SPECaccel®2023 Result

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Intel
Intel Xeon 6972P

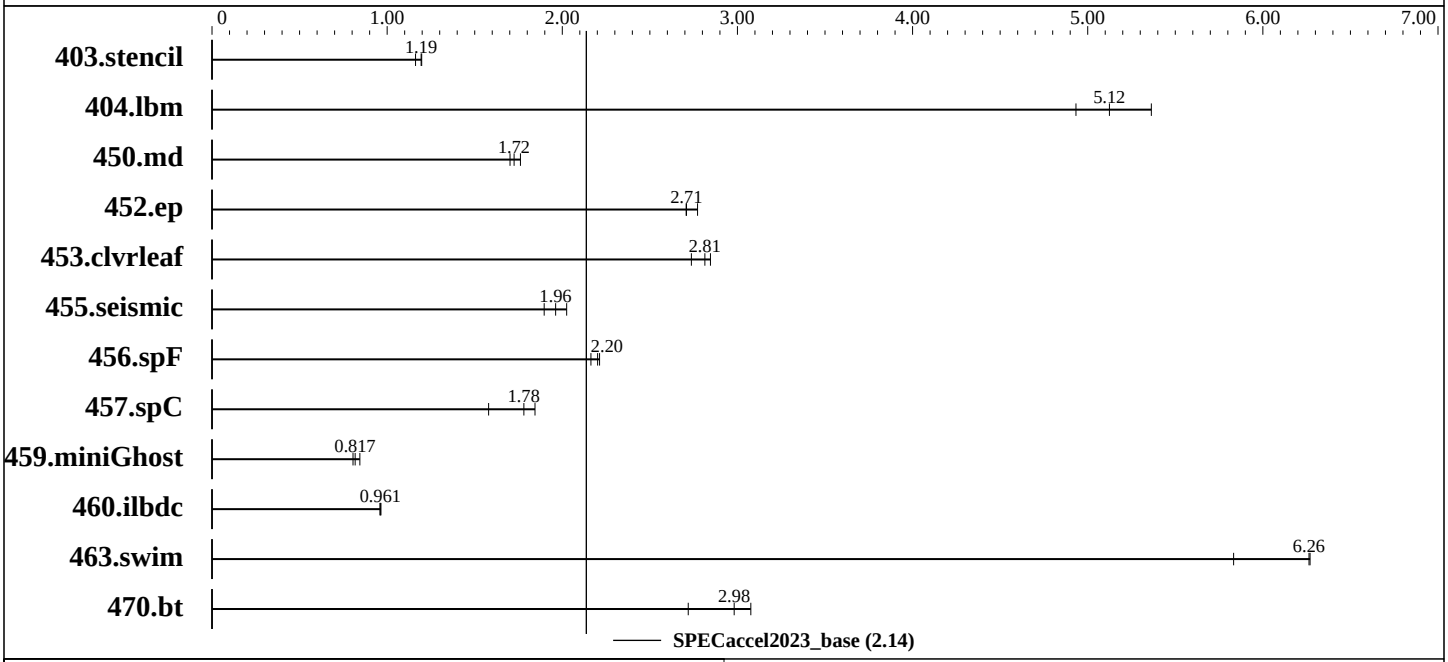
Supermicro SYS-222HA-TN (2 x Intel Xeon 6972P, 2.4GHz)

SPECaccel 2023_base = 2.14

SPECaccel 2023_peak = Not Run

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

Test Date: Aug-2025
Hardware Availability: Sep-2024
Software Availability: Jun-2025



Hardware

CPU Name:	Intel Xeon 6972P
Max MHz.:	3900
Nominal:	2400
Enabled:	192 cores, 2 chips, 2 threads/core
Orderable:	1, 2 chips
Cache L1:	64 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	480 MB I+D on chip per chip
Other:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-6400B)
Storage:	1 x 3.5 TB NVMe SSD
Other:	None
Base Threads Run:	384
Min. Peak Threads:	--
Max. Peak Threads:	--

Accelerator

Accel Model Name:	Intel Xeon 6972P
Accel Vendor:	Intel
Accel Name:	Intel Xeon 6972P
Type of Accel:	CPU
Accel Connection:	N/A
Does Accel Use ECC:	yes
Accel Description:	Intel Xeon 6972P SMT ON, Turbo ON
Accel Driver:	None

Software

OS:	Ubuntu 22.04.5 LTS Ubuntu 22.04.5 LTS 6.5.0-21-generic
Compiler:	Intel oneAPI Compiler 2025.2
Firmware:	SE5C7411.86B.9533.D01.2310110651
File System:	ext4
System State:	Run level 5 (add definition here)
Other:	None
Base Parallel Model:	SMD
Base Threads Run:	384

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Software (Continued)

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	**369**	**1.19**	368	1.20	379	1.16							
404.lbm	SMD	84.8	5.36	92.2	4.93	**88.8**	**5.12**							
450.md	SMD	**348**	**1.72**	353	1.70	341	1.76							
452.ep	SMD	153	2.71	**153**	**2.71**	150	2.77							
453.clvrleaf	SMD	365	2.74	351	2.85	**355**	**2.81**							
455.seismic	SMD	411	1.90	385	2.02	**398**	**1.96**							
456.spF	SMD	220	2.16	**216**	**2.20**	215	2.21							
457.spC	SMD	342	1.58	293	1.84	**303**	**1.78**							
459.miniGhost	SMD	699	0.844	**722**	**0.817**	733	0.805							
460.ilbdc	SMD	575	0.965	579	0.959	**577**	**0.961**							
463.swim	SMD	75.4	5.83	70.2	6.27	**70.2**	**6.26**							
470.bt	SMD	**354**	**2.98**	343	3.08	388	2.72							

