



SPEChpc™ 2021 Tiny Result

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xFusion

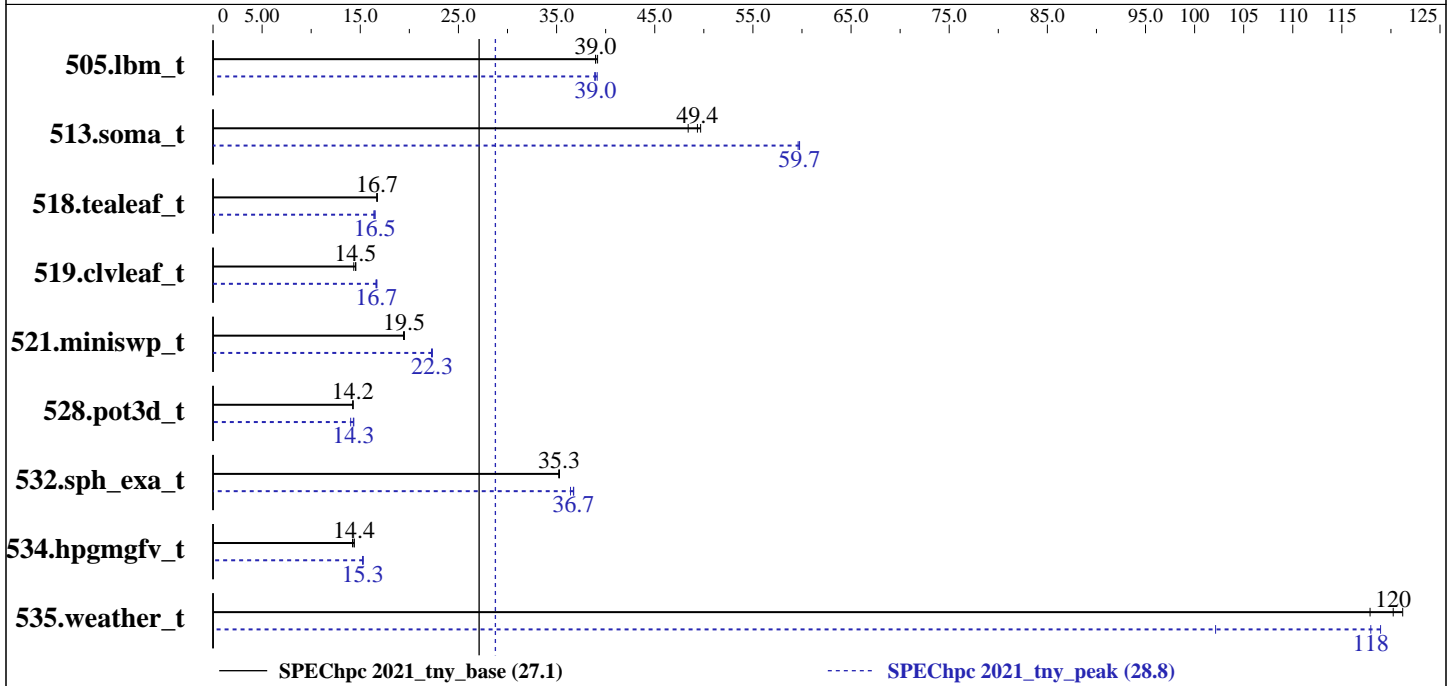
xFusion FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

SPEChpc 2021_tny_base = 27.1

SPEChpc 2021_tny_peak = 28.8

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	60	12	57.7	39.0	57.7	39.0	57.4	39.2	OMP	60	12	57.9	38.9	57.5	39.1	57.7	39.0
513.soma_t	OMP	60	12	76.4	48.4	74.5	49.7	75.0	49.4	OMP	6	120	61.9	59.7	61.9	59.8	62.1	59.6
518.tealeaf_t	OMP	60	12	98.6	16.7	98.6	16.7	98.9	16.7	OMP	48	15	99.9	16.5	100	16.5	101	16.4
519.civleaf_t	OMP	60	12	114	14.5	113	14.5	115	14.3	OMP	90	8	98.8	16.7	99.4	16.6	99.0	16.7
521.miniswp_t	OMP	60	12	82.1	19.5	82.1	19.5	82.4	19.4	OMP	24	30	71.9	22.3	71.6	22.3	71.7	22.3
528.pot3d_t	OMP	60	12	149	14.3	149	14.2	149	14.2	OMP	180	4	152	14.0	149	14.3	148	14.3
532.sph_exa_t	OMP	60	12	55.3	35.3	55.2	35.3	55.4	35.2	OMP	360	2	53.5	36.4	53.1	36.7	53.1	36.7
534.hpgmgfv_t	OMP	60	12	82.7	14.2	81.7	14.4	81.7	14.4	OMP	360	2	77.1	15.2	76.8	15.3	77.0	15.3
535.weather_t	OMP	60	12	27.4	118	26.6	121	26.8	120	OMP	60	12	27.1	119	31.6	102	27.3	118

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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: xFusion FusionServer 2288H V7
Interconnect: Mellanox HDR
Node Node: xFusion FusionServer 2288H V7
Compute Nodes Used: 3
Total Chips: 6
Total Cores: 360
Total Threads: 720
Total Memory: 1536 GB
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: 60
Base Threads Run: 12
Peak Parallel Models: OMP
Minimum Peak Ranks: 6
Maximum Peak Ranks: 360
Max. Peak Threads: 120
Min. Peak Threads: 2

Node Description: xFusion FusionServer 2288H V7

Hardware

Number of nodes: 3
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



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Interconnect Description: Mellanox HDR

Hardware

Software

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

: --

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

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=====
FC 519.clvleaf_t(peak)

ifort (IFORT) 2021.8.0 20221119

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=====
FC 519.clvleaf_t(base) 528.pot3d_t(base, peak) 535.weather_t(base, peak)

ifx (IFORT) 2023.0.0 20221201

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Base Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpicpc -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



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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:

```
mpicpc -cxx=icpx
```

Fortran benchmarks (except as noted below):

```
mpiifort -fc=ifx
```

```
519.clvleaf_t: mpiifort
```



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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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