SPECaccel®2023 Result

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Supermicro
Intel Xeon 6960P

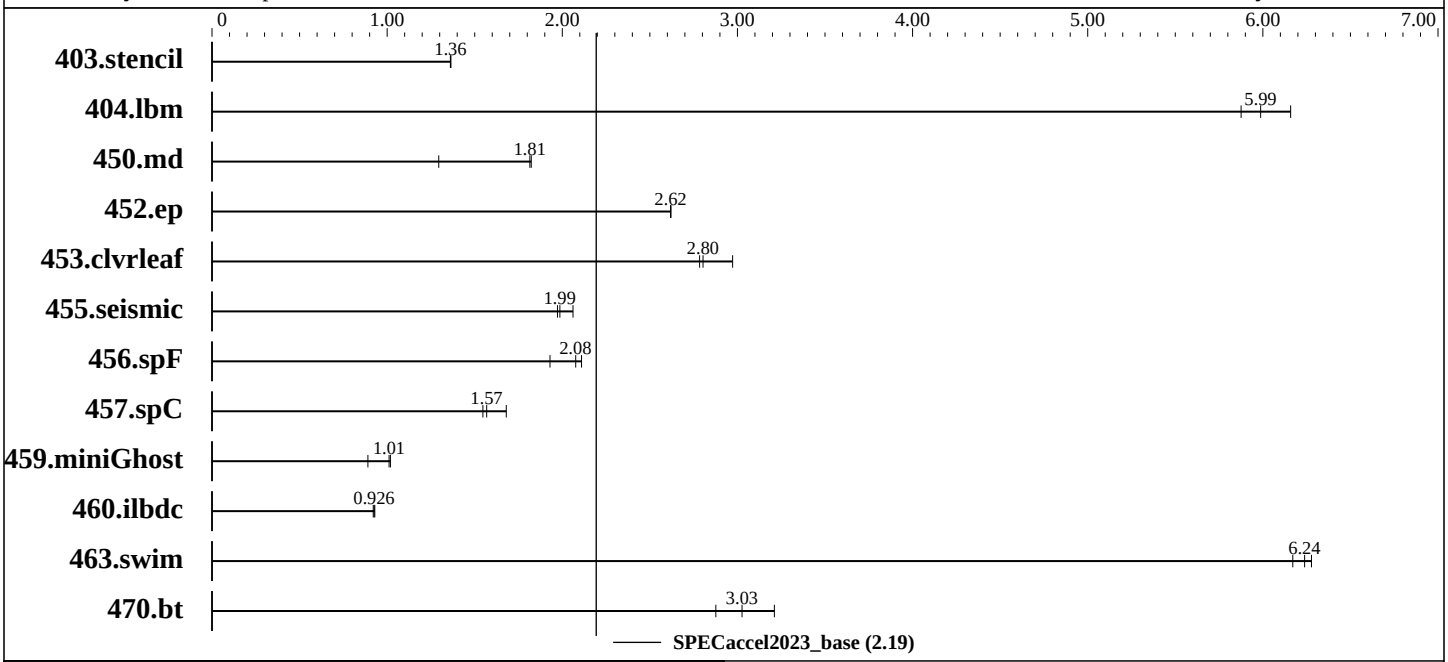
SuperServer SYS-122HA-TN-LCC (2 x Intel Xeon 6960P, 2.7GHz)

SPECaccel 2023_base = 2.19

SPECaccel 2023_peak = Not Run

accel2023 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Dec-2024
Hardware Availability: Nov-2024
Software Availability: Oct-2024



Hardware

CPU Name:	Intel Xeon 6960P
Max MHz.:	3900
Nominal:	2700
Enabled:	144 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:	432 MB I+D on chip per chip
Other:	None
Memory:	1536 GB (24 x 64 GB DDR5 2Rx4 PC5-6400B-R)
Storage:	1 x 1.6TB NVMe SSD
Other:	None
Base Threads Run:	288
Min. Peak Threads:	--
Max. Peak Threads:	--

