SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

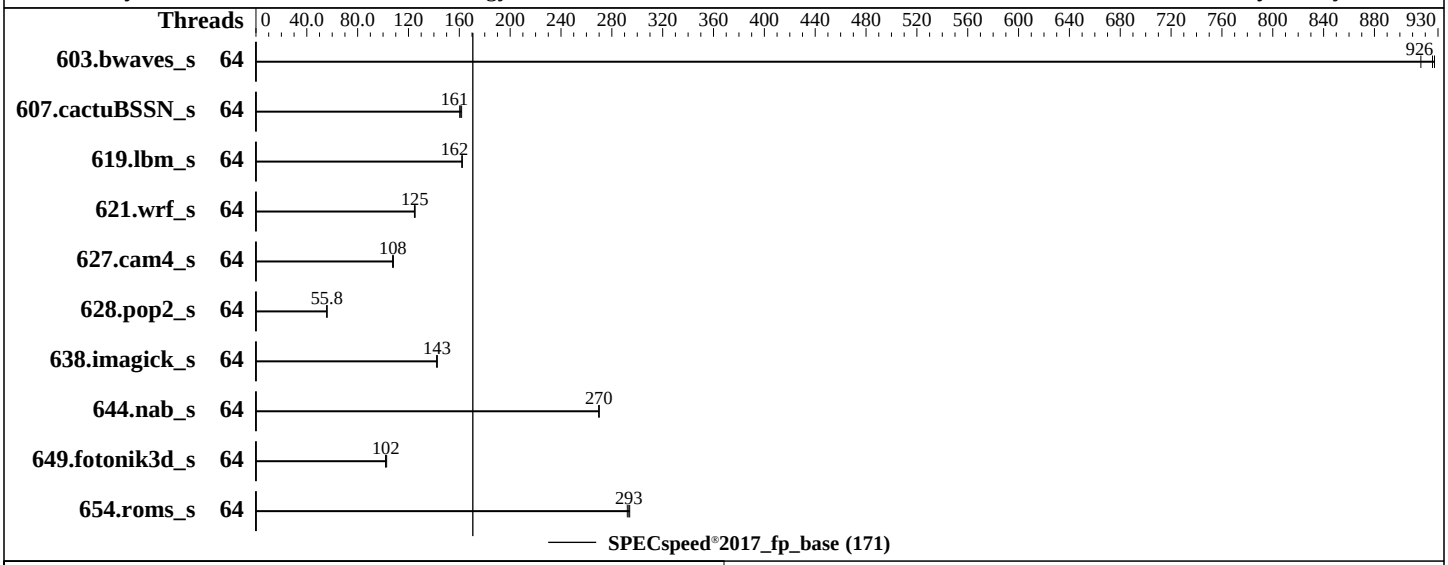
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8253)

SPECspeed®2017_fp_base = 171

SPECspeed®2017_fp_peak = Not Run

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



Hardware

CPU Name:	Intel Xeon Platinum 8253
Max MHz:	3000
Nominal:	2200
Enabled:	64 cores, 4 chips
Orderable:	2,3,4 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	22 MB I+D on chip per chip
Other:	None
Memory:	768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R)
Storage:	1 x 800 GB SATA SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 (x86_64) Kernel 4.12.14-25.13-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 PSE122R 1.53 released Aug-2019 tested as PSE121R 1.53 Jul-2019
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	BIOS set to prefer performance at the cost of additional power usage

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8253)

SPECspeed®2017_fp_base = 171

SPECspeed®2017_fp_peak = Not Run

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

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	64	63.6	927	**63.7**	**926**	64.4	917							
607.cactuBSSN_s	64	103	162	**104**	**161**	104	160							
619.lbm_s	64	**32.3**	**162**	32.3	162	32.3	162							
621.wrf_s	64	106	125	106	125	**106**	**125**							
627.cam4_s	64	82.0	108	82.4	108	**82.2**	**108**							
628.pop2_s	64	**213**	**55.8**	212	55.9	213	55.8							
638.imagick_s	64	101	142	101	143	**101**	**143**							
644.nab_s	64	**64.8**	**270**	64.7	270	64.8	270							
649.fotonik3d_s	64	88.7	103	**89.2**	**102**	89.4	102							
654.roms_s	64	53.9	292	53.5	294	**53.7**	**293**							

SPECspeed®2017_fp_base = 171

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)

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
CPU P-state Control set to Autonomous
Hyper-Threading set to Disable
Trusted Execution Technology set to Enable
DCU Streamer Prefetcher 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 295195f888a3d7edb1e6e46a485a0011
 running on linux-u1b8 Wed Nov 27 18:32:38 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) Platinum 8253 CPU @ 2.20GHz
       4  "physical id"s (chips)
       64 "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 : 16
       siblings  : 16
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              64
      On-line CPU(s) list: 0-63
      Thread(s) per core:  1
      Core(s) per socket:  16
      Socket(s):           4
      NUMA node(s):        4
      Vendor ID:           GenuineIntel
```

(Continued on next page)

Platform Notes (Continued)

```
      CPU family:          6
      Model:               85
      Model name:          Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
      Stepping:            6
      CPU MHz:             2200.000
      CPU max MHz:         3000.0000
      CPU min MHz:         1000.0000
      BogoMIPS:            4400.00
      Virtualization:      VT-x
      L1d cache:           32K
      L1i cache:           32K
      L2 cache:            1024K
      L3 cache:            22528K
      NUMA node0 CPU(s):   0-15
      NUMA node1 CPU(s):   16-31
      NUMA node2 CPU(s):   32-47
      NUMA node3 CPU(s):   48-63
      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 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_l3
      invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
      fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
      avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
      xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
      dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

  /proc/cpuinfo cache data
     cache size : 22528 KB

  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
    node 0 size: 193089 MB
    node 0 free: 189568 MB
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
    node 1 size: 193515 MB
    node 1 free: 192287 MB
    node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
    node 2 size: 193515 MB
    node 2 free: 193305 MB
    node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
    node 3 size: 193512 MB
    node 3 free: 192928 MB
```

(Continued on next page)

Platform Notes (Continued)

```
  node distances:
  node   0   1   2   3
    0:  10  21  21  21
    1:  21  10  21  21
    2:  21  21  10  21
    3:  21  21  21  10

From /proc/meminfo
   MemTotal:       792199488 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15"
      VERSION_ID="15"
      PRETTY_NAME="SUSE Linux Enterprise Server 15"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
   Linux linux-u1b8 4.12.14-25.13-default #1 SMP Tue Aug 14 15:07:35 UTC 2018 (947aa51)
   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 27 11:21

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      xfs   744G   75G  670G  10% /

From /sys/devices/virtual/dmi/id
    BIOS:    Lenovo -[PSE121R-1.53]- 07/03/2019
    Vendor:  Lenovo
```

(Continued on next page)

Platform Notes (Continued)

```
     Product: ThinkSystem SR950 -[7X12ABC1WW]-
     Product Family: ThinkSystem
     Serial:  none

  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 NO DIMM NO DIMM
      48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

  (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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

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

==============================================================================
Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_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.
------------------------------------------------------------------------------
```

(Continued on next page)

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`

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/Intel-ic19.0u1-official-linux64.2019-07-09.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/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml

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®2017 v1.1.0 on 2019-11-27 05:32:37-0500.
Report generated on 2019-12-26 11:36:06 by CPU2017 PS formatter v6255.
Originally published on 2019-12-24.