



# SPECaccel<sup>®</sup>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)

SPECaccel2023\_base = 1.25

SPECaccel2023\_peak = Not Run

accel2023 License: 13

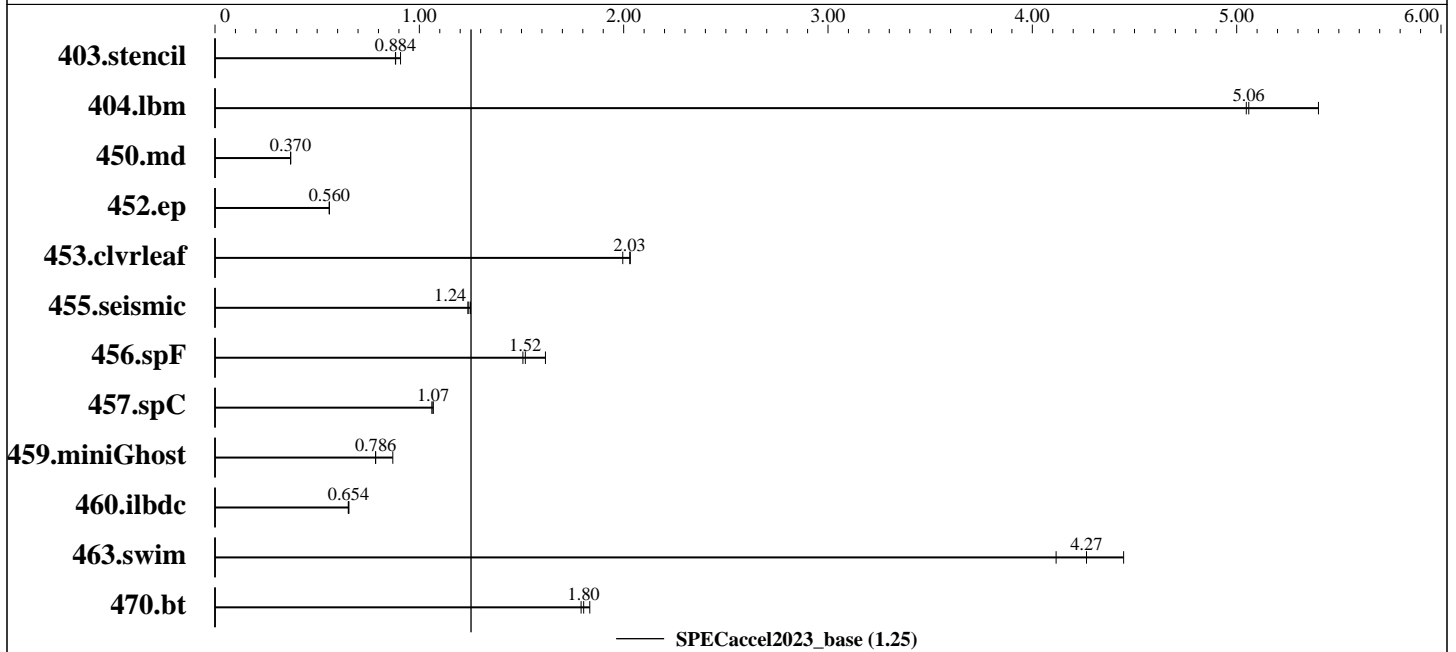
Test Sponsor: Intel

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

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



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Intel Server D50DNPI5BB (1 x Intel Xeon Max 9480, 1.9GHz, HBM-only mode)

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

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

## Platform Notes

Sysinfo program /global/panfs02/innl/abobyrr/SpecACCEL\_OMP/kits/accel2023/bin/sysinfo  
Rev: r6622 of 2021-04-07 bla7d5f8f71be5aff70a755cad7211a0  
running on eedhl27 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\_lld 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/swaps barriers and \_\_user pointer sanitization

Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS, IBPB conditional, RSB filling, PBR SB-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/swaggs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Enhanced / Automatic IBRS, IBPB: conditional, RSB filling, PBRSE-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/abobyrr/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/abobyrr/intel/oneapi/compiler/2024.0/bin/compiler
Configuration file:
  /home/abobyrr/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/abobyrr/intel/oneapi/compiler/2024.0/bin/compiler  
 Configuration file:  
 /home/abobyrr/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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Software Availability: Nov-2023

## 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 -mcmmodel=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](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](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](mailto:info@spec.org).

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