



SPEChpc™ 2021 Small Result

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xFusion

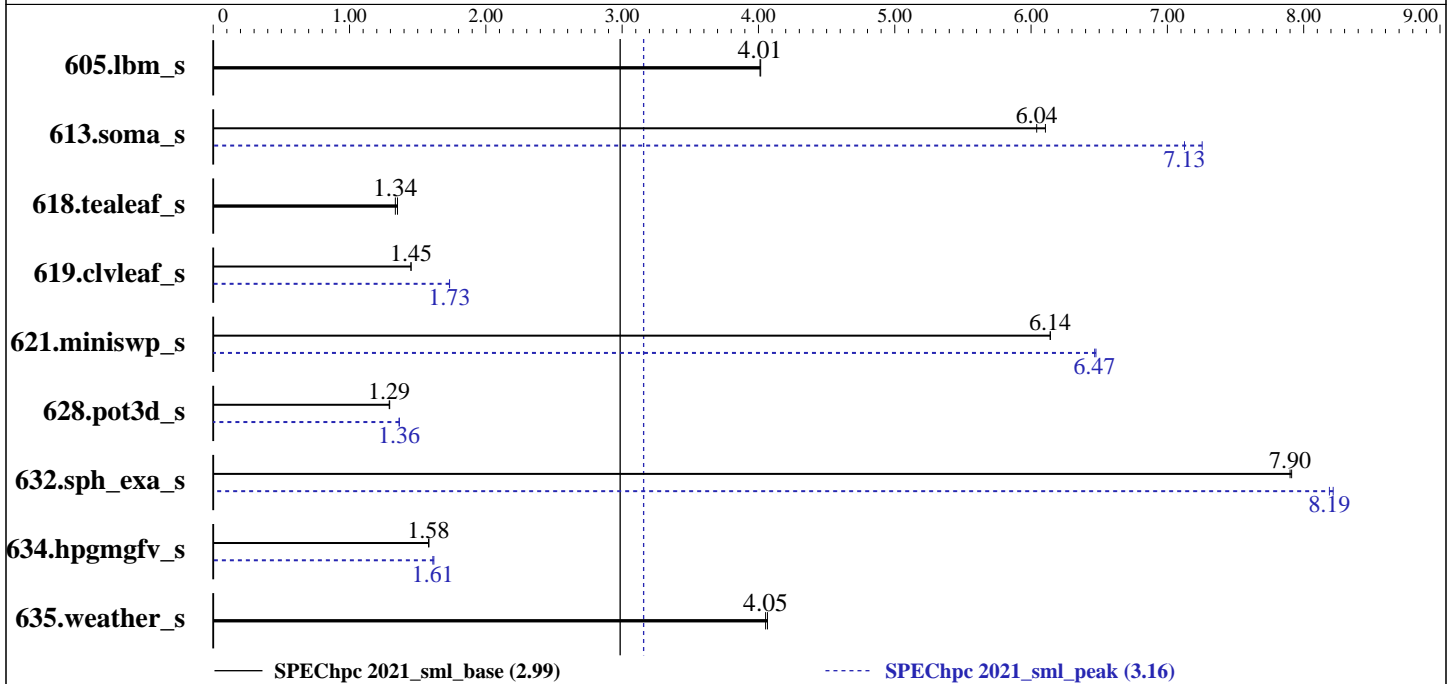
xFusion FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

SPEChpc 2021_sml_base = 2.99

SPEChpc 2021_sml_peak = 3.16

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	OMP	24	30	386	4.02	386	4.01			OMP	24	30	386	4.02	386	4.01		
613.soma_s	OMP	24	30	265	6.04	262	6.11			OMP	6	120	225	7.13	221	7.26		
618.tealeaf_s	OMP	24	30	1534	1.34	1516	1.35			OMP	24	30	1534	1.34	1516	1.35		
619.clvleaf_s	OMP	24	30	1137	1.45	1137	1.45			OMP	180	4	952	1.73	951	1.73		
621.miniswp_s	OMP	24	30	179	6.14	179	6.14			OMP	6	120	170	6.48	170	6.47		
628.pot3d_s	OMP	24	30	1294	1.29	1297	1.29			OMP	360	2	1228	1.36	1226	1.37		
632.sph_exa_s	OMP	24	30	291	7.90	291	7.91			OMP	48	15	281	8.19	280	8.22		
634.hpgmgfv_s	OMP	24	30	617	1.58	616	1.58			OMP	90	8	602	1.62	605	1.61		
635.weather_s	OMP	24	30	642	4.05	639	4.07			OMP	24	30	642	4.05	639	4.07		

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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: 24
Base Threads Run: 30
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 632.sph_exa_s(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 613.soma_s(peak) 634.hpgmgfv_s(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/icx.cfg
-----

=====
CC 605.lbm_s(base, peak) 613.soma_s(base) 618.tealeaf_s(base, peak)
   621.miniswp_s(base)
-----
Intel(R) oneAPI DPC++/C++ Compiler 2023.2.0 (2023.2.0.20230622)

```

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Compiler Version Notes (Continued)

Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /share/opt/2023.2.0/compiler/2023.2.0/linux/bin-llvm
Configuration file:
/share/opt/2023.2.0/compiler/2023.2.0/linux/bin-llvm/./bin/icx.cfg

=====
CC 621.miniswp_s(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) 2021.8.0 20221119
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

=====
FC 619.clvleaf_s(peak)
=====

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

=====
FC 628.pot3d_s(base, peak) 635.weather_s(base, peak)
=====

ifx (IFORT) 2023.0.0 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

=====
FC 619.clvleaf_s(base)
=====

ifx (IFX) 2023.2.0 20230622
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Base Compiler Invocation

C benchmarks:
mpiicc -cc=icx

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Base Compiler Invocation (Continued)

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 -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
```



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Peak Compiler Invocation

C benchmarks (except as noted below):

```
mpiicc -cc=icx
```

```
621.miniswp_s: mpiicc
```

C++ benchmarks:

```
mpiicpc -cxx=icpx
```

Fortran benchmarks (except as noted below):

```
mpiifort -fc=ifx
```

```
619.clvleaf_s: mpiifort
```

Peak 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
```

Peak Optimization Flags

C benchmarks:

```
605.lbm_s: basepeak = yes
```

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

```
618.tealeaf_s: basepeak = yes
```

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

```
634.hpgmgfv_s: Same as 613.soma_s
```

C++ benchmarks:

```
-O3 -Ofast -ipo -fiopenmp -xCORE-AVX512 -mprefer-vector-width=512
```

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Peak Optimization Flags (Continued)

C++ benchmarks (continued):

```
-qopt-multiple-gather-scatter-by-shuffles -ffast-math -flto  
-funroll-loops
```

Fortran benchmarks:

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

```
628.pot3d_s: -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
```

```
635.weather_s: basepeak = yes
```

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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