SPEC® CPU2017 Floating Point Rate Result

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Huawei

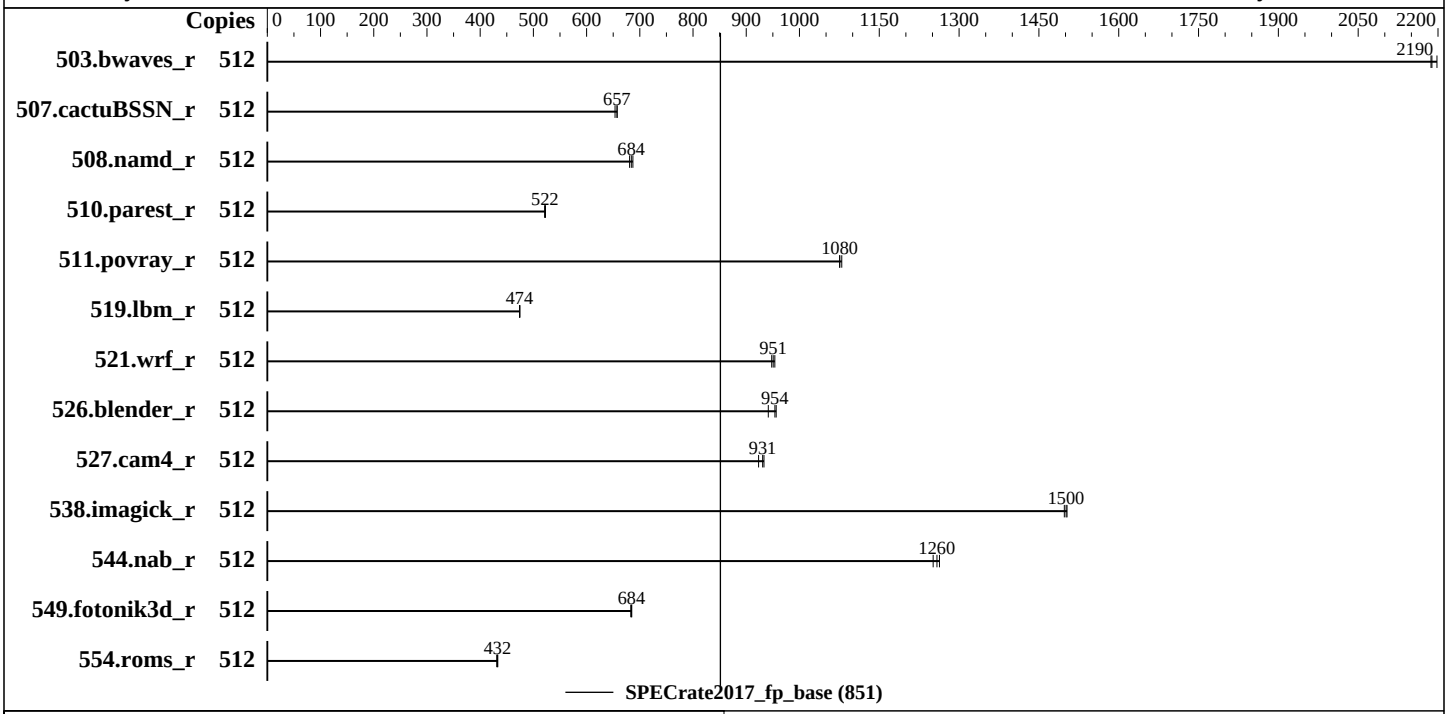
KunLun 9016 (Intel Xeon E7-4850 v4)

