SPEChpc™ 2021 Tiny Result

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Intel

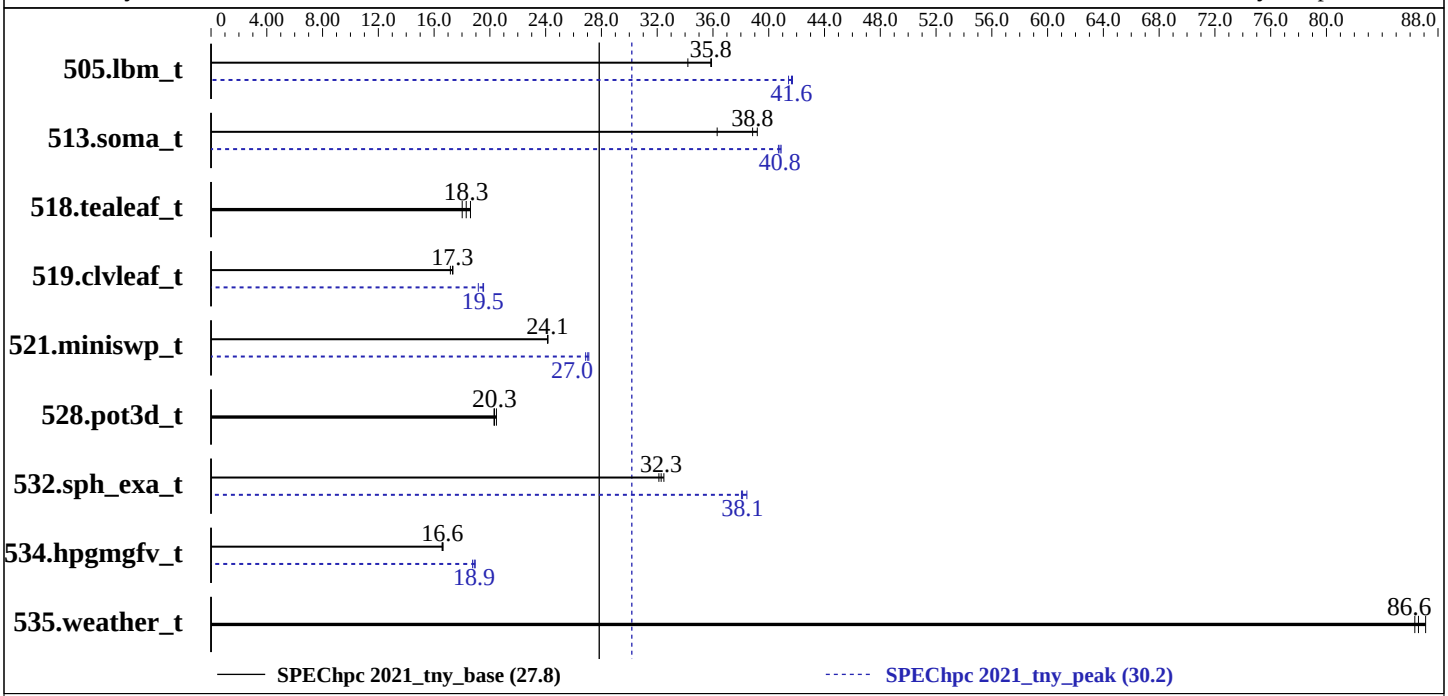
Endeavour: Intel Server D50DNP2MFALACB (Intel Xeon Platinum 8480+)

SPEChpc 2021_tny_base = 27.8

SPEChpc 2021_tny_peak = 30.2

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

Test Date: Jul-2023
Hardware Availability: Jan-2023
Software Availability: Apr-2023



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	32	14	65.8	34.2	62.7	35.9	**62.8**	**35.8**	OMP	448	1	**54.0**	**41.6**	54.0	41.7	54.3	41.4
513.soma_t	OMP	32	14	94.4	39.2	**95.3**	**38.8**	102	36.3	OMP	16	28	90.5	40.9	90.9	40.7	**90.7**	**40.8**
518.tealeaf_t	OMP	32	14	**90.2**	**18.3**	91.6	18.0	88.7	18.6	OMP	32	14	**90.2**	**18.3**	91.6	18.0	88.7	18.6
519.clvleaf_t	OMP	32	14	96.1	17.2	95.1	17.4	**95.3**	**17.3**	OMP	32	14	86.1	19.2	84.4	19.5	**84.6**	**19.5**
521.miniswp_t	OMP	32	14	66.2	24.2	66.3	24.1	**66.3**	**24.1**	OMP	16	28	59.0	27.1	**59.2**	**27.0**	59.6	26.9
528.pot3d_t	OMP	32	14	**105**	**20.3**	104	20.5	105	20.3	OMP	32	14	**105**	**20.3**	104	20.5	105	20.3
532.sph_exa_t	OMP	32	14	**60.4**	**32.3**	60.0	32.5	60.7	32.1	OMP	448	1	50.7	38.4	51.3	38.0	**51.2**	**38.1**
534.hpgmgfv_t	OMP	32	14	**70.8**	**16.6**	70.9	16.6	70.6	16.6	OMP	64	7	**62.2**	**18.9**	62.6	18.8	62.0	18.9
535.weather_t	OMP	32	14	**37.2**	**86.6**	37.0	87.1	37.4	86.3	OMP	32	14	**37.2**	**86.6**	37.0	87.1	37.4	86.3

