SPECaccel®2023 Result

Copyright 2023-2025 Standard Performance Evaluation Corporation

Intel
Intel Data Center GPU Max 1550

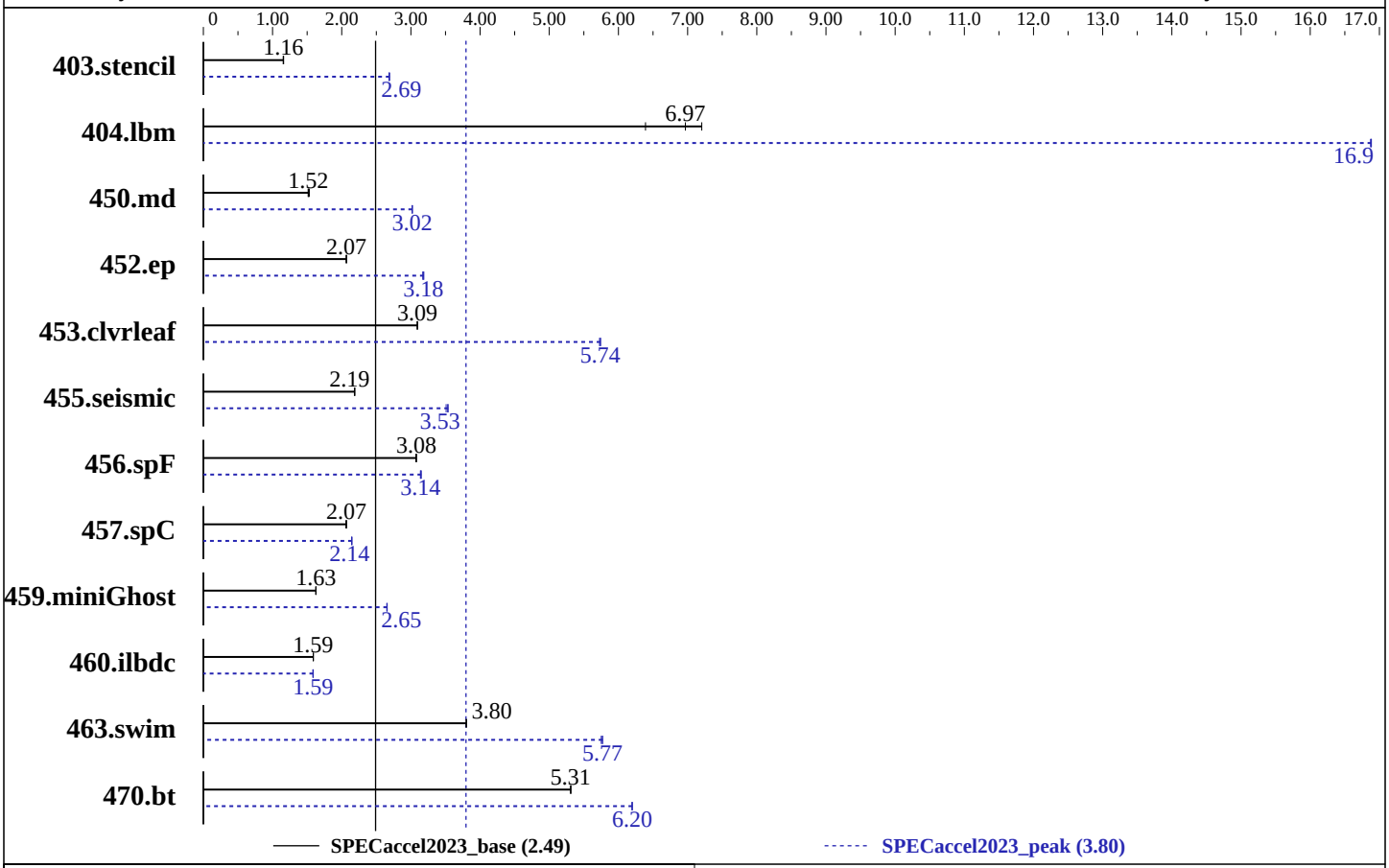
Intel Server D50DNP1SBB (2 x Intel Xeon Platinum 8480+, 2.0GHz)

SPECaccel 2023_base = 2.49

SPECaccel 2023_peak = 3.80

accel2023 License: 13
Test Sponsor: Intel
Tested by: Intel

Test Date: Dec-2024
Hardware Availability: Jan-2023
Software Availability: Nov-2024



