SPECaccel®2023 Result

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Intel
Intel Xeon Max 9480

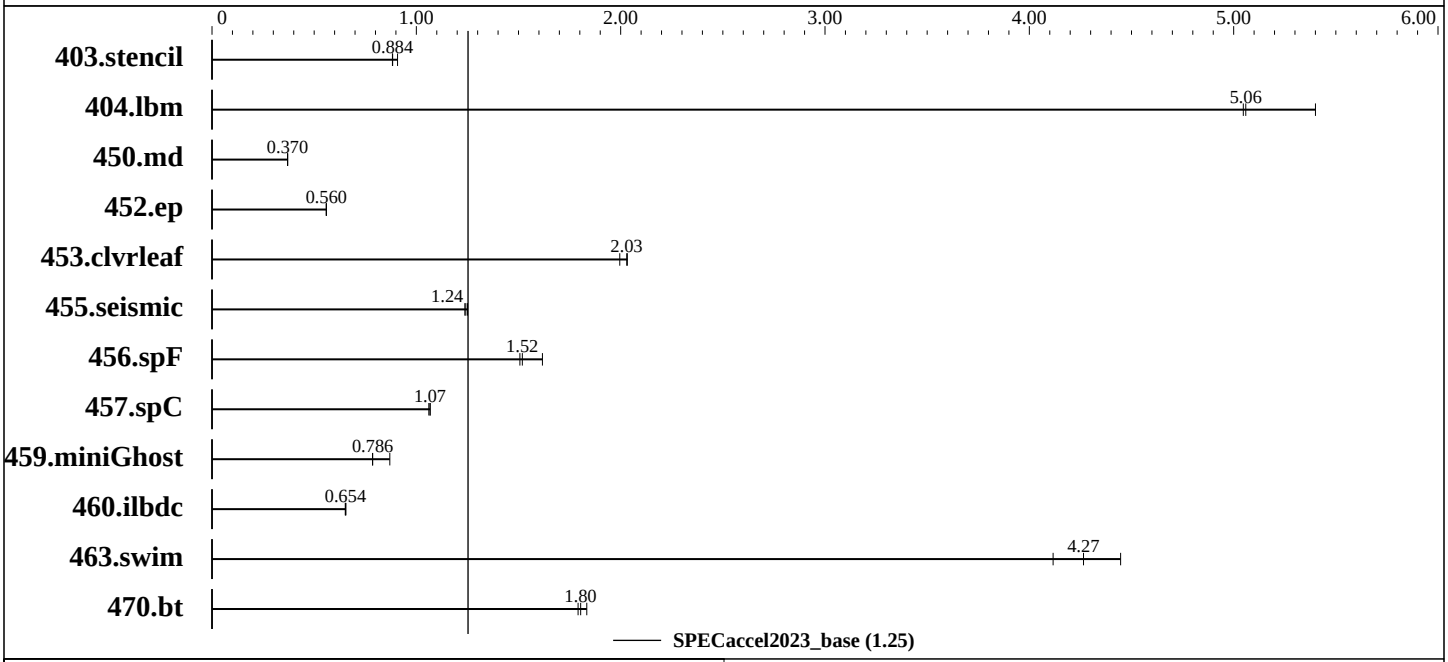
Intel Server D50DNP1SBB (1 x Intel Xeon Max 9480, 1.9GHz, HBM-only mode)

SPECaccel 2023_base = 1.25

SPECaccel 2023_peak = Not Run

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

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



Hardware

CPU Name:	Intel Xeon Max 9480
Max MHz.:	3500
Nominal:	1900
Enabled:	56 cores, 1 chip, 2 threads/core
Orderable:	1 chip
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	115200 KB I+D on chip per chip
Other:	None
Memory:	128 GB (8x16GB HBM2 3200 MT/s [3200 MT/s])
Storage:	269 TB
Other:	None
Base Threads Run:	112
Min. Peak Threads:	--
Max. Peak Threads:	--

