



SPEChpc™ 2021 Small Result

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Intel

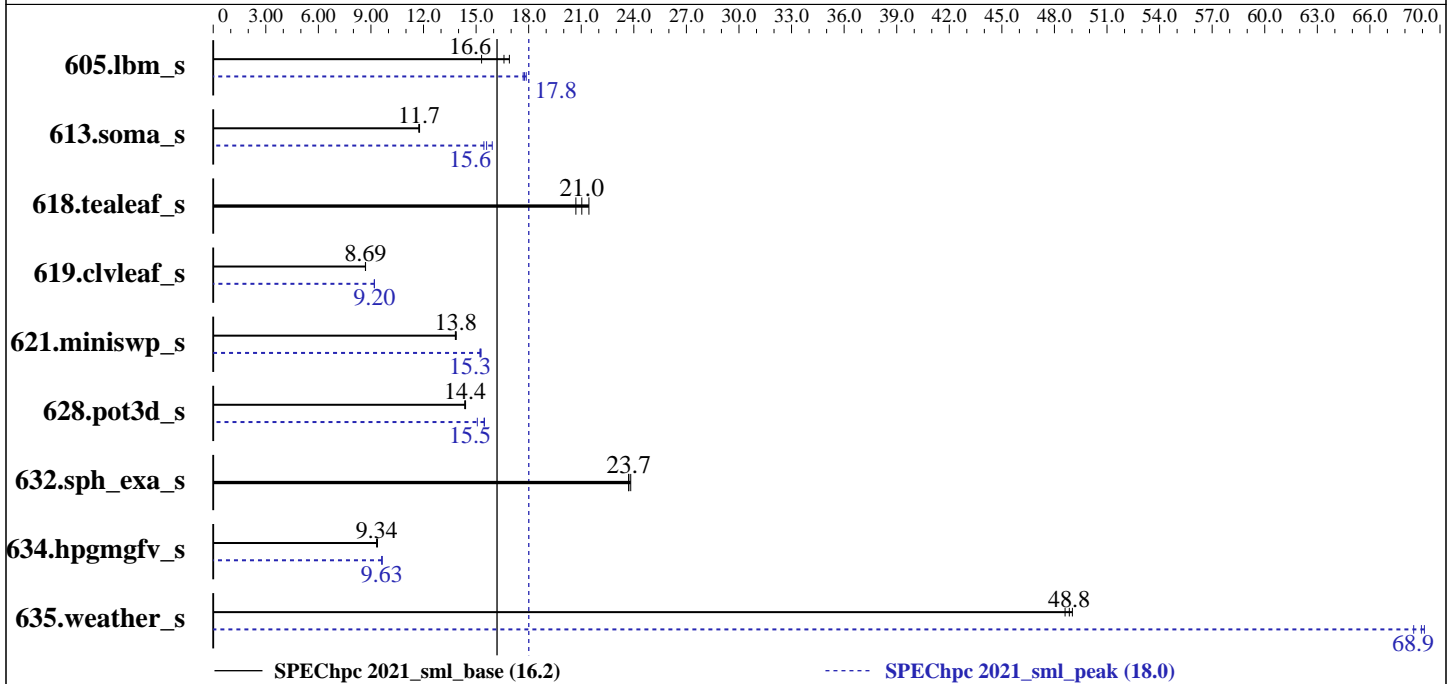
Endeavour: Intel Server D50DNP1SBB (Intel Xeon Platinum 8592+)

SPEChpc 2021_sml_base = 16.2

SPEChpc 2021_sml_peak = 18.0

hpc2021 License: 13
Test Sponsor: Intel
Tested by: Intel

Test Date: Apr-2024
Hardware Availability: Dec-2023
Software Availability: Mar-2024



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	256	8	101	15.3	91.7	16.9	93.4	16.6	OMP	512	4	87.6	17.7	87.3	17.8	86.8	17.9
613.soma_s	OMP	256	8	136	11.7	136	11.7	136	11.8	OMP	64	32	100	15.9	104	15.4	103	15.6
618.tealeaf_s	OMP	256	8	97.5	21.0	99.1	20.7	95.6	21.4	OMP	256	8	97.5	21.0	99.1	20.7	95.6	21.4
619.civleaf_s	OMP	256	8	190	8.69	190	8.69	190	8.69	OMP	256	8	179	9.20	179	9.20	179	9.19
621.miniswp_s	OMP	256	8	79.3	13.9	79.6	13.8	79.5	13.8	OMP	64	32	72.1	15.3	72.0	15.3	72.3	15.2
628.pot3d_s	OMP	256	8	117	14.4	116	14.4	117	14.4	OMP	128	16	108	15.5	108	15.5	111	15.1
632.sph_exa_s	OMP	256	8	97.0	23.7	96.5	23.8	97.0	23.7	OMP	256	8	97.0	23.7	96.5	23.8	97.0	23.7
634.hpgmgfv_s	OMP	256	8	105	9.33	104	9.37	104	9.34	OMP	1024	2	101	9.63	101	9.63	101	9.63
635.weather_s	OMP	256	8	53.0	49.0	53.5	48.6	53.2	48.8	OMP	1024	2	37.7	68.9	37.6	69.1	38.0	68.5

