SPEC® CPU2017 Floating Point Rate Result

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Fujitsu

PRIMEQUEST 3800B, Intel Xeon Platinum 8170, 2.10GHz

SPECrate2017_fp_base =   864

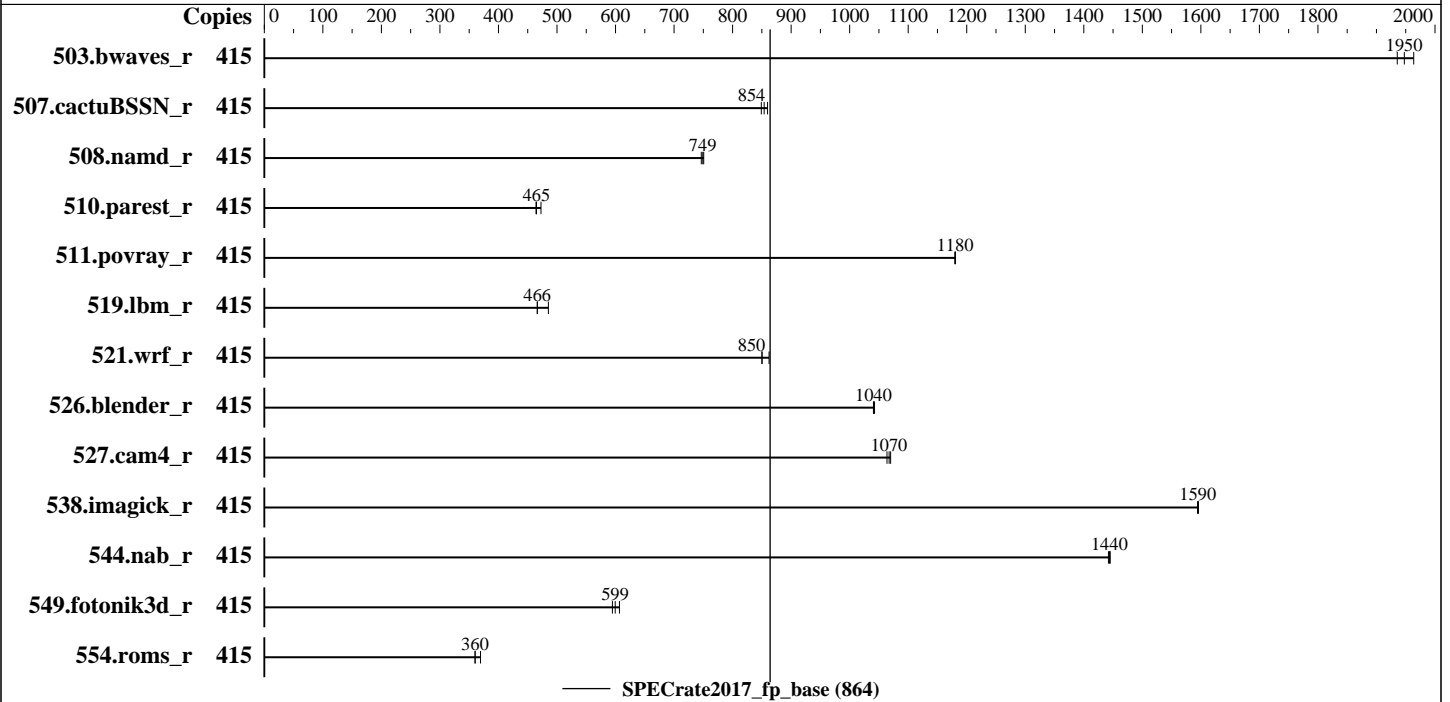SPECrate2017_fp_peak = Not Run

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Nov-2017

Hardware Availability: Jul-2017

Software Availability: Sep-2017

Copies — scale 0 to 2000

Benchmark	Copies	Value
503.bwaves_r	415	1950
507.cactuBSSN_r	415	854
508.namd_r	415	749
510.parest_r	415	465
511.povray_r	415	1180
519.lbm_r	415	466
521.wrf_r	415	850
526.blender_r	415	1040
527.cam4_r	415	1070
538.imagick_r	415	1590
544.nab_r	415	1440
549.fotonik3d_r	415	599
554.roms_r	415	360

