



# SPEChpc™ 2021 Small Result

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## xFusion

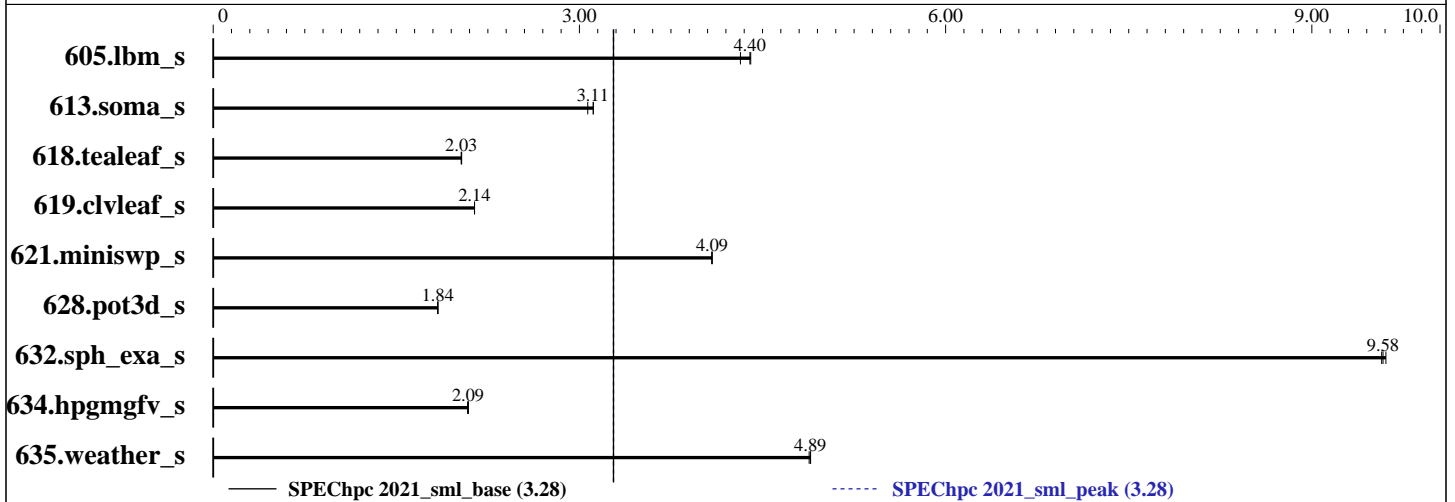
xFusion FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

SPEChpc 2021\_sml\_base = 3.28

SPEChpc 2021\_sml\_peak = 3.28

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
605.lbm_s	MPI	480	1	359	4.32	352	4.40	<b>353</b>	<b>4.40</b>	MPI	480	1	359	4.32	352	4.40	<b>353</b>	<b>4.40</b>
613.soma_s	MPI	480	1	514	3.11	<b>514</b>	<b>3.11</b>	521	3.07	MPI	480	1	514	3.11	<b>514</b>	<b>3.11</b>	521	3.07
618.tealeaf_s	MPI	480	1	<b>1008</b>	<b>2.03</b>	1007	2.04	1009	2.03	MPI	480	1	<b>1008</b>	<b>2.03</b>	1007	2.04	1009	2.03
619.cvlleaf_s	MPI	480	1	771	2.14	<b>771</b>	<b>2.14</b>	771	2.14	MPI	480	1	771	2.14	<b>771</b>	<b>2.14</b>	771	2.14
621.miniswp_s	MPI	480	1	269	4.09	269	4.08	<b>269</b>	<b>4.09</b>	MPI	480	1	269	4.09	269	4.08	<b>269</b>	<b>4.09</b>
628.pot3d_s	MPI	480	1	911	1.84	<b>910</b>	<b>1.84</b>	910	1.84	MPI	480	1	911	1.84	<b>910</b>	<b>1.84</b>	910	1.84
632.sph_exa_s	MPI	480	1	239	9.61	240	9.57	<b>240</b>	<b>9.58</b>	MPI	480	1	239	9.61	240	9.57	<b>240</b>	<b>9.58</b>
634.hpgmgfv_s	MPI	480	1	<b>467</b>	<b>2.09</b>	466	2.09	468	2.08	MPI	480	1	<b>467</b>	<b>2.09</b>	466	2.09	468	2.08
635.weather_s	MPI	480	1	533	4.88	<b>531</b>	<b>4.89</b>	531	4.89	MPI	480	1	533	4.88	<b>531</b>	<b>4.89</b>	531	4.89

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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: 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 632.sph\_exa\_s(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 605.lbm\_s(base) 613.soma\_s(base) 618.tealeaf\_s(base) 621.miniswp\_s(base)  
634.hpgmgfv\_s(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 619.clvleaf\_s(base) 628.pot3d\_s(base) 635.weather\_s(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

```
605.lbm_s: -lstdc++ -std=c++14  
613.soma_s: -lstdc++ -std=c++14  
618.tealeaf_s: -lstdc++ -std=c++14  
621.miniswp_s: -lstdc++ -std=c++14  
634.hpgmgfv_s: -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:

605.lbm\_s: basepeak = yes

613.soma\_s: basepeak = yes

618.tealeaf\_s: basepeak = yes

621.miniswp\_s: basepeak = yes

634.hpgmgfv\_s: basepeak = yes

C++ benchmarks:

632.sph\_exa\_s: basepeak = yes

Fortran benchmarks:

619.clvleaf\_s: basepeak = yes

628.pot3d\_s: basepeak = yes

635.weather\_s: 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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