



# SPEChpc™ 2021 Large Result

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## Intel

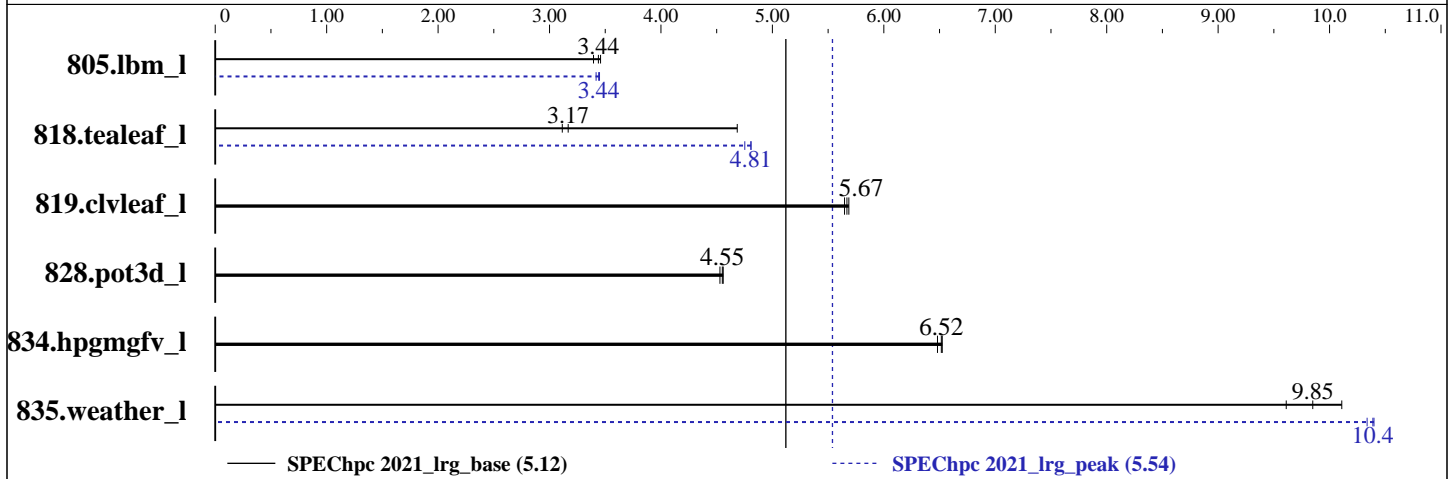
SPEChpc 2021\_lrg\_base = 5.12

Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021\_lrg\_peak = 5.54

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

Test Date: Jun-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
805.lbm_l	OMP	1536	7	<b>792</b>	<b>3.44</b>	788	3.46	803	3.39	OMP	1536	7	<b>792</b>	<b>3.44</b>	790	3.45	797	3.42
818.tealeaf_l	OMP	1536	7	<b>458</b>	<b>3.17</b>	310	4.68	466	3.11	OMP	768	14	305	4.75	302	4.81	<b>302</b>	<b>4.81</b>
819.clvleaf_l	OMP	1536	7	369	5.69	<b>370</b>	<b>5.67</b>	372	5.65	OMP	1536	7	369	5.69	<b>370</b>	<b>5.67</b>	372	5.65
828.pot3d_l	OMP	1536	7	1005	4.53	998	4.56	<b>1000</b>	<b>4.55</b>	OMP	1536	7	1005	4.53	998	4.56	<b>1000</b>	<b>4.55</b>
834.hpgmgfv_l	OMP	1536	7	517	6.48	513	6.52	<b>514</b>	<b>6.52</b>	OMP	1536	7	517	6.48	513	6.52	<b>514</b>	<b>6.52</b>
835.weather_l	OMP	1536	7	339	10.1	<b>348</b>	<b>9.85</b>	356	9.61	OMP	768	14	<b>330</b>	<b>10.4</b>	329	10.4	331	10.3

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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 D50DNP1SBB (Xeon Max 9480)  
Interconnect: Mellanox HDR  
Compute Nodes Used: 96  
Total Chips: 192  
Total Cores: 10752  
Total Threads: 21504  
Total Memory: 60 TB  
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: 1536  
Base Threads Run: 7  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 768  
Maximum Peak Ranks: 1536  
Max. Peak Threads: 14  
Min. Peak Threads: 7

### Node Description: Intel Server D50DNP1SBB (Xeon Max 9480)

#### Hardware

Number of nodes: 96  
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

#### 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

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### 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

```
=====
CC 805.lbm_1(base, peak) 818.tealeaf_1(base, peak) 834.hpgmgfv_1(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:
```

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### Compiler Version Notes (Continued)

/global/panfs05/admin5/opt/intel/oneAPI/2024.1.0/compiler/2024.1/bin/compiler/./icx.cfg

=====  
FC 819.clvleaf\_l(base, peak) 828.pot3d\_l(base, peak) 835.weather\_l(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

Fortran benchmarks:  
mpiifort -fc=ifx

### Base Portability Flags

805.lbm\_l: -lstdc++ -std=c++14  
818.tealeaf\_l: -lstdc++ -std=c++14  
834.hpgmgfv\_l: -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



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## Base Other Flags

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

## Peak Compiler Invocation

C benchmarks:  
mpicc -cc=icx  
  
Fortran benchmarks:  
mpiifort -fc=ifx

## Peak Portability Flags

805.lbm\_l: -lstdc++ -std=c++14  
818.tealeaf\_l: -lstdc++ -std=c++14  
834.hpgmgfv\_l: -lstdc++ -std=c++14

## Peak Optimization Flags

C benchmarks:  
  
805.lbm\_l: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops  
-qopt-streaming-stores=always  
  
818.tealeaf\_l: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp  
-ffast-math -flto -funroll-loops  
  
834.hpgmgfv\_l: basepeak = yes  
  
Fortran benchmarks:  
  
819.cvlleaf\_l: basepeak = yes  
  
828.pot3d\_l: basepeak = yes  
  
835.weather\_l: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512  
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp

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## Peak Optimization Flags (Continued)

835.weather\_l (continued):  
-ffast-math -flto -funroll-loops -nostandard-realloc-lhs  
-align array64byte

## 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](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](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](mailto:info@spec.org).

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