SPECrate2017_fp_base (864)

Hardware

CPU Name: Intel Xeon Platinum 8170
 Max MHz.:   3700
 Nominal: 2100
Enabled: 208 cores, 8 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:   35.75 MB I+D on chip per chip
 Other: None
Memory: 1536 GB (96 x 16 GB 2Rx4 PC4-2666V-R)
Storage: 768 GB tmpfs
Other: 1 x SAS HDD, 600 GB, 10.5K RPM, used for swap

Software

OS: SUSE Linux Enterprise Server 12 SP2
   4.4.21-69-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: Fujitsu BIOS Version V1.0.0.0 R1.21.0 for D3858-A1x. Released Dec-2017
File System: tmpfs
System State: Run level 3 (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	415	2119	1960	**2137**	**1950**	2150	1940							
507.cactuBSSN_r	415	611	860	**615**	**854**	619	849							
508.namd_r	415	**526**	**749**	528	746	525	751							
510.parest_r	415	2297	473	**2335**	**465**	2339	464							
511.povray_r	415	821	1180	**821**	**1180**	821	1180							
519.lbm_r	415	901	485	**938**	**466**	938	466							
521.wrf_r	415	1078	862	1094	850	**1093**	**850**							
526.blender_r	415	606	1040	**607**	**1040**	607	1040							
527.cam4_r	415	678	1070	**680**	**1070**	682	1060							
538.imagick_r	415	647	1600	**647**	**1590**	647	1590							
544.nab_r	415	484	1440	**484**	**1440**	483	1450							
549.fotonik3d_r	415	2666	607	**2698**	**599**	2720	595							
554.roms_r	415	1785	369	1831	360	**1831**	**360**							

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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"
Set Kernel Boot Parameter : nohz_full=1-415 isolcpus=1-415
Set tmpfs filesystem with:
mkdir /home/memory
mount -t tmpfs -o size=768g,rw tmpfs /home/memory
Process tuning setting:
echo 0 > /proc/sys/kernel/numa_balancing
echo never > /sys/kernel/mm/transparent_hugepage/enabled
cpu idle state set with:
cpupower idle-set -d 1
cpupower idle-set -d 2
set affinity of rcu threads to the cpu0:
for i in `pgrep rcu` ; do taskset -pc 0 $i ; done
```

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General Notes

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

Platform Notes

```
 BIOS configuration:
 DCU Streamer Prefetcher = Disabled
 Sub NUMA Clustering = Enabled
 Stale AtoS = Enabled
 LLC Dead Line Alloc = Disabled
 Fan Control = Full
 Sysinfo program /home/memory/speccpu/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-k55j Thu Nov 16 23:49:11 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) Platinum 8170 CPU @ 2.10GHz
       8   "physical id"s (chips)
       416 "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 : 26
       siblings  : 52
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
```

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Platform Notes (Continued)

```
     29
   physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
   29
   physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
   29

