (Continued)

Fortran benchmarks:
- m64

Peak Compiler Invocation

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

502.gcc_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

(Continued on next page)
## Peak Optimization Flags (Continued)

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<td><code>-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div</code></td>
</tr>
<tr>
<td></td>
<td><code>-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib</code></td>
</tr>
<tr>
<td></td>
<td><code>-ljemalloc</code></td>
</tr>
<tr>
<td>525.x264</td>
<td><code>-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div</code></td>
</tr>
<tr>
<td></td>
<td><code>-qopt-mem-layout-trans=3 -fno-alias</code></td>
</tr>
<tr>
<td></td>
<td><code>-L/usr/local/je5.0.1-64/lib -ljemalloc</code></td>
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<tr>
<td>557.xz</td>
<td>Same as 505.mcf</td>
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<td>C++ benchmarks:</td>
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<tr>
<td>520.omnetpp</td>
<td><code>-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo</code></td>
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<td><code>-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3</code></td>
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<td><code>-L/usr/local/je5.0.1-64/lib -ljemalloc</code></td>
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<td>523.xalancbmk</td>
<td><code>-L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32</code></td>
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<td><code>-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo</code></td>
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<td><code>-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3</code></td>
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<td><code>-L/usr/local/je5.0.1-32/lib -ljemalloc</code></td>
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<td>531.deepsjeng</td>
<td>Same as 520.omnetpp</td>
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<tr>
<td>541.leela</td>
<td>Same as 520.omnetpp</td>
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<td>Fortran benchmarks:</td>
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<tr>
<td></td>
<td><code>-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div</code></td>
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<tr>
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<td><code>-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte</code></td>
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<tr>
<td></td>
<td><code>-L/usr/local/je5.0.1-64/lib -ljemalloc</code></td>
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</tbody>
</table>

## Peak Other Flags

C benchmarks (except as noted below):

- `-m64 -std=c11`

502.gcc: `-m32 -std=c11`

C++ benchmarks (except as noted below):

- `-m64`

523.xalancbmk: `-m32`
## Lenovo Global Technology

ThinkSystem SN550  
(1.80 GHz, Intel Xeon Silver 4108)

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<th>SPECrate2017_int_base</th>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

**Test Date:** Jan-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

### Peak Other Flags (Continued)

Fortran benchmarks:
- `-m64`

The flags files that were used to format this result can be browsed at:
- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html)

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml)

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