SPECaccel®2023 Result

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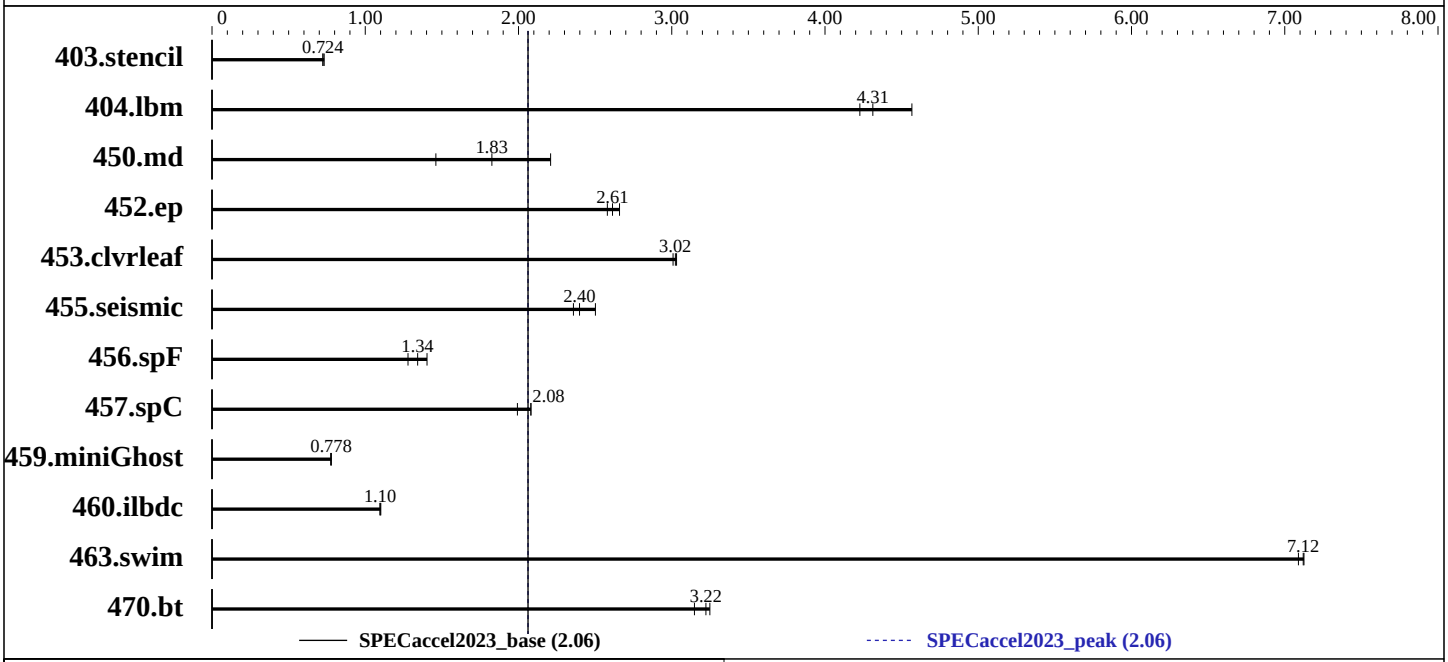
Lenovo
Intel Xeon 6788P
SR860 V4(4x Xeon 6788P)

SPECaccel 2023_base = 2.06

SPECaccel 2023_peak = 2.06

accel2023 License: 9017
Test Sponsor: Lenovo
Tested by: Lenovo

Test Date: Sep-2025
Hardware Availability: Sep-2025
Software Availability: Jun-2025



Hardware

CPU Name:	Intel Xeon 6788P
Max MHz.:	3800
Nominal:	2000
Enabled:	344 cores, 4 chips
Orderable:	4 chips
Cache L1:	64 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	336 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16 x 64 GB 2Rx4 PC5-6400B-R)
Storage:	1.92 TB
Other:	None
Base Threads Run:	344
Min. Peak Threads:	344
Max. Peak Threads:	344

Accelerator

Accel Model Name:	Intel Xeon 6788P
Accel Vendor:	Lenovo
Accel Name:	Intel Xeon 6788P
Type of Accel:	CPU
Accel Connection:	UPI
Does Accel Use ECC:	yes
Accel Description:	Intel Xeon 6788P SMT OFF, Turbo ON
Accel Driver:	None

Software

OS:	Ubuntu 24.04.2 LTS 6.8.0-79-generic
Compiler:	Intel oneAPI Compiler 2025.2.1
Firmware:	RVE103X-1.10
File System:	ext4
System State:	Run level 5
Other:	None
Base Parallel Model:	LOP
Base Threads Run:	344
Peak Parallel Models:	LOP

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Software (Continued)

