Lenovo Global Technology
ThinkSystem SR850
(2.60 GHz, Intel Xeon Gold 6240)

SPECSpeed®2017_fp_base = 190
SPECSpeed®2017_fp_peak = Not Run

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>72</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>72</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>72</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>72</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>72</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>72</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>72</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>72</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>72</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>72</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Gold 6240
Max MHz: 3900
Nominal: 2600
Enabled: 72 cores, 4 chips
Orderable: 2.4 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: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 800 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
Kernel 4.12.14-94.41-default
Compiler: C/C++: Version 19.0.4.227 of Intel
C/C++ Compiler for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE142E 2.30 released Aug-2019
tested as TEE141E 2.30 Jul-2019
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: Disable
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR850  
(2.60 GHz, Intel Xeon Gold 6240)

---

**CPU2017 License:** 9017  
**Test Date:** Nov-2019

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019

**Tested by:** Lenovo Global Technology  
**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>
<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>72</td>
<td>69.6</td>
<td>847</td>
<td>69.8</td>
<td>845</td>
<td>72.9</td>
<td>809</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>72</td>
<td><strong>92.0</strong></td>
<td><strong>181</strong></td>
<td>92.0</td>
<td>181</td>
<td>91.9</td>
<td>181</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>72</td>
<td>30.2</td>
<td>173</td>
<td>30.2</td>
<td>173</td>
<td><strong>30.2</strong></td>
<td><strong>173</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>72</td>
<td>99.0</td>
<td>134</td>
<td>100</td>
<td>132</td>
<td><strong>99.6</strong></td>
<td><strong>133</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>72</td>
<td>63.9</td>
<td>139</td>
<td>63.9</td>
<td><strong>139</strong></td>
<td>64.0</td>
<td>138</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>72</td>
<td>199</td>
<td>59.6</td>
<td>200</td>
<td>59.4</td>
<td><strong>199</strong></td>
<td><strong>59.6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>72</td>
<td>75.1</td>
<td>192</td>
<td><strong>74.4</strong></td>
<td><strong>194</strong></td>
<td>74.0</td>
<td>195</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>72</td>
<td><strong>46.4</strong></td>
<td><strong>376</strong></td>
<td>46.5</td>
<td>376</td>
<td>46.4</td>
<td>376</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>72</td>
<td><strong>75.3</strong></td>
<td><strong>121</strong></td>
<td>75.1</td>
<td>121</td>
<td>75.9</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>72</td>
<td>68.1</td>
<td>231</td>
<td>66.4</td>
<td>237</td>
<td><strong>67.3</strong></td>
<td><strong>234</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**SPECspeed®2017_fp_base =** 190  
**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"

---

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- **KMP_AFFINITY =** "granularity=fine,compact"
- **LD_LIBRARY_PATH =** "/home/cpu2017-1.1.0-ic19.0u4/lib/intel64"
- **OMP_STACKSIZE =** "192M"

---

### General Notes

- Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
- Memory using Redhat Enterprise Linux 7.5
- Transparent Huge Pages disabled by default
- `echo never > /sys/kernel/mm/transparent_hugepage/enabled`
- `echo never > /sys/kernel/mm/transparent_hugepage/defrag`
- 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)

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

Lenovo Global Technology
ThinkSystem SR850
(2.60 GHz, Intel Xeon Gold 6240)

SPECspeed®2017_fp_base = 190
SPECspeed®2017_fp_peak = Not Run

General Notes (Continued)

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
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl1e6e46a485a0011
running on linux-9o83 Thu Nov 7 21:52:39 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 6240 CPU @ 2.60GHz
  4 "physical id"s (chips)
  72 "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 : 18
  siblings : 18
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR850  
(2.60 GHz, Intel Xeon Gold 6240)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>190</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</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>Nov-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
- **Stepping:** 6
- **CPU MHz:** 2600.000
- **BogoMIPS:** 5200.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-17
- **NUMA node1 CPU(s):** 18-35
- **NUMA node2 CPU(s):** 36-53
- **NUMA node3 CPU(s):** 54-71
- **Flags:** fpu vme 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 cpuid aperfmperf 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 cpuid_fault epb cat_l3 cdp_dp L3 invpcid_single intel_pmm ssbd mba ibrs ibpb tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erna invpcid rdms qmx mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occmap llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp-epk pkp ospke avx512_vnni flush_lld arch_capabilities

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 4 5 6 7 8 9 10 11 12 13 14 15 16 17
- node 0 size: 386633 MB
- node 0 free: 386235 MB
- node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
- node 1 size: 387058 MB
- node 1 free: 386816 MB
- node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
- node 2 size: 387058 MB
- node 2 free: 386554 MB
- node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
- node 3 size: 387055 MB
- node 3 free: 386823 MB
- node distances:
  - node 0 0 1 1 1 2 1 2 3
  - node 1 1 1 1 2 1 2 3
  - node 2 1 2 3 3 3 2 1 1
  - node 3 1 2 3 3 3 2 1 1

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
(2.60 GHz, Intel Xeon Gold 6240)

SPECSpeed®2017_fp_base = 190
SPECSpeed®2017_fp_peak = Not Run

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

Platform Notes (Continued)

2:  21  31  10  21
3:  31  21  21  10

From /proc/meminfo
MemTotal: 1584952396 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 4
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

os-release:
NAME="SLES"
VERSION="12-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"

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: No status reported
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: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Nov 7 21:50

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 146G 597G 20% /home

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
Platform Notes (Continued)

Vendor: Lenovo
Product: ThinkSystem SR850 -[7X1925Z000]-
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:
48x 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,</td>
<td></td>
</tr>
<tr>
<td>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>
<tr>
<td>-----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>C++, C, Fortran</td>
<td>607.cactuBSSN_s(base)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>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>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>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>
<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)</td>
<td></td>
</tr>
<tr>
<td>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>
<tr>
<td>-----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Fortran</td>
<td>603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)</td>
<td></td>
</tr>
<tr>
<td>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 SR850
(2.60 GHz, Intel Xeon Gold 6240)

SPECSpeed®2017_fp_base = 190
SPECSpeed®2017_fp_peak = Not Run

Compiler Version Notes (Continued)
==============================================================================
Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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

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

Base Portability Flags
603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_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
## Lenovo Global Technology

**ThinkSystem SR850**  
*(2.60 GHz, Intel Xeon Gold 6240)*

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>190</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®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:** Nov-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

### 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-F.html](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](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml)