SPEChpc™ 2021 Tiny Result

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Intel

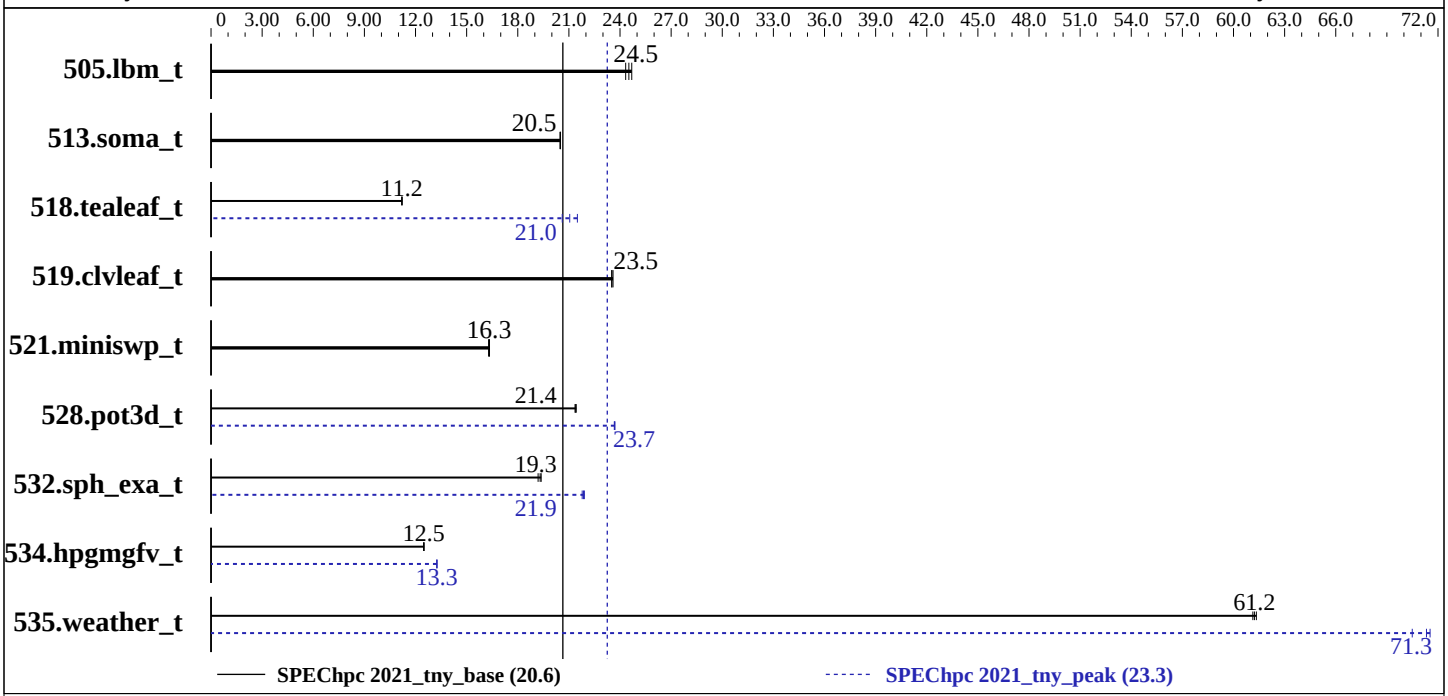
Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021_tny_base = 20.6

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

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

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-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:
`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`

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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:
`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`

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 -nostandard-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`

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`

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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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