SPEChpc™ 2021 Tiny Result

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xFusion

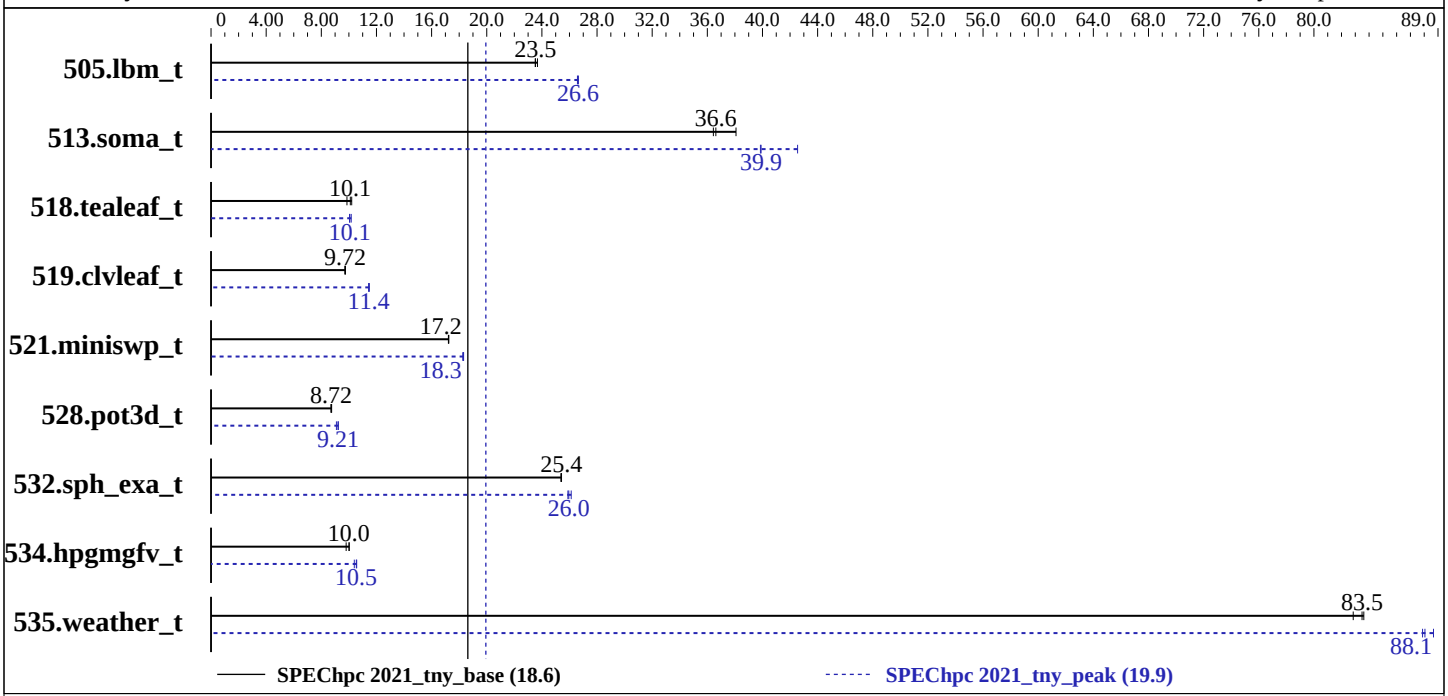
xFusion FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

SPEChpc 2021_tny_base = 18.6

SPEChpc 2021_tny_peak = 19.9

hpc2021 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Dec-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	24	20	95.7	23.5	95.0	23.7	**95.6**	**23.5**	OMP	60	8	**84.5**	**26.6**	84.7	26.6	84.4	26.6
513.soma_t	OMP	24	20	102	36.4	**101**	**36.6**	97.2	38.1	OMP	4	120	**92.7**	**39.9**	87.0	42.5	92.8	39.9
518.tealeaf_t	OMP	24	20	162	10.2	167	9.86	**163**	**10.1**	OMP	60	8	164	10.0	162	10.2	**164**	**10.1**
519.clvleaf_t	OMP	24	20	**170**	**9.72**	169	9.75	170	9.72	OMP	48	10	**144**	**11.4**	144	11.5	144	11.4
521.miniswp_t	OMP	24	20	92.8	17.2	92.9	17.2	**92.9**	**17.2**	OMP	8	60	87.3	18.3	87.6	18.3	**87.4**	**18.3**
528.pot3d_t	OMP	24	20	**244**	**8.72**	244	8.70	243	8.75	OMP	80	6	230	9.23	234	9.10	**231**	**9.21**
532.sph_exa_t	OMP	24	20	76.7	25.4	**76.7**	**25.4**	76.8	25.4	OMP	60	8	74.6	26.1	**75.1**	**26.0**	75.3	25.9
534.hpgmgfv_t	OMP	24	20	**117**	**10.0**	117	10.0	120	9.80	OMP	80	6	113	10.4	**111**	**10.5**	111	10.6
535.weather_t	OMP	24	20	38.6	83.6	38.9	82.9	**38.6**	**83.5**	OMP	80	6	36.4	88.7	**36.6**	**88.1**	36.7	87.9

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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 Sponsor: xFusion
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Test Date: Dec-2023
Hardware Availability: Jan-2023
Software Availability: Apr-2023

