SPEC® CPU2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

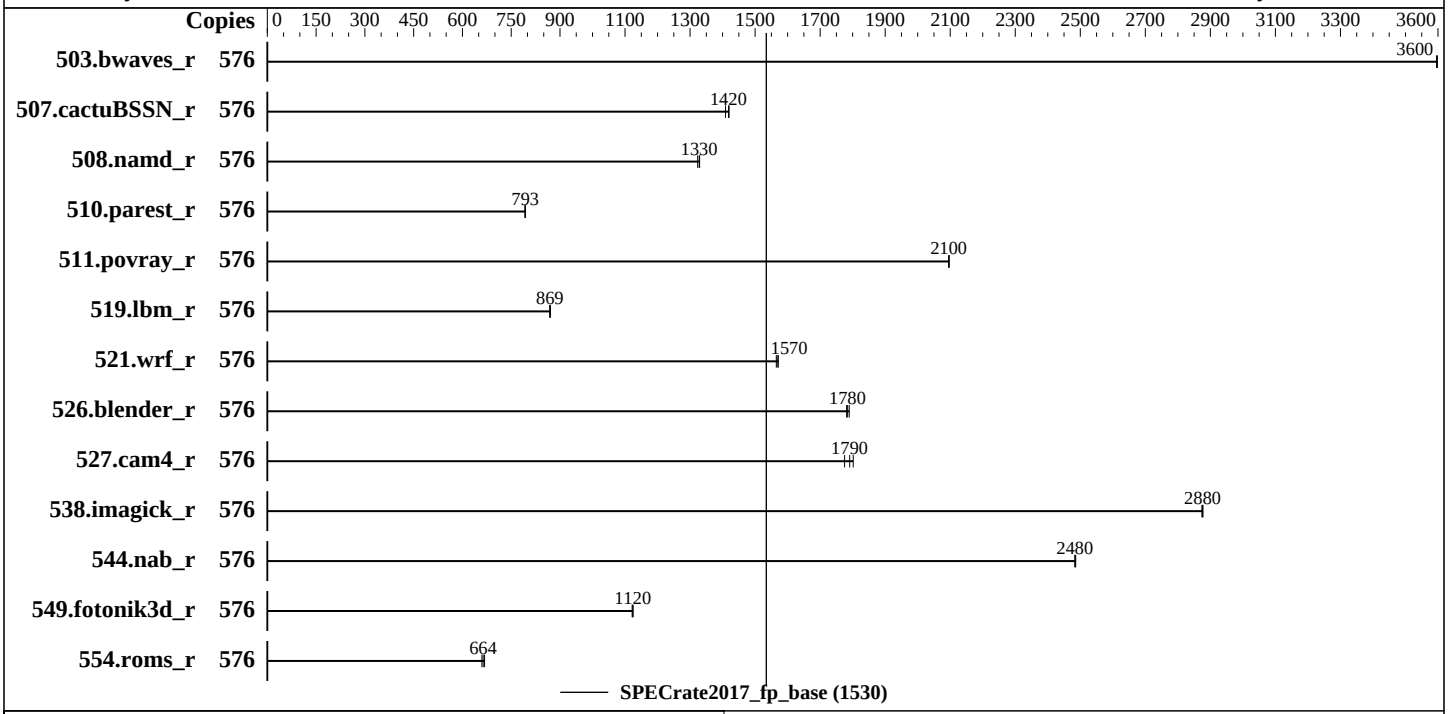
Superdome Flex
(3.00 GHz, Intel Xeon Gold 6154)

SPECrate2017_fp_base = 1530

SPECrate2017_fp_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2017
Hardware Availability: Mar-2018
Software Availability: Mar-2018



Hardware

CPU Name:	Intel Xeon Gold 6154
Max MHz.:	3700
Nominal:	3000
Enabled:	288 cores, 16 chips, 2 threads/core
Orderable:	4 to 32 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	24.75 MB I+D on chip per chip
Other:	None
Memory:	6 TB (192 x 32 GB 2Rx4 PC4-2666V-R)
Storage:	6 TB tmpfs
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 (x86_64) SP2, Kernel 4.4.74-92.38-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:	HPE Firmware Bundle Version 2.3.110 released Dec-2017 (tested with 2.3.92 11/17/2017)
File System:	tmpfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	HPE Foundation Software 1.0, Build 717a270.sles12sp2-1709012000

