Lenovo Global Technology
ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218)

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

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

SPECrate2017_int_base = 183
SPECrate2017_int_peak = Not Run

Hardware
CPU Name: Intel Xeon Gold 5218
Max MHz.: 3900
Nominal: 2300
Enabled: 32 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: 22 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
Storage: 1 x 800 GB SATA SSD
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)
Kernel 3.10.0-957.el7.x86_64
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: No
Firmware: Lenovo BIOS Version IVE135P 2.10 released Feb-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**

ThinkSystem SR630  
(2.30 GHz, Intel Xeon Gold 5218)

**SPECrate2017_int_base = 183**  
**SPECrate2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>717</td>
<td>142</td>
<td>718</td>
<td>142</td>
<td>718</td>
<td>142</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>580</td>
<td>156</td>
<td>579</td>
<td>156</td>
<td>576</td>
<td>157</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>410</td>
<td>252</td>
<td>411</td>
<td>252</td>
<td>411</td>
<td>252</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>673</td>
<td>125</td>
<td>673</td>
<td>125</td>
<td>673</td>
<td>125</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>64</td>
<td>311</td>
<td>217</td>
<td>312</td>
<td>217</td>
<td>312</td>
<td>216</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
<td>335</td>
<td>334</td>
<td>333</td>
<td>337</td>
<td>333</td>
<td>337</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>483</td>
<td>152</td>
<td>483</td>
<td>152</td>
<td>483</td>
<td>152</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>64</td>
<td>759</td>
<td>140</td>
<td>752</td>
<td>141</td>
<td>763</td>
<td>139</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>526</td>
<td>319</td>
<td>527</td>
<td>318</td>
<td>526</td>
<td>319</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>561</td>
<td>123</td>
<td>561</td>
<td>123</td>
<td>561</td>
<td>123</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>717</td>
<td>142</td>
<td>718</td>
<td>142</td>
<td>718</td>
<td>142</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>580</td>
<td>156</td>
<td>579</td>
<td>156</td>
<td>576</td>
<td>157</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>410</td>
<td>252</td>
<td>411</td>
<td>252</td>
<td>411</td>
<td>252</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>673</td>
<td>125</td>
<td>673</td>
<td>125</td>
<td>673</td>
<td>125</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>64</td>
<td>311</td>
<td>217</td>
<td>312</td>
<td>217</td>
<td>312</td>
<td>216</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>64</td>
<td>335</td>
<td>334</td>
<td>333</td>
<td>337</td>
<td>333</td>
<td>337</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>483</td>
<td>152</td>
<td>483</td>
<td>152</td>
<td>483</td>
<td>152</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>64</td>
<td>759</td>
<td>140</td>
<td>752</td>
<td>141</td>
<td>763</td>
<td>139</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>526</td>
<td>319</td>
<td>527</td>
<td>318</td>
<td>526</td>
<td>319</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>561</td>
<td>123</td>
<td>561</td>
<td>123</td>
<td>561</td>
<td>123</td>
</tr>
</tbody>
</table>

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/cpu2017-1.0.5-ic19.0u1/lib/intel164"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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>
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.

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>183</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

**Test Date:** Apr-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Nov-2018

---

**General Notes (Continued)**

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) is mitigated in the system as tested and documented.

---

**Platform Notes**

**BIOS configuration:**
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-states set to Legacy
SNC set to Enable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Sun Apr 14 06:18:01 2019

**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) Gold 5218 CPU @ 2.30GHz
  2  "physical id"s (chips)
  64 "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 : 16
siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
```
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**

ThinkSystem SR630  
(2.30 GHz, Intel Xeon Gold 5218)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base =** 183  
**SPECrate2017_int_peak =** Not Run

---

**Platform Notes (Continued)**