Hardware Summary

Type of System:	Homogenous Cluster
Compute Node:	xFusion FusionServer 2288H V7
Interconnect:	Mellanox HDR
Node Node:	xFusion FusionServer 2288H V7
Compute Nodes Used:	2
Total Chips:	4
Total Cores:	240
Total Threads:	480
Total Memory:	1 TB
Max. Peak Threads:	120

Software Summary

Compiler:	Intel oneAPI Compiler 2023.0.0
MPI Library:	Intel MPI Library 2021.8 for Linux OS
Other MPI Info:	None
Other Software:	None
Base Parallel Model:	OMP
Base Ranks Run:	24
Base Threads Run:	20
Peak Parallel Models:	OMP
Minimum Peak Ranks:	4
Maximum Peak Ranks:	80
Max. Peak Threads:	120
Min. Peak Threads:	6

Node Description: xFusion FusionServer 2288H V7

Hardware

Number of nodes:	2
Uses of the node:	Compute Node
Vendor:	xFusion
Model:	xFusion FusionServer 2288H V7
CPU Name:	Intel Xeon Platinum 8490H
CPU(s) orderable:	1, 2 chips
Chips enabled:	2
Cores enabled:	120
Cores per chip:	60
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:	512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Disk Subsystem:	1 x 7.68 TB NVMe SSD
Other Hardware:	None
Accel Count:	0
Accel Model:	None
Accel Vendor:	None
Accel Type:	None
Accel Connection:	None
Accel ECC enabled:	None
Accel Description:	None
Adapter:	MCX653105A-EFAT
Number of Adapters:	1
Slot Type:	PCI-Express 4.0 x16
Data Rate:	100 Gb/s
Ports Used:	1
Interconnect Type:	Mellanox HDR

Software

Accelerator Driver:	None
Adapter:	MCX653105A-EFAT
Adapter Driver:	5.4-3.1.0
Adapter Firmware:	20.32.1010
Operating System:	Rocky Linux release 8.7 (Green Obsidian) 4.18.0-425.3.1.el8.x86_64
Local File System:	xfs
Shared File System:	NFS
System State:	Multi-user, run level 3
Other Software:	N/A

Interconnect Description: Mellanox HDR

Hardware

Vendor:	Mellanox
Model:	Mellanox HDR
Switch Model:	Mellanox MQM8790-HS2F InfiniBand Switch
Number of Switches:	1
Number of Ports:	40
Data Rate:	200 Gbit/s
Firmware:	27.2010.1202
Topology:	Mesh
Primary Use:	MPI

Software

: --

Submit Notes

```
The config file option 'submit' was used.
```

Compiler Version Notes

```
==============================================================================
 CXXC 532.sph_exa_t(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2023.0.0 (2023.0.0.20221201)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /share/app/intel/2023.0.0/compiler/latest/linux/bin-llvm
Configuration file:
  /share/app/intel/2023.0.0/compiler/latest/linux/bin-llvm/../bin/icpx.cfg
------------------------------------------------------------------------------

==============================================================================
 CC  505.lbm_t(base, peak) 513.soma_t(base, peak) 518.tealeaf_t(base)
      521.miniswp_t(base, peak) 534.hpgmgfv_t(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2023.0.0 (2023.0.0.20221201)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /share/app/intel/2023.0.0/compiler/latest/linux/bin-llvm
Configuration file:
  /share/app/intel/2023.0.0/compiler/latest/linux/bin-llvm/../bin/icx.cfg
------------------------------------------------------------------------------

==============================================================================
 CC  518.tealeaf_t(peak) 534.hpgmgfv_t(peak)
------------------------------------------------------------------------------
icc: remark #10441: The Intel(R) C++ Compiler Classic (ICC) is deprecated and
```

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Compiler Version Notes (Continued)

```
  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) 2021.8.0 20221119
Copyright (C) 1985-2022 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  519.clvleaf_t(peak)
------------------------------------------------------------------------------
ifort (IFORT) 2021.8.0 20221119
Copyright (C) 1985-2022 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  519.clvleaf_t(base) 528.pot3d_t(base, peak) 535.weather_t(base, peak)
------------------------------------------------------------------------------
ifx (IFORT) 2023.0.0 20221201
Copyright (C) 1985-2022 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 -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -ffast-math -flto
-funroll-loops
```

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

Fortran benchmarks:
```
-O3 -Ofast -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -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 (except as noted below):
```
mpiicc -cc=icx
```

518.tealeaf_t: `mpiicc`

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

513.soma_t: `Same as 505.lbm_t`

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

521.miniswp_t: `Same as 505.lbm_t`

534.hpgmgfv_t: `Same as 518.tealeaf_t`

C++ benchmarks:
`-O3 -Ofast -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512 -qopt-multiple-gather-scatter-by-shuffles -ffast-math -flto -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: `-O3 -Ofast -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512 -qopt-multiple-gather-scatter-by-shuffles -ffast-math -flto -funroll-loops -qopt-streaming-stores=always -nostandard-realloc-lhs -align array64byte`

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Peak Optimization Flags (Continued)

535.weather_t: `-O3 -Ofast -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512 -qopt-multiple-gather-scatter-by-shuffles -ffast-math -flto -funroll-loops -nostandard-realloc-lhs -align array64byte`

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.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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