### Lenovo Global Technology

**ThinkSystem SR630**  
(2.10 GHz, Intel Xeon Platinum 8176M)

---

**SPECrate2017_fp_base** = 227  
**SPECrate2017_fp_peak** = 232

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<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>May-2018</th>
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<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
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<td>Tested by:</td>
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<td>Feb-2018</td>
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#### Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>503</td>
<td>bwaves_r</td>
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<td>507</td>
<td>cactuBSSN_r</td>
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<td>508</td>
<td>namd_r</td>
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<td>510</td>
<td>parest_r</td>
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<td>511</td>
<td>povray_r</td>
<td>112</td>
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<td>519</td>
<td>lbm_r</td>
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<tr>
<td>521</td>
<td>wrf_r</td>
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<td>526</td>
<td>blender_r</td>
<td>112</td>
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<tr>
<td>527</td>
<td>cam4_r</td>
<td>112</td>
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<tr>
<td>538</td>
<td>imagick_r</td>
<td>112</td>
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<tr>
<td>544</td>
<td>nab_r</td>
<td>112</td>
</tr>
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<td>549</td>
<td>fotonik3d_r</td>
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<td>roms_r</td>
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#### Software

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<tr>
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<td></td>
<td>Enabled:</td>
<td>56 cores, 2 chips, 2 threads/core</td>
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<td>L3:</td>
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<table>
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<tr>
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<td>OS:</td>
<td>SUSE Linux Enterprise Server 12 SP2 (x86_64)</td>
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<td>Compiler:</td>
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<td>System State:</td>
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## Lenovo Global Technology

ThinkSystem SR630  
(2.10 GHz, Intel Xeon Platinum 8176M)

### SPEC CPU2017 Floating Point Rate Result

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<td>1839</td>
<td>96.8</td>
<td>1845</td>
<td>96.4</td>
</tr>
</tbody>
</table>

**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

**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:

- **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"

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`
- `runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>`

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8176M)

**SPECrate2017_fp_base = 227**

**SPECrate2017_fp_peak = 232**

<table>
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<th>9017</th>
<th>Test Date:</th>
<th>May-2018</th>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Feb-2018</td>
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</table>

**General Notes (Continued)**

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
SNC set to Enable
UPI Prefetcher set to Disable
MONITORMWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology 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 96c45e4568ad54c135fd618bce091c0f
running on Cable-SPECcpu2017-SUSE12SP2 Sat May 26 11:25:41 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) Platinum 8176M CPU @ 2.10GHz
2 "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 : 56
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

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: 2
Core(s) per socket: 28
Socket(s): 2

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8176M)  

**SPECrate2017_fp_base** = 227  
**SPECrate2017_fp_peak** = 232

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** May-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** Feb-2018

**Platform Notes (Continued)**

- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8176M CPU @ 2.10GHz
- Stepping: 4
- CPU MHz: 2095.073
- BogoMIPS: 4190.14
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 39424K
- NUMA node0 CPU(s): 0-3,7-9,14-17,21-23,56-59,63-65,70-73,77-79
- NUMA node1 CPU(s): 4-6,10-13,18-20,24-27,60-62,66-69,74-76,80-83
- NUMA node2 CPU(s): 28-31,35-37,42-45,49-51,84-87,91-93,98-101,105-107
- NUMA node3 CPU(s): 32-34,38-41,46-48,52-55,88-90,94-97,102-104,108-111
- 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single lpm pts dtherm intel_pt rsb_ctxtsw spec_ctrl retpoline kaiser tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi l1e avx2 smep bmi2 iberd invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves ecx xgetbv1 cqm_llc cqm_occup_llc

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 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78 79  
- node 0 size: 96355 MB  
- node 0 free: 95415 MB  
- node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81 82 83  
- node 1 size: 96753 MB  
- node 1 free: 95495 MB  
- node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100 101 105 106 107  
- node 2 size: 96753 MB  
- node 2 free: 95841 MB  
- node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 58 88 89 90 94 95 96 97 102 103 104  

