SPEC® CPU2017 Floating Point Rate Result

Huawei

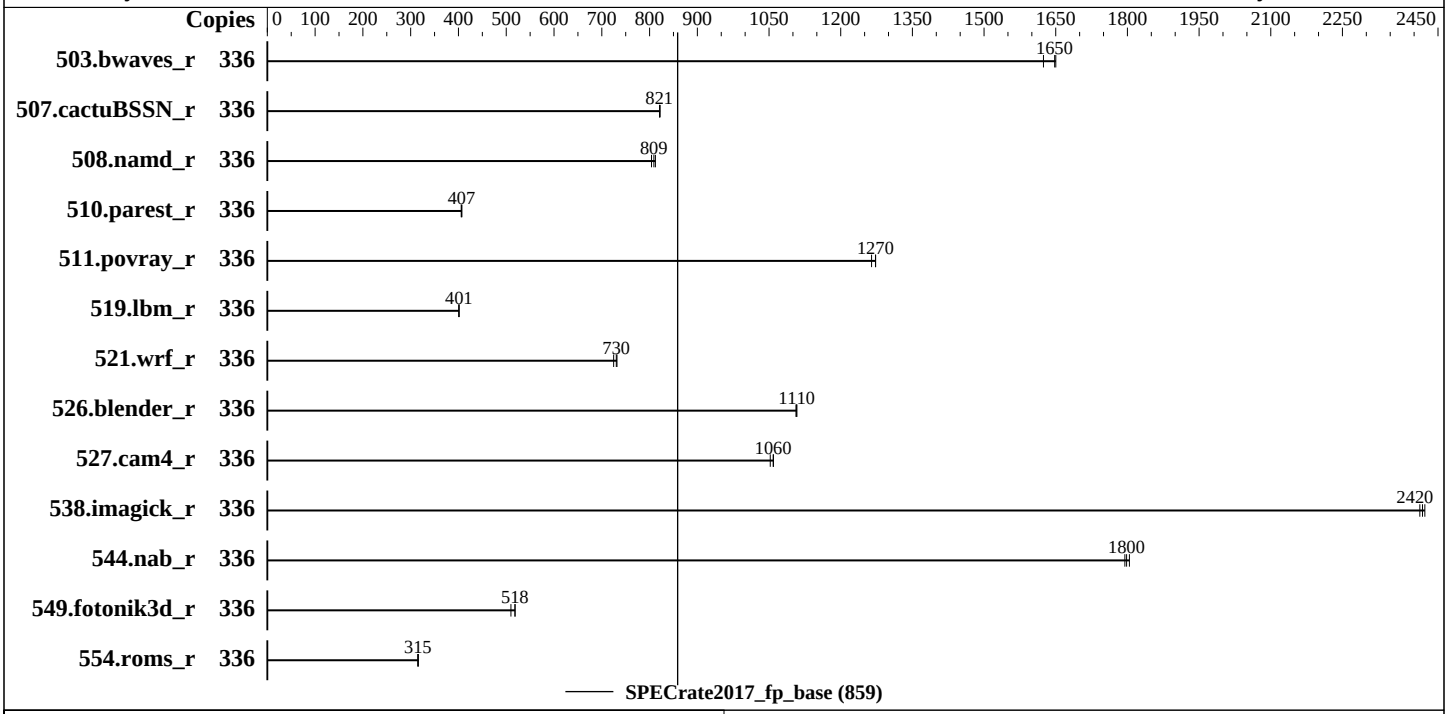
Huawei Kunlun 9008 V5 (Intel Xeon Platinum 8280)

