# SPEC® CPU2017 Integer Rate Result

**Lenovo Global Technology**  
ThinkSystem SR570  
(2.20 GHz, Intel Xeon Silver 4114)

<table>
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<th>Software Availability: Feb-2018</th>
</tr>
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<tr>
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<td>Test Date: Jun-2018</td>
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<tr>
<td>40</td>
<td>63.5</td>
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</table>

## Hardware

**CPU Name:** Intel Xeon Silver 4114  
**Max MHz.:** 3000  
**Nominal:** 2200  
**Enabled:** 20 cores, 2 chips, 2 threads/core  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 13.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
**Storage:** 1 x 800 GB SAS SSD  
**Other:** None

## Software

**OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64)  
**Kernel:** 4.4.114-94.11-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**  
**Firmware:** Lenovo BIOS Version TEE119R 1.22 released Feb-2018  
**File System:** btrfs  
**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
## SPEC CPU2017 Integer Rate Result

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### Results Table

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**SPECrate2017_int_base** = 92.4  
**SPECrate2017_int_peak** = 97.1

### 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/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"  
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;  

(Continued on next page)
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ThinkSystem SR570
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jun-2018
Hardware Availability: Nov-2017
Software Availability: Feb-2018

General Notes (Continued)

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
DCU Streamer Prefetcher set to Disable
MONITOR/MWAIT set to Enable
Execute Disable Bit set to Disable
DCA set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bdc091c0f
running on linux-jnol Thu Jun 7 09:44:09 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 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
  siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 40
  On-line CPU(s) list: 0-39
  Thread(s) per core: 2
  Core(s) per socket: 10
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6

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**Platform Notes (Continued)**

Model: 85  
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz  
Stepping: 4  
CPU MHz: 2194.850  
BogoMIPS: 4389.70  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 14080K  
NUMA node0 CPU(s): 0-9,20-29  
NUMA node1 CPU(s): 10-19,30-39  
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 aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand vpid intel_pt rdseed lahf_lm abm 3dnowprefetch ida arat epbi npt每次 pln pts dtherm intel_pt rsb_cte cxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase ts_cint tm ept vpid rsb��t ce xsaveopt xsaveopt xsaveopt xsaves xgetbv1 cqm_1lc cqm_occup_1lc pkum ospxe 

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 8 9 20 21 22 23 24 25 26 27 28 29  
node 0 size: 96058 MB  
node 0 free: 95614 MB  
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39  
node 1 size: 96748 MB  
node 1 free: 96176 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10  

From /proc/meminfo  
MemTotal: 197433932 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

From /etc/*release*/ /etc/*version*/  
SuSE-release:
**Lenovo Global Technology**

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**Platform Notes (Continued)**

```bash
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"  
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-jnol 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)  
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 7 09:43

SPEC is set to: /home/cpu2017.1.0.2.ic18.0  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda2 btrfs 744G 22G 723G 3% /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 --[TEE119R-1.22]-- 02/06/2018
Memory:  
4x NO DIMM NO DIMM  
12x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400
```

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
==============================================================================  
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.
```

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### Compiler Version Notes (Continued)

**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

**Fortran benchmarks:**
ifort

### Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

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### Base Portability Flags (Continued)

- 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:**

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**C++ benchmarks:**

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Fortran benchmarks:**

```
-Wl,-z,muldefs -xCORE-AVX512 -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
```

**Fortran benchmarks:**

```
-m64
```

### Peak Compiler Invocation

**C benchmarks:**

```
icc
```
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Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

-DSPEC_LP64
-DSPEC_LINUX_X64
-D_FILE_OFFSET_BITS=64

Peak Optimization Flags

C benchmarks:

-DSPEC_LP64
-DSPEC_LINUX

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**CPU2017 License:** 9017  
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#### Peak Optimization Flags (Continued)

- **557.xz_r:** Same as 505.mcf_r
  - **C++ benchmarks:**
   - **520.omnetpp_r:** `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
   - `xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
   - `-L/usr/local/je5.0.1-64/lib -ljemalloc
   - **523.xalancbmk_r:** `-L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32  
   - `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
   - `xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
   - `-L/usr/local/je5.0.1-32/lib -ljemalloc
   - **531.deepsjeng_r:** Same as 520.omnetpp_r
   - **541.leela_r:** Same as 520.omnetpp_r
  - **Fortran benchmarks:**
   - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
   - `-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
   - `-L/usr/local/je5.0.1-64/lib -ljemalloc

#### Peak Other Flags

- **C benchmarks (except as noted below):**
  - `-m64 -std=c11
  - **502.gcc_r:** `-m32 -std=c11
- **C++ benchmarks (except as noted below):**
  - `-m64
  - **523.xalancbmk_r:** `-m32
- **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)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.html)
## Lenovo Global Technology

**ThinkSystem SR570**  
*(2.20 GHz, Intel Xeon Silver 4114)*

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**Tested by:** Lenovo Global Technology  
**Test Date:** Jun-2018  
**Hardware Availability:** Nov-2017  
**Software Availability:** Feb-2018

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)
- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.xml)

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Tested with SPEC CPU2017 v1.0.2 on 2018-06-06 21:44:09-0400.  
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