Hardware

CPU Name:	Intel Xeon Platinum 8480+
Max MHz.:	3800
Nominal:	2000
Enabled:	112 cores, 2 chips, 2 threads/core
Orderable:	1, 2 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	105 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16x64 GB DDR5 2Rx4 PC5-4800B-R)
Storage:	1 x 1 TB Crucial CT1000P5PSSD8 M.2 SSD
Other:	None
Base Threads Run:	1
Min. Peak Threads:	1
Max. Peak Threads:	1

Accelerator

Accel Model Name:	Intel Data Center GPU Max 1550
Accel Vendor:	Intel
Accel Name:	Intel Data Center GPU Max 1550
Type of Accel:	GPU
Accel Connection:	PCIe Gen5 x16
Does Accel Use ECC:	yes
Accel Description:	See Notes
Accel Driver:	24.39.31294

SPECaccel®2023 Result

Copyright 2023-2025 Standard Performance Evaluation Corporation

Intel
Intel Data Center GPU Max 1550

Intel Server D50DNP1SBB (2 x Intel Xeon Platinum 8480+, 2.0GHz)

SPECaccel 2023_base = 2.49

SPECaccel 2023_peak = 3.80

accel2023 License: 13
Test Sponsor: Intel
Tested by: Intel

Test Date: Dec-2024
Hardware Availability: Jan-2023
Software Availability: Nov-2024

Software

OS:	Ubuntu 24.04 LTS 6.8.0-38-generic
Compiler:	Intel oneAPI Compiler 2025.0.1
Firmware:	SE5C7411.86B.9525.D26.2305160804
File System:	nfs
System State:	Run level 5
Other:	None
Base Parallel Model:	TGT
Base Threads Run:	1
Peak Parallel Models:	LOP TGT
Max. Peak Threads:	1
Min. Peak Threads:	1

Results Table

Benchmark	Base							Peak						
	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
403.stencil	TGT	379	1.16	**381**	**1.16**	381	1.16	LOP	**164**	**2.69**	164	2.68	163	2.69
404.lbm	TGT	63.2	7.20	**65.3**	**6.97**	71.2	6.39	TGT	26.9	16.9	27.0	16.9	**27.0**	**16.9**
450.md	TGT	392	1.53	**396**	**1.52**	396	1.52	TGT	199	3.02	**199**	**3.02**	199	3.02
452.ep	TGT	**201**	**2.07**	200	2.07	201	2.06	TGT	131	3.17	130	3.19	**131**	**3.18**
453.clvrleaf	TGT	323	3.09	**323**	**3.09**	323	3.09	TGT	175	5.73	174	5.74	**174**	**5.74**
455.seismic	TGT	357	2.18	**357**	**2.19**	356	2.19	TGT	220	3.54	**221**	**3.53**	222	3.51
456.spF	TGT	155	3.07	154	3.08	**154**	**3.08**	TGT	**151**	**3.14**	151	3.15	151	3.14
457.spC	TGT	261	2.07	262	2.06	**261**	**2.07**	TGT	252	2.14	251	2.15	**252**	**2.14**
459.miniGhost	TGT	362	1.63	**363**	**1.63**	363	1.63	TGT	**222**	**2.65**	222	2.66	222	2.65
460.ilbdc	TGT	349	1.59	**349**	**1.59**	349	1.59	TGT	351	1.58	349	1.59	**350**	**1.59**
463.swim	TGT	116	3.81	116	3.80	**116**	**3.80**	TGT	76.5	5.75	76.3	5.77	**76.3**	**5.77**
470.bt	TGT	199	5.31	**199**	**5.31**	199	5.31	TGT	**170**	**6.20**	170	6.20	170	6.20

SPEC accel2023_base = 2.49

SPEC accel2023_peak = 3.80

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

General Notes

```
Environment variables set by runaccel before the start of the run:
LIBOMPTARGET_LEVEL_ZERO_MEMORY_POOL = "device,4096,6,24576"
LIBOMPTARGET_LEVEL_ZERO_USE_IMMEDIATE_COMMAND_LIST = "1"
ZE_FLAT_DEVICE_HIERARCHY = "FLAT"
For the following tests src.alt was used in PEAK:
403 404 452 453 455 457 459 463 470
```

