## Lenovo Global Technology

### ThinkSystem SR650
(2.10 GHz, Intel Xeon Gold 6230T)

**SPECrate®2017_fp_base = 207**

**SPECrate®2017_fp_peak = Not Run**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_fp_base (207)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6230T
- **Max MHz:** 3900
- **Nominal:** 2100
- **Enabled:** 40 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:** 27.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **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 19.0.4.227 of Intel
- **Compiler for Linux:**
- **Fortran:** Version 19.0.4.227 of Intel Fortran
- **Compiler for Linux:**
- **Parallel:** No
- **Firmware:** Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** --
## Lenovo Global Technology

ThinkSystem SR650  
(2.10 GHz, Intel Xeon Gold 6230T)

**SPEC CPU®2017 Floating Point Rate Result**

<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>503.bwaves_r</td>
<td>80</td>
<td>1594</td>
<td>503</td>
<td>1594</td>
<td>503</td>
<td>1596</td>
<td>503</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>80</td>
<td>589</td>
<td>172</td>
<td>590</td>
<td>172</td>
<td>590</td>
<td>172</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>80</td>
<td>513</td>
<td>148</td>
<td>507</td>
<td>150</td>
<td>508</td>
<td>150</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>80</td>
<td>1760</td>
<td>119</td>
<td>1785</td>
<td>117</td>
<td>1778</td>
<td>118</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>80</td>
<td>813</td>
<td>230</td>
<td>809</td>
<td>231</td>
<td>812</td>
<td>230</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>80</td>
<td>728</td>
<td>116</td>
<td>728</td>
<td>116</td>
<td>727</td>
<td>116</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>80</td>
<td>864</td>
<td>207</td>
<td>829</td>
<td>216</td>
<td>838</td>
<td>214</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>80</td>
<td>533</td>
<td>228</td>
<td>534</td>
<td>228</td>
<td>535</td>
<td>228</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>80</td>
<td>595</td>
<td>235</td>
<td>595</td>
<td>235</td>
<td>595</td>
<td>235</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>80</td>
<td>402</td>
<td>495</td>
<td>404</td>
<td>492</td>
<td>403</td>
<td>494</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>80</td>
<td>379</td>
<td>355</td>
<td>379</td>
<td>356</td>
<td>380</td>
<td>355</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>80</td>
<td>1867</td>
<td>167</td>
<td>1866</td>
<td>167</td>
<td>1865</td>
<td>167</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>80</td>
<td>1355</td>
<td>93.8</td>
<td>1363</td>
<td>93.3</td>
<td>1365</td>
<td>93.1</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 207**  
**SPECrate®2017_fp_peak = Not Run**

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-ic19.0u4/lib/intel64"
```

Binaries compiled on a system with 1x Intel Core i9-799X 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>
```

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
General Notes (Continued)

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
Choose Operating Mode set to Custom Mode
C-States set to Legacy
SNC set to Enable
DCU Streamer Prefetcher set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Patrol Scrub set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Tue Aug 20 18:18:36 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 6230T CPU @ 2.10GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Lenovo Global Technology
ThinkSystem SR650
(2.10 GHz, Intel Xeon Gold 6230T)

**SPECrate®2017_fp_base = 207**
**SPECrate®2017_fp_peak = Not Run**

---

**Platform Notes (Continued)**

Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230T CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-2,5,6,10-12,15,16,40-42,45,46,50-52,55,56
NUMA node1 CPU(s): 3,4,7-9,13,14,17-19,43,44,47-49,53,54,57-59
NUMA node2 CPU(s): 20-22,25,26,30-32,35,36,60-62,65,66,70-72,75,76
NUMA node3 CPU(s): 23,24,27-29,33,34,37-39,63,64,67-69,73,74,77-79
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acp lmx mmx mmxex sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref 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 3nowprefetch eb6 cat _13 cd _13 intel _ppln
intel _pt ssbd mba ibrs ibpb stibp ibrs _enhanced _tpr _shadow _vnmi _flexpriority _ept
vpid fsgsbase tsc_adjust bml _hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm llc cqm _occup _llc cqm _mbm _total cqm _mbm _local dtherm ida arat pln
pts pku ospke avx512_vnni spec _ctrl intel _stibp flush _lld arch _capabilities

