# SPEC CPU®2017 Floating Point Rate Result

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## Fujitsu

PRIMEQUEST 3800E2, Intel Xeon Platinum 8253, 2.20GHz

$SPECrate®2017\_fp\_base =$ **686**
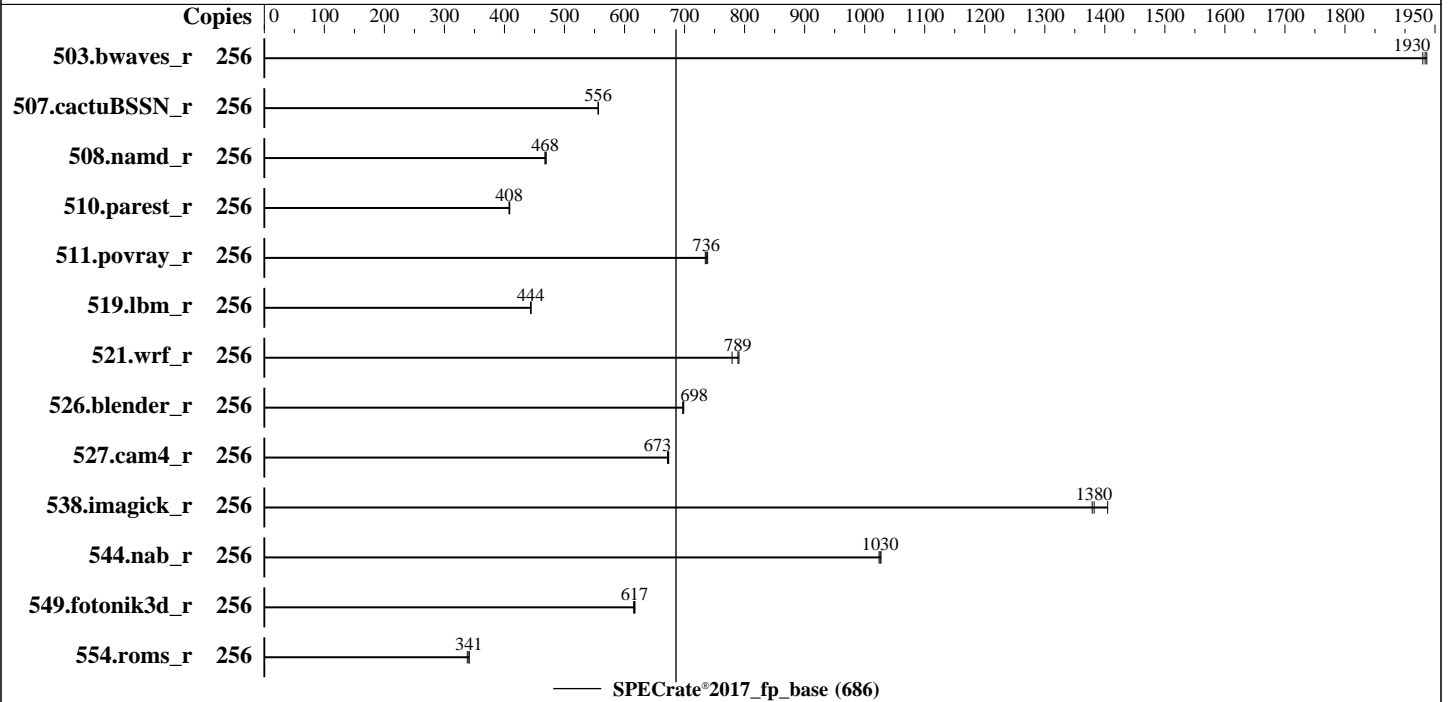
$SPECrate®2017\_fp\_peak =$ Not Run