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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	576	**1606**	**3600**	1606	3600	1605	3600							
507.cactuBSSN_r	576	518	1410	**514**	**1420**	514	1420							
508.namd_r	576	412	1330	**412**	**1330**	414	1320							
510.parest_r	576	1898	794	**1900**	**793**	1902	792							
511.povray_r	576	642	2100	**642**	**2100**	641	2100							
519.lbm_r	576	698	870	699	869	**699**	**869**							
521.wrf_r	576	**823**	**1570**	824	1570	821	1570							
526.blender_r	576	492	1780	490	1790	**492**	**1780**							
527.cam4_r	576	568	1780	**563**	**1790**	559	1800							
538.imagick_r	576	498	2870	498	2880	**498**	**2880**							
544.nab_r	576	**390**	**2480**	390	2480	390	2490							
549.fotonik3d_r	576	**1997**	**1120**	2001	1120	1996	1120							
554.roms_r	576	**1379**	**664**	1370	668	1387	660							

SPECrate2017_fp_base = 1530

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"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>       /proc/sys/vm/drop_caches
The tmpfs filesystem was set up with:
   mkdir -p /dev/shm/cpu2017-16S
   mount -t tmpfs -o size=6144G,rw tmpfs /dev/shm/cpu2017-16S
```

General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/dev/shm/cpu2017-16S/lib/ia32:/dev/shm/cpu2017-16S/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/dev/shm/cpu2017-16S/je5.0.1-32:/dev/shm/cpu2017-16S/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
```

Platform Notes

```
Rack Management Controller setting:
   modify npar pnum=0 ras=hpc

Sysinfo program /dev/shm/cpu2017-16S/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on uv4test35-sys Sat Dec  9 05:41:50 2017

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) Gold 6154 CPU @ 3.00GHz
      16  "physical id"s (chips)
      576 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 7: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 8: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 9: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 10: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 11: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 12: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 13: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 14: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 15: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                576
     On-line CPU(s) list:   0-575
     Thread(s) per core:    2
     Core(s) per socket:    18
     Socket(s):             16
     NUMA node(s):          16
     Vendor ID:             GenuineIntel
```

(Continued on next page)

Platform Notes (Continued)

```
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz
      Stepping:              4
      CPU MHz:               3700.000
      CPU max MHz:           3700.0000
      CPU min MHz:           1200.0000
      BogoMIPS:              6000.57
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              25344K
      NUMA node0 CPU(s):     0-17,288-305
      NUMA node1 CPU(s):     18-35,306-323
      NUMA node2 CPU(s):     36-53,324-341
      NUMA node3 CPU(s):     54-71,342-359
      NUMA node4 CPU(s):     72-89,360-377
      NUMA node5 CPU(s):     90-107,378-395
      NUMA node6 CPU(s):     108-125,396-413
      NUMA node7 CPU(s):     126-143,414-431
      NUMA node8 CPU(s):     144-161,432-449
      NUMA node9 CPU(s):     162-179,450-467
      NUMA node10 CPU(s):    180-197,468-485
      NUMA node11 CPU(s):    198-215,486-503
      NUMA node12 CPU(s):    216-233,504-521
      NUMA node13 CPU(s):    234-251,522-539
      NUMA node14 CPU(s):    252-269,540-557
      NUMA node15 CPU(s):    270-287,558-575
      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 pln pts dtherm intel_pt
      tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
      erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
      avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

  /proc/cpuinfo cache data
     cache size : 25344 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 16 17 288 289 290 291 292 293 294
    295 296 297 298 299 300 301 302 303 304 305
```

(Continued on next page)

