SPEChpc™ 2021 Medium Result

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Intel

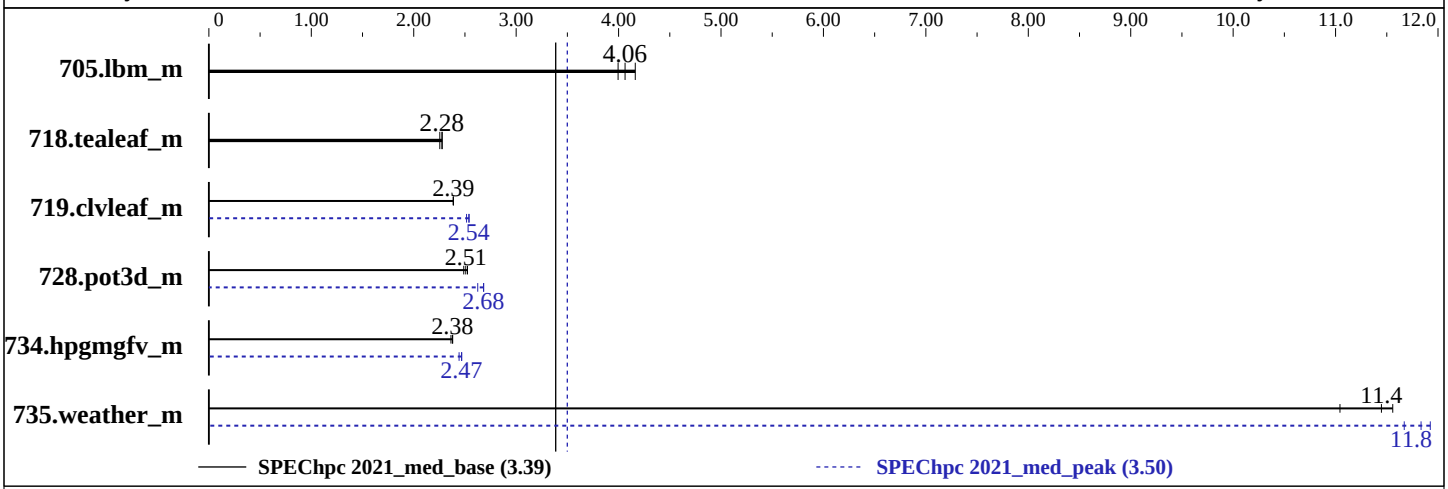
Endeavour: Intel Server D50DNP1SBB (Intel Xeon Platinum 8592+)

SPEChpc 2021_med_base = 3.39

SPEChpc 2021_med_peak = 3.50

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

Test Date: May-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
705.lbm_m	OMP	512	8	294	4.16	307	4.00	**301**	**4.06**	OMP	512	8	294	4.16	307	4.00	**301**	**4.06**
718.tealeaf_m	OMP	512	8	**593**	**2.28**	593	2.28	599	2.25	OMP	512	8	**593**	**2.28**	593	2.28	599	2.25
719.clvleaf_m	OMP	512	8	775	2.39	**775**	**2.39**	776	2.39	OMP	512	8	**729**	**2.54**	735	2.52	728	2.54
728.pot3d_m	OMP	512	8	733	2.52	**738**	**2.51**	743	2.49	OMP	1024	4	705	2.62	**690**	**2.68**	689	2.68
734.hpgmgfv_m	OMP	512	8	420	2.38	423	2.36	**420**	**2.38**	OMP	2048	2	409	2.44	405	2.47	**405**	**2.47**
735.weather_m	OMP	512	8	208	11.6	217	11.0	**210**	**11.4**	OMP	256	16	**203**	**11.8**	201	11.9	206	11.7

SPEChpc 2021_med_base = 3.39

SPEChpc 2021_med_peak = 3.50

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

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Test Sponsor: Intel
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Software Availability: Mar-2024

Hardware Summary

Type of System:	Homogenous Cluster
Compute Node:	Intel Server D50DNP1SBB (Xeon 8592+)
Interconnect:	Mellanox HDR
Compute Nodes Used:	32
Total Chips:	64
Total Cores:	4096
Total Threads:	8192
Total Memory:	16 TB
Max. Peak Threads:	16

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:	512
Base Threads Run:	8
Peak Parallel Models:	OMP
Minimum Peak Ranks:	256
Maximum Peak Ranks:	2048
Max. Peak Threads:	16
Min. Peak Threads:	2

Node Description: Intel Server D50DNP1SBB (Xeon 8592+)

Hardware

Number of nodes:	32
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 PC5-4800B-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

```
==============================================================================
 CC  705.lbm_m(base, peak) 718.tealeaf_m(base, peak) 734.hpgmgfv_m(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  719.clvleaf_m(base, peak) 728.pot3d_m(base, peak) 735.weather_m(base,
      peak)
------------------------------------------------------------------------------
ifx (IFX) 2024.1.0 20240308
```

(Continued on next page)

Compiler Version Notes (Continued)

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

Base Compiler Invocation

C benchmarks:
`mpiicc -cc=icx`

Fortran benchmarks:
`mpiifort -fc=ifx`

Base Portability Flags

705.lbm_m: `-lstdc++ -std=c++14`
718.tealeaf_m: `-lstdc++ -std=c++14`
734.hpgmgfv_m: `-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`

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`

Fortran benchmarks:
`mpiifort -fc=ifx`

Peak Portability Flags

705.lbm_m: `-lstdc++ -std=c++14`
718.tealeaf_m: `-lstdc++ -std=c++14`
734.hpgmgfv_m: `-lstdc++ -std=c++14`

Peak Optimization Flags

C benchmarks:

705.lbm_m: `basepeak = yes`

718.tealeaf_m: `basepeak = yes`

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

Fortran benchmarks:

719.clvleaf_m: `-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`

728.pot3d_m: `-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`

735.weather_m: `Same as 728.pot3d_m`

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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