**CPU2017 License:** 19
**Test Sponsor:** Fujitsu
**Tested by:** Fujitsu

**Test Date:** Jul-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Feb-2019

| Benchmark | Copies | Result |
|---|---|---|
| 503.bwaves_r | 256 | 1930 |
| 507.cactuBSSN_r | 256 | 556 |
| 508.namd_r | 256 | 468 |
| 510.parest_r | 256 | 408 |
| 511.povray_r | 256 | 736 |
| 519.lbm_r | 256 | 444 |
| 521.wrf_r | 256 | 789 |
| 526.blender_r | 256 | 698 |
| 527.cam4_r | 256 | 673 |
| 538.imagick_r | 256 | 1380 |
| 544.nab_r | 256 | 1030 |
| 549.fotonik3d_r | 256 | 617 |
| 554.roms_r | 256 | 341 |

SPECrate®2017_fp_base (686)

## Hardware

CPU Name: Intel Xeon Platinum 8253
 Max MHz: 3000
 Nominal: 2200
Enabled: 128 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: 22 MB I+D on chip per chip
 Other: None
Memory: 3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x SAS HDD, 600GB, 10.5K RPM, SAS HDD
Other: None

## Software

OS: SUSE Linux Enterprise Server 15
 4.12.14-25.28-default
Compiler: C/C++: Version 19.0.0.117 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 19.0.0.117 of Intel Fortran
 Compiler for Linux
Parallel: No
Firmware: PRIMEQUEST 3800E2 Unified Firmware
 Version PB19043, Released Jun-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: --

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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SPECrate®2017_fp_base =     686

SPECrate®2017_fp_peak = Not Run

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## Results Table

| Benchmark | Copies | Base Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Peak Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 503.bwaves_r | 256 | 1326 | 1940 | 1330 | 1930 | **1328** | **1930** | | | | | | | |
| 507.cactuBSSN_r | 256 | 582 | 557 | **583** | **556** | 583 | 556 | | | | | | | |
| 508.namd_r | 256 | 520 | 468 | **520** | **468** | 518 | 470 | | | | | | | |
| 510.parest_r | 256 | 1638 | 409 | 1642 | 408 | **1641** | **408** | | | | | | | |
| 511.povray_r | 256 | 814 | 735 | 810 | 738 | **812** | **736** | | | | | | | |
| 519.lbm_r | 256 | **608** | **444** | 608 | 444 | 608 | 444 | | | | | | | |
| 521.wrf_r | 256 | **727** | **789** | 725 | 791 | 736 | 779 | | | | | | | |
| 526.blender_r | 256 | 558 | 699 | 559 | 697 | **559** | **698** | | | | | | | |
| 527.cam4_r | 256 | **665** | **673** | 665 | 674 | 667 | 672 | | | | | | | |
| 538.imagick_r | 256 | 462 | 1380 | **461** | **1380** | 453 | 1400 | | | | | | | |
| 544.nab_r | 256 | 421 | 1020 | **420** | **1030** | 419 | 1030 | | | | | | | |
| 549.fotonik3d_r | 256 | 1622 | 615 | **1618** | **617** | 1616 | 617 | | | | | | | |
| 554.roms_r | 256 | 1203 | 338 | **1193** | **341** | 1192 | 341 | | | | | | | |

**SPECrate®2017_fp_base =     686**

**SPECrate®2017_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"
Kernel Boot Parameter set with : nohz_full=1-255

## General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-fp/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-799X 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>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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# SPEC CPU®2017 Floating Point Rate Result

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PRIMEQUEST 3800E2, Intel Xeon Platinum 8253, 2.20GHz

SPECrate®2017_fp_base = 686

SPECrate®2017_fp_peak = Not Run

**CPU2017 License:** 19
**Test Sponsor:** Fujitsu
**Tested by:** Fujitsu

**Test Date:** Jul-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Feb-2019

## 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:
 DCU Streamer Prefetcher = Disabled
 DDR4 Write Data CRC Protection = Disabled
 LLC Dead Line Alloc = Enabled
 Sub Numa Clustering = Enabled
 Uncore Frequency Scaling = Disabled
 UPI Link L0p = Disabled
 Fan Control = Full
 Sysinfo program /home/Benchmark/speccpu2017-fp/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-8r5c Wed Jul 17 21:34:16 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 8253 CPU @ 2.20GHz
       8  "physical id"s (chips)
       256 "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