(Continued on next page)
Platform Notes (Continued)

108 109 110 111
node 3 size: 96750 MB
node 3 free: 96151 MB
node distances:
node   0   1   2   3
0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal:       395891728 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

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 Cable-SPECcpu2017-SUSE12SP2 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 May 26 00:24

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 744G 218G 525G 30% /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 -[IVE113W-1.12]- 02/06/2018
Memory:
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8176M)

SPECrate2017_fp_base = 227
SPECrate2017_fp_peak = 232

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: May-2018
Tested by: Lenovo Global Technology
Hardware Availability: Aug-2017
Software Availability: Feb-2018

Platform Notes (Continued)

24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
     icc (ICC) 18.0.0 20170811
     Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
 CC  519.lbm_r(peak) 544.nab_r(peak)
     icc (ICC) 18.0.0 20170811
     Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
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     icpc (ICC) 18.0.0 20170811
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==============================================================================
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==============================================================================
 CC  511.povray_r(base) 526.blender_r(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.

==============================================================================
 CC  511.povray_r(peak) 526.blender_r(peak)

(Continued on next page)
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Compiler Version Notes (Continued)

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icc (ICC) 18.0.0 20170811
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ifort (IFORT) 18.0.0 20170811
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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 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
==============================================================================
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC 554.roms_r(peak)
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ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CC 521.wrf_r(base) 527.cam4_r(base)
==============================================================================
ifort (IFORT) 18.0.0 20170811
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**SPEC CPU2017 Floating Point Rate Result**

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**Hardware Availability:** Aug-2017  
**Software Availability:** Feb-2018

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**Compiler Version Notes (Continued)**

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

==============================================================================
CC  521.wrf_r(peak) 527.cam4_r(peak)
==============================================================================

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

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

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**Base Compiler Invocation**

C benchmarks:  
iccc

C++ benchmarks:  
icpc

Fortran benchmarks:  
ifort

Benchmarks using both Fortran and C:  
ifort iccc

Benchmarks using both C and C++:  
icpc iccc

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

---

**Base Portability Flags**

503.bwaves_r: -DSPEC_LP64  
507.cactuBSSN_r: -DSPEC_LP64  
508.namd_r: -DSPEC_LP64  
510.parest_r: -DSPEC_LP64  
511.povray_r: -DSPEC_LP64  
519.lbm_r: -DSPEC_LP64  
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsiged-char

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8176M)

SPECrate2017_fp_base = 227
SPECrate2017_fp_peak = 232

CPU2017 License: 9017
Test Date: May-2018
Test Sponsor: Lenovo Global Technology
Hardware Availability: Aug-2017
Tested by: Lenovo Global Technology
Software Availability: Feb-2018

Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

(Continued on next page)
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<th>9017</th>
<th>Test Date:</th>
<th>May-2018</th>
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<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Feb-2018</td>
</tr>
</tbody>
</table>

**Base Other Flags (Continued)**

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

**Peak Compiler Invocation**

- C benchmarks:
  `icc`
- C++ benchmarks:
  `icpc`
- Fortran benchmarks:
  `ifort`
- Benchmarks using both Fortran and C:
  `ifort icc`
- Benchmarks using both C and C++:
  `icpc icc`
- Benchmarks using Fortran, C, and C++:
  `icpc icc ifort`

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SR630  
(2.10 GHz, Intel Xeon Platinum 8176M)

**SPEC CPU2017 Floating Point Rate Result**

| SPECrate2017_fp_base = 227 |
| SPECrate2017_fp_peak = 232 |

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** May-2018  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Aug-2017  
**Software Availability:** Feb-2018

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**Peak Optimization Flags (Continued)**

519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

C++ benchmarks:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

Fortran benchmarks:

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3  
-nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both Fortran and C:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8176M)

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

SPECrate2017 fp_peak = 232
SPECrate2017 fp_base = 227

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

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

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

Benchmarks using both C 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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