Accelerator

Accel Model Name:	Intel Xeon 6960P
Accel Vendor:	Intel
Accel Name:	Intel Xeon 6960P
Type of Accel:	CPU
Accel Connection:	N/A
Does Accel Use ECC:	yes
Accel Description:	Intel Xeon 6960P SMT ON, Turbo ON
Accel Driver:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP6 6.4.0-150600.21-default
Compiler:	Intel oneAPI Compiler 2025.0.0
Firmware:	Version 1.1 released Nov-2024
File System:	btrfs
System State:	Run level 3 (multi-user)
Other:	None
Base Parallel Model:	SMD
Base Threads Run:	288
Peak Parallel Models:	Not Run

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Software (Continued)

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	323	1.36	323	1.36	**323**	**1.36**							
404.lbm	SMD	77.4	5.88	73.9	6.16	**76.0**	**5.99**							
450.md	SMD	463	1.29	329	1.82	**331**	**1.81**							
452.ep	SMD	159	2.62	**158**	**2.62**	158	2.62							
453.clvrleaf	SMD	**357**	**2.80**	359	2.78	336	2.97							
455.seismic	SMD	395	1.97	378	2.06	**393**	**1.99**							
456.spF	SMD	**229**	**2.08**	225	2.11	246	1.93							
457.spC	SMD	321	1.68	**344**	**1.57**	349	1.55							
459.miniGhost	SMD	**584**	**1.01**	579	1.02	663	0.890							
460.ilbdc	SMD	603	0.921	**599**	**0.926**	597	0.929							
463.swim	SMD	71.3	6.17	**70.5**	**6.24**	70.1	6.28							
470.bt	SMD	**349**	**3.03**	329	3.21	367	2.88							

SPEC accel2023_base = 2.19

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,72C,2T"
KMP_LIBRARY = "turnaround"
KMP_STACKSIZE = "8M"
OMP_DYNAMIC = "FALSE"
OMP_WAIT_POLICY = "active"

BIOS Setting:
    Power Performance Tuning = BIOS Controls EPB
    ENERGY_PERF_BIAS_CFG Mode = Extreme Performance
OS tunning:
    Stack size set to unlimited using "ulimit -s unlimited"
```

Platform Notes

```
 Sysinfo program /home/accel2023/bin/sysinfo
```

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Platform Notes (Continued)

```
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on 164-84 Wed Dec 18 11:14:33 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) 6960P
      2  "physical id"s (chips)
      288 "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 : 72
      siblings  : 144
      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 64
      65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 128 129 130
      131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151
      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 64
      65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 128 129 130
      131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151

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):                               288
     On-line CPU(s) list:                  0-287
     Vendor ID:                            GenuineIntel
     BIOS Vendor ID:                       Intel(R) Corporation
     Model name:                           Intel(R) Xeon(R) 6960P
     BIOS Model name:                      Intel(R) Xeon(R) 6960P  CPU @ 2.7GHz
     BIOS CPU family:                      179
     CPU family:                           6
     Model:                                173
     Thread(s) per core:                   2
     Core(s) per socket:                   72
     Socket(s):                            2
     Stepping:                             1
     BogoMIPS:                             5400.00
     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
```

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Platform Notes (Continued)

```
      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 hle avx2 smep bmi2
      erms invpcid rtm 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 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:                            6.8 MiB (144 instances)
      L1i cache:                            9 MiB (144 instances)
      L2 cache:                             288 MiB (144 instances)
      L3 cache:                             864 MiB (2 instances)
      NUMA node(s):                         6
      NUMA node0 CPU(s):                    0-23,144-167
      NUMA node1 CPU(s):                    24-47,168-191
      NUMA node2 CPU(s):                    48-71,192-215
      NUMA node3 CPU(s):                    72-95,216-239
      NUMA node4 CPU(s):                    96-119,240-263
      NUMA node5 CPU(s):                    120-143,264-287
      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     6.8M   12 Data            1     64        1             64
      L1i       64K       9M   16 Instruction     1     64        1             64
      L2         2M     288M   16 Unified         2   2048        1             64
      L3       432M     864M   16 Unified         3 442368        1             64
```

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Platform Notes (Continued)