Accelerator

Accel Model Name:	Intel Xeon Max 9480
Accel Vendor:	Intel
Accel Name:	Intel Xeon Max 9480
Type of Accel:	CPU
Accel Connection:	N/A
Does Accel Use ECC:	yes
Accel Description:	Intel Xeon Max 9480 SMT ON, Turbo OFF
Accel Driver:	None

Software

OS:	Rocky Linux 8.8 (Green Obsidian) SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.24.100-default
Compiler:	Intel oneAPI Compiler 2024.0.2
Firmware:	SE5C7411.86B.9525.D26.2305160804
File System:	panfs
System State:	Run level 5
Other:	None
Base Parallel Model:	SMD
Base Threads Run:	112

(Continued on next page)

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	**498**	**0.884**	498	0.883	485	0.908							
404.lbm	SMD	90.2	5.05	84.3	5.40	**89.9**	**5.06**							
450.md	SMD	**1621**	**0.370**	1624	0.370	1621	0.370							
452.ep	SMD	**741**	**0.560**	741	0.560	742	0.559							
453.clvrleaf	SMD	501	2.00	**493**	**2.03**	492	2.03							
455.seismic	SMD	630	1.24	624	1.25	**628**	**1.24**							
456.spF	SMD	315	1.51	294	1.62	**313**	**1.52**							
457.spC	SMD	506	1.07	**506**	**1.07**	509	1.06							
459.miniGhost	SMD	751	0.785	678	0.870	**750**	**0.786**							
460.ilbdc	SMD	851	0.652	**849**	**0.654**	847	0.655							
463.swim	SMD	**103**	**4.27**	98.9	4.45	107	4.12							
470.bt	SMD	**585**	**1.80**	589	1.79	575	1.83							

SPEC accel2023_base = 1.25

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 = "1S,56C,2T"
KMP_LIBRARY = "turnaround"
KMP_STACKSIZE = "8M"
OMP_DYNAMIC = "FALSE"
OMP_WAIT_POLICY = "active"

The PANASAS filesystem as described on this result page was formerly
generally available.  At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the
SPEC HPG Policy document, http://www.spec.org/hpg/policy.html

HBM is configured as HBM-only mode.
```

Platform Notes

```
Sysinfo program /global/panfs02/innl/abobyr/SpecACCEL_OMP/kits/accel2023/bin/sysinfo
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on eedh127 Thu Dec 28 15:21:43 2023

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) CPU Max 9480
      1  "physical id"s (chips)
      112 "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

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):                               224
     On-line CPU(s) list:                  0-55,112-167
     Off-line CPU(s) list:                 56-111,168-223
     Vendor ID:                            GenuineIntel
     Model name:                           Intel (R) Xeon (R) CPU Max 9480
     CPU family:                           6
     Model:                                143
     Thread(s) per core:                   2
     Core(s) per socket:                   56
     Socket(s):                            1
     Stepping:                             8
     Frequency boost:                      disabled
     CPU max MHz:                          1901.0000
     CPU min MHz:                          800.0000
     BogoMIPS:                             3800.00
     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 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 invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp
      ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a
      avx512f avx512dq rdseed adx 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln
      pts hwp hwp_act_window hwp_epp hwp_pkg_req 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 avx512_fp16 amx_tile flush_l1d arch_capabilities
      L1d cache:                            2.6 MiB (56 instances)
      L1i cache:                            1.8 MiB (56 instances)
      L2 cache:                             112 MiB (56 instances)
      L3 cache:                             112.5 MiB (1 instance)
      NUMA node(s):                         8
      NUMA node0 CPU(s):                    0-13,112-125
      NUMA node1 CPU(s):                    14-27,126-139
      NUMA node2 CPU(s):                    28-41,140-153
      NUMA node3 CPU(s):                    42-55,154-167
      NUMA node4 CPU(s):
      NUMA node5 CPU(s):
      NUMA node6 CPU(s):
      NUMA node7 CPU(s):
      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 and seccomp
      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
      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     2.6M   12 Data            1     64        1             64
      L1i       32K     1.8M    8 Instruction     1     64        1             64
      L2         2M     112M   16 Unified         2   2048        1             64
      L3     112.5M   112.5M   15 Unified         3 122880        1             64