SPECrate2017_fp_base = 859

SPECrate2017_fp_peak = Not Run

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018



Hardware

CPU Name:	Intel Xeon Platinum 8280
Max MHz.:	4000
Nominal:	2700
Enabled:	168 cores, 6 chips, 2 threads/core
Orderable:	2,4,6,8 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:	1152 GB (36 x 32 GB 2Rx4 PC4-2933Y-R)
Storage:	2 x 900 GB SAS HDD 10K RPM, RAID 0
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP4 4.12.14-94.41-default
Compiler:	C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
Parallel:	No
Firmware:	Version 9.25 released Feb-2019
File System:	tmpfs
System State:	Run level 5 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	336	2074	1620	2042	1650	**2045**	**1650**							
507.cactuBSSN_r	336	**518**	**821**	517	822	518	821							
508.namd_r	336	393	812	397	804	**395**	**809**							
510.parest_r	336	2159	407	**2162**	**407**	2166	406							
511.povray_r	336	**616**	**1270**	616	1270	620	1260							
519.lbm_r	336	**883**	**401**	883	401	883	401							
521.wrf_r	336	1038	725	**1031**	**730**	1029	732							
526.blender_r	336	**462**	**1110**	462	1110	463	1110							
527.cam4_r	336	**555**	**1060**	555	1060	558	1050							
538.imagick_r	336	345	2420	346	2410	**346**	**2420**							
544.nab_r	336	315	1790	**314**	**1800**	313	1800							
549.fotonik3d_r	336	**2527**	**518**	2568	510	2525	519							
554.roms_r	336	1689	316	1694	315	**1694**	**315**							

SPECrate2017_fp_base = 859

SPECrate2017_fp_peak = Not Run

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"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/memory/lib/ia32:/home/memory/lib/intel64:/home/memory/je5.0.1-32:/home/memory/je5.0.1-64"

 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.:
 numactl --interleave=all runcpu <etc>
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
```

(Continued on next page)

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 configuration:
 Sub NUMA Cluster (SNC) set to enabled
 IMC (Integrated memory controller) Interleaving set to 1 way interleave
 Xtended Prediction Table (XPT) Prefetch set to Enable
 Memory Patrol Scrub set to Disable
 Last Level Cache (LLC) Prefetch set to Disable
 Sysinfo program /home/memory/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-2yo1 Wed Mar 13 19:31:17 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 8280 CPU @ 2.70GHz
       6  "physical id"s (chips)
       336 "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
       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
       physical 4: 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 5: 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
```

(Continued on next page)

Platform Notes (Continued)

```
Byte Order:            Little Endian
CPU(s):                336
On-line CPU(s) list:   0-335
Thread(s) per core:    2
Core(s) per socket:    28
Socket(s):             6
NUMA node(s):          12
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8280 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):     0-3,7-9,14-17,21-23,168-171,175-177,182-185,189-191
NUMA node1 CPU(s):     4-6,10-13,18-20,24-27,172-174,178-181,186-188,192-195
NUMA node2 CPU(s):     28-31,35-37,42-45,49-51,196-199,203-205,210-213,217-219
NUMA node3 CPU(s):     32-34,38-41,46-48,52-55,200-202,206-209,214-216,220-223
NUMA node4 CPU(s):     56-59,63-65,70-73,77-79,224-227,231-233,238-241,245-247
NUMA node5 CPU(s):     60-62,66-69,74-76,80-83,228-230,234-237,242-244,248-251
NUMA node6 CPU(s):     84-87,91-93,98-101,105-107,252-255,259-261,266-269,273-275
NUMA node7 CPU(s):     88-90,94-97,102-104,108-111,256-258,262-265,270-272,276-279
NUMA node8 CPU(s):
112-115,119-121,126-129,133-135,280-283,287-289,294-297,301-303
NUMA node9 CPU(s):
116-118,122-125,130-132,136-139,284-286,290-293,298-300,304-307
NUMA node10 CPU(s):
140-143,147-149,154-157,161-163,308-311,315-317,322-325,329-331
NUMA node11 CPU(s):
144-146,150-153,158-160,164-167,312-314,318-321,326-328,332-335
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 cpuid
aperfmperf 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 cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
```

