



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECrate2017_fp_base = 1000

ThinkSystem SR950
(2.40 GHz, Intel Xeon Platinum 8260L)

SPECrate2017_fp_peak = Not Run

CPU2017 License: 9017

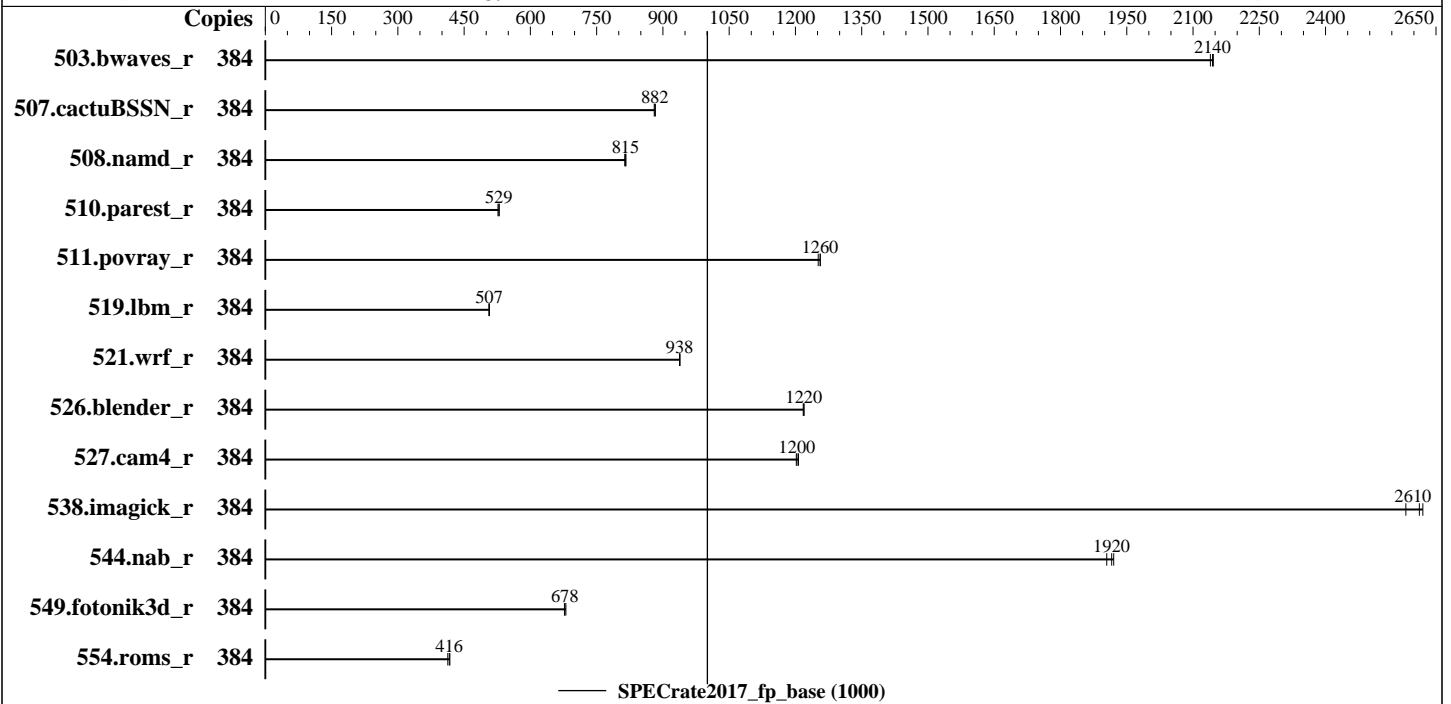
Test Date: Apr-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Dec-2018



Hardware

CPU Name: Intel Xeon Platinum 8260L
 Max MHz.: 3900
 Nominal: 2400
 Enabled: 192 cores, 8 chips, 2 threads/core
 Orderable: 2,3,4,6,8 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: 3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)
 Storage: 960 GB tmpfs
 Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
 Kernel 4.12.14-94.41-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: Lenovo BIOS Version PSE121C 1.50 released Jan-2019
 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	384	1800	2140	1794	2150	1796	2140							
507.cactuBSSN_r	384	551	883	551	882	552	880							
508.namd_r	384	447	816	447	815	448	814							
510.parest_r	384	1897	530	1908	527	1900	529							
511.povray_r	384	716	1250	714	1260	714	1260							
519.lbm_r	384	799	506	799	507	798	507							
521.wrf_r	384	917	938	916	939	917	938							
526.blender_r	384	480	1220	480	1220	480	1220							
527.cam4_r	384	559	1200	556	1210	558	1200							
538.imagick_r	384	366	2610	370	2580	364	2620							
544.nab_r	384	337	1920	339	1900	337	1920							
549.fotonik3d_r	384	2207	678	2210	677	2199	680							
554.roms_r	384	1465	416	1461	418	1477	413							