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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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SPEChpc 2021_tny_base = 27.8

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

Test Date: Jul-2023
Hardware Availability: Jan-2023
Software Availability: Apr-2023

Hardware Summary

Type of System:	Homogenous Cluster
Compute Node:	Intel Server D50DNP2MFALACB (Xeon 8480+)
Interconnect:	Mellanox HDR
Compute Nodes Used:	4
Total Chips:	8
Total Cores:	448
Total Threads:	896
Total Memory:	2 TB
Max. Peak Threads:	28

Software Summary

Compiler:	Intel oneAPI Compiler 2023.1.0
MPI Library:	Intel MPI Library 2021.9 for Linux OS
Other MPI Info:	None
Other Software:	None
Base Parallel Model:	OMP
Base Ranks Run:	32
Base Threads Run:	14
Peak Parallel Models:	OMP
Minimum Peak Ranks:	16
Maximum Peak Ranks:	448
Max. Peak Threads:	28
Min. Peak Threads:	1

Node Description: Intel Server D50DNP2MFALACB (Xeon 8480+)

Hardware

Number of nodes:	4
Uses of the node:	Compute
Vendor:	Intel
Model:	Intel Server D50DNP2MFALACB (Xeon 8480+)
CPU Name:	Intel Xeon Platinum 8480+
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 3.8 GHz
CPU MHz:	2000
Primary Cache:	32 KB I + 48 KB D on chip per core
Secondary Cache:	2 MB I+D on chip per core
L3 Cache:	105 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx8 PC5-4800B)
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:	5.9-0.5.5
Adapter Firmware:	20.36.1010
Operating System:	Rocky Linux 8.7 (Green Obsidian) 4.18.0-372.32.1.el8_6.crt3.x86_64
Local File System:	NFS
Shared File System:	PANASAS FS
System State:	Multi-user
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
```

Compiler Version Notes

```
==============================================================================
 CXXC 532.sph_exa_t(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2023.1.0 (2023.1.0.20230320)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
  /global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm
Configuration file:
  /global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm/../bin/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)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2023.1.0 (2023.1.0.20230320)
Target: x86_64-unknown-linux-gnu
```

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Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir:
  /global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm
Configuration file:
  /global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm/../bin/icx.cfg
------------------------------------------------------------------------------

==============================================================================
 CC  534.hpgmgfv_t(peak)
------------------------------------------------------------------------------
icc: remark #10441: The Intel(R) C++ Compiler Classic (ICC) is deprecated and
  will be removed from product release in the second half of 2023. The
  Intel(R) oneAPI DPC++/C++ Compiler (ICX) is the recommended compiler moving
  forward. Please transition to use this compiler. Use '-diag-disable=10441'
  to disable this message.
icc: command line warning #10148: option
  '-Wno-incompatible-function-pointer-types' not supported
icc (ICC) 2021.9.0 20230302
Copyright (C) 1985-2023 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  519.clvleaf_t(peak)
------------------------------------------------------------------------------
ifort (IFORT) 2021.9.0 20230302
Copyright (C) 1985-2023 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  519.clvleaf_t(base) 528.pot3d_t(base, peak) 535.weather_t(base, peak)
------------------------------------------------------------------------------
ifx (IFX) 2023.1.0 20230320
Copyright (C) 1985-2023 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`

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 (except as noted below):
`-Ispecmpitime -Wno-incompatible-function-pointer-types`

521.miniswp_t: `-Ispecmpitime/ -Wno-incompatible-function-pointer-types`

534.hpgmgfv_t: `-Ispecmpitime -Wno-incompatible-function-pointer-types`

C++ benchmarks:
`-Ispecmpitime`

Fortran benchmarks:

519.clvleaf_t: `-Ispecmpitime`

Peak Compiler Invocation

C benchmarks (except as noted below):
`mpiicc -cc=icx`

534.hpgmgfv_t: `mpiicc`

C++ benchmarks:
`mpiicpc -cxx=icpx`

Fortran benchmarks (except as noted below):
`mpiifort -fc=ifx`

519.clvleaf_t: `mpiifort`

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

513.soma_t: `Same as 505.lbm_t`

518.tealeaf_t: `basepeak = yes`

521.miniswp_t: `Same as 505.lbm_t`

534.hpgmgfv_t: `-O3 -Ofast -xCORE-AVX512 -ansi-alias -qopenmp -ipo -qopt-zmm-usage=high -qopt-multiple-gather-scatter-by-shuffles`

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

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Peak Optimization Flags (Continued)

C++ benchmarks (continued):
`-funroll-loops`

Fortran benchmarks:

519.clvleaf_t: `-O3 -Ofast -xCORE-AVX512 -ansi-alias -qopenmp -ipo -qopt-zmm-usage=high -qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs -align array64byte`

528.pot3d_t: `basepeak = yes`

535.weather_t: `basepeak = yes`

Peak Other Flags

C benchmarks (except as noted below):
`-Ispecmpitime -Wno-incompatible-function-pointer-types`

521.miniswp_t: `-Ispecmpitime/ -Wno-incompatible-function-pointer-types`

534.hpgmgfv_t: `-Ispecmpitime  -Wno-incompatible-function-pointer-types`

C++ benchmarks:
`-Ispecmpitime`

Fortran benchmarks:

519.clvleaf_t: `-Ispecmpitime`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2023-08-16.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2023-08-16.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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