Platform Notes (Continued)

```
node 0 size: 372920 MB
node 0 free: 328030 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 306 307 308 309 310
311 312 313 314 315 316 317 318 319 320 321 322 323
node 1 size: 375252 MB
node 1 free: 331825 MB
node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 324 325 326 327 328
329 330 331 332 333 334 335 336 337 338 339 340 341
node 2 size: 375252 MB
node 2 free: 332710 MB
node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 342 343 344 345 346
347 348 349 350 351 352 353 354 355 356 357 358 359
node 3 size: 375252 MB
node 3 free: 332794 MB
node 4 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 360 361 362 363 364
365 366 367 368 369 370 371 372 373 374 375 376 377
node 4 size: 375252 MB
node 4 free: 332733 MB
node 5 cpus: 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 378 379 380
381 382 383 384 385 386 387 388 389 390 391 392 393 394 395
node 5 size: 375252 MB
node 5 free: 332754 MB
node 6 cpus: 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413
node 6 size: 375252 MB
node 6 free: 332673 MB
node 7 cpus: 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143
414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431
node 7 size: 375252 MB
node 7 free: 332762 MB
node 8 cpus: 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161
432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449
node 8 size: 375252 MB
node 8 free: 332790 MB
node 9 cpus: 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179
450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467
node 9 size: 375252 MB
node 9 free: 332830 MB
node 10 cpus: 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197
468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485
node 10 size: 375252 MB
node 10 free: 332747 MB
node 11 cpus: 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215
486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503
node 11 size: 375252 MB
node 11 free: 332827 MB
node 12 cpus: 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233
```

(Continued on next page)

Platform Notes (Continued)

```
   504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521
   node 12 size: 375252 MB
   node 12 free: 332789 MB
   node 13 cpus: 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251
   522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539
   node 13 size: 375252 MB
   node 13 free: 332824 MB
   node 14 cpus: 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269
   540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557
   node 14 size: 375252 MB
   node 14 free: 332809 MB
   node 15 cpus: 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287
   558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575
   node 15 size: 375244 MB
   node 15 free: 332798 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  16  43  43  43  43  43  43  43  43  43  43  43  43  43  43
     1:  16  10  43  43  43  43  43  43  43  43  43  43  43  43  43  43
     2:  43  43  10  16  43  43  43  43  43  43  43  43  43  43  43  43
     3:  43  43  16  10  43  43  43  43  43  43  43  43  43  43  43  43
     4:  43  43  43  43  10  16  43  43  43  43  43  43  43  43  43  43
     5:  43  43  43  43  16  10  43  43  43  43  43  43  43  43  43  43
     6:  43  43  43  43  43  43  10  16  43  43  43  43  43  43  43  43
     7:  43  43  43  43  43  43  16  10  43  43  43  43  43  43  43  43
     8:  43  43  43  43  43  43  43  43  10  16  43  43  43  43  43  43
     9:  43  43  43  43  43  43  43  43  16  10  43  43  43  43  43  43
    10:  43  43  43  43  43  43  43  43  43  43  10  16  43  43  43  43
    11:  43  43  43  43  43  43  43  43  43  43  16  10  43  43  43  43
    12:  43  43  43  43  43  43  43  43  43  43  43  43  10  16  43  43
    13:  43  43  43  43  43  43  43  43  43  43  43  43  16  10  43  43
    14:  43  43  43  43  43  43  43  43  43  43  43  43  43  43  10  16
    15:  43  43  43  43  43  43  43  43  43  43  43  43  43  43  16  10

 From /proc/meminfo
    MemTotal:       6145746556 kB
    HugePages_Total:       0
    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
```

(Continued on next page)

Platform Notes (Continued)

```
      # 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.
   hpe-foundation-release: HPE Foundation Software 1.0, Build
   717a270.sles12sp2-1709012000
   hpe-mpi-release: HPE MPI 1.2, Build 718a13.sles12sp2-1710021900
   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"
   sgi-release: SGI Performance Suite 1.16

 uname -a:
   Linux uv4test35-sys 4.4.74-92.38-default #1 SMP Tue Sep 12 19:43:46 UTC 2017 (545c055)
   x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Dec 7 12:57

 SPEC is set to: /dev/shm/cpu2017-16S
   Filesystem     Type   Size  Used Avail Use% Mounted on
   tmpfs          tmpfs  6.0T  107G  5.9T   2% /dev/shm/cpu2017-16S

 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.

 (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.
```

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

==============================================================================
 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
Copyright (C) 1985-2017 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=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

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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=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/HPE-Superdome_Flex-RevA.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/HPE-Superdome_Flex-RevA.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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