## Lenovo Global Technology

**ThinkSystem SR630**

(3.60 GHz, Intel Xeon Gold 6244)

---

### SPECspeed2017_fp_base = 103

### SPECspeed2017_fp_peak = Not Run

---

### 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

---

### Threads

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (103)</th>
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<tbody>
<tr>
<td>16</td>
<td>603.bwaves_s 99.3</td>
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<tr>
<td>16</td>
<td>607.cactuBSSN_s 82.2</td>
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<tr>
<td>16</td>
<td>619.lbm_s 108</td>
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<td>16</td>
<td>621.wrf_s 57.2</td>
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<tr>
<td>16</td>
<td>627.cam4_s 63.8</td>
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<td>16</td>
<td>628.pop2_s 75.4</td>
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<td>16</td>
<td>638.imagick_s 142</td>
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<td>16</td>
<td>644.nab_s 79.9</td>
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<td>16</td>
<td>649.fotonik3d_s 110</td>
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<tr>
<td>16</td>
<td>654.roms_s</td>
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</tbody>
</table>

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### Hardware

**CPU Name:** Intel Xeon Gold 6244

**Max MHz.:** 4400

**Nominal:** 3600

**Enabled:** 16 cores, 2 chips

**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:** 24.75 MB I+D on chip per chip

**Other:** None

**Memory:** 384 GB (24 x 16 GB 2Rx8 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 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;

**Fortran:** Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux

**Parallel:** Yes

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

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<td>142</td>
<td>111</td>
<td>143</td>
<td>110</td>
</tr>
</tbody>
</table>

### 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-ic19.0u1/lib/intel64"
- OMP_STACKSIZE = "192M"

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"

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.  
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.

---

SPECspeed2017_fp_base = 103  
SPECspeed2017_fp_peak = Not Run  
Test Date: Apr-2019  
Hardware Availability: Apr-2019  
Software Availability: Nov-2018
**SPEC CPU2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR630  
(3.60 GHz, Intel Xeon Gold 6244)

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</table>

**SPECspeed2017_fp_base** = 103  
**SPECspeed2017_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
- SNC set to Enable
- Stale AtoS set to Enable

Sysinfo program `/home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo`
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on localhost.localdomain Mon Apr 22 10:44:19 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 6244 CPU @ 3.60GHz
- 2 "physical id"s (chips)
- 16 "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 : 8
  - physical 0: cores 4 8 17 18 19 24 25 27
  - physical 1: cores 2 3 4 8 17 20 24 26

From `lscpu`:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 16
- On-line CPU(s) list: 0-15
- Thread(s) per core: 1
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6244 CPU @ 3.60GHz
- Stepping: 6
- CPU MHz: 3600.000
- BogoMIPS: 7200.00
- Virtualization: VT-x
- L1d cache: 32K
- Lli cache: 32K

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
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**SPEC CPU2017 Floating Point Speed Result**

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
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**Test Date:** Apr-2019  
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**Platform Notes (Continued)**

```
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
Flags: fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush dtc 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 eagerfsi pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abrm 3dnowprefetch epb cat_l3 cdp_l3 intel_pt ssbd mba
ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx ept vpid fsgsbase
tsc_adjts bml hle avx2 smep bmi2 ertsm invpcid rtm cqm mpx rdt_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaving xgetbv1
cqm_llc cqm_occu_pll cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku 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)
ode 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 196280 MB
node 0 free: 191418 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 196608 MB
node 1 free: 191996 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10
```

From /proc/meminfo
```
MemTotal: 395878084 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"
```

(Continued on next page)
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SPEC CPU2017 Floating Point Speed Result
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SPECspeed2017_fp_base = 103
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CPU2017 License: 9017
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Platform Notes (Continued)

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 Apr 22 10:41

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

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018

(Continued on next page)
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Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Compiler Version Notes (Continued)
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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.
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

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
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.llvm_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-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
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Tested with SPEC CPU2017 v1.0.5 on 2019-04-21 22:44:19-0400.