# Lenovo Global Technology

## ThinkSystem SR630

(2.60 GHz, Intel Xeon Silver 4112)

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<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>43.8</th>
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<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>46.5</td>
</tr>
</tbody>
</table>

### CPU2017 License:

- 9017

### Test Sponsor:

- Lenovo Global Technology

### Tested by:

- Lenovo Global Technology

### Test Date:

- Dec-2017

### Hardware

<table>
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<td>557.xz_r</td>
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### 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 IVE109Q 1.00 released Jun-2017

- **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;
  - 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 releases

### CPU Name:

- Intel Xeon Silver 4112

### Max MHz.:

- 3000

### Nominal:

- 2600

### Enabled:

- 8 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:

- 8.25 MB I+D on chip per chip

### Other:

- None

### Memory:

- 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)

### Storage:

- 1 x 800 GB SAS SSD

### Other:

- None
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Results Table

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SPECrate2017_int_base = 43.8
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/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>

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)

(Continued on next page)
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General Notes (Continued)

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
MONITORMWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC Deadline Alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on Cable-SPECcpu2017-SUSE12SP2 Fri Dec 22 17:43:40 2017

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 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  16 "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 : 4
  siblings : 8
  physical 0: cores 1 2 4 5
  physical 1: cores 1 2 4 5

From lscpu:
  Architecture: x86_64
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Dec-2017
Tested by: Lenovo Global Technology
Hardware Availability: Aug-2017
Software Availability: Sep-2017

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
Stepping: 4
CPU MHz: 2593.901
BogoMIPS: 5187.80
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0-3,8-11
NUMA node1 CPU(s): 4-7,12-15
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 nni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpre pdcm pcd cda sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pni pts dtherm intel_pt
tpr_shadow vmmflexpm sortex vmptrlist smep bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsave xgetbv1 cqm_1ll cqm_occup_llc

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 8 9 10 11
node 0 size: 193110 MB
node 0 free: 192367 MB
node 1 cpus: 4 5 6 7 12 13 14 15
node 1 size: 193504 MB
node 1 free: 192809 MB
node distances:
node 0 1
0: 10 21

(Continued on next page)
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### SPECs

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### Platform Notes (Continued)

1: 21 10

From /proc/meminfo

- MemTotal: 395893920 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

- SUSE-release:
  - VERSION = 12
  - PATCHLEVEL = 2
  - 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 Cable-SPECcpu2017-SUSE12SP2 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 Dec 22 17:41**

**SPEC is set to**: /home/cpu2017.1.0.2.ic18.0

**Filesystem**  | **Type**  | **Size**  | **Used**  | **Avail**  | **Use%**  | **Mounted on**
--- | --- | --- | --- | --- | --- | ---
/dev/sda2 | btrfs | 744G | 176G | 567G | 24% | /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 -[IVE109Q-1.00]- 06/28/2017
- Memory:
  - 24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
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(2.60 GHz, Intel Xeon Silver 4112)  

**SPECrate2017 int_base** = 43.8

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**Compiler Version Notes**

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**Base Compiler Invocation**

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)
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:
-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:

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

(Continued on next page)
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Software Availability: Sep-2017

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
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

Peak Optimization Flags

C benchmarks:
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

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### SPECrate2017_int_peak = 46.5

### SPECrate2017_int_base = 43.8

## Peak Optimization Flags (Continued)

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

525.x264_r:  
-Wl, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -fno-alias  
-L/usr/local/je5.0.1-64/lib -ljemalloc

577.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/je5.0.1-64/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

(Continued on next page)
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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

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/Lenovo-Platform-SPECCpu2017-Flags-V1.2-SKL-A.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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