



SPEChpc™ 2021 Medium Result

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Intel

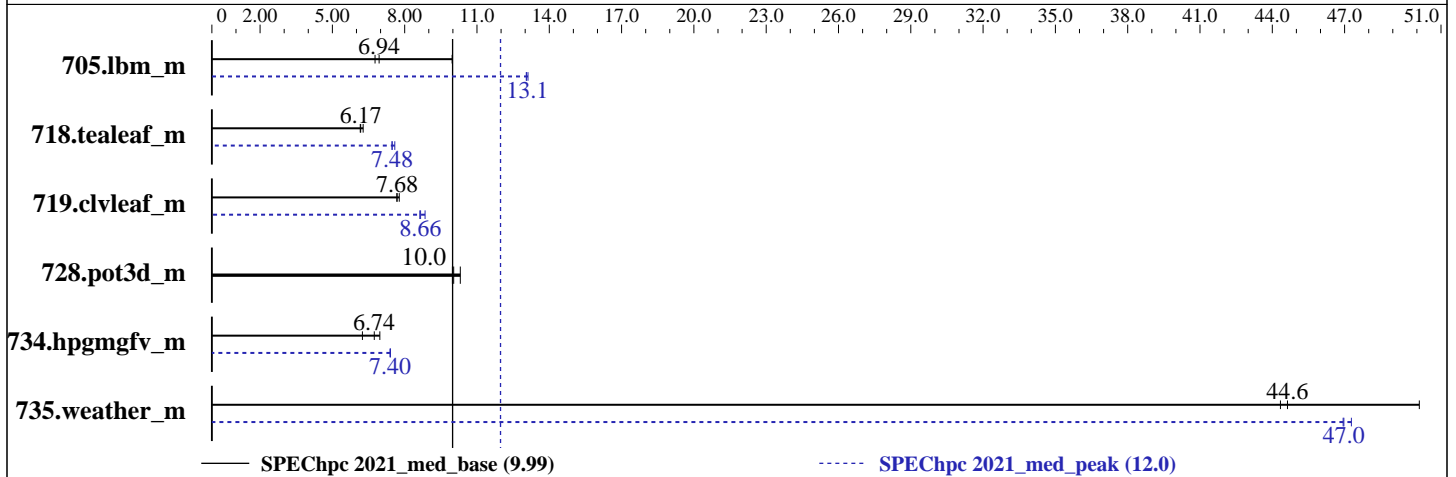
Endeavour: Intel Server D50DNP2MFALACB (Intel Xeon Platinum 8480+)

SPEChpc 2021_med_base = 9.99

SPEChpc 2021_med_peak = 12.0

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		
705.lbm_m	OMP	1024	14	123	9.97	181	6.77	177	6.94	OMP	512	28	93.9	13.0	93.4	13.1	93.8	13.1
718.tealeaf_m	OMP	1024	14	215	6.28	219	6.17	219	6.16	OMP	512	28	178	7.59	181	7.47	180	7.48
719.clvleaf_m	OMP	1024	14	238	7.77	241	7.68	241	7.68	OMP	1024	14	209	8.85	214	8.63	214	8.66
728.pot3d_m	OMP	1024	14	179	10.3	184	10.0	185	9.98	OMP	1024	14	179	10.3	184	10.0	185	9.98
734.hpgmgfv_m	OMP	1024	14	143	6.97	160	6.25	148	6.74	OMP	2048	7	135	7.40	135	7.40	135	7.41
735.weather_m	OMP	1024	14	47.9	50.1	54.1	44.3	53.8	44.6	OMP	14336	1	51.1	46.9	51.1	47.0	50.8	47.3

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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: 128
Total Chips: 256
Total Cores: 14336
Total Threads: 28672
Total Memory: 64 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: 1024
Base Threads Run: 14
Peak Parallel Models: OMP
Minimum Peak Ranks: 512
Maximum Peak Ranks: 14336
Max. Peak Threads: 28
Min. Peak Threads: 1

Node Description: Intel Server D50DNP2MFALACB (Xeon 8480+)

Hardware

Number of nodes: 128
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 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

```
=====
CC 705.lbm_m(base, peak) 718.tealeaf_m(base, peak) 734.hpgmgfv_m(base)
=====
```

```
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/icx.cfg
=====
```

```
=====
CC 734.hpgmgfv_m(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
```

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Compiler Version Notes (Continued)

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 719.clvleaf_m(peak)

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

=====
FC 719.clvleaf_m(base) 728.pot3d_m(base, peak) 735.weather_m(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

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

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Base Optimization Flags (Continued)

C benchmarks (continued):

-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 (except as noted below):

mpiicc -cc=icx

734.hpgmgfv_m: mpiicc

Fortran benchmarks (except as noted below):

mpiifort -fc=ifx

719.clvleaf_m: mpiifort

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

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Peak Optimization Flags (Continued)

705.lbm_m (continued):

```
-ffast-math -flto -funroll-loops  
-qopt-streaming-stores=always
```

718.tealeaf_m: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512

```
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops
```

734.hpgmgfv_m: -O3 -Ofast -xCORE-AVX512 -ansi-alias -qopenmp -ipo

```
-qopt-zmm-usage=high  
-qopt-multiple-gather-scatter-by-shuffles
```

Fortran benchmarks:

719.clvleaf_m: -O3 -Ofast -xCORE-AVX512 -ansi-alias -qopenmp -ipo

```
-qopt-zmm-usage=high  
-qopt-multiple-gather-scatter-by-shuffles  
-nostandard-realloc-lhs -align array64byte
```

728.pot3d_m: basepeak = yes

735.weather_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
```

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.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.

Tested with SPEChpc2021 v1.1.7 on 2023-07-19 08:02:10-0400.
Report generated on 2023-09-06 19:36:45 by hpc2021 PDF formatter v1.0.3.
Originally published on 2023-09-06.