



SPEChpc™ 2021 Small Result

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Intel

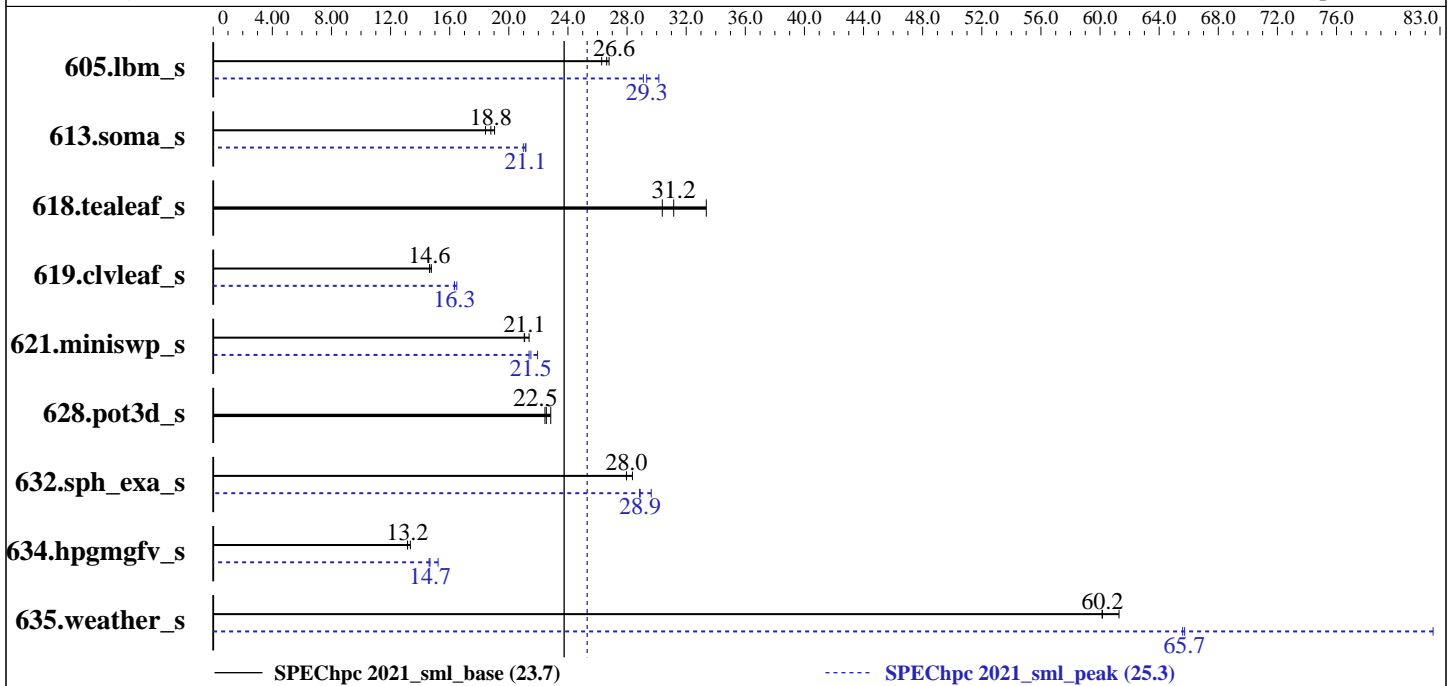
Endeavour: Intel Server D50DNP2MFALACB (Intel Xeon Platinum 8480+)

SPEChpc 2021_sml_base = 23.7

SPEChpc 2021_sml_peak = 25.3

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

Test Date: Jul-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	256	14	59.0	26.3	58.2	26.6	57.9	26.8	OMP	512	7	51.4	30.2	53.3	29.1	52.8	29.3
613.soma_s	OMP	256	14	84.0	19.0	86.9	18.4	85.2	18.8	OMP	128	28	76.3	21.0	75.6	21.2	75.8	21.1
618.tealeaf_s	OMP	256	14	65.8	31.2	61.5	33.4	67.5	30.4	OMP	256	14	65.8	31.2	61.5	33.4	67.5	30.4
619.clvleaf_s	OMP	256	14	112	14.8	113	14.6	113	14.6	OMP	256	14	100	16.5	101	16.3	101	16.3
621.miniswp_s	OMP	256	14	51.5	21.4	52.3	21.0	52.2	21.1	OMP	128	28	50.1	21.9	51.5	21.4	51.2	21.5
628.pot3d_s	OMP	256	14	73.3	22.8	74.6	22.4	74.3	22.5	OMP	256	14	73.3	22.8	74.6	22.4	74.3	22.5
632.sph_exa_s	OMP	256	14	81.1	28.4	82.2	28.0	82.3	28.0	OMP	512	7	77.6	29.6	79.6	28.9	79.8	28.8
634.hpgmgfv_s	OMP	256	14	73.1	13.3	74.2	13.1	74.1	13.2	OMP	512	7	64.1	15.2	66.7	14.6	66.5	14.7
635.weather_s	OMP	256	14	42.4	61.3	43.2	60.2	43.2	60.1	OMP	1792	2	31.5	82.5	39.6	65.7	39.6	65.6