```plaintext
Model:                   85
Model name:              Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
Stepping:                6
CPU MHz:                 2300.000
BogoMIPS:                4600.00
Virtualization:         VT-x
L1d cache:               32K
L1i cache:               32K
L2 cache:                1024K
L3 cache:                22528K
NUMA node0 CPU(s):       0-3,8-11,32-35,40-43
NUMA node1 CPU(s):       4-7,12-15,36-39,44-47
NUMA node2 CPU(s):       16-19,24-27,48-51,56-59
NUMA node3 CPU(s):       20-23,28-31,52-55,60-63
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 lahf_lm abm 3dnowprefetch cpb cat_13 cdp_13 intel_pt ssbd mba
                        ibrs ibrd stibp ibrs_enabled tpr_shadow vnni flexpriority ept vpid fsgsbase
                        tsc_adjust bmi1 hle avx2 smep bmi2  erms invpcid rtm cqm mpx rdts_a avx512f avx512dq
                        rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1
                        cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke
                        avx512_vnnl spec_ctrl intel_stibp flush_lld arch_capabilities

/proc/cpuinfo cache data
cache size : 22528 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
node 0 size: 97977 MB
node 0 free: 95494 MB
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
node 1 size: 98304 MB
node 1 free: 95978 MB
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
node 2 size: 98304 MB
node 2 free: 95403 MB
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
node 3 size: 98304 MB
node 3 free: 95984 MB
node distances:
node 0 1 2 3
  0: 10 11 21 21
```

(Continued on next page)
### Lenovo Global Technology

ThinkSystem SR630  
(2.30 GHz, Intel Xeon Gold 5218)  

---

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>183</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>SPEC CPU2017 Integer Rate Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright 2017-2019 Standard Performance Evaluation Corporation</td>
</tr>
</tbody>
</table>

---

**Tested by:** Lenovo Global Technology  
**Test Sponsor:** Lenovo Global Technology  
**CPU2017 License:** 9017  
**Test Date:** Apr-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018  

---

**Platform Notes (Continued)**

```
1: 11 10 21 21  
2: 21 21 10 11  
3: 21 21 11 10
```

- From `/proc/meminfo`  
  - MemTotal: 395878596 kB  
  - HugePages_Total: 0  
  - Hugepagesize: 2048 kB

- From `/etc/*release*`  
  - os-release:  
    - NAME="Red Hat Enterprise Linux Server"  
    - VERSION="7.6 (Maipo)"  
    - ID=rhel  
    - ID_LIKE="fedora"  
    - VARIANT="Server"  
    - VARIANT_ID="server"  
    - VERSION_ID="7.6"  
    - PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"

- redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)  
- system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

- From `/etc/*version*`  
- uname -a:  
  - Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux

- Kernel self-reported vulnerability status:

  - CVE-2017-5754 (Meltdown): Not affected  
  - CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization  
  - CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

- run-level 3 Apr 14 06:16

- SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1  
  - Filesystem Type Size Used Avail Use% Mounted on  
  - /dev/sdb2 xfs 689G 21G 668G 4% /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 -[IVE135P-2.10]- 02/13/2019
  - Memory:  
    - 24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218)

**SPEC CPU2017 Integer Rate Result**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>183</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

(End of data from sysinfo program)

**Compiler Version Notes**

```
==============================================================================
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
   557.xz_r(base)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
   541.leela_r(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC 548.exchange2_r(base)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
   64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

**Base Compiler Invocation**

C benchmarks:  
```
icc -m64 -std=c11```

C++ benchmarks:  
```
icpc -m64```

Fortran benchmarks:  
```
ifort -m64```
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**  
ThinkSystem SR630  
(2.30 GHz, Intel Xeon Gold 5218)

**SPECrate2017_int_base** = 183  
**SPECrate2017_int_peak** = Not Run

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

**Base Portability Flags**

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64  
502.gcc_r: -DSPEC_LP64  
503.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.kee_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=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

C++ benchmarks:  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

Fortran benchmarks:  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-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-A.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-A.xml
**Lenovo Global Technology**

ThinkSystem SR630 (2.30 GHz, Intel Xeon Gold 5218)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>183</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th><strong>Test Date:</strong></th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware Availability:</strong></td>
<td>Apr-2019</td>
</tr>
<tr>
<td><strong>Software Availability:</strong></td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

---

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2019-04-13 18:18:01-0400.  