## SPEC CPU®2017 Integer Rate Result

### Lenovo Global Technology

**ThinkSystem SR630**

(3.20 GHz, Intel Xeon Silver 4215R)

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

**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

### SPECrate®2017_int_base = 120

**SPECrate®2017_int_peak = Not Run**

### Hardware

<table>
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<th>Copies</th>
<th>SPECrate®2017_int_base (120)</th>
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<tr>
<td>500.perlbench_r</td>
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<td>82.3</td>
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<tr>
<td>502.gcc_r</td>
<td>32</td>
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<td>505.mcf_r</td>
<td>32</td>
<td>72.9</td>
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<tr>
<td>520.omnetpp_r</td>
<td>32</td>
<td>166</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>32</td>
<td>213</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32</td>
<td>239</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>236</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>32</td>
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<tr>
<td>548.exchange2_r</td>
<td>32</td>
<td>98.4</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>68.4</td>
</tr>
</tbody>
</table>

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
  - Kernel 4.12.14-195-default
- **Compiler:**  
  - C/C++: Version 19.1.1.217 of Intel C/C++  
  - Compiler for Linux;
  - Fortran: Version 19.1.1.217 of Intel Fortran
- **Parallel:** No
- **Firmware:** Lenovo BIOS Version IVE155L 2.61 released May-2020
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage

### CPU Information

- **Name:** Intel Xeon Silver 4215R  
  - **Max MHz:** 4000  
  - **Nominal:** 3200
- **Enabled:** 16 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:** 11 MB I+D on chip per chip
- **Other:** None

### Memory Information

- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 800 GB SATA SSD
- **Other:** None
Lenovo Global Technology
ThinkSystem SR630
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrates®2017_int_base = 120
SPECrates®2017_int_peak = Not Run

Results Table

<table>
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<tr>
<th>Benchmark</th>
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<td>548.exchange2_r</td>
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<tr>
<td>557.xz_r</td>
<td>32</td>
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<td>505</td>
<td>68.4</td>
<td>505</td>
<td>68.4</td>
</tr>
</tbody>
</table>

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
  "/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/je5.0.1-32"
MALLOCONF = "retain:true"
**Lenovo Global Technology**

ThinkSystem SR630  
(3.20 GHz, Intel Xeon Silver 4215R)  

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Redhat Enterprise Linux 8.0  
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>
```
NA: 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 and then set it to Custom Mode  
MONITOR/MWAIT set to Enable  
SNC set to Enable  
DCU Streamer Prefetcher set to Disable  
LLC dead line alloc set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7ed1be6e46a485a0011  
running on linux-thtl Mon Jun 29 06:17:57 2020

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 4215R CPU @ 3.20GHz  
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
```

From lscpu:  
```
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit
```
Lenovo Global Technology

ThinkSystem SR630
(3.20 GHz, Intel Xeon Silver 4215R)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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</table>

**SPECrate®2017_int_base = 120**

**SPECrate®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2020</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
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</table>

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Byte Order:</th>
<th>Little Endian</th>
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<tbody>
<tr>
<td>Address sizes:</td>
<td>46 bits physical, 48 bits virtual</td>
</tr>
<tr>
<td>CPU(s):</td>
<td>32</td>
</tr>
<tr>
<td>On-line CPU(s) list:</td>
<td>0-31</td>
</tr>
<tr>
<td>Thread(s) per core:</td>
<td>2</td>
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<tr>
<td>Core(s) per socket:</td>
<td>8</td>
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<tr>
<td>Socket(s):</td>
<td>2</td>
</tr>
<tr>
<td>NUMA node(s):</td>
<td>2</td>
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<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>CPU family:</td>
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<tr>
<td>Model:</td>
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<tr>
<td>Model name:</td>
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<td>32K</td>
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<tr>
<td>L2 cache:</td>
<td>1024K</td>
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<td>L3 cache:</td>
<td>11264K</td>
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<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-7,16-23</td>
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<tr>
<td>NUMA node1 CPU(s):</td>
<td>8-15,24-31</td>
</tr>
<tr>
<td>Flags:</td>
<td>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 cpuid aperfmperf 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 lahf_lm ablp abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pinn ssbd mba ibpb stibp ibrs ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi hle avx2 smep bmi2 erms invpcid rtm cmq mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavec cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities</td>
</tr>
</tbody>
</table>

```
/from 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: 386659 MB
node 0 free: 386090 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(3.20 GHz, Intel Xeon Silver 4215R)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECrates®2017_int_base = 120
SPECrates®2017_int_peak = Not Run

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

Platform Notes (Continued)

node 1 size: 387068 MB
node 1 free: 386613 MB
node distances:
  node  0  1
  0:  10  21
  1:  21  10

From /proc/meminfo
MemTotal: 792297420 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 15 SP1

From /etc/*release* /etc/*version*
  os-release:
  NAME="SLES"
  VERSION="15-SP1"
  VERSION_ID="15.1"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-thtl 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 29 06:06

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

Filesystem   Type       Size  Used Avail Use% Mounted on
/dev/sda2     xfs     744G     44G   701G    6% /

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SR630  
(3.20 GHz, Intel Xeon Silver 4215R)  

**SPECratre®2017_int_base = 120**  
**SPECratre®2017_int_peak = Not Run**

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<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
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<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

From /sys/devices/virtual/dmi/id  
BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020  
Vendor: Lenovo  
Product: ThinkSystem SR630 -[7X01RCZ000]-  
Product Family: ThinkSystem  
Serial: 1234567890

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.

Memory:  
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

This system support 12 DIMMs per processor, total 24 DIMMs.  
24 DIMM slots installed with 32 GB DIMM for this run, and running at 2400 due to CPU limitation.

**Compiler Version Notes**

C  
500.perlbbench_r(base) 502.gcc_r(base) 505.mcf_r(base)  
525.x264_r(base) 557.xz_r(base)

---

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

C++  
520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
541.leela_r(base)

---

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

Fortran  
548.exchange2_r(base)

---

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 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
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:
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ffast-math -ftol -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

C++ benchmarks:
- -m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -ftol -mfpmath=sse
- -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- -lqkmalloc

Fortran benchmarks:
- -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
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ThinkSystem SR630  
(3.20 GHz, Intel Xeon Silver 4215R)

SPECrate®2017_int_base = 120
SPECrate®2017_int_peak = Not Run

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

Test Date: Jun-2020
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Software Availability: Apr-2020

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- nostandard-realloc-lhs -align array32byte -auto
- mbranches-within-32B-boundaries
- L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- lqkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-28 18:17:56-0400.
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