Platform Notes

```
Device Vendor                                Intel
Device Version                               OpenCL 3.0 NEO
Driver Version                               24.39.31294
Base clock                                   900MHz
Max clock frequency                          1600MHz
Tiles                                        2
Slices per Tile                              1
Max compute units per Tile                   512
Sub-slices per slice                         64
EUs per sub-slice                            8
Threads per EU                               8
Max work item dimensions                     3
Max work item sizes                          1024x1024x1024
Max work group size                          1024
Preferred work group size multiple           32
Max sub-groups per work group                64
Sub-group sizes                              16, 32
L1 Cache per EU                              65536
L2 cache size                                427819008
Global memory size                           137438953472
Address bits                                 64, Little-Endian

Sysinfo program /nfs/site/home/mknyazev/spec/accel2023/for_report/bin/sysinfo
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on sdp562928 Sun Dec 15 21:02:21 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 : Intel(R) Xeon(R) Platinum 8480+
      2  "physical id"s (chips)
      224 "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 : 56
      siblings  : 112
      physical 0: cores 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
      physical 1: cores 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

From lscpu from util-linux 2.39.3:
     Architecture:                         x86_64
```

(Continued on next page)

Platform Notes (Continued)

```
CPU op-mode(s):                       32-bit, 64-bit
Address sizes:                        52 bits physical, 57 bits virtual
Byte Order:                           Little Endian
CPU(s):                               224
On-line CPU(s) list:                  0-223
Vendor ID:                            GenuineIntel
Model name:                           Intel(R) Xeon(R) Platinum 8480+
CPU family:                           6
Model:                                143
Thread(s) per core:                   2
Core(s) per socket:                   56
Socket(s):                            2
Stepping:                             6
CPU(s) scaling MHz:                   26%
CPU max MHz:                          3800.0000
CPU min MHz:                          800.0000
BogoMIPS:                             4000.00
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 tsc_known_freq 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 cat_l2 cdp_l3 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
tpr_shadow flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms
invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect user_shstk avx_vnni
avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req
vnmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri
movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr ibt amx_bf16
avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
Virtualization:                       VT-x
L1d cache:                            5.3 MiB (112 instances)
L1i cache:                            3.5 MiB (112 instances)
L2 cache:                             224 MiB (112 instances)
L3 cache:                             210 MiB (2 instances)
NUMA node(s):                         2
NUMA node0 CPU(s):                    0-55,112-167
NUMA node1 CPU(s):                    56-111,168-223
Vulnerability Gather data sampling:   Not affected
Vulnerability Itlb multihit:          Not affected
Vulnerability L1tf:                   Not affected
Vulnerability Mds:                    Not affected
Vulnerability Meltdown:               Not affected
Vulnerability Mmio stale data:        Not affected
```

(Continued on next page)

Platform Notes (Continued)

```
      Vulnerability Reg file data sampling: Not affected
      Vulnerability Retbleed:               Not affected
      Vulnerability Spec rstack overflow:   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; Enhanced / Automatic IBRS; IBPB
      conditional; RSB filling; PBRSB-eIBRS SW sequence; BHI BHI_DIS_S
      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       48K     5.3M   12 Data            1     64        1             64
       L1i       32K     3.5M    8 Instruction     1     64        1             64
       L2         2M     224M   16 Unified         2   2048        1             64
       L3       105M     210M   15 Unified         3 114688        1             64

  /proc/cpuinfo cache data
     cache size : 107520 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 55 112
    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
    node 0 size: 515772 MB
    node 0 free: 491967 MB
    node 1 cpus: 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 96 97 98 99 100 101 102 103 104 105 106
    107 108 109 110 111 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184
    185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206
    207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223
    node 1 size: 516002 MB
    node 1 free: 432037 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10

  From /proc/meminfo
     MemTotal:       1056537844 kB
     HugePages_Total:       0
```

(Continued on next page)