 From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                416
     On-line CPU(s) list:   0-415
     Thread(s) per core:    2
     Core(s) per socket:    26
     Socket(s):             8
     NUMA node(s):          16
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 85
     Model name:            Intel(R) Xeon(R) Platinum 8170 CPU @ 2.10GHz
     Stepping:              4
     CPU MHz:               2799.999
     CPU max MHz:           3700.0000
     CPU min MHz:           1000.0000
     BogoMIPS:              4200.25
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              1024K
     L3 cache:              36608K
     NUMA node0 CPU(s):     0-3,7-9,13-15,20-22,208-211,215-217,221-223,228-230
     NUMA node1 CPU(s):     4-6,10-12,16-19,23-25,212-214,218-220,224-227,231-233
     NUMA node2 CPU(s):     26-29,33-35,39-41,46-48,234-237,241-243,247-249,254-256
     NUMA node3 CPU(s):     30-32,36-38,42-45,49-51,238-240,244-246,250-253,257-259
     NUMA node4 CPU(s):     52-55,59-61,65-67,72-74,260-263,267-269,273-275,280-282
     NUMA node5 CPU(s):     56-58,62-64,68-71,75-77,264-266,270-272,276-279,283-285
     NUMA node6 CPU(s):     78-81,85-87,91-93,98-100,286-289,293-295,299-301,306-308
     NUMA node7 CPU(s):     82-84,88-90,94-97,101-103,290-292,296-298,302-305,309-311
     NUMA node8 CPU(s):
   104-107,111-113,117-119,124-126,312-315,319-321,325-327,332-334
     NUMA node9 CPU(s):
   108-110,114-116,120-123,127-129,316-318,322-324,328-331,335-337
     NUMA node10 CPU(s):
   130-133,137-139,143-145,150-152,338-341,345-347,351-353,358-360
     NUMA node11 CPU(s):
   134-136,140-142,146-149,153-155,342-344,348-350,354-357,361-363
     NUMA node12 CPU(s):
```

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Platform Notes (Continued)

```
     156-159,163-165,169-171,176-178,364-367,371-373,377-379,384-386
     NUMA node13 CPU(s):
     160-162,166-168,172-175,179-181,368-370,374-376,380-383,387-389
     NUMA node14 CPU(s):
     182-185,189-191,195-197,202-204,390-393,397-399,403-405,410-412
     NUMA node15 CPU(s):
     186-188,192-194,198-201,205-207,394-396,400-402,406-409,413-415
     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 hwp
     hwp_act_window hwp_epp hwp_pkg_req 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 : 36608 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 7 8 9 13 14 15 20 21 22 208 209 210 211 215 216 217 221 222 223
    228 229 230
    node 0 size: 95377 MB
    node 0 free: 85747 MB
    node 1 cpus: 4 5 6 10 11 12 16 17 18 19 23 24 25 212 213 214 218 219 220 224 225 226
    227 231 232 233
    node 1 size: 96763 MB
    node 1 free: 96528 MB
    node 2 cpus: 26 27 28 29 33 34 35 39 40 41 46 47 48 234 235 236 237 241 242 243 247 248
    249 254 255 256
    node 2 size: 96763 MB
    node 2 free: 96527 MB
    node 3 cpus: 30 31 32 36 37 38 42 43 44 45 49 50 51 238 239 240 244 245 246 250 251 252
    253 257 258 259
    node 3 size: 96763 MB
    node 3 free: 96528 MB
    node 4 cpus: 52 53 54 55 59 60 61 65 66 67 72 73 74 260 261 262 263 267 268 269 273 274
    275 280 281 282
    node 4 size: 96763 MB
    node 4 free: 96527 MB
    node 5 cpus: 56 57 58 62 63 64 68 69 70 71 75 76 77 264 265 266 270 271 272 276 277 278
    279 283 284 285
    node 5 size: 96763 MB
```

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Platform Notes (Continued)