```
 /proc/cpuinfo cache data
    cache size : 442368 KB

 From numactl --hardware
 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 23 144 145 146
   147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167
   node 0 size: 257479 MB
   node 0 free: 256070 MB
   node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
   168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189
   190 191
   node 1 size: 258035 MB
   node 1 free: 257148 MB
   node 2 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
   192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213
   214 215
   node 2 size: 258035 MB
   node 2 free: 257480 MB
   node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
   216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237
   238 239
   node 3 size: 257996 MB
   node 3 free: 257362 MB
   node 4 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114
   115 116 117 118 119 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256
   257 258 259 260 261 262 263
   node 4 size: 258035 MB
   node 4 free: 257359 MB
   node 5 cpus: 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137
   138 139 140 141 142 143 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279
   280 281 282 283 284 285 286 287
   node 5 size: 257588 MB
   node 5 free: 256959 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:       1584303020 kB
    HugePages_Total:       0
```

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Platform Notes (Continued)

```
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP6"
      VERSION_ID="15.6"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP6"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp6"

uname -a:
   Linux 164-84 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC
   2024 (36c1e09) 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 3 Dec 18 11:09 last=5

SPEC is set to: /home/accel2023
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/nvme0n1p2 btrfs  1.5T   24G  1.5T   2% /home

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

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Platform Notes (Continued)

```
     Vendor:          Supermicro
     Product:         Super Server
     Product Family:  Family
     Serial:          0123456789

  Additional information from dmidecode 3.4 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 Samsung M321R8GA0PB2-CCPKC 64 GB 2 rank 6400

  BIOS:
     BIOS Vendor:       American Megatrends International, LLC.
     BIOS Version:      1.1
     BIOS Date:         11/06/2024
     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 2025.0.0 (2025.0.0.20241008)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/intel/oneapi/compiler/2025.0/bin/compiler
Configuration file: /opt/intel/oneapi/compiler/2025.0/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
Fortran     | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)
            | 463.swim(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.0 20241008
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C  | 453.clvrleaf(base) 459.miniGhost(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.0 20241008
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
```

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Compiler Version Notes (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler 2025.0.0 (2025.0.0.20241008)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/intel/oneapi/compiler/2025.0/bin/compiler
Configuration file: /opt/intel/oneapi/compiler/2025.0/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:
`-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`
`-fimf-precision=low -Xclang`
`-fopenmp-declare-target-scalar-defaultmap-firstprivate`

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`
`-fimf-precision=low -nostandard-realloc-lhs -align array32byte -auto`
`-fimf-accuracy-bits-sqrt=14`

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Base Optimization Flags (Continued)

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
-fimf-precision=low -Xclang
-fopenmp-declare-target-scalar-defaultmap-firstprivate
-nostandard-realloc-lhs -align array32byte -auto
-fimf-accuracy-bits-sqrt=14
```

The flags files that were used to format this result can be browsed at

http://www.spec.org/accel2023/flags/Supermicro-Platform-Settings-V1.2-SPR-revG.html
http://www.spec.org/accel2023/flags/Intel_compiler_flags.2024-12-31.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/accel2023/flags/Supermicro-Platform-Settings-V1.2-SPR-revG.xml
http://www.spec.org/accel2023/flags/Intel_compiler_flags.2024-12-31.xml

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

Tested with SPECaccel2023 v2.0.18 on 2024-12-18 14:14:33-0500.
Report generated on 2025-02-21 10:18:51 by accel2023 PS formatter v112.
Originally published on 2025-02-20.