



# SPEChpc™ 2021 Small Result

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## Intel

SPEChpc 2021\_sml\_base = 43.5

Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021\_sml\_peak = Not Run

hpc2021 License: 13

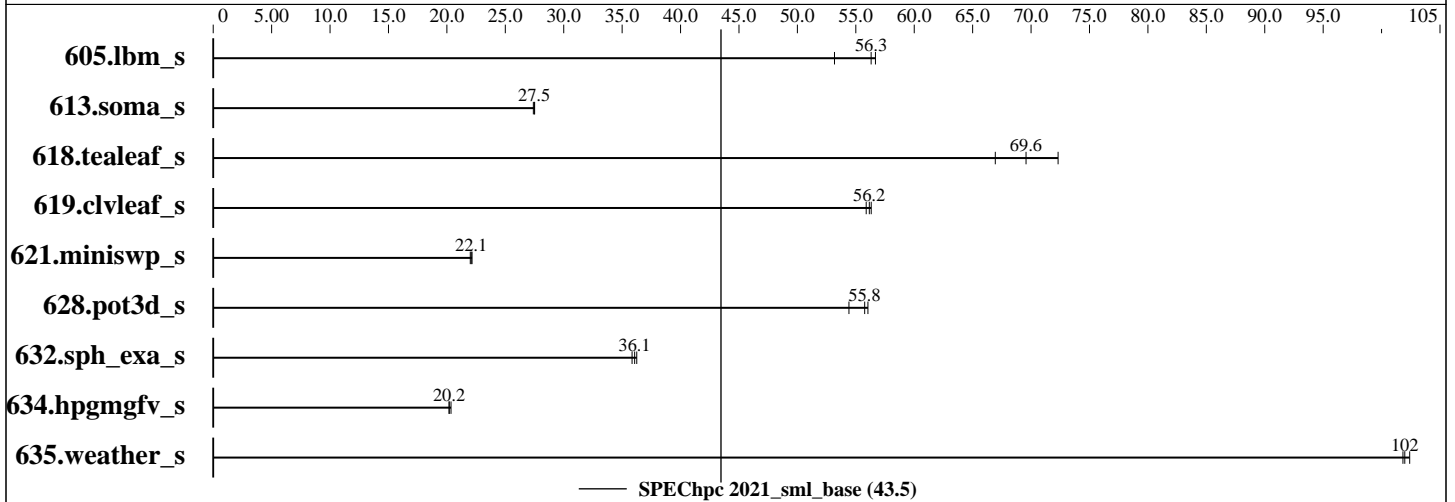
Test Date: Jun-2024

Test Sponsor: Intel

Hardware Availability: Jan-2023

Tested by: Intel

Software Availability: Mar-2024



## Results Table

Benchmark	Base										Peak							
	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
605.lbm_s	OMP	512	14	29.1	53.2	27.3	56.7	<u>27.5</u>	<u>56.3</u>									
613.soma_s	OMP	512	14	<u>58.2</u>	<u>27.5</u>	58.2	27.5	58.4	27.4									
618.tealeaf_s	OMP	512	14	28.3	72.3	30.6	66.9	<u>29.5</u>	<u>69.6</u>									
619.clvleaf_s	OMP	512	14	29.3	56.3	<u>29.4</u>	<u>56.2</u>	29.5	55.9									
621.miniswp_s	OMP	512	14	49.7	22.2	50.0	22.0	<u>49.8</u>	<u>22.1</u>									
628.pot3d_s	OMP	512	14	<u>30.0</u>	<u>55.8</u>	29.9	56.0	30.8	54.4									
632.sph_exa_s	OMP	512	14	64.2	35.8	<u>63.8</u>	<u>36.1</u>	63.4	36.3									
634.hpgmgfv_s	OMP	512	14	47.9	20.4	<u>48.3</u>	<u>20.2</u>	48.3	20.2									
635.weather_s	OMP	512	14	25.5	102	25.4	102	<u>25.5</u>	<u>102</u>									

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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### Hardware Summary

Type of System: Homogenous Cluster  
Compute Node: Intel Server D50DNP1SBB (Xeon Max 9480)  
Interconnect: Mellanox HDR  
Compute Nodes Used: 32  
Total Chips: 64  
Total Cores: 3584  
Total Threads: 7168  
Total Memory: 20 TB  
Max. Peak Threads: --

