### SPEC® CPU2017 Floating Point Speed Result

**Lenovo Global Technology**  
ThinkSystem SN850  
(2.20 GHz, Intel Xeon Platinum 8253)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base =</th>
<th>SPECspeed2017_fp_peak =</th>
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<tr>
<td>603.bwaves_s</td>
<td>162</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>172</td>
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<tr>
<td>619.lmb_s</td>
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<tr>
<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
<td>107</td>
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<tr>
<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
<td>253</td>
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<td>649.fotonik3d_s</td>
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<tr>
<td>654.roms_s</td>
<td>319</td>
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</table>

#### Hardware
- **CPU Name:** Intel Xeon Platinum 8253  
- **Max MHz.:** 3000  
- **Nominal:** 2200  
- **Enabled:** 64 cores, 4 chips, 2 threads/core  
- **Orderable:** 2,4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 22 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)  
- **Storage:** 960 GB tmpfs  
- **Other:** None

#### Software
- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
- **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 IVE135L 2.10 released Jan-2019  
- **File System:** tmpfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None
SPEC CPU2017 Floating Point Speed Result

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Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Platinum 8253)

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

SPECspeed2017_fp_base = 162
SPECspeed2017_fp_peak = Not Run

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

Results Table

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</table>

SPECspeed2017_fp_base = 162
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"
Tmpfs filesystem can be set with:
    mount -t tmpfs -o size=960g tmpfs /home
Process tuning setting:
    echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SN850
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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

General Notes (Continued)
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 Custom Mode
Memory Power Management set to Automatic
Energy Efficient Turbo set to Disable
C-States set to Disable
Page Policy set to Adaptive
Trusted Execution Technology 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 Fri Apr 26 06:49:48 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)
  128 "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 : 32
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): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6

(Continued on next page)
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CPU2017 License: 9017  Test Sponsor: Lenovo Global Technology  Hardware Availability: Apr-2019
Tested by: Lenovo Global Technology  Software Availability: Nov-2018

Platform Notes (Continued)

Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz  
Stepping: 6  
CPU MHz: 2200.000  
BogoMIPS: 4400.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 22528K  
NUMA node0 CPU(s): 0-15,64-79  
NUMA node1 CPU(s): 16-31,80-95  
NUMA node2 CPU(s): 32-47,96-111  
NUMA node3 CPU(s): 48-63,112-127  
Flags: fpu vme de pse tkp mtrr pae 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 eagerfpn pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbm 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 cpb cat_13 cdp_13 intel_pt ssbd mba ibrs ibpb ibrs_enhanced trp_shadow vnni fpxpriority etp vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 ets m357 ept vpd va he apic sm mce pxrt v.misc bmi2 ets smep bmi2 ems invpcid rtm cmqm mpx rd-ti avx512f avx512dq rdseed adx smap clflushopt clwb avx512vcd avx512bw avx512vl xsaveopt xsavec xgetbv1 cmqm lsl cmqm_occup_llc cmqm_mbb_total cmqm_mbb_local dtherm ida arat pns hwp_epp pku ospke avx512_vnni spec_ctrl intel_stibp flush_lld 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 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79  
    node 0 size: 392886 MB  
    node 0 free: 375580 MB  
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95  
    node 1 size: 392886 MB  
    node 1 free: 375580 MB  
    node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111  
    node 2 size: 392886 MB  
    node 2 free: 375580 MB  
    node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127  
    node 3 size: 392886 MB

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Platform Notes (Continued)

node 3 free: 384412 MB
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: 1584960420 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)"
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 26 06:45

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmtmpfs 800G 8.3G 792G 2% /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.

(Continued on next page)
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Platform Notes (Continued)

BIOS Lenovo -[IVE135L-2.10]- 01/10/2019
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(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
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.

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FC  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 19.0.1.144 Build 20181018
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CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
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 Compiler Version Notes (Continued)

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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

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

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**Base Optimization Flags (Continued)**

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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-25 18:49:47-0400.