SPEC CPU®2017 Integer Rate Result

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xFusion

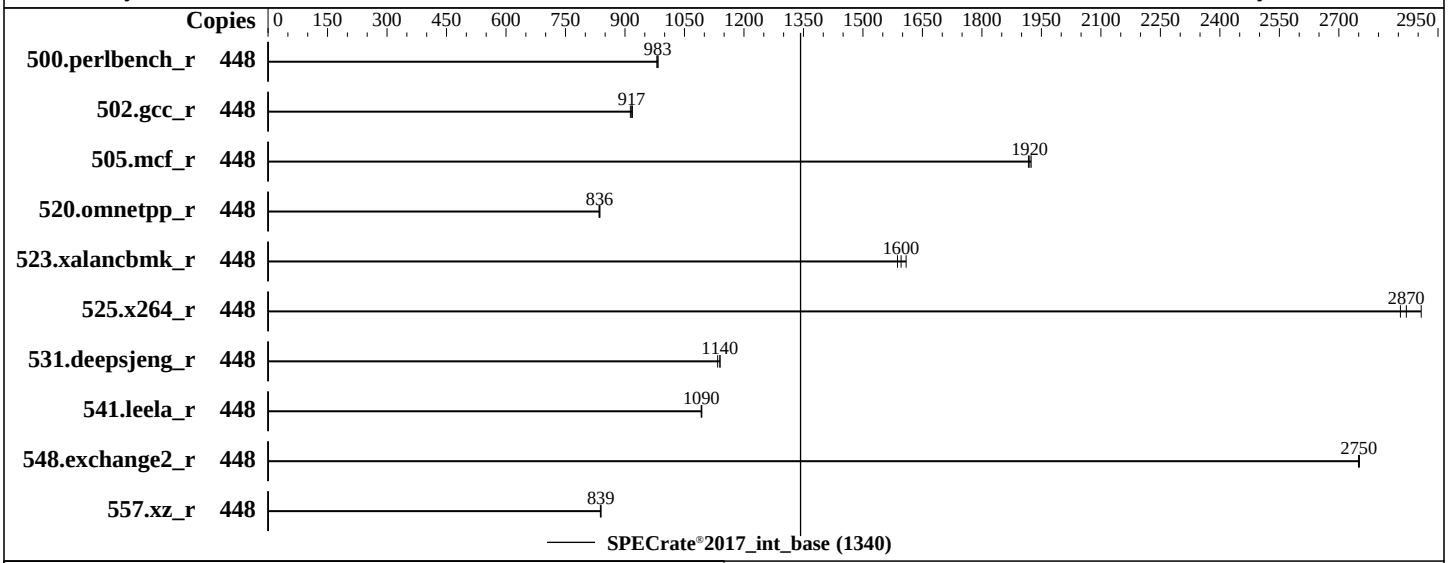
xFusion KunLun 9008 V5 (Intel Xeon Platinum 8280)

SPECrate®2017_int_base = 1340

SPECrate®2017_int_peak = Not Run

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Feb-2022
Hardware Availability: Apr-2019
Software Availability: Dec-2020



Hardware

CPU Name:	Intel Xeon Platinum 8280
Max MHz:	4000
Nominal:	2700
Enabled:	224 cores, 8 chips, 2 threads/core
Orderable:	2,4,6,8 chip
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:	3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)
Storage:	1 x 2400 GB SAS, 10000 RPM
Other:	None

Software

OS:	Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64
Compiler:	C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
Parallel:	No
Firmware:	Version 8.18 released Sep-2021
File System:	ext4
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	448	728	980	725	983	**726**	**983**							
502.gcc_r	448	691	919	**692**	**917**	694	914							
505.mcf_r	448	**377**	**1920**	378	1920	376	1920							
520.omnetpp_r	448	**703**	**836**	704	835	702	837							
523.xalancbmk_r	448	**296**	**1600**	298	1590	294	1610							
525.x264_r	448	275	2860	**273**	**2870**	270	2910							
531.deepsjeng_r	448	453	1130	**451**	**1140**	450	1140							
541.leela_r	448	679	1090	**679**	**1090**	678	1090							
548.exchange2_r	448	427	2750	**427**	**2750**	427	2750							
557.xz_r	448	576	839	**577**	**839**	577	838							

SPECrate®2017_int_base = **1340**

SPECrate®2017_int_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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/spec/lib/intel64:/home/spec/lib/ia32:/home/spec/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
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.:
```

(Continued on next page)

General Notes (Continued)

```
numactl --interleave=all runcpu <etc>
NA: 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.
```

Platform Notes

```
BIOS configuration:
Power Policy Set to Performance
SNC Set to Enabled
IMC (Integrated memory controller) Interleaving set to 1 way interleave
Xtended Prediction Table (XPT) Prefetch set to Enabled
Last Level Cache (LLC) Prefetch set to Disabled