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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: Intel Server D50DNP1SBB (Xeon 8592+)
Interconnect: Mellanox HDR
Compute Nodes Used: 16
Total Chips: 32
Total Cores: 2048
Total Threads: 4096
Total Memory: 8 TB
Max. Peak Threads: 32

Software Summary

Compiler: Intel oneAPI Compiler 2024.1.0
MPI Library: Intel MPI Library 2021.12 for Linux OS
Other MPI Info: None
Other Software: None
Base Parallel Model: OMP
Base Ranks Run: 256
Base Threads Run: 8
Peak Parallel Models: OMP
Minimum Peak Ranks: 64
Maximum Peak Ranks: 1024
Max. Peak Threads: 32
Min. Peak Threads: 2

Node Description: Intel Server D50DNP1SBB (Xeon 8592+)

Hardware

Number of nodes: 16
Uses of the node: Compute
Vendor: Intel
Model: Intel Server D50DNP1SBB (Xeon 8592+)
CPU Name: Intel Xeon Platinum 8592+
CPU(s) orderable: 1, 2 chips
Chips enabled: 2
Cores enabled: 128
Cores per chip: 64
Threads per core: 2
CPU Characteristics: Turbo Boost Technology up to 3.9 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: 320 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-5600B-R)
Disk Subsystem: 1 x 1 TB NVMe U.2 2.5" SSD
Other Hardware: None
Accel Count: None
Accel Model: None
Accel Vendor: None
Accel Type: None
Accel Connection: None
Accel ECC enabled: None
Accel Description: None
Adapter: Mellanox ConnectX-6 HDR
Number of Adapters: 1
Slot Type: PCI-Express 4.0 x16
Data Rate: 200Gbit/s
Ports Used: 1
Interconnect Type: Mellanox HDR

Software

Accelerator Driver: None
Adapter: Mellanox ConnectX-6 HDR
Adapter Driver: 23.04-0.5.3
Adapter Firmware: 20.37.1014
Operating System: Rocky Linux 8.8 (Green Obsidian)
4.18.0-477.15.1.el8_8.x86_64
Local File System: xfs
Shared File System: PANASAS FS
System State: Run level 5
Other Software: None



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Interconnect Description: Mellanox HDR

Hardware

Software

Vendor: Mellanox
Model: Mellanox HDR
Switch Model: Mellanox MQM8790-HS2F Quantum HDR InfiniBand Switch
Number of Switches: 18
Number of Ports: 40
Data Rate: 200 Gbit/s
Firmware: 20.36.1010
Topology: Fat-tree
Primary Use: MPI Traffic

: --

Submit Notes

The config file option 'submit' was used.

General Notes

The PANASAS filesystem as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC HPG Policy document, <http://www.spec.org/hpg/policy.html>

Compiler Version Notes

=====
CXXC 632.sph_exa_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler
Configuration file:
/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler/./icpx.cfg

=====
CC 605.lbm_s(base, peak) 613.soma_s(base, peak) 618.tealeaf_s(base, peak)
621.miniswp_s(base, peak) 634.hpgmgfv_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler 2024.1.0 (2024.1.0.20240308)
Target: x86_64-unknown-linux-gnu

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Compiler Version Notes (Continued)

```

Thread model: posix
InstalledDir:
  /global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler
Configuration file:
  /global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler/./icx.cfg
-----
=====
FC 619.clvleaf_s(base, peak) 628.pot3d_s(base, peak) 635.weather_s(base,
  peak)
-----
ifx (IFX) 2024.1.0 20240308
Copyright (C) 1985-2024 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

```

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

```

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Base Optimization Flags (Continued)

C++ benchmarks:

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

Fortran benchmarks:

```
-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -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:

```
mpiicc -cc=icx
```

C++ benchmarks:

```
mpiicpc -cxx=icpx
```

Fortran benchmarks:

```
mpiifort -fc=ifx
```

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
```



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Peak Optimization Flags

C benchmarks:

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

613.soma_s: Same as 605.lbm_s

618.tealeaf_s: basepeak = yes

621.miniswp_s: Same as 605.lbm_s

634.hpgmgfv_s: Same as 605.lbm_s

C++ benchmarks:

632.sph_exa_s: basepeak = yes

Fortran benchmarks:

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

```
628.pot3d_s: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops -nostandard-realloc-lhs  
-align array64byte
```

635.weather_s: Same as 628.pot3d_s

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.2024-12-11.html



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You can also download the XML flags source by saving the following link:

http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2024-12-11.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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