## Lenovo Global Technology

**ThinkSystem SR850**  
(2.50 GHz, Intel Xeon Platinum 8180)

### SPECspeed2017_fp_base = 173  
### SPECspeed2017_fp_peak = 174

<table>
<thead>
<tr>
<th>Threaded Tests</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>112</td>
<td></td>
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</table>

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8180</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3800</td>
</tr>
<tr>
<td>Nominal</td>
<td>2500</td>
</tr>
<tr>
<td>Enabled</td>
<td>112 cores, 4 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>2,4 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>Cache L3</td>
<td>38.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)</td>
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<tr>
<td>Storage</td>
<td>1 x 800 GB SAS SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP2 (x86_64)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.4.121-92.80-default</td>
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<tr>
<td>Compiler</td>
<td>C/C++: Version 18.0.0.128 of Intel C/C++</td>
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<tr>
<td>Compiler for Linux</td>
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<tr>
<td>Fortran</td>
<td>Version 18.0.0.128 of Intel Fortran</td>
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<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
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<td>Other</td>
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## SPEC CPU2017 Floating Point Speed Result

### Lenovo Global Technology

**ThinkSystem SR850**  
(2.50 GHz, Intel Xeon Platinum 8180)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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<tr>
<td>SPECspeed2017_fp_peak</td>
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</tbody>
</table>

#### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td>213</td>
<td>71.4</td>
<td>220</td>
<td>72.2</td>
<td>218</td>
</tr>
</tbody>
</table>

**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"
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 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.

**Platform Notes**

BIOS configuration:  
Choose Operating Mode set to Custom Mode  
CPU P-state Control set to None

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
(2.50 GHz, Intel Xeon Platinum 8180)

SPECspeed2017_fp_base = 173
SPECspeed2017_fp_peak = 174

Platform Notes (Continued)

Page Policy set to Adaptive
C-States set to Legacy
Energy Efficient Turbo set to Disable
Platform Controlled Type set to Maximum Performance
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
Trusted Execution Technology set to Enable
DCA set to Enable
LLC dead line alloc set to Enable
Stale A to S set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c091c0f
running on Electron-node-01 Mon Jul 16 20:03:44 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 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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR850
(2.50 GHz, Intel Xeon Platinum 8180)

SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 173
SPECspeed2017_fp_peak = 174

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

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
Stepping: 4
CPU MHZ: 2494.135
BogoMIPS: 4988.27
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epg invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl stibp ssbd retpoline kaiser tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx avx512f avx512dq rdsched adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsave xsetive xgetbv1 cqm_llc cqm_occup_llc

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
Lenovo Global Technology
ThinkSystem SR850 (2.50 GHz, Intel Xeon Platinum 8180)

SPECspeed2017_fp_base = 173
SPECspeed2017_fp_peak = 174

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

Platform Notes (Continued)

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<th>0</th>
<th>1</th>
<th>2</th>
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<td>0:</td>
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<td>21</td>
<td>21</td>
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<tr>
<td>1:</td>
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<td>10</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>2:</td>
<td>21</td>
<td>31</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>3:</td>
<td>31</td>
<td>21</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

From /proc/meminfo
MemTotal: 1584967620 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 Electron-node-01 4.4.121-92.80-default #1 SMP Mon May 21 14:40:10 UTC 2018
  (2afdd00) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 16 10:38

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 688G 275G 414G 40% /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 -[TEE123N-1.40]- 06/12/2018
  Memory:
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR850
(2.50 GHz, Intel Xeon Platinum 8180)

SPEC CPU2017 Floating Point Speed Result

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Lenovo Global Technology

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

SPECspeed2017_fp_base = 173
SPECspeed2017_fp_peak = 174

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

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.
iccc (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.
iccc (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.

==============================================================================
FC   603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
==============================================================================
ifort (IFORT) 18.0.0 20170811

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Lenovo Global Technology
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SPECspeed2017_fp_base = 173
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Tested by: Lenovo Global Technology

Compiler Version Notes (Continued)

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--------------------------------------------------------------------------------
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

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

--------------------------------------------------------------------------------
CC  621.wrf_s(peak) 628.pop2_s(peak)

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.

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

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

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Lenovo Global Technology
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SPECspeed2017_fp_peak = 174
SPECspeed2017_fp_base = 173

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Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Base Portability Flags (Continued)

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

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
### Lenovo Global Technology

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<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jul-2018  
**Hardware Availability:** Aug-2017  
**Software Availability:** May-2018

### 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:
- 621.wrf_s: 
  -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

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Lenovo Global Technology
ThinkSystem SR850
(2.50 GHz, Intel Xeon Platinum 8180)

**SPECspeed2017_fp_base** = 173
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**CPU2017 License**: 9017  
**Test Sponsor**: Lenovo Global Technology  
**Tested by**: Lenovo Global Technology

**Test Date**: Jul-2018  
**Hardware Availability**: Aug-2017  
**Software Availability**: May-2018

---

**Peak Optimization Flags (Continued)**

621.wrf_s (continued):
-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

---

**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

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-H.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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