/proccpuinfo cache data

cache size : 28160 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 5 6 10 11 12 15 16 40 41 42 45 46 50 51 52 55 56
node 0 size: 196280 MB
node 0 free: 191535 MB
node 1 cpus: 3 4 7 8 9 13 14 17 18 19 43 44 47 48 49 53 54 57 58 59
node 1 size: 196608 MB
node 1 free: 191825 MB
node 2 cpus: 20 21 22 25 26 30 31 32 35 36 60 61 62 65 66 70 71 72 75 76
node 2 size: 196608 MB
node 2 free: 192172 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(2.10 GHz, Intel Xeon Gold 6230T)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 207
SPECrate®2017_fp_peak = Not Run

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

Test Date: Aug-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Platform Notes (Continued)

node 3 cpus: 23 24 27 28 29 33 34 37 38 39 63 64 67 68 69 73 74 77 78 79
node 3 size: 196608 MB
node 3 free: 192126 MB
node distances:
node 0 1 2 3
0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal: 792239644 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

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 Aug 20 18:13

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sdb2    xfs  689G   36G  653G   6% /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

(Continued on next page)
# SPEC CPU®2017 Floating Point Rate Result

**Lenovo Global Technology**  
ThinkSystem SR650  
(2.10 GHz, Intel Xeon Gold 6230T)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>207</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Aug-2019

<table>
<thead>
<tr>
<th>Tested by:</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

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 -[IVE141E-2.30]- 07/02/2019  
Memory:  
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933  

(End of data from sysinfo program)

**Compiler Version Notes**

```
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)  
-------------------  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++             | 508.namd_r(base) 510.parest_r(base)  
-------------------  
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++, C          | 511.povray_r(base) 526.blender_r(base)  
-------------------  
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++, C, Fortran | 507.cactuBSSN_r(base)  
-------------------  
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

**ThinkSystem SR650**  
(2.10 GHz, Intel Xeon Gold 6230T)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>207</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Aug-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019

## Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
--- Fortran  
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
---
```

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
--- Fortran, C  
Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
---
```

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

## Base Compiler Invocation

### C benchmarks:

```
icc -m64 -std=c11
```

### C++ benchmarks:

```
icpc -m64
```

### Fortran benchmarks:

```
ifort -m64
```

### Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

### Benchmarks using both C and C++:

```
icpc -m64 icc -m64 -std=c11
```

### Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```
Lenovo Global Technology
ThinkSystem SR650
(2.10 GHz, Intel Xeon Gold 6230T)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 207</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_peak = Not Run</th>
</tr>
</thead>
</table>

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

Test Date: Aug-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Base Portability Flags

503. bwaves_r: -DSPEC_LP64
507. cactuBSSN_r: -DSPEC_LP64
508. namd_r: -DSPEC_LP64
510. parest_r: -DSPEC_LP64
511. povray_r: -DSPEC_LP64
519. lbm_r: -DSPEC_LP64
521. wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526. blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527. cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538. imagick_r: -DSPEC_LP64
544. nab_r: -DSPEC_LP64
549. fotonik3d_r: -DSPEC_LP64
554. roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte
Lenovo Global Technology
ThinkSystem SR650
(2.10 GHz, Intel Xeon Gold 6230T)

SPECraté®2017_fp_base = 207
SPECraté®2017_fp_peak = Not Run

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

Test Date: Aug-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

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-D.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-D.xml

SPEC CPU and SPECraté 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 v1.0.5 on 2019-08-20 06:18:35-0400.
Report generated on 2019-09-17 16:11:03 by CPU2017 PDF formatter v6255.
Originally published on 2019-09-17.