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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"
Tmpfs filesystem can be set with:
mount -t tmpfs -o size=960g tmpfs /home
Process tuning setting:
echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us
echo 240000000 > /proc/sys/kernel/sched_latency_ns
echo 5000000 > /proc/sys/kernel/sched_migration_cost_ns
echo 100000000 > /proc/sys/kernel/sched_min_granularity_ns
echo 150000000 > /proc/sys/kernel/sched_wakeup_granularity_ns

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5

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General Notes (Continued)

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) 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.
- Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.
- Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
MONITOR/MWAIT set to Enable
SNC set to Enable
Patrol Scrub set to Disable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sles12sp4 Sat Apr 27 05:54:57 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 8260L CPU @ 2.40GHz
8 "physical id"s (chips)
384 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 10 11 12 13 16 17 18 19 20 21 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 25 26 27 28 29

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Platform Notes (Continued)

```

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

```

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):       32-bit, 64-bit
Byte Order:           Little Endian
CPU(s):               384
On-line CPU(s) list:  0-383
Thread(s) per core:   2
Core(s) per socket:   24
Socket(s):            8
NUMA node(s):        16
Vendor ID:            GenuineIntel
CPU family:           6
Model:               85
Model name:           Intel(R) Xeon(R) Platinum 8260L CPU @ 2.40GHz
Stepping:             6
CPU MHz:              2400.000
CPU max MHz:          3900.0000
CPU min MHz:          1000.0000
BogoMIPS:             4800.00
Virtualization:       VT-x
L1d cache:            32K
L1i cache:            32K
L2 cache:             1024K
L3 cache:             36608K
NUMA node0 CPU(s):   0-3,7-9,13-15,19,20,192-195,199-201,205-207,211,212
NUMA node1 CPU(s):   4-6,10-12,16-18,21-23,196-198,202-204,208-210,213-215
NUMA node2 CPU(s):   24-27,31,32,36-38,42-44,216-219,223,224,228-230,234-236
NUMA node3 CPU(s):   28-30,33-35,39-41,45-47,220-222,225-227,231-233,237-239
NUMA node4 CPU(s):   48-51,55-57,61-63,67,68,240-243,247-249,253-255,259,260
NUMA node5 CPU(s):   52-54,58-60,64-66,69-71,244-246,250-252,256-258,261-263
NUMA node6 CPU(s):   72-75,79-81,85-87,91,92,264-267,271-273,277-279,283,284
NUMA node7 CPU(s):   76-78,82-84,88-90,93-95,268-270,274-276,280-282,285-287
NUMA node8 CPU(s):   96-99,103-105,109-111,115,116,288-291,295-297,301-303,307,308
NUMA node9 CPU(s):   100-102,106-108,112-114,117-119,292-294,298-300,304-306,309-311
NUMA node10 CPU(s):  120-123,127-129,133-135,139,140,312-315,319-321,325-327,331,332
NUMA node11 CPU(s):  124-126,130-132,136-138,141-143,316-318,322-324,328-330,333-335
NUMA node12 CPU(s):  144-147,151,152,156-158,162-164,336-339,343,344,348-350,354-356

```

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Platform Notes (Continued)

```

NUMA node13 CPU(s):
148-150,153-155,159-161,165-167,340-342,345-347,351-353,357-359
NUMA node14 CPU(s):
168-171,174-176,180-182,187,188,360-363,366-368,372-374,379,380
NUMA node15 CPU(s):
172,173,177-179,183-186,189-191,364,365,369-371,375-378,381-383
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
aperfperf 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 ssbd mba ibrs ibpb stibp 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 pku ospke avx512_vnni flush_lld arch_capabilities

```

```

/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 19 20 192 193 194 195 199 200 201 205 206 207 211
212
node 0 size: 193120 MB
node 0 free: 192349 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 21 22 23 196 197 198 202 203 204 208 209 210 213
214 215
node 1 size: 193501 MB
node 1 free: 193165 MB
node 2 cpus: 24 25 26 27 31 32 36 37 38 42 43 44 216 217 218 219 223 224 228 229 230
234 235 236
node 2 size: 193530 MB
node 2 free: 193260 MB
node 3 cpus: 28 29 30 33 34 35 39 40 41 45 46 47 220 221 222 225 226 227 231 232 233
237 238 239
node 3 size: 193530 MB
node 3 free: 193252 MB
node 4 cpus: 48 49 50 51 55 56 57 61 62 63 67 68 240 241 242 243 247 248 249 253 254
255 259 260
node 4 size: 193530 MB
node 4 free: 193363 MB
node 5 cpus: 52 53 54 58 59 60 64 65 66 69 70 71 244 245 246 250 251 252 256 257 258
261 262 263
node 5 size: 193530 MB

```

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Platform Notes (Continued)

