



# SPEChpc™ 2021 Tiny Result

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## Intel

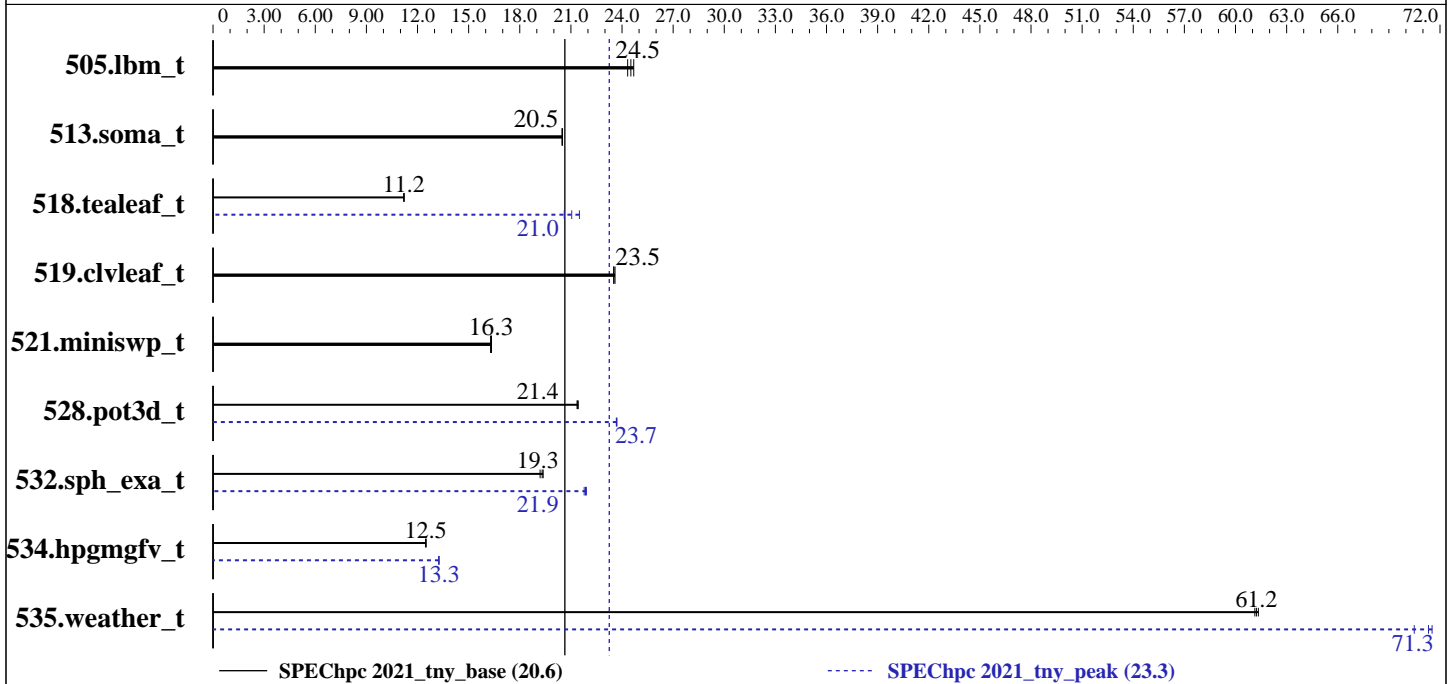
SPEChpc 2021\_tny\_base = 20.6

Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021\_tny\_peak = 23.3

hpc2021 License: 13  
Test Sponsor: Intel  
Tested by: Intel

Test Date: Apr-2024  
Hardware Availability: Jan-2023  
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
505.lbm_t	OMP	16	14	<b>91.8</b>	<b>24.5</b>	91.1	24.7	92.5	24.3	OMP	16	14	<b>91.8</b>	<b>24.5</b>	91.1	24.7	92.5	24.3
513.soma_t	OMP	16	14	181	20.5	<b>181</b>	<b>20.5</b>	180	20.5	OMP	16	14	181	20.5	<b>181</b>	<b>20.5</b>	180	20.5
518.tealeaf_t	OMP	16	14	147	11.2	147	11.2	<b>147</b>	<b>11.2</b>	OMP	8	28	<b>78.4</b>	<b>21.0</b>	76.7	21.5	80.1	20.6
519.cvlleaf_t	OMP	16	14	<b>70.2</b>	<b>23.5</b>	69.9	23.6	70.2	23.5	OMP	16	14	<b>70.2</b>	<b>23.5</b>	69.9	23.6	70.2	23.5
521.miniswp_t	OMP	16	14	98.2	16.3	97.9	16.3	<b>98.0</b>	<b>16.3</b>	OMP	16	14	98.2	16.3	97.9	16.3	<b>98.0</b>	<b>16.3</b>
528.pot3d_t	OMP	16	14	<b>99.4</b>	<b>21.4</b>	99.2	21.4	99.4	21.4	OMP	32	7	89.7	23.7	<b>89.7</b>	<b>23.7</b>	89.8	23.7
532.sph_exa_t	OMP	16	14	<b>101</b>	<b>19.3</b>	102	19.2	101	19.4	OMP	112	2	89.5	21.8	89.0	21.9	<b>89.2</b>	<b>21.9</b>
534.hpgmgfv_t	OMP	16	14	94.2	12.5	94.0	12.5	<b>94.1</b>	<b>12.5</b>	OMP	112	2	<b>88.7</b>	<b>13.3</b>	88.6	13.3	88.7	13.3
535.weather_t	OMP	16	14	52.8	61.1	52.6	61.3	<b>52.7</b>	<b>61.2</b>	OMP	32	7	45.1	71.5	<b>45.2</b>	<b>71.3</b>	45.8	70.5

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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: 2  
Total Chips: 4  
Total Cores: 224  
Total Threads: 448  
Total Memory: 256 GB  
Max. Peak Threads: 28

### 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: 16  
Base Threads Run: 14  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 8  
Maximum Peak Ranks: 112  
Max. Peak Threads: 28  
Min. Peak Threads: 2

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

#### Hardware

Number of nodes: 2  
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: 128 GB (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  
Interconnect Type: Mellanox HDR

#### 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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## Interconnect Description: Mellanox HDR

### Hardware

### Software

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

