



# SPEChpc™ 2021 Tiny Result

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## xFusion

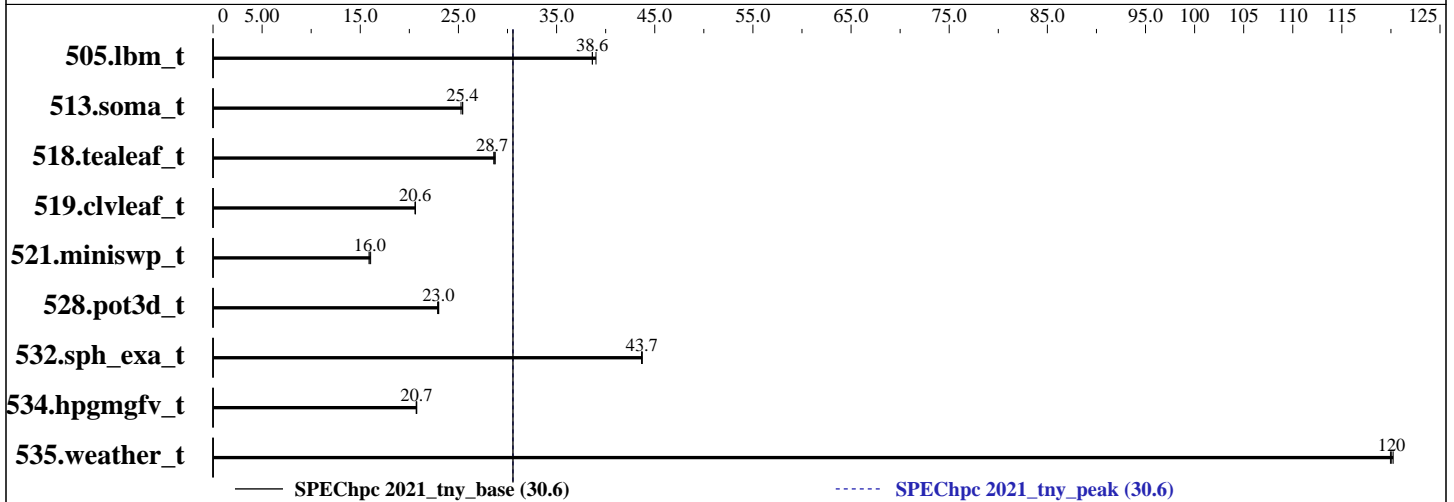
xFusion FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

SPEChpc 2021\_tny\_base = 30.6

SPEChpc 2021\_tny\_peak = 30.6

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     | MPI   | 480   | 1         | 57.7        | 39.0        | <b>58.2</b> | <b>38.6</b> | 58.2        | 38.6        | MPI   | 480   | 1         | 57.7        | 39.0        | <b>58.2</b> | <b>38.6</b> | 58.2        | 38.6        |
| 513.soma_t    | MPI   | 480   | 1         | 145         | 25.4        | <b>146</b>  | <b>25.4</b> | 146         | 25.3        | MPI   | 480   | 1         | 145         | 25.4        | <b>146</b>  | <b>25.4</b> | 146         | 25.3        |
| 518.tealeaf_t | MPI   | 480   | 1         | <b>57.5</b> | <b>28.7</b> | 57.7        | 28.6        | 57.4        | 28.7        | MPI   | 480   | 1         | <b>57.5</b> | <b>28.7</b> | 57.7        | 28.6        | 57.4        | 28.7        |
| 519.clvleaf_t | MPI   | 480   | 1         | <b>80.1</b> | <b>20.6</b> | 80.2        | 20.6        | 80.0        | 20.6        | MPI   | 480   | 1         | <b>80.1</b> | <b>20.6</b> | 80.2        | 20.6        | 80.0        | 20.6        |
| 521.miniswp_t | MPI   | 480   | 1         | <b>100</b>  | <b>16.0</b> | 99.6        | 16.1        | 101         | 15.9        | MPI   | 480   | 1         | <b>100</b>  | <b>16.0</b> | 99.6        | 16.1        | 101         | 15.9        |
| 528.pot3d_t   | MPI   | 480   | 1         | 92.4        | 23.0        | <b>92.5</b> | <b>23.0</b> | 92.9        | 22.9        | MPI   | 480   | 1         | 92.4        | 23.0        | <b>92.5</b> | <b>23.0</b> | 92.9        | 22.9        |
| 532.sph_exa_t | MPI   | 480   | 1         | 44.6        | 43.7        | <b>44.6</b> | <b>43.7</b> | 44.7        | 43.7        | MPI   | 480   | 1         | 44.6        | 43.7        | <b>44.6</b> | <b>43.7</b> | 44.7        | 43.7        |
| 534.hpgmgfv_t | MPI   | 480   | 1         | 56.6        | 20.7        | 56.8        | 20.7        | <b>56.7</b> | <b>20.7</b> | MPI   | 480   | 1         | 56.6        | 20.7        | 56.8        | 20.7        | <b>56.7</b> | <b>20.7</b> |
| 535.weather_t | MPI   | 480   | 1         | 26.8        | 120         | 26.9        | 120         | <b>26.9</b> | <b>120</b>  | MPI   | 480   | 1         | 26.8        | 120         | 26.9        | 120         | <b>26.9</b> | <b>120</b>  |

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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 Date:** Dec-2023  
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**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: 4  
Total Chips: 8  
Total Cores: 480  
Total Threads: 480  
Total Memory: 2 TB  
Max. Peak Threads: 1

### 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: MPI  
Base Ranks Run: 480  
Base Threads Run: 1  
Peak Parallel Models: MPI  
Minimum Peak Ranks: 480  
Maximum Peak Ranks: 480  
Max. Peak Threads: 1  
Min. Peak Threads: 1

## Node Description: xFusion FusionServer 2288H V7

### Hardware

Number of nodes: 4  
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: 1  
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)  
-----

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) 513.soma\_t(base) 518.tealeaf\_t(base) 521.miniswp\_t(base)  
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  
-----

=====  
FC 519.clvleaf\_t(base) 528.pot3d\_t(base) 535.weather\_t(base)  
-----

ifx (IFORT) 2023.0.0 20221201

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## Compiler Version Notes (Continued)

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

C++ benchmarks:

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

Fortran benchmarks:

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



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## Base Other Flags

C benchmarks:  
-Wno-incompatible-function-pointer-types

## 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: basepeak = yes  
C++ benchmarks:  
532.sph\_exa\_t: basepeak = yes  
Fortran benchmarks:  
519.clvleaf\_t: basepeak = yes  
528.pot3d\_t: basepeak = yes  
535.weather\_t: basepeak = yes

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](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](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](mailto:info@spec.org).

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