SPECaccel®2023 Result

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Intel
Intel Xeon Platinum 8480+

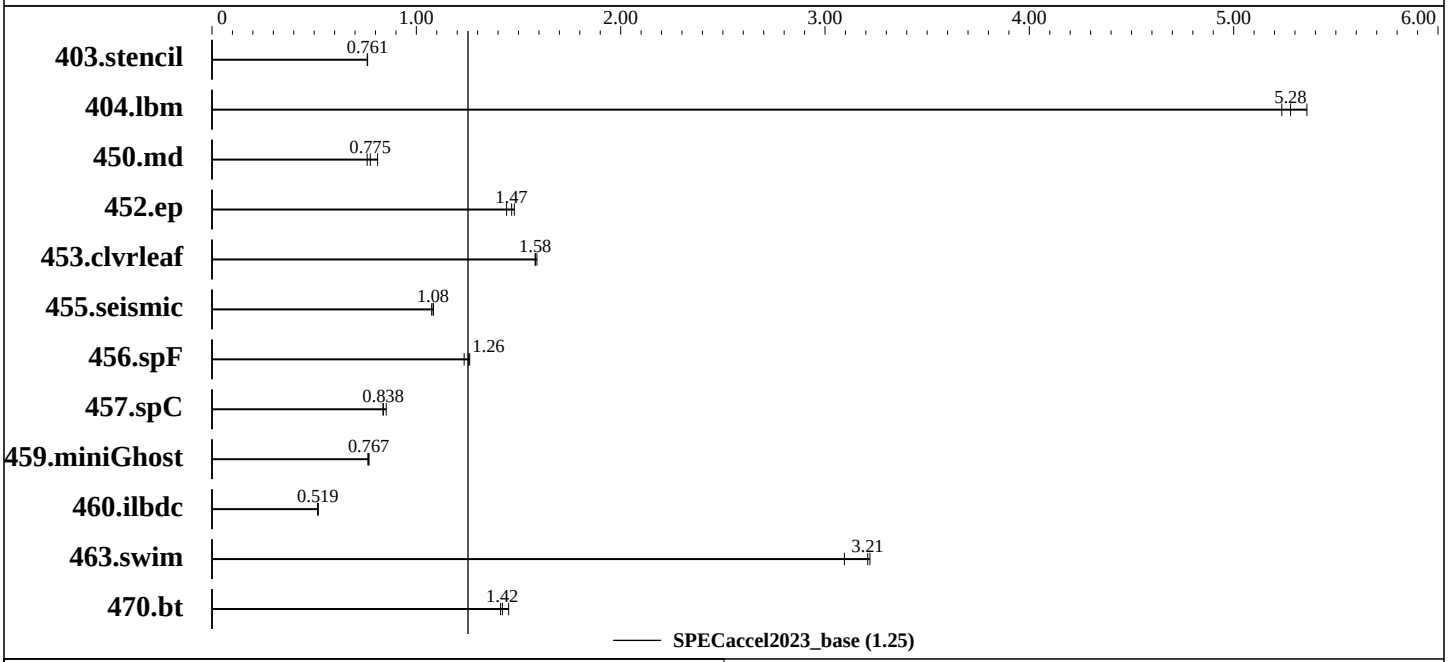
Intel Server D50DNP2MFALACB (2 x Intel Xeon Platinum 8480+, 2.0GHz)

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 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:	512 GB (16 x 32 GB 2Rx8 PC5-4800B)
Storage:	269 TB
Other:	None
Base Threads Run:	224
Min. Peak Threads:	--
Max. Peak Threads:	--

Accelerator

Accel Model Name:	Intel Xeon Platinum 8480+
Accel Vendor:	Intel
Accel Name:	Intel Xeon Platinum 8480+
Type of Accel:	CPU
Accel Connection:	N/A
Does Accel Use ECC:	yes
Accel Description:	Intel Xeon Platinum 8480+ SMT ON, Turbo ON
Accel Driver:	N/A

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:	224

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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	**578**	**0.761**	579	0.760	578	0.761							
404.lbm	SMD	86.9	5.24	84.9	5.36	**86.2**	**5.28**							
450.md	SMD	**774**	**0.775**	740	0.810	790	0.759							
452.ep	SMD	281	1.48	**283**	**1.47**	288	1.44							
453.clvrleaf	SMD	**632**	**1.58**	632	1.58	629	1.59							
455.seismic	SMD	**721**	**1.08**	720	1.08	726	1.07							
456.spF	SMD	**378**	**1.26**	385	1.23	377	1.26							
457.spC	SMD	**644**	**0.838**	633	0.853	645	0.837							
459.miniGhost	SMD	768	0.768	774	0.763	**769**	**0.767**							
460.ilbdc	SMD	1068	0.520	**1070**	**0.519**	1074	0.517							
463.swim	SMD	**137**	**3.21**	142	3.09	137	3.22							
470.bt	SMD	**742**	**1.42**	727	1.45	747	1.41							

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 = "2S,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
```

Platform Notes

```
Sysinfo program /global/panfs02/innl/abobyr/SpecACCEL_OMP/kits/accel2023/bin/sysinfo
Rev: r6622 of 2021-04-07 b1a7d5f8f71be5aff70a755cad7211a0
running on eedq017 Sat Dec 23 04:46:58 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) 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 2.37.2:
     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:                  0-223
     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
     Frequency boost:                      enabled
     CPU max MHz:                          2001.0000
     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
     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
```

(Continued on next page)

Platform Notes (Continued)

```
      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 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:                           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
      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     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.
```

(Continued on next page)

Platform Notes (Continued)

```
   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: 257737 MB
   node 0 free: 245461 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: 257925 MB
   node 1 free: 256182 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

From /proc/meminfo
   MemTotal:       528039236 kB
   HugePages_Total:       0
   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 eedq017 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:
```

(Continued on next page)

Platform Notes (Continued)

```
 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 23 04:45

 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  244T   25T  91% /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)
```

(Continued on next page)

Compiler Version Notes (Continued)

```
          | 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.
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`

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`

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Base Optimization Flags (Continued)

(*) 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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