SPECrate2017_fp_base = 851

SPECrate2017_fp_peak = Not Run

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

Test Date: May-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018



Hardware

CPU Name:	Intel Xeon E7-4850 v4
Max MHz.:	2800
Nominal:	2100
Enabled:	256 cores, 16 chips, 2 threads/core
Orderable:	4,8,16 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	40 MB I+D on chip per chip
Other:	None
Memory:	4 TB (128 x 32 GB 2Rx4 PC4-2400T-R, running at 1333)
Storage:	3 x 900 GB SAS HDD 10K RPM, RAID 0
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP2 4.4.120-92.70-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:	No
Firmware:	Version BLXSV320 released Feb-2018
File System:	ext4
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	512	2348	2190	2336	2200	**2346**	**2190**							
507.cactuBSSN_r	512	986	657	**986**	**657**	992	653							
508.namd_r	512	714	681	708	687	**711**	**684**							
510.parest_r	512	2562	523	2570	521	**2567**	**522**							
511.povray_r	512	1112	1080	1107	1080	**1111**	**1080**							
519.lbm_r	512	**1138**	**474**	1139	474	1137	475							
521.wrf_r	512	1210	948	**1206**	**951**	1203	954							
526.blender_r	512	815	956	828	941	**817**	**954**							
527.cam4_r	512	970	923	**962**	**931**	959	933							
538.imagick_r	512	850	1500	**848**	**1500**	847	1500							
544.nab_r	512	682	1260	**685**	**1260**	689	1250							
549.fotonik3d_r	512	2914	685	**2915**	**684**	2922	683							
554.roms_r	512	**1881**	**432**	1887	431	1878	433							

SPECrate2017_fp_base = 851

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/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/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>
```

(Continued on next page)

General Notes (Continued)

```
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:
 Set Power Efficiency Mode to Performance
 Memory Patrol Scrub set to Disable
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-i5c0 Tue Jul  3 00:26:28 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) CPU E7-4850 v4 @ 2.10GHz
       16  "physical id"s (chips)
       512 "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 : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 4: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 5: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 6: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 7: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 8: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 9: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 10: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 11: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 12: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 13: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 14: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 15: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 From lscpu:
```

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Platform Notes (Continued)

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                512
On-line CPU(s) list:   0-511
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             16
NUMA node(s):          16
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 79
Model name:            Intel(R) Xeon(R) CPU E7-4850 v4 @ 2.10GHz
Stepping:              1
CPU MHz:               2100.000
CPU max MHz:           2800.0000
CPU min MHz:           1200.0000
BogoMIPS:              4200.05
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              256K
L3 cache:              40960K
NUMA node0 CPU(s):     0-15,256-271
NUMA node1 CPU(s):     16-31,272-287
NUMA node2 CPU(s):     32-47,288-303
NUMA node3 CPU(s):     48-63,304-319
NUMA node4 CPU(s):     64-79,320-335
NUMA node5 CPU(s):     80-95,336-351
NUMA node6 CPU(s):     96-111,352-367
NUMA node7 CPU(s):     112-127,368-383
NUMA node8 CPU(s):     128-143,384-399
NUMA node9 CPU(s):     144-159,400-415
NUMA node10 CPU(s):    160-175,416-431
NUMA node11 CPU(s):    176-191,432-447
NUMA node12 CPU(s):    192-207,448-463
NUMA node13 CPU(s):    208-223,464-479
NUMA node14 CPU(s):    224-239,480-495
NUMA node15 CPU(s):    240-255,496-511
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu mce_recovery pni pclmulqdq dtes64 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 arat epb invpcid_single pln pts
dtherm intel_pt spec_ctrl stibp retpoline kaiser tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdseed adx
```

(Continued on next page)

Platform Notes (Continued)

```
      smap xsaveopt cqm_llc cqm_occup_llc

 /proc/cpuinfo cache data
    cache size : 40960 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 16 nodes (0-15)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 256 257 258 259 260 261 262 263 264
   265 266 267 268 269 270 271
   node 0 size: 257423 MB
   node 0 free: 248874 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 272 273 274 275 276 277
   278 279 280 281 282 283 284 285 286 287
   node 1 size: 258024 MB
   node 1 free: 251608 MB
   node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 288 289 290 291 292 293
   294 295 296 297 298 299 300 301 302 303
   node 2 size: 258024 MB
   node 2 free: 251587 MB
   node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 304 305 306 307 308 309
   310 311 312 313 314 315 316 317 318 319
   node 3 size: 258024 MB
   node 3 free: 251646 MB
   node 4 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 320 321 322 323 324 325
   326 327 328 329 330 331 332 333 334 335
   node 4 size: 258024 MB
   node 4 free: 251514 MB
   node 5 cpus: 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 336 337 338 339 340 341
   342 343 344 345 346 347 348 349 350 351
   node 5 size: 258024 MB
   node 5 free: 251526 MB
   node 6 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 352 353 354
   355 356 357 358 359 360 361 362 363 364 365 366 367
   node 6 size: 258024 MB
   node 6 free: 251441 MB
   node 7 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 368 369
   370 371 372 373 374 375 376 377 378 379 380 381 382 383
   node 7 size: 258024 MB
   node 7 free: 251292 MB
   node 8 cpus: 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 384 385
   386 387 388 389 390 391 392 393 394 395 396 397 398 399
   node 8 size: 258024 MB
   node 8 free: 251645 MB
   node 9 cpus: 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 400 401
   402 403 404 405 406 407 408 409 410 411 412 413 414 415
   node 9 size: 258024 MB
```

