### Lenovo Global Technology

ThinkSystem SR590  
(1.90 GHz, Intel Xeon Gold 6262V)

<table>
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#### SPEC CPU 2017 Floating Point Speed Result

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<td>149</td>
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<td>607.cactuBSSN_s</td>
<td>48 threads</td>
<td>86.4</td>
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<td>619.lbm_s</td>
<td>48 threads</td>
<td>116</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48 threads</td>
<td>97.8</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48 threads</td>
<td>54.1</td>
</tr>
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<td>628.pop2_s</td>
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</tr>
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<td>638.imagick_s</td>
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<td>76.9</td>
</tr>
<tr>
<td>644.nab_s</td>
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</tr>
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</tr>
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<td>654.roms_s</td>
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#### Hardware

- **CPU Name:** Intel Xeon Gold 6262V  
  - **Max MHz:** 3600 MHz  
  - **Nominal:** 1900 MHz  
  - **Enabled:** 48 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:** 33 MB I+D on chip per chip  
  - **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 960 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 19.0.0.117 of Intel C/C++  
  - **Fortran:** Version 19.0.0.117 of Intel Fortran
- **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:** --
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| SPECspeed®2017_fp_peak = Not Run |

### Results Table

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### 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/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.
# SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Aug-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** Dec-2018

## Platform Notes

**BIOS configuration:**  
Choose Operating Mode set to Maximum Performance  
Choose Operating Mode set to Custom Mode  
CPU P-state Control set to Automatic  
MONITOR/MWAIT set to Enable  
Hyper-Threading set to Disable  
Adjacent Cache Prefetch set to Disable  
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-2uov Thu Aug 15 14:28:00 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 6262V CPU @ 1.90GHz`  
  - 2 "physical id"s (chips)  
  - 48 "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 : 24  
    - siblings : 24  
    - physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29  
    - physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:  
- `Architecture: x86_64`  
- `CPU op-mode(s): 32-bit, 64-bit`  
- `Byte Order: Little Endian`  
- `CPU(s): 48`  
- `On-line CPU(s) list: 0-47`  
- `Thread(s) per core: 1`  
- `Core(s) per socket: 24`  
- `Socket(s): 2`  
- `NUMA node(s): 2`  
- `Vendor ID: GenuineIntel`  
- `CPU family: 6`  
- `Model: 85`  
- `Model name: Intel(R) Xeon(R) Gold 6262V CPU @ 1.90GHz`  
- `Stepping: 7`  
- `CPU MHz: 1900.000`  
- `BogoMIPS: 3800.00`  
- `Virtualization: VT-x`  
- `L1d cache: 32K`  
- `L1i cache: 32K`  
- `L2 cache: 1024K`

*(Continued on next page)*
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Platform Notes (Continued)

L3 cache: 33792K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47

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 pbs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref perf core巡检 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr pdcn 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_l3
invpcid_single intel_pcas ssbd mba ibrs ibpb tpr_shadow vnumi flexpriority ept
vpid fsgsbase tsc_adjust bml1 hle avx2 smep bmi2 erms invpcid rtm cm qmx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occu llc cqm_mbms_total cqm_mbms_local
dtherm ida arat pin pts hwp_epp pk u ospke avx512_vnni flush_l1d arch_capabilities

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 12 13 14 15 16 17 18 19 20 21 22 23
node 0 size: 96354 MB
node 0 free: 95613 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 96711 MB
node 1 free: 96355 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197699184 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"
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SPECspeed®2017_fp_base = 125
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Platform Notes (Continued)

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-2017-5754 (Meltdown): Not affected
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 Aug 15 14:27

SPEC is set to: /home/cpu2017-1.0.5-ic19
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdb3       btrfs 740G  46G 694G  7% /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 -[TEE141E-2.30]- 07/02/2019
    Memory:
        4x NO DIMM NO DIMM
        12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base)

(Continued on next page)
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Compiler Version Notes (Continued)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Fortran, C
603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

Fortran
621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

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.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

### Base Optimization Flags

**C benchmarks:**

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

**Fortran benchmarks:**

-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

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

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

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
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