Lenovo Global Technology
ThinkSystem SR950
(2.50 GHz, Intel Xeon Platinum 8180)

SPECspeed2017_fp_base = 191
SPECspeed2017_fp_peak = 191

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

Threads

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<td>112</td>
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<tr>
<td>619.lbm_s</td>
<td>112</td>
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<tr>
<td>621.wrf_s</td>
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<tr>
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<td>112</td>
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<tr>
<td>638.imagick_s</td>
<td>112</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>112</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base (191) ---- SPECspeed2017_fp_peak (191)

Hardware
CPU Name: Intel Xeon Platinum 8180
Max MHz.: 3800
Nominal: 2500
Enabled: 112 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: 38.5 MB I+D on chip per chip
Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 800 GB SAS SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.21-69-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux:
Parallel: Yes
Firmware: Lenovo BIOS Version IVE105X 1.00 released Aug-2017
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
SPEC CPU2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SR950
(2.50 GHz, Intel Xeon Platinum 8180)

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Results Table

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<tr>
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</table>

SPECspeed2017_fp_base = 191
SPECspeed2017_fp_peak = 191

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/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "/$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
MONITORWAIT set to Enable
Trusted Execution Technology set to Enable
XPT Prefetcher set to Enable
DCA set to Enable
LLC Deadline Alloc set to Disable

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.50 GHz, Intel Xeon Platinum 8180)

SPECspeed2017_fp_base = 191
SPECspeed2017_fp_peak = 191

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on Proton4S-SUSE12SP2 Tue Oct 10 12:21:13 2017

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 8180 CPU @ 2.50GHz
   4 "physical id"s (chips)
   112 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
           28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
           28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
           28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
           28 29 30

From lscpu:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              112
On-line CPU(s) list: 0-111
Thread(s) per core:  1
Core(s) per socket:  28
Socket(s):           4
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
Stepping:            4
CPU MHz:             2494.138
BogoMIPS:            4988.27
Virtualization:     VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            39424K

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR950  
(2.50 GHz, Intel Xeon Platinum 8180)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

NUMA node0 CPU(s): 0-27  
NUMA node1 CPU(s): 28-55  
NUMA node2 CPU(s): 56-83  
NUMA node3 CPU(s): 84-111

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 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
erms invpcid rtm cqm avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

From /proc/cpuinfo cache data  
    cache size : 39424 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 16 17 18 19 20 21 22 23 24 25 26 27  
nod 0 size: 386500 MB  
nod 0 free: 385207 MB  
nod 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55  
nod 1 size: 387042 MB  
nod 1 free: 385764 MB  
nod 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83  
nod 2 size: 387042 MB  
nod 2 free: 385508 MB  
nod 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111  
nod 3 size: 387038 MB  
nod 3 free: 385724 MB  
nod distances:  
nod 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: 1584767268 kB  
    HugePages_Total: 0  
    Hugepagesize: 2048 kB

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Lenovo Global Technology
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SPECspeed2017_fp_base = 191
SPECspeed2017_fp_peak = 191

Platform Notes (Continued)

From /etc/*release* /etc/*version*

SuSE-release:
   SUSE Linux Enterprise Server 12 (x86_64)
   VERSION = 12
   PATCHLEVEL = 2
   # 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-SP2"
   VERSION_ID="12.2"
   PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
   ID="sles"
   ANSI_COLOR="0;32"
   CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux Proton4S-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
   (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 10 07:32

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

Filesystem    Type     Size  Used Avail Use% Mounted on
/dev/sda3      btrfs    743G  177G   566G  24% /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 -[PSE105X-1.00]- 08/17/2017
Memory:
   48x NO DIMM NO DIMM
   48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
  CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
  icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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Lenovo Global Technology
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Hardware Availability: Sep-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

==============================================================================
CC  619.lbm_s(peak)□
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  607.cactuBSSN_s(base)
==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  607.cactuBSSN_s(peak)
==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
==============================================================================
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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ifort (IFORT) 18.0.0 20170811

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Compiler Version Notes (Continued)

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icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-----------------------------------------------

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactusBSSN_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
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**SPECspeed2017_fp_base = 191**
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Test Sponsor: Lenovo Global Technology
Hardware Availability: Sep-2017
Software Availability: Sep-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

## Base Optimization Flags

**C benchmarks:**
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
```

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

**Benchmarks using Fortran, C, and C++:**
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
```

## Base Other Flags

**C benchmarks:**
```bash
-m64 -std=c11
```

**Fortran benchmarks:**
```bash
-m64
```

**Benchmarks using both Fortran and C:**
```bash
-m64 -std=c11
```

**Benchmarks using Fortran, C, and C++:**
```bash
-m64 -std=c11
```

## Peak Compiler Invocation

**C benchmarks:**
```bash
icc
```

**Fortran benchmarks:**
```bash
ifort
```
Lenovo Global Technology
ThinkSystem SR950
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Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
644.nab_s: Same as 638.imagick_s

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

Benchmarks using both Fortran and C:
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.50 GHz, Intel Xeon Platinum 8180)

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

Test Date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

**SPECspeed2017_fp_peak = 191**
**SPECspeed2017_fp_base = 191**

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**Peak Optimization Flags (Continued)**

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-.prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte

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**Peak Other Flags**

C benchmarks:
- -m64 -std=c11

Fortran benchmarks:
- -m64

Benchmarks using both Fortran and C:
- -m64 -std=c11

Benchmarks using Fortran, C, and C++:
- -m64 -std=c11

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-Flags-V1.2-SKL-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-Flags-V1.2-SKL-C.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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