



SPECaccel[®]2023 Result

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Intel Intel Data Center GPU Max 1550

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

SPECaccel2023_base = 2.49

SPECaccel2023_peak = 3.80

accel2023 License: 13

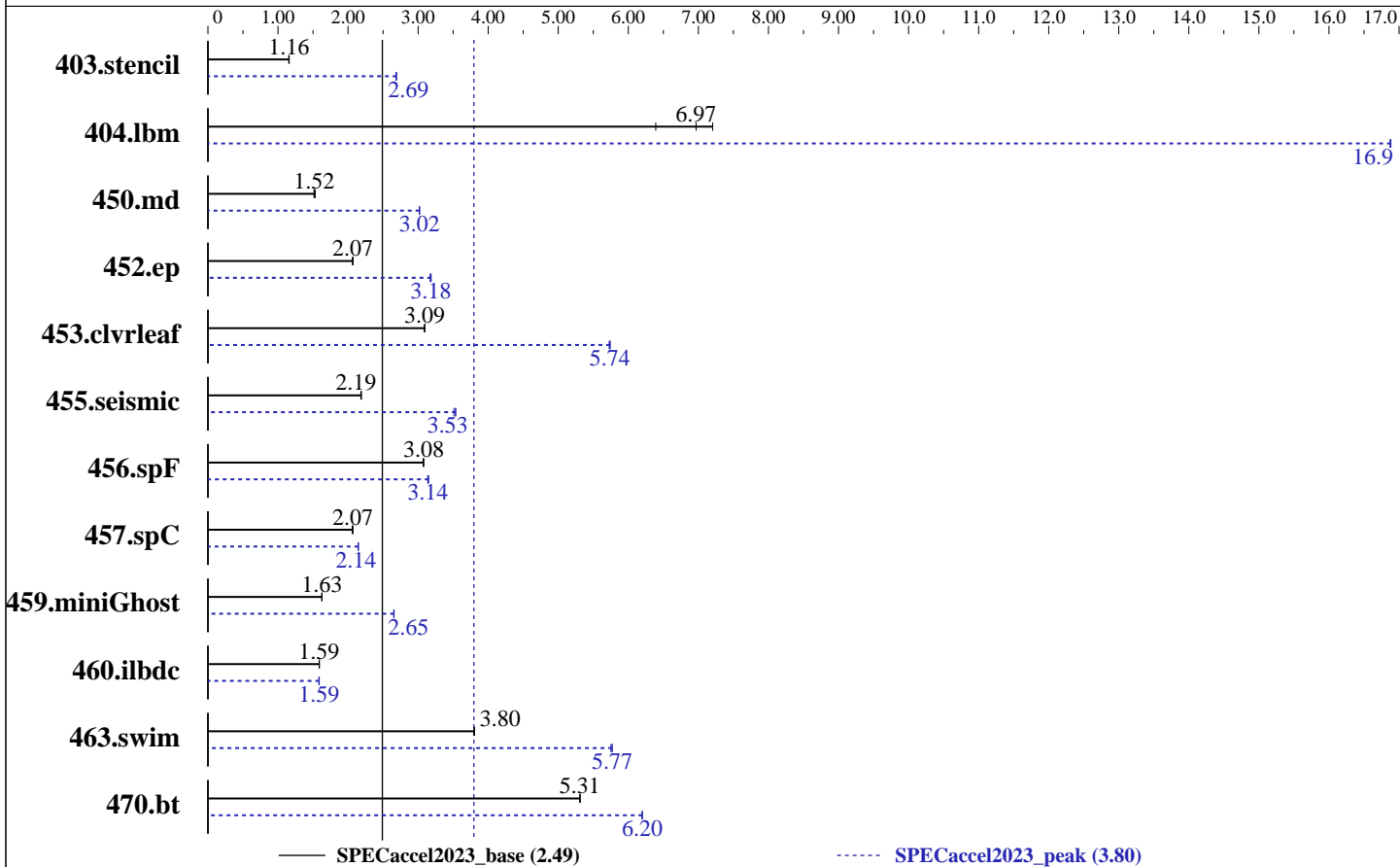
Test Sponsor: Intel

Tested by: Intel

Test Date: Dec-2024

Hardware Availability: Jan-2023

Software Availability: Nov-2024



— SPECaccel2023_base (2.49)

- - - - - SPECaccel2023_peak (3.80)

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



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



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Tested by: Intel

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

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

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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 pdpegb 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
vnni 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_lli 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)



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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; PBR SB-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

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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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Enhanced / Automatic IBRS; IBPB: conditional; RSB filling; PBRSE-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

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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
cthcr-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

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Compiler Version Notes (Continued)

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

ifx (IFX) 2025.0.1 20241106

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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

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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"'
```

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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[®]2023 Result

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Intel
Intel Data Center GPU Max 1550

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

SPECaccel2023_base = 2.49

SPECaccel2023_peak = 3.80

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

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

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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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