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

SPECspeed®2017_int_base = 10.3
SPECspeed®2017_int_peak = Not Run

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed 2017_int_base</th>
<th>SPECspeed 2017_int_peak</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>32</td>
<td>6.44</td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>32</td>
<td>9.12</td>
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<tr>
<td>605.mcf_s</td>
<td>32</td>
<td>17.7</td>
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</tr>
<tr>
<td>620.omnetpp_s</td>
<td>32</td>
<td>6.07</td>
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</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>32</td>
<td>13.6</td>
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<tr>
<td>625.x264_s</td>
<td>32</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
<td>32</td>
<td>4.90</td>
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</tr>
<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>16.9</td>
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</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
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</tr>
</tbody>
</table>

--- SPECspeed®2017_int_base (10.3) ---

Hardware

CPU 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: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
Storage: 1 x 800 GB SATA SSD
Other: None

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
Compiler for Linux
Parallel: Yes
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
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost of additional power usage
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SPECSpeed®2017_int_base = 10.3
SPECSpeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
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<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
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<tr>
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<td>430</td>
<td>9.27</td>
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<td>103</td>
<td>13.7</td>
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<td>13.6</td>
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<td>625.x264_s</td>
<td>32</td>
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<td>15.4</td>
<td>114</td>
<td>15.4</td>
<td>115</td>
<td>15.4</td>
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<td></td>
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<tr>
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<td>5.85</td>
<td>246</td>
<td>5.84</td>
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<td></td>
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<td>641.leela_s</td>
<td>32</td>
<td>351</td>
<td>4.86</td>
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<td>4.90</td>
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<td>4.90</td>
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<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>174</td>
<td>16.9</td>
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<td>174</td>
<td>16.9</td>
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<tr>
<td>657.xz_s</td>
<td>32</td>
<td>301</td>
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<td>20.5</td>
<td>302</td>
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</table>

SPECSpeed®2017_int_base = 10.3
SPECSpeed®2017_int_peak = Not Run

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

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

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j e5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

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:

(Continued on next page)
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General Notes (Continued)

sync; echo 3> /proc/sys/vm/drop_caches
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-thtl Mon Jun 29 22:23:21 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
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2

(Continued on next page)
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**SPECspeed®2017_int_base = 10.3**

**SPECspeed®2017_int_peak = Not Run**

**Platform Notes (Continued)**

NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4215R CPU @ 3.20GHz
Stepping: 7
CPU MHz: 3200.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 6400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7, 16-23
NUMA nodel CPU(s): 8-15, 24-31

Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpichse sep mtrr pge mca cmov pat pse36 clflush dts acpichse sep mtrr pge mca cmov

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

Available:

- node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
- node 0 size: 386689 MB
- node 0 free: 386294 MB
- node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
- node 1 size: 387038 MB
- node 1 free: 386452 MB
- node distances:
  - node 0: 10 21
  - node 1: 21 10

(Continued on next page)
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SPECspeed®2017_int_base = 10.3
SPECspeed®2017_int_peak = Not Run

Platform Notes (Continued)

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 21:48

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% /

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

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## Lenovo Global Technology

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### Platform Notes (Continued)

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 benchmarks ---
<table>
<thead>
<tr>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)</td>
</tr>
<tr>
<td>625.x264_s(base) 657.xz_s(base)</td>
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</table>

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++ benchmarks ---
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)</td>
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</table>

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 benchmarks ---
<table>
<thead>
<tr>
<th>Fortran</th>
</tr>
</thead>
<tbody>
<tr>
<td>648.exchange2_s(base)</td>
</tr>
</tbody>
</table>

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
```
**LENovo Global Technology**

**ThinkSystem SR630**  
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<table>
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### Base Compiler Invocation (Continued)

**C++ benchmarks:**  
icpc

**Fortran benchmarks:**  
ifort

### Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**  
-m64 -qnnextgen -std=c11  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs  
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops  
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC/OpenMP  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

**C++ benchmarks:**  
-m64 -qnnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -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 -xCORE-AVX512  
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte  
-mbranches-within-32B-boundaries
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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/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.

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