Platform Notes (Continued)

```
   Hugepagesize:       2048 kB

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

 /usr/bin/lsb_release -d
   Ubuntu 24.04 LTS

 From /etc/*release* /etc/*version*
   debian_version: trixie/sid
   os-release:
      PRETTY_NAME="Ubuntu 24.04 LTS"
      NAME="Ubuntu"
      VERSION_ID="24.04"
      VERSION="24.04 LTS (Noble Numbat)"
      VERSION_CODENAME=noble
      ID=ubuntu
      ID_LIKE=debian
      HOME_URL="https://www.ubuntu.com/"

 uname -a:
   Linux sdp562928 6.8.0-38-generic #38-Ubuntu SMP PREEMPT_DYNAMIC Fri Jun  7 15:25:01
   UTC 2024 x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 gather_data_sampling:                                Not affected
 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
 reg_file_data_sampling:                              Not affected
 retbleed:                                            Not affected
 spec_rstack_overflow:                                Not affected
 CVE-2018-3639 (Speculative Store Bypass):            Mitigation: Speculative Store
                                                      Bypass disabled via prctl
 CVE-2017-5753 (Spectre variant 1):                   Mitigation: usercopy/swapgs
                                                      barriers and __user pointer
                                                      sanitization
 CVE-2017-5715 (Spectre variant 2):                  Mitigation: Enhanced / Automatic
                                                      IBRS; IBPB: conditional; RSB
                                                    filling; PBRSB-eIBRS: SW sequence;
                                                      BHI: BHI_DIS_S
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):             Not affected
```

(Continued on next page)

Platform Notes (Continued)

```
 run-level 5 Dec 13 20:08

 SPEC is set to: /nfs/site/home/mknyazev/spec/accel2023/for_report
    Filesystem                              Type  Size  Used Avail Use% Mounted on
    cthor-fs1.jf.intel.com:/home/mknyazev nfs   200T   82T  108T  43%
    /nfs/site/home/mknyazev

 From /sys/devices/virtual/dmi/id
     Vendor:         Intel Corporation
     Product:        D50DNP1SBB
     Product Family: Family

 Cannot run dmidecode; consider saying (as root)
    chmod +s /usr/sbin/dmidecode

 BIOS:
    BIOS Vendor:       Intel Corporation
    BIOS Version:      SE5C7411.86B.9525.D26.2305160804
    BIOS Date:         05/16/2023

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C          | 403.stencil(base, peak) 404.lbm(base, peak) 452.ep(base, peak)
           | 457.spC(base, peak) 470.bt(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2025.0.1 (2025.0.1.20241106)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
  /opt/hpc_software/compilers/intel/xmain-rel/20241106/compiler/latest/bin/compiler
Configuration file:
  /opt/hpc_software/compilers/intel/xmain-rel/20241106/compiler/latest/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base, peak) 455.seismic(base, peak) 456.spF(base, peak)
           | 460.ilbdc(base, peak) 463.swim(base, peak)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.1 20241106
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
```

(Continued on next page)

Compiler Version Notes (Continued)

```
Fortran, C | 453.clvrleaf(base, peak) 459.miniGhost(base, peak)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.1 20241106
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler 2025.0.1 (2025.0.1.20241106)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
  /opt/hpc_software/compilers/intel/xmain-rel/20241106/compiler/latest/bin/compiler
Configuration file:
  /opt/hpc_software/compilers/intel/xmain-rel/20241106/compiler/latest/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: -mcmodel=medium -Wl,--no-relax
459.miniGhost: -nofor-main

Base Optimization Flags

C benchmarks:
-O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

(Continued on next page)

Base Optimization Flags (Continued)

Fortran benchmarks:
-O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

Benchmarks using both Fortran and C:
-O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Peak Portability Flags

450.md: -80
457.spC: -mcmodel=medium -Wl,--no-relax
459.miniGhost: -nofor-main

Peak Optimization Flags

C benchmarks:
-O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'

(Continued on next page)

Peak Optimization Flags (Continued)

C benchmarks (continued):
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

Fortran benchmarks:

450.md: -O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto
-ffast-math -fiopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-declare-target-scalar-defaultmap=firstprivate

455.seismic: -O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto
-ffast-math -fiopenmp
-fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

456.spF: Same as 455.seismic

460.ilbdc: Same as 455.seismic

463.swim: Same as 455.seismic

Benchmarks using both Fortran and C:
-O3 -xCORE-AVX512 -mprefer-vector-width=512 -flto -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen="-fp-model=precise"
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f -options "-cl-fast-relaxed-math"'
-fopenmp-target-loopopt
-fopenmp-declare-target-scalar-defaultmap=firstprivate

The flags file that was used to format this result can be browsed at
http://www.spec.org/accel2023/flags/Intel_compiler_flags.2025-01-15.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/accel2023/flags/Intel_compiler_flags.2025-01-15.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 v2.0.18 on 2024-12-16 00:02:20-0500.
Report generated on 2025-01-15 13:17:18 by accel2023 PS formatter v112.
Originally published on 2025-01-15.