SPEChpc™ 2021 Small Result

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Intel

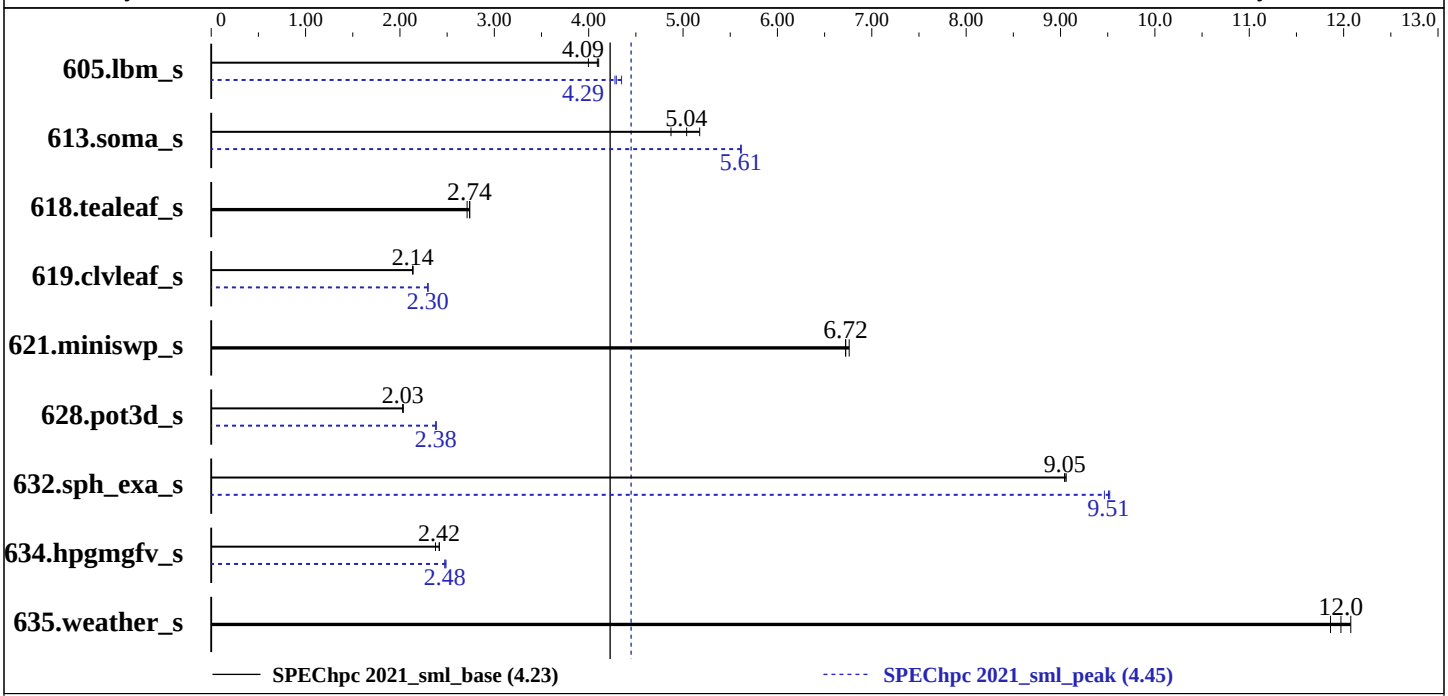
Endeavour: Intel Server D50DNP1SBB (Intel Xeon Platinum 8592+)

SPEChpc 2021_sml_base = 4.23

SPEChpc 2021_sml_peak = 4.45

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	64	8	388	4.00	378	4.11	**379**	**4.09**	OMP	256	2	356	4.35	**361**	**4.29**	362	4.28
613.soma_s	OMP	64	8	328	4.87	**318**	**5.04**	309	5.18	OMP	16	32	285	5.61	285	5.62	**285**	**5.61**
618.tealeaf_s	OMP	64	8	748	2.74	**749**	**2.74**	756	2.71	OMP	64	8	748	2.74	**749**	**2.74**	756	2.71
619.clvleaf_s	OMP	64	8	772	2.14	**772**	**2.14**	774	2.13	OMP	128	4	718	2.30	719	2.30	**719**	**2.30**
621.miniswp_s	OMP	64	8	164	6.72	**164**	**6.72**	163	6.76	OMP	64	8	164	6.72	**164**	**6.72**	163	6.76
628.pot3d_s	OMP	64	8	825	2.03	**825**	**2.03**	823	2.03	OMP	128	4	703	2.38	704	2.38	**703**	**2.38**
632.sph_exa_s	OMP	64	8	254	9.06	**254**	**9.05**	254	9.04	OMP	256	2	243	9.46	242	9.52	**242**	**9.51**
634.hpgmgfv_s	OMP	64	8	**404**	**2.42**	410	2.38	403	2.42	OMP	256	2	392	2.49	**394**	**2.48**	394	2.48
635.weather_s	OMP	64	8	219	11.9	**217**	**12.0**	215	12.1	OMP	64	8	219	11.9	**217**	**12.0**	215	12.1

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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 Availability: Dec-2023
Software Availability: Mar-2024

Hardware Summary

Type of System:	Homogenous Cluster
Compute Node:	Intel Server D50DNP1SBB (Xeon 8592+)
Interconnect:	Mellanox HDR
Compute Nodes Used:	4
Total Chips:	8
Total Cores:	512
Total Threads:	1024
Total Memory:	2 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:	64
Base Threads Run:	8
Peak Parallel Models:	OMP
Minimum Peak Ranks:	16
Maximum Peak Ranks:	256
Max. Peak Threads:	32
Min. Peak Threads:	2

Node Description: Intel Server D50DNP1SBB (Xeon 8592+)

Hardware

Number of nodes:	4
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

Interconnect Description: Mellanox HDR

Hardware

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

Software

: --

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

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: `basepeak = yes`

634.hpgmgfv_s: `Same as 605.lbm_s`

C++ benchmarks:

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

Fortran benchmarks:

619.clvleaf_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: `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.2024-12-11.html`

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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