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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 D50DNP2MFALACB (Xeon 8480+)
Interconnect: Mellanox HDR
Compute Nodes Used: 32
Total Chips: 64
Total Cores: 3584
Total Threads: 7168
Total Memory: 16 TB
Max. Peak Threads: 28

Software Summary

Compiler: Intel oneAPI Compiler 2023.1.0
MPI Library: Intel MPI Library 2021.9 for Linux OS
Other MPI Info: None
Other Software: None
Base Parallel Model: OMP
Base Ranks Run: 256
Base Threads Run: 14
Peak Parallel Models: OMP
Minimum Peak Ranks: 128
Maximum Peak Ranks: 1792
Max. Peak Threads: 28
Min. Peak Threads: 2

Node Description: Intel Server D50DNP2MFALACB (Xeon 8480+)

Hardware

Number of nodes: 32
Uses of the node: Compute
Vendor: Intel
Model: Intel Server D50DNP2MFALACB (Xeon 8480+)
CPU Name: Intel Xeon Platinum 8480+
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 3.8 GHz
CPU MHz: 2000
Primary Cache: 32 KB I + 48 KB D on chip per core
Secondary Cache: 2 MB I+D on chip per core
L3 Cache: 105 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B)
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: 5.9-0.5.5
Adapter Firmware: 20.36.1010
Operating System: Rocky Linux 8.7 (Green Obsidian)
4.18.0-372.32.1.el8_6.crt3.x86_64
Local File System: NFS
Shared File System: PANASAS FS
System State: Multi-user
Other Software: None



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Interconnect Description: Mellanox HDR

Hardware

Software

Vendor: Mellanox
Model: Mellanox HDR
Switch Model: Mellanox QM8790-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 2023.1.0 (2023.1.0.20230320)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm
Configuration file:
/global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm/./bin/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)

Intel(R) oneAPI DPC++/C++ Compiler 2023.1.0 (2023.1.0.20230320)
Target: x86_64-unknown-linux-gnu

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Compiler Version Notes (Continued)

Thread model: posix
InstalledDir:

/global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm
Configuration file:
/global/panfs01/admin/opt/intel/oneAPI/2023.1.0.46401/compiler/2023.1.0/linux/bin-llvm/./bin/icx.cfg

=====
CC 634.hpgmgfv_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) 2021.9.0 20230302
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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

ifort (IFORT) 2021.9.0 20230302
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====
FC 619.clvleaf_s(base) 628.pot3d_s(base, peak) 635.weather_s(base, peak)
=====

ifx (IFX) 2023.1.0 20230320
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
mpiicc -cc=icx

C++ benchmarks:
mpicpc -cxx=icpx

Fortran benchmarks:
mpiifort -fc=ifx



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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:

```
-Ispecmpitime -Wno-incompatible-function-pointer-types
```

C++ benchmarks:

```
-Ispecmpitime
```

Fortran benchmarks:

```
619.clvleaf_s: -Ispecmpitime
```

Peak Compiler Invocation

C benchmarks (except as noted below):

```
mpicc -cc=icx
```

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Peak Compiler Invocation (Continued)

634.hpgmgfv_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: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp
-ffast-math -flto -funroll-loops
-qopt-streaming-stores=always

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

618.tealeaf_s: basepeak = yes

621.miniswp_s: Same as 613.soma_s

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

C++ benchmarks:

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

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Peak Optimization Flags (Continued)

C++ benchmarks (continued):

-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: basepeak = yes

635.weather_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

Peak Other Flags

C benchmarks:

-Ispecmpitime -Wno-incompatible-function-pointer-types

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

619.clvleaf_s: -Ispecmpitime

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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