Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Silver 4210)

SPECspeed2017_fp_base = 82.4
SPECspeed2017_fp_peak = Not Run

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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Threads

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<th>Benchmark</th>
<th>Threads</th>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>68.5</td>
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<tr>
<td>619.lbm_s</td>
<td>20</td>
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<tr>
<td>621.wrf_s</td>
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<td>627.cam4_s</td>
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<tr>
<td>628.pop2_s</td>
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<td>654.roms_s</td>
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--- SPECspeed2017_fp_base (82.4) ---

Hardware

CPU Name: Intel Xeon Silver 4210
Max MHz.: 3200
Nominal: 2200
Enabled: 20 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: 13.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
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 IVE135R 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
Lenovo Global Technology
ThinkSystem SR650
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CPU2017 License: 9017
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Results Table

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</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 82.4
SPECspeed2017_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-ic19.0u1/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

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
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SPECspeed2017_fp_base = 82.4
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
Stale AtoS set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Thu May 9 15:43:21 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) Silver 4210 CPU @ 2.20GHz
  2 "physical id"s (chips)
  20 "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 : 10
  siblings : 10
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
  Architecture:     x86_64
  CPU op-mode(s):   32-bit, 64-bit
  Byte Order:       Little Endian
  CPU(s):           20
  On-line CPU(s) list: 0-19
  Thread(s) per core: 1
  Core(s) per socket: 10
  Socket(s):        2
  NUMA node(s):     2
  Vendor ID:        GenuineIntel
  CPU family:       6
  Model:            85
  Model name:       Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
  Stepping:         6
  CPU MHz:          2200.000
  BogoMIPS:         4400.00
  Virtualization:   VT-x
  L1d cache:        32K
  L1i cache:        32K
  L2 cache:         1024K

(Continued on next page)
Lenovo Global Technology

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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

**Platform Notes (Continued)**

```
L3 cache: 14080K
NUMA node0 CPU(s): 0-9
NUMA node1 CPU(s): 10-19
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
aperfmperf eagerfpu nmi pln揆v qd tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_pt ssbd mba
ibs ibpb stibp ibrs enhanced tpr_shadow vnmi fpxpriority ept vpid fsqsbale
msr rdtsc msrbds mbx_adjust mba hkm hevxz smep bni2 rmes invpcid rtm cgm mp4 rdt_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv
l cqm_llc cqm_occup LLC cqm_mbms_total cqm_mbm_local dtherm ida arat pln pts pku ospe
vax512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities
```

/proclm/proc/cpuid cache data
  cache size: 14080 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
  node 0 size: 196281 MB
  node 0 free: 191466 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19
  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: 395879788 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)
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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 May 9 15:24

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem  Type Size Used Avail Use% Mounted on
    /dev/sdb2      xfs   689G   18G  671G   3% /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 -[IVE135R-2.10]- 02/27/2019
    Memory:
        24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2400

(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.

==============================================================================================================

PC 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
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650
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**Compiler Version Notes (Continued)**

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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**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.hm_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++:
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-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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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