Sysinfo program /home/spec/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Fri Feb 11 20:34:03 2022

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 8280 CPU @ 2.70GHz
      8  "physical id"s (chips)
      448 "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
      physical 6: 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
```

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Platform Notes (Continued)

```
       28 29 30
      physical 7: 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 from util-linux 2.32.1:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              448
      On-line CPU(s) list: 0-447
      Thread(s) per core:  2
      Core(s) per socket:  28
      Socket(s):           8
      NUMA node(s):        16
      Vendor ID:           GenuineIntel
      CPU family:          6
      Model:               85
      Model name:          Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
      Stepping:            7
      CPU MHz:             3300.004
      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):   0-3,7-9,14-17,21-23,224-227,231-233,238-241,245-247
      NUMA node1 CPU(s):   4-6,10-13,18-20,24-27,228-230,234-237,242-244,248-251
      NUMA node2 CPU(s):   28-31,35-37,42-45,49-51,252-255,259-261,266-269,273-275
      NUMA node3 CPU(s):   32-34,38-41,46-48,52-55,256-258,262-265,270-272,276-279
      NUMA node4 CPU(s):   56-59,63-65,70-73,77-79,280-283,287-289,294-297,301-303
      NUMA node5 CPU(s):   60-62,66-69,74-76,80-83,284-286,290-293,298-300,304-307
      NUMA node6 CPU(s):   84-87,91-93,98-101,105-107,308-311,315-317,322-325,329-331
      NUMA node7 CPU(s):   88-90,94-97,102-104,108-111,312-314,318-321,326-328,332-335
      NUMA node8 CPU(s):   112-115,119-121,126-129,133-135,336-339,343-345,350-353,357-359
      NUMA node9 CPU(s):   116-118,122-125,130-132,136-139,340-342,346-349,354-356,360-363
      NUMA node10 CPU(s):  140-143,147-149,154-157,161-163,364-367,371-373,378-381,385-387
      NUMA node11 CPU(s):  144-146,150-153,158-160,164-167,368-370,374-377,382-384,388-391
      NUMA node12 CPU(s):  168-171,175-177,182-185,189-191,392-395,399-401,406-409,413-415
      NUMA node13 CPU(s):  172-174,178-181,186-188,192-195,396-398,402-405,410-412,416-419
      NUMA node14 CPU(s):  196-199,203-205,210-213,217-219,420-423,427-429,434-437,441-443
      NUMA node15 CPU(s):  200-202,206-209,214-216,220-223,424-426,430-433,438-440,444-447
      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
```

(Continued on next page)

Platform Notes (Continued)

```
      aperfmperf pni pclmulqdq dtes64 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 ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad
      fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid 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 md_clear flush_l1d arch_capabilities

  /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: 16 nodes (0-15)
    node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23 224 225 226 227 231 232 233 238 239 240
    241 245 246 247
    node 0 size: 189428 MB
    node 0 free: 191308 MB
    node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 228 229 230 234 235 236 237 242 243
    244 248 249 250 251
    node 1 size: 191199 MB
    node 1 free: 193163 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 252 253 254 255 259 260 261 266
    267 268 269 273 274 275
    node 2 size: 190427 MB
    node 2 free: 193015 MB
    node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 256 257 258 262 263 264 265 270
    271 272 276 277 278 279
    node 3 size: 190523 MB
    node 3 free: 190749 MB
    node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79 280 281 282 283 287 288 289 294
    295 296 297 301 302 303
    node 4 size: 191379 MB
    node 4 free: 193340 MB
    node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83 284 285 286 290 291 292 293 298
    299 300 304 305 306 307
    node 5 size: 191353 MB
    node 5 free: 193356 MB
    node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107 308 309 310 311 315 316 317
    322 323 324 325 329 330 331
    node 6 size: 191165 MB
    node 6 free: 190078 MB
    node 7 cpus: 88 89 90 94 95 96 97 102 103 104 108 109 110 111 312 313 314 318 319 320
    321 326 327 328 332 333 334 335
    node 7 size: 191349 MB
    node 7 free: 192028 MB
```

(Continued on next page)

Platform Notes (Continued)