```

node 5 free: 193370 MB
node 6 cpus: 72 73 74 75 79 80 81 85 86 87 91 92 264 265 266 267 271 272 273 277 278
279 283 284
node 6 size: 193530 MB
node 6 free: 193280 MB
node 7 cpus: 76 77 78 82 83 84 88 89 90 93 94 95 268 269 270 274 275 276 280 281 282
285 286 287
node 7 size: 193530 MB
node 7 free: 193265 MB
node 8 cpus: 96 97 98 99 103 104 105 109 110 111 115 116 288 289 290 291 295 296 297
301 302 303 307 308
node 8 size: 193530 MB
node 8 free: 193281 MB
node 9 cpus: 100 101 102 106 107 108 112 113 114 117 118 119 292 293 294 298 299 300
304 305 306 309 310 311
node 9 size: 193530 MB
node 9 free: 193274 MB
node 10 cpus: 120 121 122 123 127 128 129 133 134 135 139 140 312 313 314 315 319 320
321 325 326 327 331 332
node 10 size: 193530 MB
node 10 free: 193359 MB
node 11 cpus: 124 125 126 130 131 132 136 137 138 141 142 143 316 317 318 322 323 324
328 329 330 333 334 335
node 11 size: 193530 MB
node 11 free: 193367 MB
node 12 cpus: 144 145 146 147 151 152 156 157 158 162 163 164 336 337 338 339 343 344
348 349 350 354 355 356
node 12 size: 193530 MB
node 12 free: 176629 MB
node 13 cpus: 148 149 150 153 154 155 159 160 161 165 166 167 340 341 342 345 346 347
351 352 353 357 358 359
node 13 size: 193530 MB
node 13 free: 193356 MB
node 14 cpus: 168 169 170 171 174 175 176 180 181 182 187 188 360 361 362 363 366 367
368 372 373 374 379 380
node 14 size: 193530 MB
node 14 free: 193349 MB
node 15 cpus: 172 173 177 178 179 183 184 185 186 189 190 191 364 365 369 370 371 375
376 377 378 381 382 383
node 15 size: 193527 MB
node 15 free: 193363 MB
node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0: 10 11 21 21 31 31 21 21 21 21 31 31 31 31 31 31
1: 11 10 21 21 31 31 21 21 21 21 31 31 31 31 31 31
2: 21 21 10 11 21 21 31 31 31 31 21 21 31 31 31 31
3: 21 21 11 10 21 21 31 31 31 31 21 21 31 31 31 31

```

(Continued on next page)



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Platform Notes (Continued)

```

4: 31 31 21 21 10 11 21 21 31 31 31 31 21 21 31 31
5: 31 31 21 21 11 10 21 21 31 31 31 31 21 21 31 31
6: 21 21 31 31 21 21 10 11 31 31 31 31 31 31 21 21
7: 21 21 31 31 21 21 11 10 31 31 31 31 31 31 21 21
8: 21 21 31 31 31 31 31 31 10 11 21 21 21 21 31 31
9: 21 21 31 31 31 31 31 31 11 10 21 21 21 21 31 31
10: 31 31 21 21 31 31 31 31 21 21 10 11 31 31 21 21
11: 31 31 21 21 31 31 31 31 21 21 11 10 31 31 21 21
12: 31 31 31 31 21 21 31 31 21 21 31 31 10 11 21 21
13: 31 31 31 31 21 21 31 31 21 21 31 31 11 10 21 21
14: 31 31 31 31 31 31 21 21 31 31 21 21 21 21 10 11
15: 31 31 31 31 31 31 21 21 31 31 21 21 21 21 11 10

```

From /proc/meminfo

```

MemTotal:      3170352916 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

From /etc/*release* /etc/*version*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 4
# 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-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"

```

uname -a:

```

Linux sles12sp4 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
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: Indirect Branch Restricted Speculation,
IBPB, IBRS_FW

```

run-level 3 Apr 27 05:52

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Platform Notes (Continued)

SPEC is set to: /home/cpu2017-1.0.5-ic19

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	960G	11G	950G	2%	/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 Lenovo -[PSE121C-1.50]- 01/16/2019

Memory:

96x 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.
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.

=====
FC 507.cactuBSSN_r(base)

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Compiler Version Notes (Continued)

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.

=====
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

Benchmarks using both Fortran and C:

ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:

icpc -m64 icc -m64 -std=c11

(Continued on next page)



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Base Compiler Invocation (Continued)

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
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
-align array32byte
```

(Continued on next page)



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Base Optimization Flags (Continued)

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.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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