Max. Peak Threads: 344
Min. Peak Threads: 344

Results Table

Benchmark	Base							Peak						
	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
403.stencil	LOP	**608**	**0.724**	601	0.732	608	0.723	LOP	**608**	**0.724**	601	0.732	608	0.723
404.lbm	LOP	**106**	**4.31**	99.6	4.57	108	4.23	LOP	**106**	**4.31**	99.6	4.57	108	4.23
450.md	LOP	411	1.46	**329**	**1.83**	272	2.21	LOP	411	1.46	**329**	**1.83**	272	2.21
452.ep	LOP	156	2.66	161	2.58	**159**	**2.61**	LOP	156	2.66	161	2.58	**159**	**2.61**
453.clvrleaf	LOP	**331**	**3.02**	330	3.03	332	3.01	LOP	**331**	**3.02**	330	3.03	332	3.01
455.seismic	LOP	312	2.50	331	2.36	**325**	**2.40**	LOP	312	2.50	331	2.36	**325**	**2.40**
456.spF	LOP	371	1.28	339	1.40	**354**	**1.34**	LOP	371	1.28	339	1.40	**354**	**1.34**
457.spC	LOP	259	2.08	**260**	**2.08**	271	1.99	LOP	259	2.08	**260**	**2.08**	271	1.99
459.miniGhost	LOP	758	0.778	762	0.775	**759**	**0.778**	LOP	758	0.778	762	0.775	**759**	**0.778**
460.ilbdc	LOP	**506**	**1.10**	504	1.10	506	1.10	LOP	**506**	**1.10**	504	1.10	506	1.10
463.swim	LOP	**61.8**	**7.12**	62.1	7.09	61.8	7.13	LOP	**61.8**	**7.12**	62.1	7.09	61.8	7.13
470.bt	LOP	335	3.15	325	3.25	**327**	**3.22**	LOP	335	3.15	325	3.25	**327**	**3.22**

SPEC accel2023_base = 2.06

SPEC accel2023_peak = 2.06

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:
FORT_BUFFERED = "true"
KMP_AFFINITY = "compact,0,granularity=thread"
KMP_BLOCKTIME = "infinite"
KMP_HW_SUBSET = "4S,86C,1T"
KMP_LIBRARY = "turnaround"
KMP_STACKSIZE = "8M"
OMP_DYNAMIC = "FALSE"
OMP_WAIT_POLICY = "active"
```

Platform Notes

```
Sysinfo program /root/ACCEL2018/bin/sysinfo
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on androsnet1 Wed Oct  1 01:11:41 2025

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
```

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) 6788P
      4  "physical id"s (chips)
      344 "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 : 86
      siblings  : 86
      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 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
      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 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
      physical 2: 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 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
      physical 3: 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 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

From lscpu from util-linux 2.39.3:
     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):                               344
     On-line CPU(s) list:                  0-343
     Vendor ID:                            GenuineIntel
     BIOS Vendor ID:                       Intel(R) Corporation
     Model name:                           Intel(R) Xeon(R) 6788P
     BIOS Model name:                      Intel(R) Xeon(R) 6788P UNKNOWN CPU @ 2.0GHz
     BIOS CPU family:                      179
     CPU family:                           6
     Model:                                173
     Thread(s) per core:                   1
     Core(s) per socket:                   86
     Socket(s):                            4
     Stepping:                             1
     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
```

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Platform Notes (Continued)

```
      nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl 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
      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 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 amx_bf16
      avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
      L1d cache:                            16.1 MiB (344 instances)
      L1i cache:                            21.5 MiB (344 instances)
      L2 cache:                             688 MiB (344 instances)
      L3 cache:                             1.3 GiB (4 instances)
      NUMA node(s):                         4
      NUMA node0 CPU(s):                    0-85
      NUMA node1 CPU(s):                    86-171
      NUMA node2 CPU(s):                    172-257
      NUMA node3 CPU(s):                    258-343
      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
      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 Not affected; 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    16.1M   12 Data            1     64        1             64
      L1i       64K    21.5M   16 Instruction     1     64        1             64
      L2         2M     688M   16 Unified         2   2048        1             64
      L3       336M     1.3G   16 Unified         3 344064        1             64

  /proc/cpuinfo cache data
```

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Platform Notes (Continued)

```
    cache size : 344064 KB

 From numactl --hardware
 WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   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
   node 0 size: 257511 MB
   node 0 free: 254224 MB
   node 1 cpus: 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107
   108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129
   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
   node 1 size: 258018 MB
   node 1 free: 255805 MB
   node 2 cpus: 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
   212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233
   234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255
   256 257
   node 2 size: 258018 MB
   node 2 free: 255316 MB
   node 3 cpus: 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
   276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297
   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
   node 3 size: 257998 MB
   node 3 free: 256088 MB
   node distances:
   node   0   1   2   3
     0:  10  21  21  21
     1:  21  10  21  21
     2:  21  21  10  21
     3:  21  21  21  10

 From /proc/meminfo
    MemTotal:       1056304904 kB
    HugePages_Total:    1024
    Hugepagesize:       2048 kB

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

 /usr/bin/lsb_release -d
    Ubuntu 24.04.2 LTS
```

