



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019

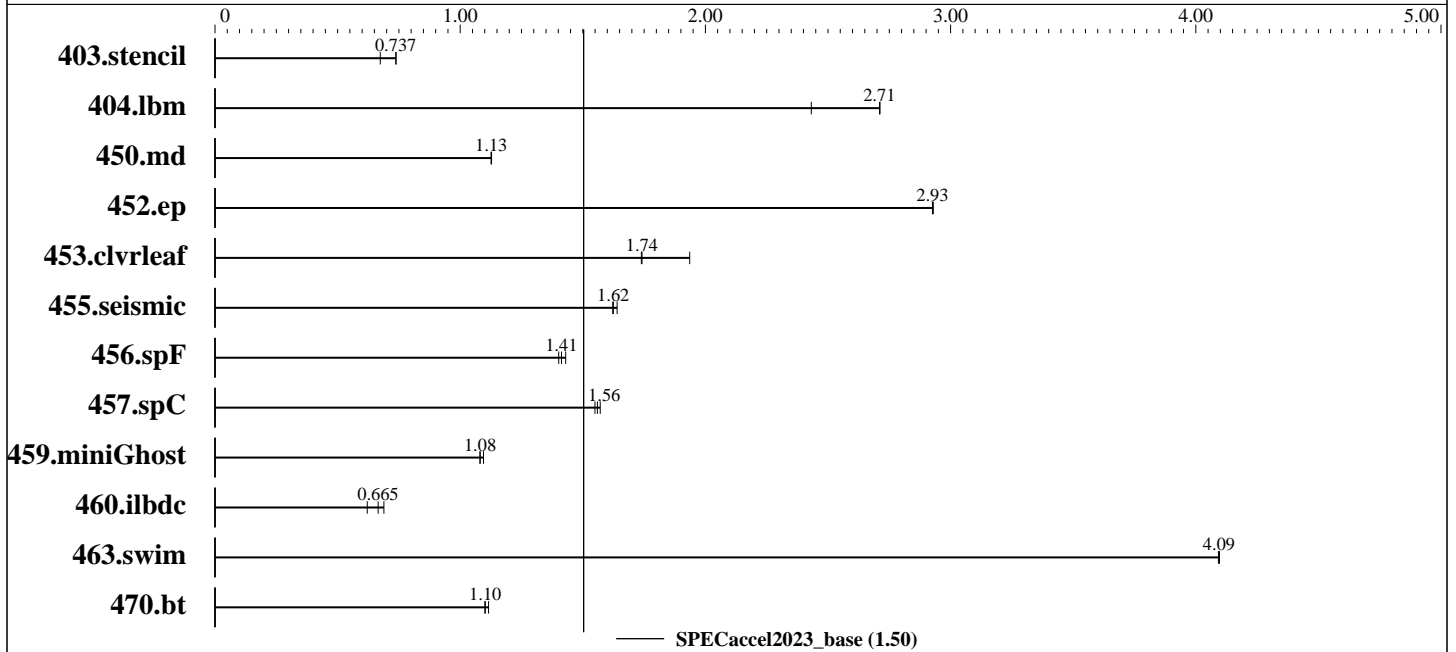
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: May-2024

Hardware Availability: Jun-2024

Software Availability: Feb-2024



Hardware

CPU Name: AMD EPYC 9684X
 Max MHz.: 3700
 Nominal: 2550
 Enabled: 192 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 1152 MB I+D on chip per chip,
 96 MB shared / 8 cores
 Other: None
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-5600B-R,
 running at 4800 MHz)
 Storage: 1 x 1.6 TB NVMe SSD
 Other: None
 Base Threads Run: 384
 Min. Peak Threads: --
 Max. Peak Threads: --

Accelerator

Accel Model Name: AMD EPYC 9684X
 Accel Vendor: AMD
 Accel Name: AMD EPYC 9684X
 Type of Accel: CPU
 Accel Connection: N/A
 Does Accel Use ECC: Yes
 Accel Description: 2 x AMD EPYC 9684X
 Accel Driver: N/A

Software

OS: Red Hat Enterprise Linux release 9.2 (Plow)
 5.14.0-284.11.1.el9_2.x86_64
 Compiler: Intel oneAPI DPC++/C++ Compiler,
 Version 2024.0.2
 Firmware: Version C245M8.4.3.4.225.0319240301 released
 Mar-2024
 File System: xfs
 System State: Run level 3 (multi-user)
 Other: None

(Continued on next page)



SPECaccel[®] 2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Software (Continued)

Base Parallel Model: SMD
Base Threads Run: 384
Peak Parallel Models: Not Run
Max. Peak Threads: --
Min. Peak Threads: --