```
   node 5 free: 96528 MB
   node 6 cpus: 78 79 80 81 85 86 87 91 92 93 98 99 100 286 287 288 289 293 294 295 299
   300 301 306 307 308
   node 6 size: 96763 MB
   node 6 free: 96527 MB
   node 7 cpus: 82 83 84 88 89 90 94 95 96 97 101 102 103 290 291 292 296 297 298 302 303
   304 305 309 310 311
   node 7 size: 96763 MB
   node 7 free: 96528 MB
   node 8 cpus: 104 105 106 107 111 112 113 117 118 119 124 125 126 312 313 314 315 319
   320 321 325 326 327 332 333 334
   node 8 size: 96763 MB
   node 8 free: 96528 MB
   node 9 cpus: 108 109 110 114 115 116 120 121 122 123 127 128 129 316 317 318 322 323
   324 328 329 330 331 335 336 337
   node 9 size: 96763 MB
   node 9 free: 96528 MB
   node 10 cpus: 130 131 132 133 137 138 139 143 144 145 150 151 152 338 339 340 341 345
   346 347 351 352 353 358 359 360
   node 10 size: 96763 MB
   node 10 free: 96528 MB
   node 11 cpus: 134 135 136 140 141 142 146 147 148 149 153 154 155 342 343 344 348 349
   350 354 355 356 357 361 362 363
   node 11 size: 96763 MB
   node 11 free: 96528 MB
   node 12 cpus: 156 157 158 159 163 164 165 169 170 171 176 177 178 364 365 366 367 371
   372 373 377 378 379 384 385 386
   node 12 size: 96763 MB
   node 12 free: 96528 MB
   node 13 cpus: 160 161 162 166 167 168 172 173 174 175 179 180 181 368 369 370 374 375
   376 380 381 382 383 387 388 389
   node 13 size: 96763 MB
   node 13 free: 96528 MB
   node 14 cpus: 182 183 184 185 189 190 191 195 196 197 202 203 204 390 391 392 393 397
   398 399 403 404 405 410 411 412
   node 14 size: 96763 MB
   node 14 free: 96527 MB
   node 15 cpus: 186 187 188 192 193 194 198 199 200 201 205 206 207 394 395 396 400 401
   402 406 407 408 409 413 414 415
   node 15 size: 96613 MB
   node 15 free: 96378 MB
   node distances:
   node   0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
     0:  10   11   35   35   35   35   40   40   40   40   40   40   35   35   40   40
     1:  11   10   35   35   35   35   40   40   40   40   40   40   35   35   40   40
     2:  35   35   10   11   40   40   35   35   40   40   35   35   40   40   40   40
     3:  35   35   11   10   40   40   35   35   40   40   35   35   40   40   40   40
```

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Platform Notes (Continued)

```
    4:   35   35   40   40   10   11   35   35   35   35   40   40   40   40   40   40
    5:   35   35   40   40   11   10   35   35   35   35   40   40   40   40   40   40
    6:   40   40   35   35   35   35   10   11   40   40   40   40   40   40   35   35
    7:   40   40   35   35   35   35   11   10   40   40   40   40   40   40   35   35
    8:   40   40   40   40   35   35   40   40   10   11   35   35   35   35   40   40
    9:   40   40   40   40   35   35   40   40   11   10   35   35   35   35   40   40
   10:   40   40   35   35   40   40   40   40   35   35   10   11   40   40   35   35
   11:   40   40   35   35   40   40   40   40   35   35   11   10   40   40   35   35
   12:   35   35   40   40   40   40   40   40   35   35   40   40   10   11   35   35
   13:   35   35   40   40   40   40   40   40   35   35   40   40   11   10   35   35
   14:   40   40   40   40   40   40   35   35   40   40   35   35   35   35   10   11
   15:   40   40   40   40   40   40   35   35   40   40   35   35   35   35   11   10


 From /proc/meminfo
    MemTotal:       1583801256 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 linux-k55j 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Nov 16 23:12

 SPEC is set to: /home/memory/speccpu
    Filesystem      Type    Size  Used Avail Use% Mounted on
    tmpfs           tmpfs   768G  8.8G  760G   2% /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
```

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Platform Notes (Continued)

```
 frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
   BIOS FUJITSU V1.0.0.0 R1.21.0 for D3858-A1x            09/15/2017
   Memory:
     46x Hynix HMA42GR7BJR4N-VK 16 GB 2 rank 2666
     50x Samsung M393A2G40EB2-CTD 16 GB 2 rank 2666

 (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)
```

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Compiler Version Notes (Continued)

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

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`

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Base Portability Flags (Continued)

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`

(Continued on next page)

Fujitsu

PRIMEQUEST 3800B, Intel Xeon Platinum 8170, 2.10GHz

SPECrate2017_fp_base = 864

SPECrate2017_fp_peak = Not Run

CPU2017 License: 19	**Test Date:** Nov-2017
Test Sponsor: Fujitsu	**Hardware Availability:** Jul-2017
Tested by: Fujitsu	**Software Availability:** Sep-2017

Base Other Flags (Continued)

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/Fujitsu-Platform-Settings-V1.2-SKL-RevC.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevC.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.xml

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

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