(Continued on next page)

Platform Notes (Continued)

```
   node 9 free: 251547 MB
   node 10 cpus: 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 416 417
   418 419 420 421 422 423 424 425 426 427 428 429 430 431
   node 10 size: 258024 MB
   node 10 free: 251653 MB
   node 11 cpus: 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 432 433
   434 435 436 437 438 439 440 441 442 443 444 445 446 447
   node 11 size: 258024 MB
   node 11 free: 251645 MB
   node 12 cpus: 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 448 449
   450 451 452 453 454 455 456 457 458 459 460 461 462 463
   node 12 size: 258024 MB
   node 12 free: 251638 MB
   node 13 cpus: 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 464 465
   466 467 468 469 470 471 472 473 474 475 476 477 478 479
   node 13 size: 258024 MB
   node 13 free: 251648 MB
   node 14 cpus: 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 480 481
   482 483 484 485 486 487 488 489 490 491 492 493 494 495
   node 14 size: 258024 MB
   node 14 free: 251646 MB
   node 15 cpus: 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 496 497
   498 499 500 501 502 503 504 505 506 507 508 509 510 511
   node 15 size: 257856 MB
   node 15 free: 251479 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  21  31  21  41  41  51  51  61  61  71  71  61  61  71  71
     1:  21  10  21  31  41  41  51  51  61  61  71  71  61  61  71  71
     2:  31  21  10  21  51  51  41  41  71  71  61  61  71  71  61  61
     3:  21  31  21  10  51  51  41  41  71  71  61  61  71  71  61  61
     4:  41  41  51  51  10  21  31  21  61  61  71  71  61  61  71  71
     5:  41  41  51  51  21  10  21  31  61  61  71  71  61  61  71  71
     6:  51  51  41  41  31  21  10  21  71  71  61  61  71  71  61  61
     7:  51  51  41  41  21  31  21  10  71  71  61  61  71  71  61  61
     8:  61  61  71  71  61  61  71  71  10  21  31  21  41  41  51  51
     9:  61  61  71  71  61  61  71  71  21  10  21  31  41  41  51  51
    10:  71  71  61  61  71  71  61  61  31  21  10  21  51  51  41  41
    11:  71  71  61  61  71  71  61  61  21  31  21  10  51  51  41  41
    12:  61  61  71  71  61  61  71  71  41  41  51  51  10  21  31  21
    13:  61  61  71  71  61  61  71  71  41  41  51  51  21  10  21  31
    14:  71  71  61  61  71  71  61  61  51  51  41  41  31  21  10  21
    15:  71  71  61  61  71  71  61  61  51  51  41  41  21  31  21  10

 From /proc/meminfo
    MemTotal:       4226684040 kB
    HugePages_Total:       0
```

(Continued on next page)

Platform Notes (Continued)

```
    Hugepagesize:       2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP2

 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 linux-i5c0 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 5 Jul 2 16:29

 SPEC is set to: /home/cpu2017
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sda4      btrfs  2.4T  208G  2.2T   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 American Megatrends Inc. BLXSV320 2/23/2018
   Memory:
    70x Hynix HMA84GR7MFR4N-UH 32 GB 2 rank 2400, configured at 1333
    15x Micron 36ASF4G72PZ-2G3B1 32 GB 2 rank 2400, configured at 1333
    256x NO DIMM NO DIMM
    43x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400, configured at 1333

 (End of data from sysinfo program)
```

Compiler Version Notes

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

==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 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.
------------------------------------------------------------------------------

==============================================================================
 FC  507.cactuBSSN_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.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

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

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base 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

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=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

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-V1.2-BDW-RevG.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-V1.2-BDW-RevG.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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