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Platform Notes (Continued)

```
      dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

 /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: 12 nodes (0-11)
   node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23 168 169 170 171 175 176 177 182 183 184
   185 189 190 191
   node 0 size: 95099 MB
   node 0 free: 90953 MB
   node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 172 173 174 178 179 180 181 186 187
   188 192 193 194 195
   node 1 size: 96728 MB
   node 1 free: 96123 MB
   node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 196 197 198 199 203 204 205 210
   211 212 213 217 218 219
   node 2 size: 96757 MB
   node 2 free: 96162 MB
   node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 200 201 202 206 207 208 209 214
   215 216 220 221 222 223
   node 3 size: 96757 MB
   node 3 free: 96169 MB
   node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79 224 225 226 227 231 232 233 238
   239 240 241 245 246 247
   node 4 size: 96757 MB
   node 4 free: 96138 MB
   node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83 228 229 230 234 235 236 237 242
   243 244 248 249 250 251
   node 5 size: 96757 MB
   node 5 free: 96165 MB
   node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107 252 253 254 255 259 260 261
   266 267 268 269 273 274 275
   node 6 size: 96757 MB
   node 6 free: 95281 MB
   node 7 cpus: 88 89 90 94 95 96 97 102 103 104 108 109 110 111 256 257 258 262 263 264
   265 270 271 272 276 277 278 279
   node 7 size: 96757 MB
   node 7 free: 96161 MB
   node 8 cpus: 112 113 114 115 119 120 121 126 127 128 129 133 134 135 280 281 282 283
   287 288 289 294 295 296 297 301 302 303
   node 8 size: 96757 MB
   node 8 free: 94349 MB
   node 9 cpus: 116 117 118 122 123 124 125 130 131 132 136 137 138 139 284 285 286 290
   291 292 293 298 299 300 304 305 306 307
   node 9 size: 96757 MB
```

(Continued on next page)

Platform Notes (Continued)

```
   node 9 free: 95539 MB
   node 10 cpus: 140 141 142 143 147 148 149 154 155 156 157 161 162 163 308 309 310 311
   315 316 317 322 323 324 325 329 330 331
   node 10 size: 96757 MB
   node 10 free: 96158 MB
   node 11 cpus: 144 145 146 150 151 152 153 158 159 160 164 165 166 167 312 313 314 318
   319 320 321 326 327 328 332 333 334 335
   node 11 size: 96532 MB
   node 11 free: 95943 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11
     0:  10  11  31  31  21  21  21  21  21  21  31  31
     1:  11  10  31  31  21  21  21  21  21  21  31  31
     2:  31  31  10  11  21  21  21  21  31  31  21  21
     3:  31  31  11  10  21  21  21  21  31  31  21  21
     4:  21  21  21  21  10  11  31  31  31  31  31  31
     5:  21  21  21  21  11  10  31  31  31  31  31  31
     6:  21  21  21  21  31  31  10  11  31  31  31  31
     7:  21  21  21  21  31  31  11  10  31  31  31  31
     8:  21  21  31  31  31  31  31  31  10  11  21  21
     9:  21  21  31  31  31  31  31  31  11  10  21  21
    10:  31  31  21  21  31  31  31  31  21  21  10  11
    11:  31  31  21  21  31  31  31  31  21  21  11  10

From /proc/meminfo
   MemTotal:       1186998592 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP4

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 4
      # 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-SP4"
      VERSION_ID="12.4"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp4"
```

(Continued on next page)

Platform Notes (Continued)

```
 uname -a:
    Linux linux-2yo1 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 5 Mar 13 15:08

 SPEC is set to: /home/memory
    Filesystem     Type   Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  600G  4.2G  596G   1% /home/memory

 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 INSYDE Corp. 9.25 02/15/2019
   Memory:
    60x NO DIMM NO DIMM
    36x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

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Compiler Version Notes (Continued)

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  507.cactuBSSN_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)

Base Compiler Invocation (Continued)

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

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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

(Continued on next page)

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
`-xCORE-AVX2 -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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Base 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/Huawei-Platform-Settings-SKL-V1.7.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/Huawei-Platform-Settings-SKL-V1.7.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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