Results Table

Benchmark	Base							Peak						
	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
403.stencil	SMD	653	0.674	596	0.739	<u>597</u>	<u>0.737</u>							
404.lbm	SMD	187	2.43	168	2.71	<u>168</u>	<u>2.71</u>							
450.md	SMD	532	1.13	<u>532</u>	<u>1.13</u>	533	1.13							
452.ep	SMD	142	2.93	<u>142</u>	<u>2.93</u>	142	2.93							
453.clvrlfleaf	SMD	517	1.94	575	1.74	<u>574</u>	<u>1.74</u>							
455.seismic	SMD	476	1.64	481	1.62	<u>480</u>	<u>1.62</u>							
456.spF	SMD	<u>336</u>	<u>1.41</u>	339	1.40	332	1.43							
457.spC	SMD	<u>346</u>	<u>1.56</u>	348	1.55	344	1.57							
459.miniGhost	SMD	539	1.09	<u>546</u>	<u>1.08</u>	546	1.08							
460.ilbdc	SMD	<u>834</u>	<u>0.665</u>	806	0.689	894	0.621							
463.swim	SMD	<u>107</u>	<u>4.09</u>	107	4.10	108	4.09							
470.bt	SMD	946	1.12	<u>957</u>	<u>1.10</u>	959	1.10							

SPEC accel2023_base = 1.50

SPEC accel2023_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runaccel before the start of the run:

```
FORT_BUFFERED = "true"
KMP_AFFINITY = "compact,0,granularity=thread"
KMP_BLOCKTIME = "infinite"
KMP_HW_SUBSET = "2S,96C,2T"
KMP_LIBRARY = "turnaround"
KMP_STACKSIZE = "128M"
OMP_DYNAMIC = "FALSE"
OMP_WAIT_POLICY = "active"
```

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, the CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

General Notes (Continued)

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

sysinfo program /home/specaccel/bin/sysinfo
Rev: r6622 of 2021-04-07 bla7d5f8f71be5aff70a755cad7211a0
running on rhel92nvme Thu May 9 18:53:37 2024

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 : AMD EPYC 9684X 96-Core Processor
 2 "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 : 96
siblings : 192
physical 0: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81
82 83 84 85 86 87 88 89 90 91 92 93 94 95
physical 1: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81
82 83 84 85 86 87 88 89 90 91 92 93 94 95
```

```
From lscpu from util-linux 2.37.4:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 52 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 384
On-line CPU(s) list: 0-383
Vendor ID: AuthenticAMD
BIOS Vendor ID: Advanced Micro Devices, Inc.
Model name: AMD EPYC 9684X 96-Core Processor
BIOS Model name: AMD EPYC 9684X 96-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 2
Core(s) per socket: 96
```

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Platform Notes (Continued)

```

Socket(s):                2
Stepping:                 2
Frequency boost:         enabled
CPU max MHz:              3715.4290
CPU min MHz:              1500.0000
BogoMIPS:                 5092.25
Flags:                    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr
pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt
pdpe1gb rdtscp lm constant_tsc rep_good noopl nonstop_tsc cpuid extd_apicid
aperfmpperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
popcnt aes xsave avx fl16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a
misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba
perfmon_v2 ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm
rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin cppc arat
npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
pausefilter pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl avx512vbmi umip
pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_lld
Virtualization:          AMD-V
L1d cache:               6 MiB (192 instances)
L1i cache:               6 MiB (192 instances)
L2 cache:                 192 MiB (192 instances)
L3 cache:                 2.3 GiB (24 instances)
NUMA node(s):            2
NUMA node0 CPU(s):       0-95,192-287
NUMA node1 CPU(s):       96-191,288-383
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:         Not affected
Vulnerability Meltdown:    Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed:    Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:  Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:  Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling, PBRSE-eIBRS Not affected
Vulnerability Srbds:       Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	6M	8	Data	1	64	1	64

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Platform Notes (Continued)

L1i	32K	6M	8 Instruction	1	64	1	64
L2	1M	192M	8 Unified	2	2048	1	64
L3	96M	2.3G	16 Unified	3	98304	1	64

/proc/cpuinfo cache data
cache size : 1024 KB

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 2 nodes (0-1)

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
86 87 88 89 90 91 92 93 94 95 192 193 194 195 196 197 198 199 200 201 202 203 204 205
206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227
228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249
250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271
272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287

node 0 size: 773695 MB

node 0 free: 770093 MB

node 1 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114
115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136
137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158
159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180
181 182 183 184 185 186 187 188 189 190 191 288 289 290 291 292 293 294 295 296 297 298
299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320
321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342
343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364
365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383

node 1 size: 774031 MB

node 1 free: 770341 MB

node distances:

node 0 1
0: 10 32
1: 32 10

From /proc/meminfo

MemTotal: 1584872276 kB

HugePages_Total: 0

Hugepagesize: 2048 kB

/sbin/tuned-adm active

Current active profile: latency-performance

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

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Platform Notes (Continued)

```

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="9.2 (Plow)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="9.2"
  PLATFORM_ID="platform:el9"
  PRETTY_NAME="Red Hat Enterprise Linux 9.2 (Plow)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 9.2 (Plow)
system-release: Red Hat Enterprise Linux release 9.2 (Plow)
system-release-cpe: cpe:/o:redhat:enterprise_linux:9::baseos

uname -a:
Linux rhel92nvme 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12
10:45:03 EDT 2023 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
mmio_stale_data: Not affected
retbleed: Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store
Bypass disabled via prctl
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps
barriers and __user pointer
sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Retpolines, IBPB:
conditional, IBRS_FW, STIBP:
always-on, RSB filling,
PBRSE-eIBRS: Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 9 18:53 last=5

SPEC is set to: /home/specaccel
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/nvme1nlp25 xfs   1.3T  961G  291G  77% /home

From /sys/devices/virtual/dmi/id
Vendor:          Cisco Systems Inc
Product:         UCSC-C245-M8SX

```

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Platform Notes (Continued)

Serial: WZP2733019E

Additional information from dmidecode 3.3 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:

24x 0xCE00 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600, configured at 4800

BIOS:

BIOS Vendor: Cisco Systems, Inc.
BIOS Version: C245M8.4.3.4.225.0319240301
BIOS Date: 03/19/2024
BIOS Revision: 5.27

(End of data from sysinfo program)

Compiler Version Notes

=====
C | 403.stencil(base) 404.lbm(base) 452.ep(base) 457.spC(base)
| 470.bt(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /home/intel_tools/compiler/compiler/2024.1/bin/compiler
Configuration file:
/home/intel_tools/compiler/compiler/2024.1/bin/compiler/./icx.cfg
=====

=====
Fortran | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)
| 463.swim(base)
=====

ifx (IFX) 2024.1.0 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
=====

=====
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)
=====

ifx (IFX) 2024.1.0 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)
Target: x86_64-unknown-linux-gnu

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Compiler Version Notes (Continued)

Thread model: posix
InstalledDir: /home/intel_tools/compiler/compiler/2024.1/bin/compiler
Configuration file:
/home/intel_tools/compiler/compiler/2024.1/bin/compiler/./icx.cfg

Base Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Base Portability Flags

450.md: -80
457.spC: -Wl,--no-relax(icx)(*) -shared-intel -Wl,--no-relax(icx)
459.miniGhost: -nofor-main

(*) Indicates a portability flag that was found in a non-portability variable.

Base Optimization Flags

C benchmarks:

403.stencil: -qopenmp -Ofast -O3 -march=common-avx512
-mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math
-qopt-dynamic-align -fvec-peel-loops
-qopt-streaming-stores always -Xclang
-fopenmp-declare-target-scalar-defaultmap-firstprivate
-fimf-precision=low

404.lbm: Same as 403.stencil

452.ep: Same as 403.stencil

(Continued on next page)



SPECaccel[®]2023 Result

Copyright 2023-2024 Standard Performance Evaluation Corporation

Cisco Systems
AMD EPYC 9684X
Cisco UCS C245 M8

SPECaccel2023_base = 1.50

SPECaccel2023_peak = Not Run

accel2023 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: May-2024

Hardware Availability: Jun-2024

Software Availability: Feb-2024

Base Optimization Flags (Continued)

```
457.spC: -qopenmp -Ofast -O3 -march=common-avx512
-mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math
-qopt-dynamic-align -fvec-peel-loops
-qopt-streaming-stores always -Xclang
-fopenmp-declare-target-scalar-defaultmap-firstprivate
-fimf-precision=low -mcmmodel=medium(*)
```

470.bt: Same as 403.stencil

Fortran benchmarks:

```
-qopenmp -Ofast -O3 -march=common-avx512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math
-qopt-dynamic-align -fvec-peel-loops -qopt-streaming-stores always
-nostandard-realloc-lhs -align array32byte -auto
-fimf-accuracy-bits-sqrt=14 -fimf-precision=low
```

Benchmarks using both Fortran and C:

```
-qopenmp -Ofast -O3 -march=common-avx512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math
-qopt-dynamic-align -fvec-peel-loops -qopt-streaming-stores always
-Xclang -fopenmp-declare-target-scalar-defaultmap-firstprivate
-fimf-precision=low -nostandard-realloc-lhs -align array32byte -auto
-fimf-accuracy-bits-sqrt=14
```

(*) Indicates an optimization flag that was found in a portability variable.

The flags file that was used to format this result can be browsed at

http://www.spec.org/accel2023/flags/Intel_compiler_flags_accel.2024.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/accel2023/flags/Intel_compiler_flags_accel.2024.xml

SPECaccel is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPECaccel2023 v2.0.17 on 2024-05-09 21:53:37-0400.

Report generated on 2024-05-29 12:14:31 by accel2023 PDF formatter v112.

Originally published on 2024-05-29.