Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

<table>
<thead>
<tr>
<th>SPECspeed\textsuperscript{2017}_fp_base = 123</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed\textsuperscript{2017}_fp_peak = Not Run</td>
</tr>
</tbody>
</table>

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

### Hardware
- **CPU Name:** Intel Xeon Gold 6246
- **Max MHz:** 4200
- **Ordered:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 24.75 MB I+D on chip per chip
- **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 C/C++
- **Compiler for Linux:**
- **Compiler for Fortran:** Version 19.0.4.227 of Intel Fortran
- **Compiler for Linux:**
- **Parallel:** Yes
- **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:** --

---

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed\textsuperscript{2017}_fp_base (123)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
</tr>
</tbody>
</table>

---

SPEC CPU\textsuperscript{2017} Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation
Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

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

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>118</td>
<td>499</td>
<td>119</td>
<td>495</td>
<td>119</td>
<td>495</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>132</td>
<td>126</td>
<td>132</td>
<td>127</td>
<td>132</td>
<td>126</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>57.3</td>
<td>91.4</td>
<td>56.9</td>
<td>92.0</td>
<td>57.8</td>
<td>90.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>108</td>
<td>122</td>
<td>108</td>
<td>122</td>
<td>109</td>
<td>122</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>113</td>
<td>78.4</td>
<td>113</td>
<td>78.2</td>
<td>113</td>
<td>78.3</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>175</td>
<td>67.9</td>
<td>172</td>
<td>69.0</td>
<td>175</td>
<td>68.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>141</td>
<td>102</td>
<td>141</td>
<td>102</td>
<td>141</td>
<td>102</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>90.5</td>
<td>193</td>
<td>90.4</td>
<td>193</td>
<td>90.4</td>
<td>193</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>108</td>
<td>84.7</td>
<td>105</td>
<td>86.6</td>
<td>108</td>
<td>84.6</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>127</td>
<td>124</td>
<td>128</td>
<td>123</td>
<td>127</td>
<td>124</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 123**
**SPECspeed®2017_fp_peak = Not Run**

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

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
OMP_STACKSIZE = "192M"

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`

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.
Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

SPECSpeed®2017_fp_base = 123
SPECSpeed®2017_fp_peak = Not Run

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-States set to Legacy
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
Stale AtoS set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Wed Sep 11 14:57:34 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 6246 CPU @ 3.30GHz
  2 "physical id"s (chips)
  24 "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: 12
siblings: 12
physical 0: cores 0 2 4 8 10 17 18 19 20 24 25 27
physical 1: cores 0 1 2 3 4 8 9 10 11 17 18 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
Stepping: 7
CPU MHz: 3300.000
BogoMIPS: 6600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

SPECspeed®2017_fp_base = 123
SPECspeed®2017_fp_peak = Not Run

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

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

Platform Notes (Continued)

L3 cache: 25344K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsxsp avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_i3 cdp_i3 intel_pinn
intel_p TL sbad mba ibrs bpbi stibp ibrs enhanced tpr_shadow vvmi flexpriority ept
vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 emms invpcid rtm cqm mpzx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsxsp
xsxsp xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln
pts pkp ospke avx512_vnni spec_ctrl intel_stibp flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 25344 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 8 9 10 11
  node 0 size: 39288 MB
  node 0 free: 383795 MB
  node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
  node 1 size: 393216 MB
  node 1 free: 384382 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 792240156 kB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

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

**SPECspeed®2017_fp_base** = 123

**SPECspeed®2017_fp_peak** = Not Run

---

**Platform Notes (Continued)**

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 Sep 11 14:53

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 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**

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>
|==============================================================================

==============================================================================
<table>
<thead>
<tr>
<th>C++, C, Fortran</th>
<th>607.cactuBSSN_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>
|==============================================================================

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

SPECSpeed®2017_fp_base = 123
SPECSpeed®2017_fp_peak = Not Run

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

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

Compiler Version Notes (Continued)

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.
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.

Base Compiler Invocation

C benchmarks:
  icc -m64 -std=c11

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
  icpc -m64 icc -m64 -std=c11 ifort -m64
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR650
(3.30 GHz, Intel Xeon Gold 6246)

**SPECspeed®2017_fp_base** = 123

**SPECspeed®2017_fp_peak** = Not Run

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

### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.blm_s: -DSPEC_LP64
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- assume byterecl
- 638.imagick_s: -DSPEC_LP64
- 644.nab_s: -DSPEC_LP64
- 649.fotonik3d_s: -DSPEC_LP64
- 654.roms_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

**Fortran benchmarks:**
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

**Benchmarks using both Fortran and C:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

**Benchmarks using Fortran, C, and C++:**
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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
<table>
<thead>
<tr>
<th>Lenovo Global Technology</th>
<th>SPECspeed\textsuperscript{2017_fp_base} = 123</th>
</tr>
</thead>
<tbody>
<tr>
<td>ThinkSystem SR650</td>
<td>SPECspeed\textsuperscript{2017_fp_peak} = Not Run</td>
</tr>
<tr>
<td>(3.30 GHz, Intel Xeon Gold 6246)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</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>
<tr>
<td>Test Date:</td>
<td>Sep-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

SPEC CPU and SPECspeed 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\textsuperscript{2017} v1.0.5 on 2019-09-11 02:57:34-0400.
Originally published on 2019-10-01.