  /proc/cpuinfo cache data
```

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Platform Notes (Continued)

```
    cache size : 115200 KB

 From numactl --hardware
 WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 8 nodes (0-7)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 112 113 114 115 116 117 118 119 120 121
   122 123 124 125
   node 0 size: 15838 MB
   node 0 free: 5104 MB
   node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 126 127 128 129 130 131 132 133
   134 135 136 137 138 139
   node 1 size: 16074 MB
   node 1 free: 15453 MB
   node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 140 141 142 143 144 145 146 147
   148 149 150 151 152 153
   node 2 size: 16120 MB
   node 2 free: 15677 MB
   node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 154 155 156 157 158 159 160 161
   162 163 164 165 166 167
   node 3 size: 16120 MB
   node 3 free: 15642 MB
   node 4 cpus:
   node 4 size: 16120 MB
   node 4 free: 15956 MB
   node 5 cpus:
   node 5 size: 16120 MB
   node 5 free: 15976 MB
   node 6 cpus:
   node 6 size: 16120 MB
   node 6 free: 15753 MB
   node 7 cpus:
   node 7 size: 16072 MB
   node 7 free: 15910 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  14  14  14  23  23  23  23
     1:  14  10  14  14  23  23  23  23
     2:  14  14  10  14  23  23  23  23
     3:  14  14  14  10  23  23  23  23
     4:  23  23  23  23  10  14  14  14
     5:  23  23  23  23  14  10  14  14
     6:  23  23  23  23  14  14  10  14
     7:  23  23  23  23  14  14  14  10

 From /proc/meminfo
    MemTotal:       131676676 kB
    HugePages_Total:       0
```

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Platform Notes (Continued)

```
   Hugepagesize:       2048 kB

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

 /usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 15 SP4

 From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP4"
      VERSION_ID="15.4"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp4"

 uname -a:
   Linux eedh127 5.14.21-150400.24.100-default #1 SMP PREEMPT_DYNAMIC Mon Dec 4 19:12:13
   UTC 2023 (3f5cd84) 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 and
                                                      seccomp
 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
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):             Not affected

 run-level 5 Dec 28 14:56
```

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Platform Notes (Continued)

```
 SPEC is set to: /global/panfs02/innl/abobyr/SpecACCEL_OMP/kits/accel2023
    Filesystem                Type   Size  Used Avail Use% Mounted on
    panfs://36.101.212.1/innl panfs  269T  245T   25T  92% /global/panfs02/innl

 From /sys/devices/virtual/dmi/id
     Vendor:         Intel Corporation
     Product:        D50DNP
     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) 404.lbm(base) 452.ep(base) 457.spC(base)
           | 470.bt(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2024.0.2 (2024.0.2.20231213)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /home/abobyr/intel/oneapi/compiler/2024.0/bin/compiler
Configuration file:
  /home/abobyr/intel/oneapi/compiler/2024.0/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
Fortran    | 450.md(base) 455.seismic(base) 456.spF(base) 460.ilbdc(base)
           | 463.swim(base)
------------------------------------------------------------------------------
ifx (IFX) 2024.0.2 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C | 453.clvrleaf(base) 459.miniGhost(base)
------------------------------------------------------------------------------
ifx (IFX) 2024.0.2 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
```

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Compiler Version Notes (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler 2024.0.2 (2024.0.2.20231213)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /home/abobyr/intel/oneapi/compiler/2024.0/bin/compiler
Configuration file:
  /home/abobyr/intel/oneapi/compiler/2024.0/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: `-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`

404.lbm: `Same as 403.stencil`

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Base Optimization Flags (Continued)

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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