



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Fujitsu

PRIMEQUEST 3800B2, Intel Xeon Platinum 8280L, 2.70GHz

SPECrate2017\_fp\_base = 839

SPECrate2017\_fp\_peak = Not Run

CPU2017 License: 19

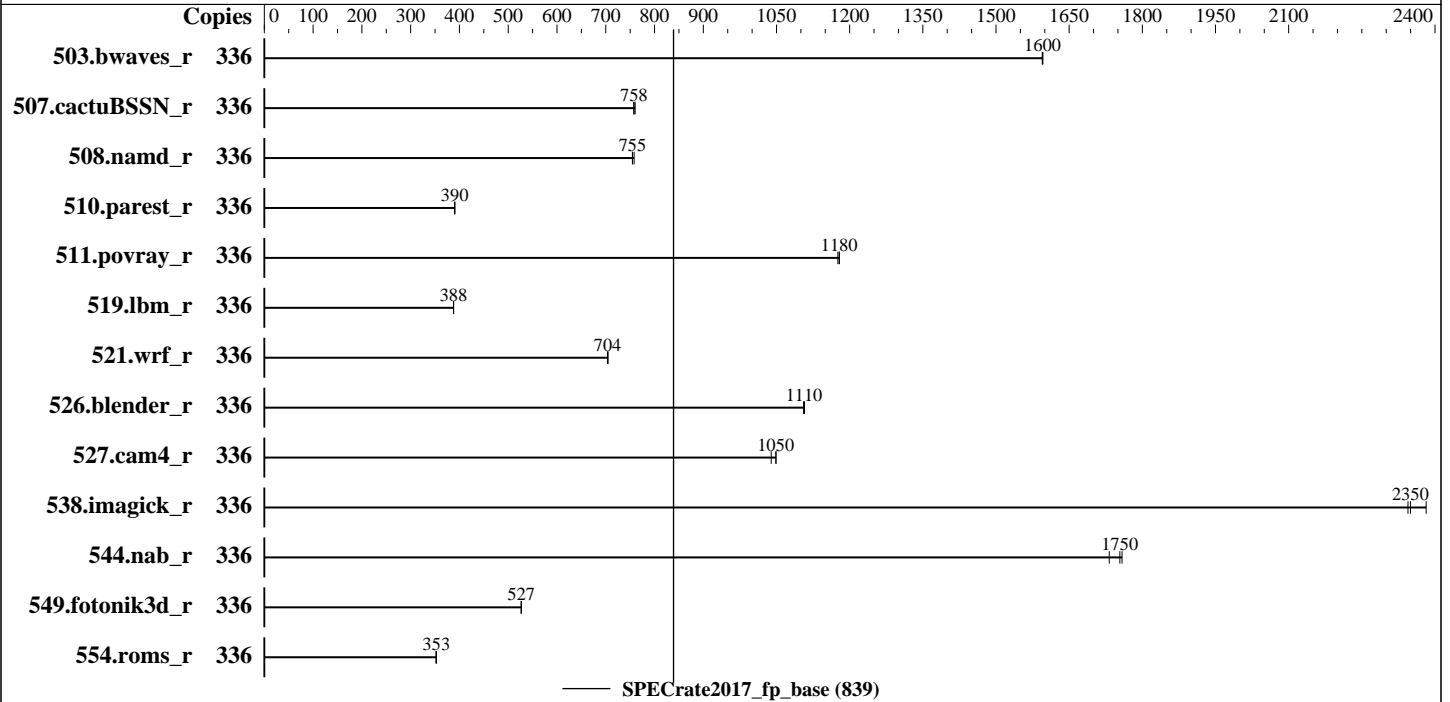
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Mar-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019



