# SPEChpc™ 2021 Medium Result

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## Intel

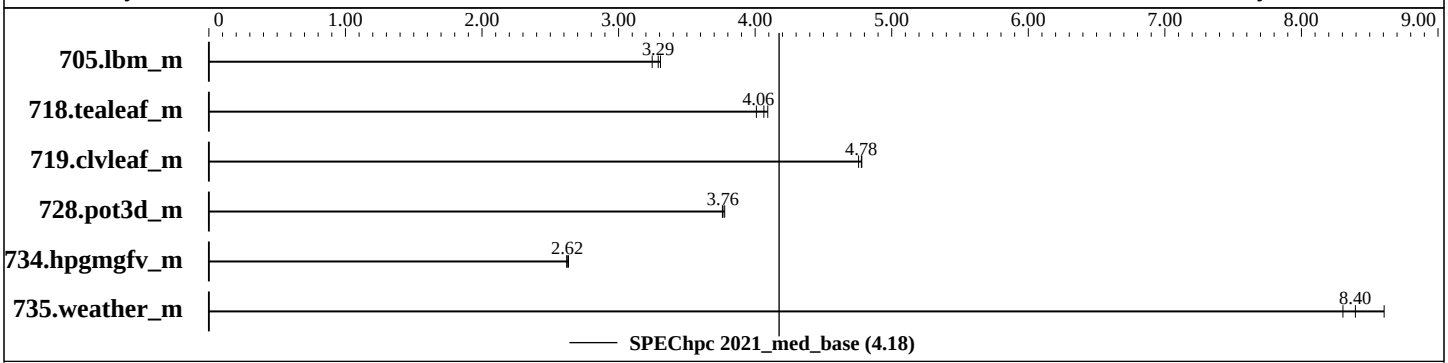
Endeavour: Intel Server D50DNP1SBB (Xeon Max 9480)

SPEChpc 2021_med_base = 4.18

SPEChpc 2021_med_peak = Not Run

**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 |
| 705.lbm_m | OMP | 512 | 7 | 377 | 3.25 | 370 | 3.31 | **372** | **3.29** | | | | | | | | | |
| 718.tealeaf_m | OMP | 512 | 7 | 330 | 4.09 | 337 | 4.01 | **332** | **4.06** | | | | | | | | | |
| 719.clvleaf_m | OMP | 512 | 7 | **387** | **4.78** | 389 | 4.76 | 387 | 4.78 | | | | | | | | | |
| 728.pot3d_m | OMP | 512 | 7 | 492 | 3.76 | 490 | 3.78 | **491** | **3.76** | | | | | | | | | |
| 734.hpgmgfv_m | OMP | 512 | 7 | **381** | **2.62** | 380 | 2.63 | 382 | 2.62 | | | | | | | | | |
| 735.weather_m | OMP | 512 | 7 | **286** | **8.40** | 289 | 8.30 | 279 | 8.61 | | | | | | | | | |

**SPEChpc 2021_med_base = 4.18**

**SPEChpc 2021_med_peak = Not Run**

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: | 32 |
| Total Chips: | 64 |
| Total Cores: | 3584 |
| Total Threads: | 7168 |
| Total Memory: | 20 TB |
| Max. Peak Threads: | -- |

### 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: | 7 |
| Peak Parallel Models: | Not Run |
| Minimum Peak Ranks: | -- |
| Maximum Peak Ranks: | -- |
| Max. Peak Threads: | -- |
| Min. Peak Threads: | -- |

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

#### Hardware

| | |
|---|---|
| Number of nodes: | 32 |
| 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)<br>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

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

**(Continued on next page)**

## Compiler Version Notes (Continued)

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

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

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`

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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