: --

## 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-only mode.

## Compiler Version Notes

=====  
CXXC 532.sph\_exa\_t(base, peak)  
-----

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  
-----

=====  
CC 505.lbm\_t(base, peak) 513.soma\_t(base, peak) 518.tealeaf\_t(base, peak)  
  521.miniswp\_t(base, peak) 534.hpgmgfv\_t(base, peak)  
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## Compiler Version Notes (Continued)

```

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 519.clvleaf_t(base, peak) 528.pot3d_t(base, peak) 535.weather_t(base,
  peak)
-----

ifx (IFX) 2024.1.0 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
-----

```

## Base Compiler Invocation

C benchmarks:  
mpiicc -cc=icx

C++ benchmarks:  
mpicpc -cxx=icpx

Fortran benchmarks:  
mpiifort -fc=ifx

## Base Portability Flags

```

505.lbm_t: -lstdc++ -std=c++14
513.soma_t: -lstdc++ -std=c++14
518.tealeaf_t: -lstdc++ -std=c++14
521.miniswp_t: -lstdc++ -std=c++14
534.hpgmgfv_t: -lstdc++ -std=c++14

```

## Base Optimization Flags

C benchmarks:  
-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flto

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## Base Optimization Flags (Continued)

C benchmarks (continued):

-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

## Peak Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpicpc -cxx=icpx

Fortran benchmarks:

mpiifort -fc=ifx

## Peak Portability Flags

505.lbm\_t: -lstdc++ -std=c++14  
513.soma\_t: -lstdc++ -std=c++14  
518.tealeaf\_t: -lstdc++ -std=c++14  
521.miniswp\_t: -lstdc++ -std=c++14  
534.hpgmgfv\_t: -lstdc++ -std=c++14



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## Peak Optimization Flags

C benchmarks:

505.lbm\_t: basepeak = yes

513.soma\_t: basepeak = yes

518.tealeaf\_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops

521.miniswp\_t: basepeak = yes

534.hpgmgfv\_t: Same as 518.tealeaf\_t

C++ benchmarks:

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

Fortran benchmarks:

519.clvleaf\_t: basepeak = yes

528.pot3d\_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops -nonstandard-realloc-lhs  
-align array64byte

535.weather\_t: Same as 528.pot3d\_t

## Peak 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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