 From lscpu:
    Architecture:        x86_64
    CPU op-mode(s):      32-bit, 64-bit
    Byte Order:          Little Endian
    CPU(s):              256
```

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## Platform Notes (Continued)

```
         On-line CPU(s) list:  0-255
         Thread(s) per core:   2
         Core(s) per socket:   16
         Socket(s):            8
         NUMA node(s):         16
         Vendor ID:            GenuineIntel
         CPU family:           6
         Model:                85
         Model name:           Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
         Stepping:             6
         CPU MHz:              2200.000
         CPU max MHz:          3000.0000
         CPU min MHz:          1000.0000
         BogoMIPS:             4400.00
         Virtualization:       VT-x
         L1d cache:            32K
         L1i cache:            32K
         L2 cache:             1024K
         L3 cache:             22528K
         NUMA node0 CPU(s):    0-3,8-11,128-131,136-139
         NUMA node1 CPU(s):    4-7,12-15,132-135,140-143
         NUMA node2 CPU(s):    16-19,24-27,144-147,152-155
         NUMA node3 CPU(s):    20-23,28-31,148-151,156-159
         NUMA node4 CPU(s):    32-35,40-43,160-163,168-171
         NUMA node5 CPU(s):    36-39,44-47,164-167,172-175
         NUMA node6 CPU(s):    48-51,56-59,176-179,184-187
         NUMA node7 CPU(s):    52-55,60-63,180-183,188-191
         NUMA node8 CPU(s):    64-67,72-75,192-195,200-203
         NUMA node9 CPU(s):    68-71,76-79,196-199,204-207
         NUMA node10 CPU(s):   80-83,88-91,208-211,216-219
         NUMA node11 CPU(s):   84-87,92-95,212-215,220-223
         NUMA node12 CPU(s):   96-99,104-107,224-227,232-235
         NUMA node13 CPU(s):   100-103,108-111,228-231,236-239
         NUMA node14 CPU(s):   112-115,120-123,240-243,248-251
         NUMA node15 CPU(s):   116-119,124-127,244-247,252-255
         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 intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced 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 dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku
         ospke avx512_vnni flush_l1d arch_capabilities
```

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## Platform Notes (Continued)

```
 /proc/cpuinfo cache data
    cache size : 22528 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 8 9 10 11 128 129 130 131 136 137 138 139
   node 0 size: 192271 MB
   node 0 free: 191909 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 132 133 134 135 140 141 142 143
   node 1 size: 193532 MB
   node 1 free: 193219 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 144 145 146 147 152 153 154 155
   node 2 size: 193532 MB
   node 2 free: 193259 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 148 149 150 151 156 157 158 159
   node 3 size: 193503 MB
   node 3 free: 193097 MB
   node 4 cpus: 32 33 34 35 40 41 42 43 160 161 162 163 168 169 170 171
   node 4 size: 193532 MB
   node 4 free: 193212 MB
   node 5 cpus: 36 37 38 39 44 45 46 47 164 165 166 167 172 173 174 175
   node 5 size: 193532 MB
   node 5 free: 193302 MB
   node 6 cpus: 48 49 50 51 56 57 58 59 176 177 178 179 184 185 186 187
   node 6 size: 193532 MB
   node 6 free: 193305 MB
   node 7 cpus: 52 53 54 55 60 61 62 63 180 181 182 183 188 189 190 191
   node 7 size: 193532 MB
   node 7 free: 193301 MB
   node 8 cpus: 64 65 66 67 72 73 74 75 192 193 194 195 200 201 202 203
   node 8 size: 193532 MB
   node 8 free: 193333 MB
   node 9 cpus: 68 69 70 71 76 77 78 79 196 197 198 199 204 205 206 207
   node 9 size: 193532 MB
   node 9 free: 193067 MB
   node 10 cpus: 80 81 82 83 88 89 90 91 208 209 210 211 216 217 218 219
   node 10 size: 193532 MB
   node 10 free: 193315 MB
   node 11 cpus: 84 85 86 87 92 93 94 95 212 213 214 215 220 221 222 223
   node 11 size: 193532 MB
   node 11 free: 193339 MB
   node 12 cpus: 96 97 98 99 104 105 106 107 224 225 226 227 232 233 234 235
   node 12 size: 193532 MB
   node 12 free: 193309 MB
   node 13 cpus: 100 101 102 103 108 109 110 111 228 229 230 231 236 237 238 239
```

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## Platform Notes (Continued)