### Hardware

CPU Name: Intel Xeon Platinum 8280L  
 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: 2304 GB (72 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: Fujitsu BIOS Version V1.0.0.0 R1.21.0 for D3858-B1x, Released Jun-2019 tested as V1.0.0.0 R91.11.0 for D3858-B1x Mar-2019  
 File System: xfs  
 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	336	2111	1600	<b><u>2112</u></b>	<b><u>1600</u></b>	2113	1590							
507.cactuBSSN_r	336	562	757	560	760	<b><u>561</u></b>	<b><u>758</u></b>							
508.namd_r	336	421	758	<b><u>423</u></b>	<b><u>755</u></b>	423	755							
510.parest_r	336	2251	391	2254	390	<b><u>2252</u></b>	<b><u>390</u></b>							
511.povray_r	336	665	1180	667	1180	<b><u>666</u></b>	<b><u>1180</u></b>							
519.lbm_r	336	<b><u>913</u></b>	<b><u>388</u></b>	913	388	913	388							
521.wrf_r	336	<b><u>1069</u></b>	<b><u>704</u></b>	1069	704	1068	705							
526.blender_r	336	463	1110	<b><u>462</u></b>	<b><u>1110</u></b>	462	1110							
527.cam4_r	336	<b><u>560</u></b>	<b><u>1050</u></b>	560	1050	566	1040							
538.imagick_r	336	356	2340	<b><u>356</u></b>	<b><u>2350</u></b>	351	2380							
544.nab_r	336	322	1760	<b><u>322</u></b>	<b><u>1750</u></b>	326	1730							
549.fotonik3d_r	336	<b><u>2486</u></b>	<b><u>527</u></b>	2485	527	2486	527							
554.roms_r	336	<b><u>1513</u></b>	<b><u>353</u></b>	1517	352	1513	353							

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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"  
Kernel Boot Parameter set with : nohz\_full=1-335

## General Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/Benchmark/speccpu2017-fp/lib/ia32:/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>
```

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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### 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  
Hardware Prefetcher = Disabled  
LLC Dead Line Alloc = 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 Mon Mar 18 07:29:36 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 8280L 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

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### Platform Notes (Continued)

```

CPU op-mode(s):      32-bit, 64-bit
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 8280L 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
aperfmpperf 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 bmil 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_lld arch_capabilities

```

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### Platform Notes (Continued)

```
/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: 192149 MB
node 0 free: 191562 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: 193527 MB
node 1 free: 193200 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: 193498 MB
node 2 free: 193239 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: 193527 MB
node 3 free: 193230 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: 193527 MB
node 4 free: 193302 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: 193527 MB
node 5 free: 193296 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: 193527 MB
node 6 free: 193193 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: 193527 MB
node 7 free: 193248 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: 193528 MB
node 8 free: 193331 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: 193528 MB
node 9 free: 193328 MB
node 10 cpus: 140 141 142 143 147 148 149 154 155 156 157 161 162 163 308 309 310 311
```

(Continued on next page)



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### Platform Notes (Continued)

```

315 316 317 322 323 324 325 329 330 331
node 10 size: 193528 MB
node 10 free: 193263 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: 193324 MB
node 11 free: 193115 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11
0:  10 11 20 20 20 20 28 28 28 28 28 28
1:  11 10 20 20 20 20 28 28 28 28 28 28
2:  20 20 10 11 28 28 20 20 28 28 20 20
3:  20 20 11 10 28 28 20 20 28 28 20 20
4:  20 20 28 28 10 11 20 20 20 20 28 28
5:  20 20 28 28 11 10 20 20 20 20 28 28
6:  28 28 20 20 20 20 10 11 28 28 28 28
7:  28 28 20 20 20 20 11 10 28 28 28 28
8:  28 28 28 28 20 20 28 28 10 11 20 20
9:  28 28 28 28 20 20 28 28 11 10 20 20
10: 28 28 20 20 28 28 28 28 20 20 10 11
11: 28 28 20 20 28 28 28 28 20 20 11 10

```

```

From /proc/meminfo
MemTotal:      2376420476 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

```

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

```

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### Platform Notes (Continued)

filling

run-level 3 Mar 18 07:23

SPEC is set to: /home/Benchmark/speccpu2017-fp

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda3	xfs	142G	17G	125G	12%	/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 R91.11.0 for D3858-B1x 03/15/2019

Memory:

56x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933  
16x 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 19.0.0.117 Build 20180804  
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 19.0.0.117 Build 20180804  
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 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
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### Compiler Version Notes (Continued)

FC 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,  
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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.

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 19.0.0.117 Build 20180804  
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 19.0.0.117 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

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

(Continued on next page)





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## Base Compiler Invocation (Continued)

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
```

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
```

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-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-RevA.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-RevA.xml>

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