Lenovo Global Technology
ThinkSystem SD530
(2.20 GHz, Intel Xeon Gold 5120T)

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

Hardware
CPU Name: Intel Xeon Gold 5120T
Max MHz.: 3200
Nominal: 2200
Enabled: 28 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: 19.25 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage: 1 x 800 GB SAS SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.114-92.64-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 TEE119R 1.22 released Feb-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Lenovo Global Technology
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SPECspeed2017_fp_base = 85.1
SPECspeed2017_fp_peak = 85.8

Results Table

<table>
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<tr>
<th>Benchmark</th>
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<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Threads</th>
<th>Seconds</th>
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</tbody>
</table>

SPECspeed2017_fp_base = 85.1
SPECspeed2017_fp_peak = 85.8

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 rncpu before the start of the run:
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/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"
OMP_STACKSIZE = "192M"

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 rncpu 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.

Platform Notes
BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
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SPECspeed2017_fp_base = 85.1
SPECspeed2017_fp_peak = 85.8

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Test Date: Jun-2018
Hardware Availability: Aug-2017
Software Availability: Feb-2018

Platform Notes (Continued)

DCU Streamer Prefetcher set to Disable
MONITOR/MWAIT set to Enable
Trusted Execution Technology set to Enable
DCA set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc0f
running on Staek-04 Tue Jun 19 07:27:04 2018

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 5120T CPU @ 2.20GHz
  2 "physical id"s (chips)
  28 "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 : 14
  siblings : 14
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 28
On-line CPU(s) list: 0-27
Thread(s) per core: 1
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5120T CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2194.834
BogoMIPS: 4389.66
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K

(Continued on next page)
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Platform Notes (Continued)

ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux Staek-04 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 19 01:36

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda4    xfs   689G   56G  634G   9% /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 -[TEE119R-1.22]- 02/06/2018
   Memory:
      4x NO DIMM NO DIMM
   12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

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.
------------------------------------------------------------------------------

==============================================================================
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.

(Continued on next page)
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<tr>
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<th>85.1</th>
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<tr>
<td>SPECspeed2017_fp_peak</td>
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2018
Hardware Availability: Aug-2017
Tested by: Lenovo Global Technology
Software Availability: Feb-2018

**Compiler Version Notes (Continued)**

```c
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.
```

```c
FC 607.cactuBSSN_s(peak)
```

```c
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.
```

```c
======================================================================================
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
======================================================================================
```

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

```c
======================================================================================
FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
======================================================================================
```

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

```c
======================================================================================
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
======================================================================================
```

```c
ifort (IFORT) 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.
```

```c
======================================================================================
CC 621.wrf_s(peak) 628.pop2_s(peak)
======================================================================================
```

```c
ifort (IFORT) 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.
```

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Lenovo Global Technology
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**SPEC CPU2017 Floating Point Speed Result**

| Test Date: | Jun-2018 |
| Test Sponsor: | Lenovo Global Technology |
| Hardware Availability: | Aug-2017 |
| Software Availability: | Feb-2018 |

**CPU2017 License:** 9017
**Tested by:** Lenovo Global Technology

**Compiler Version Notes (Continued)**

### 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.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

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ThinkSystem SD530
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SPECspeed2017_fp_base = 85.1
SPECspeed2017_fp_peak = 85.8

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=3 -qopenmp -DSPEC_OPENMP
-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 -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Base 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

Peak 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
## 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:

- `prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP`
- `-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -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`

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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SPECspeed2017_fp_base = 85.1
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Test Date: Jun-2018
Hardware Availability: Aug-2017
Software Availability: Feb-2018

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

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-SPECcpu2017-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-SPECcpu2017-Flags-V1.2-SKL-C.xml

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