```
   node 13 size: 193532 MB
   node 13 free: 193225 MB
   node 14 cpus: 112 113 114 115 120 121 122 123 240 241 242 243 248 249 250 251
   node 14 size: 193532 MB
   node 14 free: 193346 MB
   node 15 cpus: 116 117 118 119 124 125 126 127 244 245 246 247 252 253 254 255
   node 15 size: 193331 MB
   node 15 free: 193126 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  11  20  20  20  20  28  28  28  28  28  28  20  20  28  28
     1:  11  10  20  20  20  20  28  28  28  28  28  28  20  20  28  28
     2:  20  20  10  11  28  28  20  20  28  28  20  20  28  28  28  28
     3:  20  20  11  10  28  28  20  20  28  28  20  20  28  28  28  28
     4:  20  20  28  28  10  11  20  20  20  20  28  28  28  28  28  28
     5:  20  20  28  28  11  10  20  20  20  20  28  28  28  28  28  28
     6:  28  28  20  20  20  20  10  11  28  28  28  28  28  28  20  20
     7:  28  28  20  20  20  20  11  10  28  28  28  28  28  28  20  20
     8:  28  28  28  28  20  20  28  28  10  11  20  20  20  20  28  28
     9:  28  28  28  28  20  20  28  28  11  10  20  20  20  20  28  28
    10:  28  28  20  20  28  28  28  28  20  20  10  11  28  28  20  20
    11:  28  28  20  20  28  28  28  28  20  20  11  10  28  28  20  20
    12:  20  20  28  28  28  28  28  28  20  20  28  28  10  11  20  20
    13:  20  20  28  28  28  28  28  28  20  20  28  28  11  10  20  20
    14:  28  28  28  28  28  28  20  20  28  28  20  20  20  20  10  11
    15:  28  28  28  28  28  28  20  20  28  28  20  20  20  20  11  10

 From /proc/meminfo
   MemTotal:       3169313700 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-8r5c 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
   x86_64 x86_64 x86_64 GNU/Linux
```

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SPECrate®2017_fp_base =  686

SPECrate®2017_fp_peak = Not Run

## Platform Notes (Continued)

```
  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: Enhanced IBRS, IBPB: conditional, RSB
  filling

  run-level 3 Jul 17 21:31

  SPEC is set to: /home/Benchmark/speccpu2017-fp
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda3       xfs   142G   55G   87G  39% /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 FUJITSU V1.0.0.0 R1.16.0 for D3858-B1x            04/24/2019
    Memory:
      68x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933
      28x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

  (End of data from sysinfo program)
```

## Compiler Version Notes

```
==============================================================================
C                | 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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++              | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C           | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
```

**(Continued on next page)**

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|---|---|
| **Test Sponsor:** Fujitsu | **Hardware Availability:** Apr-2019 |
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## Compiler Version Notes (Continued)

```
   Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
Fortran         | 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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

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# Base Compiler Invocation (Continued)

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`

# 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`

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## Fujitsu

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# Base Optimization Flags (Continued)

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -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 -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=3
```

Benchmarks using Fortran, C, and C++:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
-align array32byte
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevE.xml

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

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