Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECram(2017_fp_base)</th>
<th>SPECram(2017_fp_peak)</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>112</td>
<td>247</td>
<td>537</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>112</td>
<td>247</td>
<td>537</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>112</td>
<td>258</td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>112</td>
<td>259</td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>112</td>
<td>375</td>
<td></td>
</tr>
<tr>
<td>519.lblm_r</td>
<td>112</td>
<td>413</td>
<td></td>
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<tr>
<td>521.wrf_r</td>
<td>112</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>112</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>112</td>
<td>361</td>
<td></td>
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<tr>
<td>538.imagick_r</td>
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<tr>
<td>544.nab_r</td>
<td>112</td>
<td>570</td>
<td>790</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>112</td>
<td>173</td>
<td>349</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>112</td>
<td>105</td>
<td>173</td>
</tr>
</tbody>
</table>

**Hardware**
- **CPU Name:** Intel Xeon Platinum 8280M
- **Max MHz:** 4000
- **Nominal:** 2700
- **Enabled:** 56 cores, 2 chips, 2 threads/core
- **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:** 38.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)
- **Storage:** 1 x 1.9 TB SSD SAS
- **Other:** None

**Software**
- **OS:** SUSE Linux Enterprise Server 15 (x86_64) 4.12.14-23-default
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** Version 4.0.4c released Apr-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

SPECrate®2017_fp_base = 277
SPECrate®2017_fp_peak = 281

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
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<td>1043</td>
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<td>112</td>
<td>1025</td>
<td>245</td>
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<td>350</td>
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<td>489</td>
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<tr>
<td>527.cam4_r</td>
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<td>543</td>
<td>361</td>
<td>544</td>
<td>360</td>
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<tr>
<td>544.nab_r</td>
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<td>570</td>
<td>332</td>
<td>572</td>
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<td>569</td>
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<tr>
<td>549.fotonik3d_r</td>
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<td>2524</td>
<td>173</td>
<td>2522</td>
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<tr>
<td>554.roms_r</td>
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<td>1689</td>
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<td>105</td>
<td>112</td>
<td>1692</td>
<td>105</td>
<td>1694</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/lib/intel64"

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
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

SPECrate®2017_fp_base = 277
SPECrate®2017_fp_peak = 281

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

General Notes (Continued)

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 Settings:
Intel HyperThreading Technology set to Enabled
SNC set to Enabled
IMC Interleaving set to 1-way Interleave
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
running on linux-4z0x Mon Jun  3 17:53:09 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 8280M CPU @ 2.70GHz
  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
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jun-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

Sony Ericsson pictures by photo from the phone.

**Platform Notes (Continued)**

```
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280M CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 5400.00
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 pdelgb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pcd cca sse4_1 sse4_2 x2apic movbe popcnt
```

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

<table>
<thead>
<tr>
<th>Available:</th>
<th>4 nodes (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0 cpus:</td>
<td>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</td>
</tr>
<tr>
<td>node 0 size:</td>
<td>192071 MB</td>
</tr>
<tr>
<td>node 0 free:</td>
<td>176886 MB</td>
</tr>
<tr>
<td>node 1 cpus:</td>
<td>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</td>
</tr>
<tr>
<td>node 1 size:</td>
<td>193525 MB</td>
</tr>
<tr>
<td>node 1 free:</td>
<td>181911 MB</td>
</tr>
<tr>
<td>node 2 cpus:</td>
<td>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</td>
</tr>
<tr>
<td>node 2 size:</td>
<td>193525 MB</td>
</tr>
<tr>
<td>node 2 free:</td>
<td>182082 MB</td>
</tr>
</tbody>
</table>

(Continued on next page)
### Platform Notes (Continued)

node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104 108 109 110 111
node 3 size: 193522 MB
node 3 free: 182069 MB
node distances:
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10

From /proc/meminfo
MemTotal:       791188692 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
```
os-release:
 NAME="SLES"
 VERSION="15"
 VERSION_ID="15"
 PRETTY_NAME="SUSE Linux Enterprise Server 15"
 ID="sles"
 ID_LIKE="suse"
 ANSI_COLOR="0;32"
 CPE_NAME="cpe:/o:suse:sles:15"
```

uname -a:
```
Linux linux-4z0x 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Jun 3 09:13

SPEC is set to: /home/cpu2017
```
<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sdaf1</td>
<td>xfs</td>
<td>891G</td>
<td>76G</td>
<td>816G 9% /</td>
</tr>
</tbody>
</table>
```

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

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

SPECratre®2017_fp_base = 277
SPECratre®2017_fp_peak = 281

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
BIOS Cisco Systems, Inc. C240M5.4.0.4c.0.0411190411 04/11/2019
Memory:
24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)  

SPECrater®2017_fp_base = 277
SPECrater®2017_fp_peak = 281

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
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SPECrater®2017_fp_base = 277
SPECrater®2017_fp_peak = 281

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Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

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 -funsigned-char
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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-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=4 -auto
-nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)

SPECrate®2017_fp_base = 277
SPECrate®2017_fp_peak = 281

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

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

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

538.imagick_r: -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

544.nab_r: Same as 538.imagick_r

C++ benchmarks:
508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

(Continued on next page)
Cisco Systems  
Cisco UCS C240 M5 (Intel Xeon Platinum 8280M, 2.70GHz)  

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<th>9019</th>
<th>Test Date:</th>
<th>Jun-2019</th>
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<td>Cisco Systems</td>
<td>Software Availability:</td>
<td>May-2019</td>
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**SPEC CPU®2017 Floating Point Rate Result**

SPECrade®2017_fp_base = 277

SPECrade®2017_fp_peak = 281

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**Peak Optimization Flags (Continued)**

510.parest_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Fortran benchmarks:

503.bwaves_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -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-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Benchmarks using both Fortran and C:

- `prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

526.blender_r: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Benchmarks using Fortran, C, and C++:

- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

---

The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml
Cisco Systems
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