```
node 8 cpus: 112 113 114 115 119 120 121 126 127 128 129 133 134 135 336 337 338 339
343 344 345 350 351 352 353 357 358 359
node 8 size: 191363 MB
node 8 free: 193281 MB
node 9 cpus: 116 117 118 122 123 124 125 130 131 132 136 137 138 139 340 341 342 346
347 348 349 354 355 356 360 361 362 363
node 9 size: 191275 MB
node 9 free: 193352 MB
node 10 cpus: 140 141 142 143 147 148 149 154 155 156 157 161 162 163 364 365 366 367
371 372 373 378 379 380 381 385 386 387
node 10 size: 191251 MB
node 10 free: 193346 MB
node 11 cpus: 144 145 146 150 151 152 153 158 159 160 164 165 166 167 368 369 370 374
375 376 377 382 383 384 388 389 390 391
node 11 size: 191159 MB
node 11 free: 193350 MB
node 12 cpus: 168 169 170 171 175 176 177 182 183 184 185 189 190 191 392 393 394 395
399 400 401 406 407 408 409 413 414 415
node 12 size: 191291 MB
node 12 free: 189549 MB
node 13 cpus: 172 173 174 178 179 180 181 186 187 188 192 193 194 195 396 397 398 402
403 404 405 410 411 412 416 417 418 419
node 13 size: 191495 MB
node 13 free: 193343 MB
node 14 cpus: 196 197 198 199 203 204 205 210 211 212 213 217 218 219 420 421 422 423
427 428 429 434 435 436 437 441 442 443
node 14 size: 191421 MB
node 14 free: 193319 MB
node 15 cpus: 200 201 202 206 207 208 209 214 215 216 220 221 222 223 424 425 426 430
431 432 433 438 439 440 444 445 446 447
node 15 size: 190737 MB
node 15 free: 192771 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
  0:  10  11  31  31  21  21  21  21  21  21  31  31  31  31  31  31
  1:  11  10  31  31  21  21  21  21  21  21  31  31  31  31  31  31
  2:  31  31  10  11  21  21  21  21  31  31  21  21  31  31  31  31
  3:  31  31  11  10  21  21  21  21  31  31  21  21  31  31  31  31
  4:  21  21  21  21  10  11  31  31  31  31  31  31  21  21  31  31
  5:  21  21  21  21  11  10  31  31  31  31  31  31  21  21  31  31
  6:  21  21  21  21  31  31  10  11  31  31  31  31  31  31  21  21
  7:  21  21  21  21  31  31  11  10  31  31  31  31  31  31  21  21
  8:  21  21  31  31  31  31  31  31  10  11  21  21  31  31  21  21
  9:  21  21  31  31  31  31  31  31  11  10  21  21  31  31  21  21
 10:  31  31  21  21  31  31  31  31  21  21  10  11  21  21  31  31
 11:  31  31  21  21  31  31  31  31  21  21  11  10  21  21  31  31
 12:  31  31  31  31  21  21  31  31  31  31  21  21  10  11  21  21
```

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Platform Notes (Continued)

```
   13:  31  31  31  31  21  21  31  31  31  31  21  21  11  10  21  21
   14:  31  31  31  31  31  31  21  21  21  21  31  31  21  21  10  11
   15:  31  31  31  31  31  31  21  21  21  21  31  31  21  21  11  10

From /proc/meminfo
   MemTotal:       3168351848 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/sbin/tuned-adm active
    Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
   performance

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.3 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.3"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
      ANSI_COLOR="0;31"
   redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
   system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
   Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                         KVM: Mitigation: Split huge pages
CVE-2018-3620 (L1 Terminal Fault):                        Not affected
Microarchitectural Data Sampling:                         Not affected
CVE-2017-5754 (Meltdown):                                 Not affected
CVE-2018-3639 (Speculative Store Bypass):                 Mitigation: Speculative Store
                                                          Bypass disabled via prctl and
                                                          seccomp
CVE-2017-5753 (Spectre variant 1):                        Mitigation: usercopy/swapgs
                                                          barriers and __user pointer
                                                          sanitization
CVE-2017-5715 (Spectre variant 2):                       Mitigation: Enhanced IBRS, IBPB:
                                                          conditional, RSB filling
```

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Platform Notes (Continued)

```
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):               Mitigation: TSX disabled

 run-level 3 Feb 11 20:22

 SPEC is set to: /home/spec
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb1      ext4  2.0T  6.1G  1.9T   1% /home/spec

 From /sys/devices/virtual/dmi/id
     Vendor:         xFusion
     Product:        9008 V5
     Product Family: Purley
     Serial:         123456

 Additional information from dmidecode 3.2 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.
   Memory:
     38x Hynix HMA84GR7CJR4N-WM 32 GB 2 rank 2933
     3x Hynix HMA84GR7JJR4N-WM 32 GB 2 rank 2933
     55x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

 BIOS:
    BIOS Vendor:       INSYDE Corp.
    BIOS Version:      8.18
    BIOS Date:         09/06/2021
    BIOS Revision:     8.18

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
        | 525.x264_r(base) 557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
        | 541.leela_r(base)
```

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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
  Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc
```

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CSL-V1.1.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CSL-V1.1.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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