Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

SPEC CPU®2017 Integer Rate Result

SPECCrate®2017_int_base = 269
SPECCrate®2017_int_peak = Not Run

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

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

CPU Name: Intel Xeon Gold 6230R
Max MHz: 4000
Nominal: 2100
Enabled: 52 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: 35.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)
Storage: 1 x 960 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 19.0.5.281 of Intel
C/C++ Compiler for Linux;
Fortran: Version 19.0.5.281 of Intel Fortran
Compiler for Linux
Parallel: No
Firmware: Lenovo BIOS Version TEE152L 2.51 released Feb-2020
tested as TEE151L 2.51 Jan-2020
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage

<table>
<thead>
<tr>
<th>Program</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>104</td>
<td>222</td>
<td>Not Run</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>104</td>
<td>323</td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>104</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>104</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>104</td>
<td>568</td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>104</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>104</td>
<td>218</td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>104</td>
<td>519</td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>104</td>
<td>171</td>
<td></td>
</tr>
</tbody>
</table>

---

500.perlbench_r 104
502.gcc_r 104
505.mcf_r 104
520.omnetpp_r 104
523.xalancbmk_r 104
525.x264_r 104
531.deepsjeng_r 104
541.leela_r 104
548.exchange2_r 104
557.xz_r 104
Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

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

SPECrate®2017_int_base = 269
SPECrate®2017_int_peak = Not Run

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Copies</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>104</td>
<td>840</td>
<td>197</td>
<td>842</td>
<td>197</td>
<td>843</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>104</td>
<td>662</td>
<td>222</td>
<td>664</td>
<td>222</td>
<td>664</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>104</td>
<td><strong>521</strong></td>
<td><strong>323</strong></td>
<td>521</td>
<td>323</td>
<td>521</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>104</td>
<td><strong>747</strong></td>
<td><strong>183</strong></td>
<td>746</td>
<td>183</td>
<td>747</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>104</td>
<td>361</td>
<td>304</td>
<td>361</td>
<td>304</td>
<td>362</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>104</td>
<td><strong>321</strong></td>
<td><strong>568</strong></td>
<td>319</td>
<td>570</td>
<td>321</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>104</td>
<td>517</td>
<td>230</td>
<td>518</td>
<td>230</td>
<td><strong>517</strong></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>104</td>
<td>788</td>
<td>219</td>
<td><strong>790</strong></td>
<td><strong>218</strong></td>
<td>792</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>104</td>
<td>526</td>
<td>518</td>
<td>525</td>
<td>519</td>
<td><strong>525</strong></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>104</td>
<td>657</td>
<td>171</td>
<td><strong>658</strong></td>
<td><strong>171</strong></td>
<td>658</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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.0-ic19.0u5/lib/intel64:/home/cpu2017-1.1.0-ic19.0u5/lib/ia32:/home/cpu2017-1.1.0-ic19.0u5/je5.0.1-32"

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.:
**General Notes (Continued)**

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.

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 and then set it to Custom Mode
MONITOR/MWAIT set to Enable
SNC set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edblie6e46a485a0011
running on linux-maist Mon Mar 23 15:13:01 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) Gold 6230R CPU @ 2.10GHz
  2 "physical id"s (chips)
    104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

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): 104

(Continued on next page)
Lenovo Global Technology (2.10 GHz, Intel Xeon Gold 6230R)

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

SPECrate®2017_int_base = 269
SPECrate®2017_int_peak = Not Run

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7-9,13-15,20-22,52-55,59-61,65-67,72-74
NUMA node1 CPU(s): 4-6,10-12,16-19,23-25,56-58,62-64,68-71,75-77
NUMA node2 CPU(s): 26-29,33-35,39-41,46-48,78-81,85-87,91-93,98-100
NUMA node3 CPU(s): 30-32,36-38,42-45,49-51,82-84,88-90,94-97,101-103
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

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 7 8 9 13 14 15 20 21 22 52 53 54 55 59 60 61 65 66 67 72 73 74
node 0 size: 47701 MB
node 0 free: 46830 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 19 23 24 25 56 57 58 62 63 64 68 69 70 71 75 76 77
node 1 size: 48379 MB

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

**ThinkSystem SR570**  
(2.10 GHz, Intel Xeon Gold 6230R)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Mar-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Sep-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>node 1 free: 48147 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 2 cpus: 26 27 28 29 33 34 35 39 40 41 46 47 48 78 79 80 81 85 86 87 91 92 93 98 99 100</td>
</tr>
<tr>
<td>node 2 size: 48379 MB</td>
</tr>
<tr>
<td>node 2 free: 48132 MB</td>
</tr>
<tr>
<td>node 3 cpus: 30 31 32 36 37 38 42 43 44 45 49 50 51 82 83 84 88 89 90 94 95 96 97 101 102 103</td>
</tr>
<tr>
<td>node 3 size: 48348 MB</td>
</tr>
<tr>
<td>node 3 free: 48141 MB</td>
</tr>
<tr>
<td>node distances: node 0 1 2 3</td>
</tr>
<tr>
<td>0: 10 11 21 21</td>
</tr>
<tr>
<td>1:  11 10 21 21</td>
</tr>
<tr>
<td>2: 21 21 10 11</td>
</tr>
<tr>
<td>3: 21 21 11 10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- MemTotal: 197435460 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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:

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

| SPECrate\textsuperscript{®}2017\textsubscript{int}_base = | 269 |
| SPECrate\textsuperscript{®}2017\textsubscript{int}_peak = | Not Run |

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

Platform Notes (Continued)

```
run-level 3 Mar 23 15:11
SPECSPEC is set to: /home/cpu2017-1.1.0-ic19.0u5
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   892G   56G  837G   7% /
From /sys/devices/virtual/dmi/id
BIOS:    Lenovo -[TEE151L-2.51]- 01/13/2020
Vendor:  Lenovo
Product: ThinkSystem SR570 -[7Y02RCZ000]-
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:
4x NO DIMM NO DIMM
12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933
(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C       | 500.perlbench_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 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 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 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```
Fortran | 548.exchange2_r(base)  
```

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 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 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto
-mfpmath=sse -funroll-loops -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto -mfpmath=sse
-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(2.10 GHz, Intel Xeon Gold 6230R)

SPECrate®2017_int_base = 269
SPECrate®2017_int_peak = Not Run

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

Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Base Optimization Flags (Continued)

C++ benchmarks (continued):
- /usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
- lqkmalloc

Fortran benchmarks:
- m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
- qopt-mem-layout-trans=4 -nostandard-realloc-lhs
- /usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/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-F.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-F.xml

SPEC CPU and SPECrate are registered trademarks 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 CPU®2017 v1.1.0 on 2020-03-23 03:13:01-0400.
Report generated on 2020-04-14 14:12:50 by CPU2017 PDF formatter v6255.
Originally published on 2020-04-14.