SPEChpc™ 2021 Small Result

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Intel

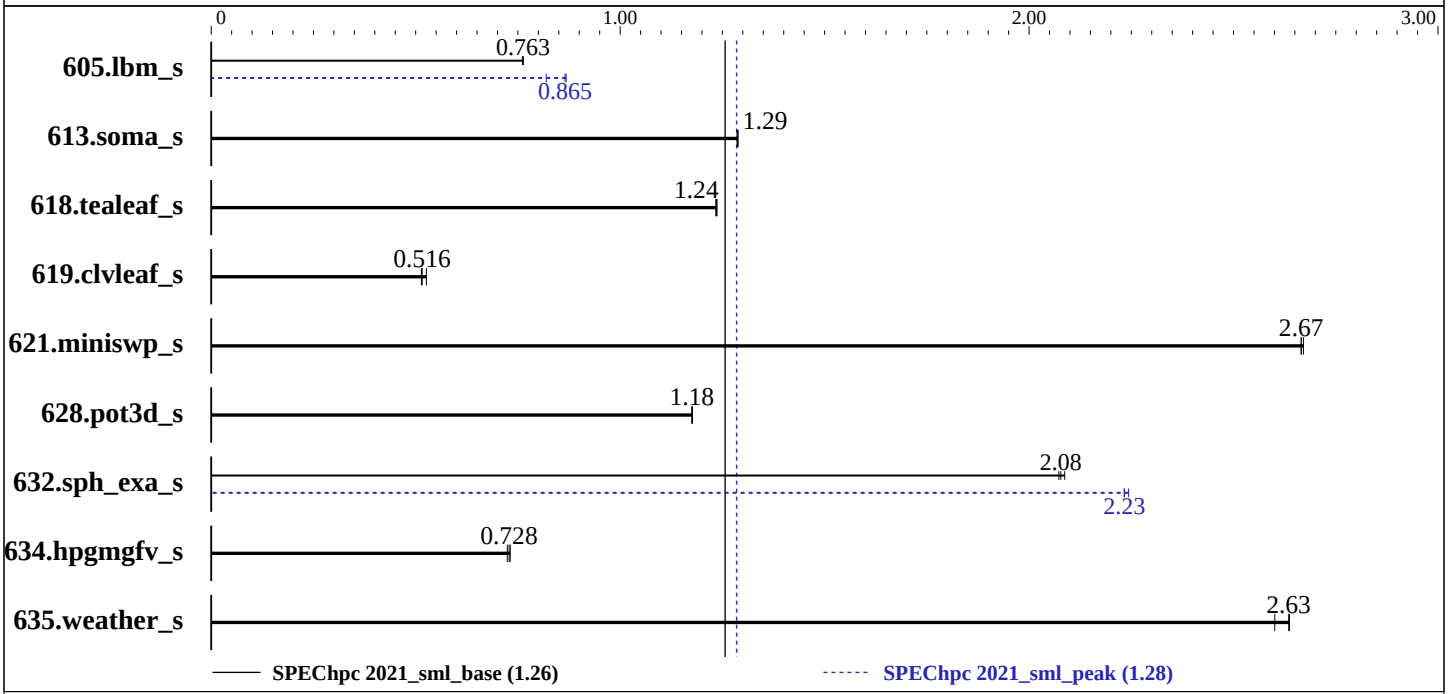
Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021_sml_base = 1.26

SPEChpc 2021_sml_peak = 1.28

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

Test Date: Apr-2024
Hardware Availability: Jan-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	8	14	2032	0.763	2037	0.761	**2032**	**0.763**	OMP	16	7	**1791**	**0.865**	1892	0.819	1786	0.868
613.soma_s	OMP	8	14	1244	1.29	**1243**	**1.29**	1242	1.29	OMP	8	14	1244	1.29	**1243**	**1.29**	1242	1.29
618.tealeaf_s	OMP	8	14	1661	1.23	**1660**	**1.24**	1657	1.24	OMP	8	14	1661	1.23	**1660**	**1.24**	1657	1.24
619.clvleaf_s	OMP	8	14	3210	0.514	**3198**	**0.516**	3136	0.526	OMP	8	14	3210	0.514	**3198**	**0.516**	3136	0.526
621.miniswp_s	OMP	8	14	413	2.67	**413**	**2.67**	412	2.67	OMP	8	14	413	2.67	**413**	**2.67**	412	2.67
628.pot3d_s	OMP	8	14	1425	1.18	1423	1.18	**1425**	**1.18**	OMP	8	14	1425	1.18	1423	1.18	**1425**	**1.18**
632.sph_exa_s	OMP	8	14	1110	2.07	1102	2.09	**1107**	**2.08**	OMP	16	7	**1030**	**2.23**	1025	2.24	1030	2.23
634.hpgmgfv_s	OMP	8	14	1347	0.724	1333	0.731	**1338**	**0.728**	OMP	8	14	1347	0.724	1333	0.731	**1338**	**0.728**
635.weather_s	OMP	8	14	**987**	**2.63**	986	2.64	1000	2.60	OMP	8	14	**987**	**2.63**	986	2.64	1000	2.60
SPEChpc 2021_sml_base = 1.26																		
SPEChpc 2021_sml_peak = 1.28																		

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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Hardware Availability: Jan-2023
Software Availability: Mar-2024

Hardware Summary

Type of System:	Homogenous Cluster
Compute Node:	Intel Server D50DNP1SBB (Xeon Max 9480)
Interconnect:	Mellanox HDR
Compute Nodes Used:	1
Total Chips:	2
Total Cores:	112
Total Threads:	224
Total Memory:	640 GB
Max. Peak Threads:	14

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:	8
Base Threads Run:	14
Peak Parallel Models:	OMP
Minimum Peak Ranks:	8
Maximum Peak Ranks:	16
Max. Peak Threads:	14
Min. Peak Threads:	7

Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

Hardware

Number of nodes:	1
Uses of the node:	Compute
Vendor:	Intel
Model:	Intel Server D50DNP1SBB (Xeon Max 9480)
CPU Name:	Intel Xeon Max 9480
CPU(s) orderable:	1, 2 chips
Chips enabled:	2
Cores enabled:	112
Cores per chip:	56
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:	640 GB (16 x 32GB 2Rx8 PC5-4800B-R + 8 x 16GB HBM2 3200 MT/s)
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

(Continued on next page)

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

Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

Hardware (Continued)

Interconnect Type: Mellanox HDR

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

HBM is configured as HBM cache mode.
```

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
```

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

==============================================================================
 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
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`

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: `basepeak = yes`

618.tealeaf_s: `basepeak = yes`

621.miniswp_s: `basepeak = yes`

634.hpgmgfv_s: `basepeak = yes`

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: `basepeak = yes`

628.pot3d_s: `basepeak = yes`

635.weather_s: `basepeak = yes`

Peak Other Flags

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

The flags files that were used to format this result can be browsed at
`http://www.spec.org/hpc2021/flags/HBM.html`
`http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2024-12-11.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/hpc2021/flags/HBM.xml`
`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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