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Platform Notes (Continued)

```
From /etc/*release* /etc/*version*
   debian_version: trixie/sid
   os-release:
      PRETTY_NAME="Ubuntu 24.04.2 LTS"
      NAME="Ubuntu"
      VERSION_ID="24.04"
      VERSION="24.04.2 LTS (Noble Numbat)"
      VERSION_CODENAME=noble
      ID=ubuntu
      ID_LIKE=debian
      HOME_URL="https://www.ubuntu.com/"

uname -a:
   Linux androsnet1 6.8.0-79-generic #79-Ubuntu SMP PREEMPT_DYNAMIC Tue Aug 12 14:42:46
   UTC 2025 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: Not
                                                       affected; BHI: BHI_DIS_S
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

run-level 5 Sep 17 06:19

SPEC is set to: /root/ACCEL2018
   Filesystem                     Type  Size  Used Avail Use% Mounted on
   /dev/mapper/ubuntu--vg-ubuntu--lv ext4   98G   35G   58G  38% /

From /sys/devices/virtual/dmi/id
```

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Platform Notes (Continued)

```
     Vendor:          Lenovo
     Product:         ThinkSystem SR850/SR860 V4
     Product Family: ThinkSystem
     Serial:          1234567890

 Additional information from dmidecode 3.5 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:
     11x SK Hynix HMCG88AHBRA284N 32 GB 2 rank 6400
     2x SK Hynix HMCG88AHBRA286N 32 GB 2 rank 6400
     6x SK Hynix HMCG88AHBRA290N 32 GB 2 rank 6400
     13x SK Hynix HMCG88AHBRA292N 32 GB 2 rank 6400

 BIOS:
    BIOS Vendor:       Lenovo
    BIOS Version:      RVE101R-0.10
    BIOS Date:         03/27/2025
    BIOS Revision:     0.10
    Firmware Revision: 1.16

 (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 2025.2.1 (2025.2.0.20250806)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/intel/oneapi/compiler/2025.2/bin/compiler
Configuration file: /opt/intel/oneapi/compiler/2025.2/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)
           | 463.swim(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.2.1 20250806
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

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

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Compiler Version Notes (Continued)

```
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.2.1 20250806
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler 2025.2.1 (2025.2.0.20250806)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/intel/oneapi/compiler/2025.2/bin/compiler
Configuration file: /opt/intel/oneapi/compiler/2025.2/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
459.miniGhost: -nofor-main

Base Optimization Flags

C benchmarks:
-Ofast -O3 -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math -fiopenmp
-qopt-dynamic-align -fvec-peel-loops -qopt-streaming-stores always
-Xclang -fopenmp-declare-target-scalar-defaultmap-firstprivate
-fimf-precision=low -mcmodel=medium

Fortran benchmarks:
-Ofast -O3 -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math -fiopenmp
-qopt-dynamic-align -fvec-peel-loops -qopt-streaming-stores always
-nostandard-realloc-lhs -align array32byte -auto

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
`-fimf-accuracy-bits-sqrt=14 -fimf-precision=low`

Benchmarks using both Fortran and C:
`-Ofast -O3 -xCORE-AVX512 -mprefer-vector-width=512`
`-qopt-multiple-gather-scatter-by-shuffles -flto -ffast-math -fiopenmp`
`-qopt-dynamic-align -fvec-peel-loops -qopt-streaming-stores always`
`-Xclang -fopenmp-declare-target-scalar-defaultmap-firstprivate`
`-fimf-precision=low -mcmodel=medium -nostandard-realloc-lhs`
`-align array32byte -auto -fimf-accuracy-bits-sqrt=14`

Peak Optimization Flags

C benchmarks:

403.stencil: `basepeak = yes`

404.lbm: `basepeak = yes`

452.ep: `basepeak = yes`

457.spC: `basepeak = yes`

470.bt: `basepeak = yes`

Fortran benchmarks:

450.md: `basepeak = yes`

455.seismic: `basepeak = yes`

456.spF: `basepeak = yes`

460.ilbdc: `basepeak = yes`

463.swim: `basepeak = yes`

Benchmarks using both Fortran and C:

453.clvrleaf: `basepeak = yes`

459.miniGhost: `basepeak = yes`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/accel2023/flags/Intel_compiler_flags.2024-02-14.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/accel2023/flags/Intel_compiler_flags.2024-02-14.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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