



# SPEChpc™ 2021 Tiny Result

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## Intel

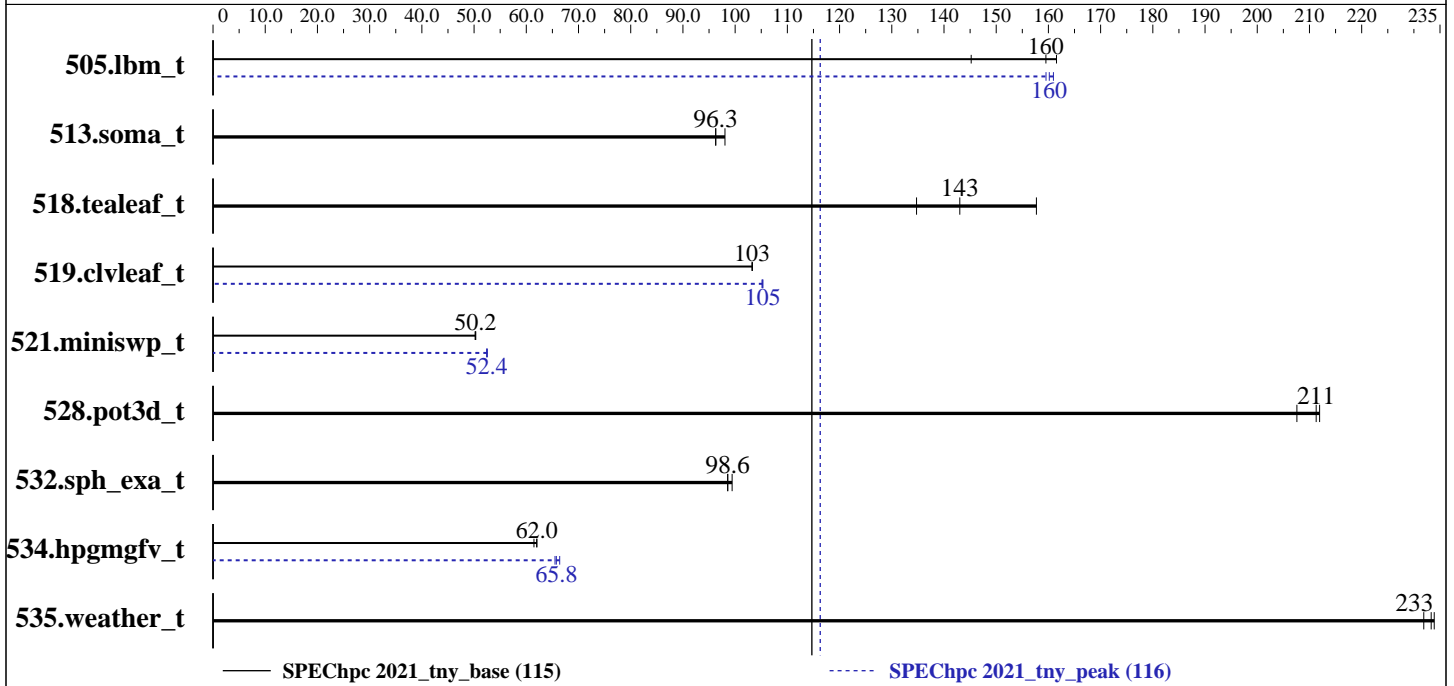
Endeavour: Intel Server D50DNP1SBB (Intel Xeon Platinum 8592+)

SPEChpc 2021\_tny\_base = 115

SPEChpc 2021\_tny\_peak = 116

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

Test Date: Apr-2024  
Hardware Availability: Dec-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	256	8	15.5	145	<b>14.1</b>	<b>160</b>	13.9	162	OMP	256	8	14.1	160	<b>14.0</b>	<b>160</b>	14.0	161
513.soma_t	OMP	256	8	37.7	98.1	38.4	96.3	<b>38.4</b>	<b>96.3</b>	OMP	256	8	37.7	98.1	38.4	96.3	<b>38.4</b>	<b>96.3</b>
518.tealeaf_t	OMP	256	8	12.2	135	<b>11.5</b>	<b>143</b>	10.5	158	OMP	256	8	12.2	135	<b>11.5</b>	<b>143</b>	10.5	158
519.civleaf_t	OMP	256	8	16.0	103	<b>16.0</b>	<b>103</b>	16.0	103	OMP	256	8	15.7	105	<b>15.7</b>	<b>105</b>	15.7	105
521.miniswp_t	OMP	256	8	<b>31.8</b>	<b>50.2</b>	31.8	50.3	31.9	50.2	OMP	64	32	<b>30.5</b>	<b>52.4</b>	30.5	52.4	30.5	52.5
528.pot3d_t	OMP	256	8	10.2	208	10.0	212	<b>10.1</b>	<b>211</b>	OMP	256	8	10.2	208	10.0	212	<b>10.1</b>	<b>211</b>
532.sph_exa_t	OMP	256	8	19.8	98.6	<b>19.8</b>	<b>98.6</b>	19.6	99.4	OMP	256	8	19.8	98.6	<b>19.8</b>	<b>98.6</b>	19.6	99.4
534.hpgmgfv_t	OMP	256	8	18.9	62.0	<b>19.0</b>	<b>62.0</b>	19.1	61.5	OMP	512	4	17.7	66.4	17.9	65.5	<b>17.9</b>	<b>65.8</b>
535.weather_t	OMP	256	8	13.9	232	13.8	234	<b>13.8</b>	<b>233</b>	OMP	256	8	13.9	232	13.8	234	<b>13.8</b>	<b>233</b>

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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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**Test Date:** Apr-2024  
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### Hardware Summary

Type of System: Homogenous Cluster  
Compute Node: Intel Server D50DNP1SBB (Xeon 8592+)  
Interconnect: Mellanox HDR  
Compute Nodes Used: 16  
Total Chips: 32  
Total Cores: 2048  
Total Threads: 4096  
Total Memory: 8 TB  
Max. Peak Threads: 32

### 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: 256  
Base Threads Run: 8  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 64  
Maximum Peak Ranks: 512  
Max. Peak Threads: 32  
Min. Peak Threads: 4

### Node Description: Intel Server D50DNP1SBB (Xeon 8592+)

#### Hardware

Number of nodes: 16  
Uses of the node: Compute  
Vendor: Intel  
Model: Intel Server D50DNP1SBB (Xeon 8592+)  
CPU Name: Intel Xeon Platinum 8592+  
CPU(s) orderable: 1, 2 chips  
Chips enabled: 2  
Cores enabled: 128  
Cores per chip: 64  
Threads per core: 2  
CPU Characteristics: Turbo Boost Technology up to 3.9 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: 320 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-5600B-R)  
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>

## 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)  
-----

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)  
Target: x86\_64-unknown-linux-gnu

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## Compiler Version Notes (Continued)

```

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:  
`mpiicpc -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`  
`-funroll-loops`

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## Base Optimization Flags (Continued)

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:

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

513.soma\_t: basepeak = yes

518.tealeaf\_t: basepeak = yes

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

534.hpgmgfv\_t: Same as 521.miniswp\_t

C++ benchmarks:

532.sph\_exa\_t: basepeak = yes

Fortran benchmarks:

```
519.clvleaf_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops  
-qopt-streaming-stores=always -nonstandard-realloc-lhs  
-align array64byte
```

528.pot3d\_t: basepeak = yes

535.weather\_t: basepeak = yes

## Peak Other Flags

C benchmarks:

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

The flags file that was used to format this result can be browsed at

[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)



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You can also download the XML flags source by saving the following link:

[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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