



SPEChpc™ 2021 Tiny Result

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Intel

SPEChpc 2021_tny_base = 40.0

Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021_tny_peak = 40.3

hpc2021 License: 13

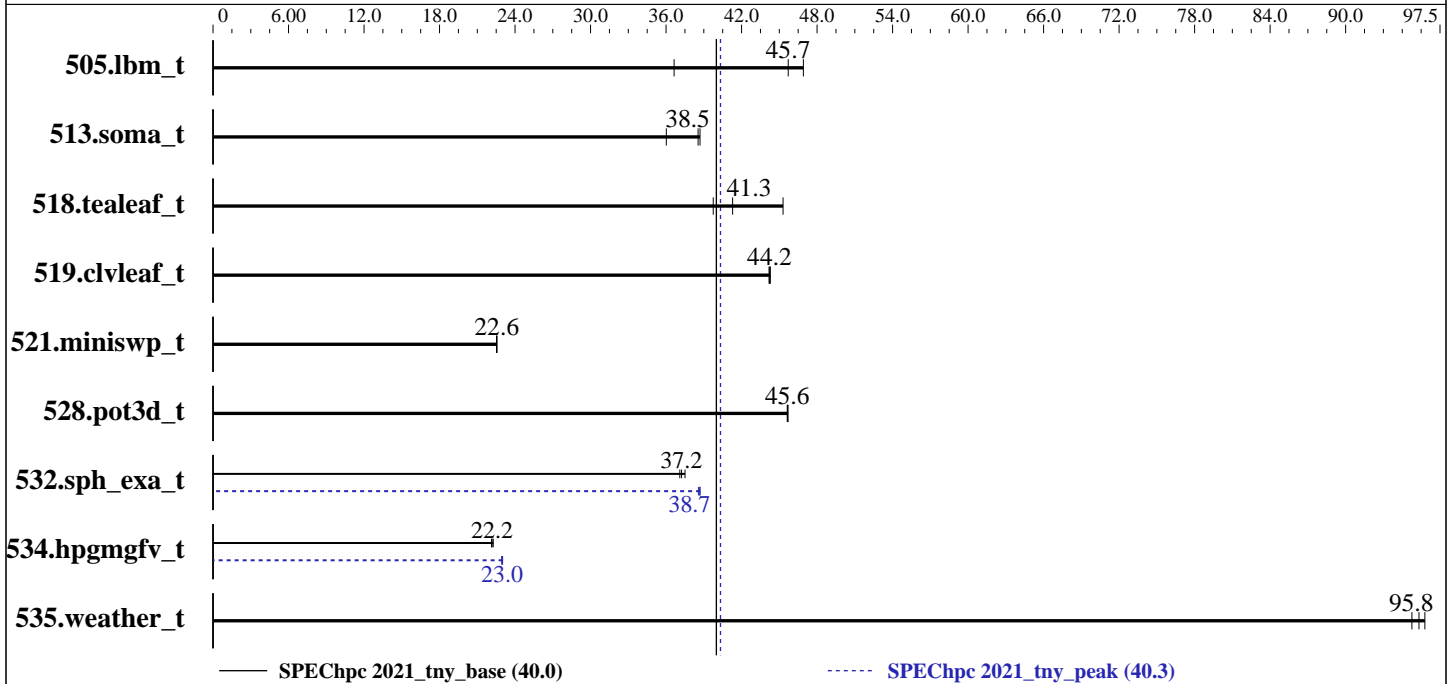
Test Date: Apr-2024

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
505.lbm_t	OMP	64	7	61.4	36.6	<u>49.2</u>	<u>45.7</u>	48.0	46.9	OMP	64	7	61.4	36.6	<u>49.2</u>	<u>45.7</u>	48.0	46.9
513.soma_t	OMP	64	7	103	36.0	95.6	38.7	<u>96.0</u>	<u>38.5</u>	OMP	64	7	103	36.0	95.6	38.7	<u>96.0</u>	<u>38.5</u>
518.tealeaf_t	OMP	64	7	36.4	45.3	41.5	39.7	<u>40.0</u>	<u>41.3</u>	OMP	64	7	36.4	45.3	41.5	39.7	<u>40.0</u>	<u>41.3</u>
519.cvlleaf_t	OMP	64	7	37.3	44.2	37.3	44.3	<u>37.3</u>	<u>44.2</u>	OMP	64	7	37.3	44.2	37.3	44.3	<u>37.3</u>	<u>44.2</u>
521.miniswp_t	OMP	64	7	71.0	22.5	70.9	22.6	<u>70.9</u>	<u>22.6</u>	OMP	64	7	71.0	22.5	70.9	22.6	<u>70.9</u>	<u>22.6</u>
528.pot3d_t	OMP	64	7	46.5	45.7	46.6	45.6	<u>46.6</u>	<u>45.6</u>	OMP	64	7	46.5	45.7	46.6	45.6	<u>46.6</u>	<u>45.6</u>
532.sph_exa_t	OMP	64	7	<u>52.4</u>	<u>37.2</u>	52.0	37.5	52.6	37.1	OMP	448	2	<u>50.4</u>	<u>38.7</u>	50.6	38.6	50.4	38.7
534.hpgmgfv_t	OMP	64	7	<u>53.0</u>	<u>22.2</u>	52.8	22.3	53.1	22.1	OMP	448	2	<u>51.1</u>	<u>23.0</u>	51.1	23.0	51.2	22.9
535.weather_t	OMP	64	7	33.5	96.3	<u>33.7</u>	<u>95.8</u>	33.9	95.3	OMP	64	7	33.5	96.3	<u>33.7</u>	<u>95.8</u>	33.9	95.3

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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: 4
Total Chips: 8
Total Cores: 448
Total Threads: 896
Total Memory: 512 GB
Max. Peak Threads: 7

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: 64
Base Threads Run: 7
Peak Parallel Models: OMP
Minimum Peak Ranks: 64
Maximum Peak Ranks: 448
Max. Peak Threads: 7
Min. Peak Threads: 2

Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

Hardware

Number of nodes: 4
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
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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

```

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: basepeak = yes

521.miniswp_t: basepeak = yes

534.hpgmgfv_t: -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:

519.clvleaf_t: basepeak = yes

528.pot3d_t: basepeak = yes

535.weather_t: basepeak = yes

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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