SPEC accel2023_base = 2.14

SPEC accel2023_peak = Not Run

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 = "2S,96C,2T"
KMP_LIBRARY = "turnaround"
KMP_STACKSIZE = "8M"
OMP_DYNAMIC = "FALSE"
OMP_WAIT_POLICY = "active"
```

Platform Notes

```
Sysinfo program /root/knektyag/accel2023-2.0.18/bin/sysinfo
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on SMCAP6 Thu Aug  7 06:53:13 2025

SUT (System Under Test) info as seen by some common utilities.
```

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Platform Notes (Continued)

```
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) 6972P
      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 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
      25 26 27 28 29 30 31 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 95 128 129 130 131 132 133 134 135 136 137 138 139
      140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
      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 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 95 128 129 130 131 132 133 134 135 136 137 138 139
      140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159

From lscpu from util-linux 2.37.2:
     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:                            GenuineIntel
     Model name:                           Intel(R) Xeon(R) 6972P
     CPU family:                           6
     Model:                                173
     Thread(s) per core:                   2
     Core(s) per socket:                   96
     Socket(s):                            2
     Stepping:                             1
     CPU max MHz:                          3900.0000
     CPU min MHz:                          800.0000
     BogoMIPS:                             4800.00
     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 invpcid_single 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
```

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Platform Notes (Continued)

```
      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 avx_vnni
      avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req
      hfi 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:                         9 MiB (192 instances)
      L1i cache:                         12 MiB (192 instances)
      L2 cache:                          384 MiB (192 instances)
      L3 cache:                          960 MiB (2 instances)
      NUMA node(s):                      6
      NUMA node0 CPU(s):                 0-31,192-223
      NUMA node1 CPU(s):                 32-63,224-255
      NUMA node2 CPU(s):                 64-95,256-287
      NUMA node3 CPU(s):                 96-127,288-319
      NUMA node4 CPU(s):                 128-159,320-351
      NUMA node5 CPU(s):                 160-191,352-383
      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 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
      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       9M   12 Data            1     64        1             64
      L1i       64K      12M   16 Instruction     1     64        1             64
      L2         2M     384M   16 Unified         2   2048        1             64
      L3       480M     960M   16 Unified         3 491520        1             64

  /proc/cpuinfo cache data
     cache size : 491520 KB

  From numactl --hardware
```

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Platform Notes (Continued)

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 6 nodes (0-5)
  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 31 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210
  211 212 213 214 215 216 217 218 219 220 221 222 223
  node 0 size: 257545 MB
  node 0 free: 248346 MB
  node 1 cpus: 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 63 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239
  240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255
  node 1 size: 258031 MB
  node 1 free: 251852 MB
  node 2 cpus: 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 95 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271
  272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287
  node 2 size: 257979 MB
  node 2 free: 251810 MB
  node 3 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114
  115 116 117 118 119 120 121 122 123 124 125 126 127 288 289 290 291 292 293 294 295 296
  297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318
  319
  node 3 size: 258031 MB
  node 3 free: 255075 MB
  node 4 cpus: 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145
  146 147 148 149 150 151 152 153 154 155 156 157 158 159 320 321 322 323 324 325 326 327
  328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349
  350 351
  node 4 size: 258031 MB
  node 4 free: 253040 MB
  node 5 cpus: 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177
  178 179 180 181 182 183 184 185 186 187 188 189 190 191 352 353 354 355 356 357 358 359
  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 5 size: 258013 MB
  node 5 free: 183617 MB
  node distances:
  node   0   1   2   3   4   5
    0:  10  12  12  21  21  21
    1:  12  10  12  21  21  21
    2:  12  12  10  21  21  21
    3:  21  21  21  10  12  12
    4:  21  21  21  12  10  12
    5:  21  21  21  12  12  10

From /proc/meminfo
   MemTotal:       1584778080 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 22.04.5 LTS

 From /etc/*release* /etc/*version*
   debian_version: bookworm/sid
   os-release:
      PRETTY_NAME="Ubuntu 22.04.5 LTS"
      NAME="Ubuntu"
      VERSION_ID="22.04"
      VERSION="22.04.5 LTS (Jammy Jellyfish)"
      VERSION_CODENAME=jammy
      ID=ubuntu
      ID_LIKE=debian
      HOME_URL="https://www.ubuntu.com/"

 uname -a:
   Linux SMCAP6 6.5.0-21-generic #21~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Fri Feb  9
   13:32:52 UTC 2 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
 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
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

 run-level 5 Jun 30 05:39
```

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Platform Notes (Continued)

```
SPEC is set to: /root/knektyag/accel2023-2.0.18
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p2 ext4  1.8T  129G  1.6T   8% /

From /sys/devices/virtual/dmi/id
    Vendor:         Supermicro
    Product:        SYS-222HA-TN
    Product Family: Family
    Serial:         S928613X4614557

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 Micron Technology MTC40F2046S1RC64BDY QSFF 64 GB 2 rank 6400

BIOS:
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      1.1
   BIOS Date:         10/28/2024
   BIOS Revision:     5.35

(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 2025.2.0 (2025.2.0.20250605)
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) 2025.2.0 20250605
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) 2025.2.0 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler 2025.2.0 (2025.2.0.20250605)
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
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: -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

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Base Optimization Flags (Continued)

404.lbm: `Same as 403.stencil`

452.ep: `Same as 403.stencil`

457.spC: `-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(*)`

470.bt: `Same as 403.stencil`

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 -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 -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.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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