### Software Summary

Compiler: Intel oneAPI Compiler 2024.1.0  
MPI Library: Intel MPI Library 2021.12 for Linux OS  
Other MPI Info: None  
Other Software: None  
Base Parallel Model: OMP  
Base Ranks Run: 512  
Base Threads Run: 14  
Peak Parallel Models: Not Run  
Minimum Peak Ranks: --  
Maximum Peak Ranks: --  
Max. Peak Threads: --  
Min. Peak Threads: --

### Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

#### Hardware

Number of nodes: 32  
Uses of the node: Compute  
Vendor: Intel  
Model: Intel Server D50DNP1SBB (Xeon Max 9480)  
CPU Name: Intel Xeon Max 9480  
CPU(s) orderable: 1, 2 chips  
Chips enabled: 2  
Cores enabled: 112  
Cores per chip: 56  
Threads per core: 2  
CPU Characteristics: Turbo Boost Technology up to 3.5 GHz  
CPU MHz: 1900  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 2 MB I+D on chip per core  
L3 Cache: 112.5 MB I+D on chip per chip  
Other Cache: None  
Memory: 640 GB (16 x 32GB 2Rx8 PC5-4800B-R + 8 x 16GB HBM2 3200 MT/s)  
Disk Subsystem: 1 x 1 TB NVMe U.2 2.5" SSD  
Other Hardware: None  
Accel Count: None  
Accel Model: None  
Accel Vendor: None  
Accel Type: None  
Accel Connection: None  
Accel ECC enabled: None  
Accel Description: None  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200Gbit/s  
Ports Used: 1

#### Software

Accelerator Driver: None  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 23.04-0.5.3  
Adapter Firmware: 20.37.1014  
Operating System: Rocky Linux 8.8 (Green Obsidian) 4.18.0-477.15.1.el8\_8.x86\_64  
Local File System: xfs  
Shared File System: PANASAS FS  
System State: Run level 5  
Other Software: None

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### Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

#### Hardware (Continued)

Interconnect Type: Mellanox HDR

### Interconnect Description: Mellanox HDR

#### Hardware

Vendor: Mellanox  
Model: Mellanox HDR  
Switch Model: Mellanox MQM8790-HS2F Quantum HDR InfiniBand Switch  
Number of Switches: 18  
Number of Ports: 40  
Data Rate: 200 Gbit/s  
Firmware: 20.36.1010  
Topology: Fat-tree  
Primary Use: MPI Traffic

#### Software

: --

### Submit Notes

The config file option 'submit' was used.

### General Notes

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 cache mode.

### Compiler Version Notes

=====  
CXXC 632.sph\_exa\_s(base)  
-----

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir:  
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler  
Configuration file:  
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler/./icpx.cfg

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## Compiler Version Notes (Continued)

=====  
CC 605.lbm\_s(base) 613.soma\_s(base) 618.tealeaf\_s(base) 621.miniswp\_s(base)  
634.hpgmgfv\_s(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir:  
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler  
Configuration file:  
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler/./icx.cfg  
=====

=====  
FC 619.clvleaf\_s(base) 628.pot3d\_s(base) 635.weather\_s(base)  
=====

ifx (IFX) 2024.1.0 20240308  
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=====

## Base Compiler Invocation

C benchmarks:  
mpiicc -cc=icx  
  
C++ benchmarks:  
mpiicpc -cxx=icpx  
  
Fortran benchmarks:  
mpiifort -fc=ifx

## Base Portability Flags

605.lbm\_s: -lstdc++ -std=c++14  
613.soma\_s: -lstdc++ -std=c++14  
618.tealeaf\_s: -lstdc++ -std=c++14  
621.miniswp\_s: -lstdc++ -std=c++14  
634.hpgmgfv\_s: -lstdc++ -std=c++14



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## Base Optimization Flags

C benchmarks:

```
-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flto
-funroll-loops
```

C++ benchmarks:

```
-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flto
-funroll-loops
```

Fortran benchmarks:

```
-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flto
-funroll-loops -nostandard-realloc-lhs -align array64byte
```

## Base Other Flags

C benchmarks:

```
-Wno-incompatible-function-pointer-types
```

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

<http://www.spec.org/hpc2021/flags/HBM.html>

[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2024-12-11.html](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2024-12-11.html)

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

<http://www.spec.org/hpc2021/flags/HBM.xml>

[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2024-12-11.xml](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2024-12-11.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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