SPEChpc™ 2021 Large Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

Intel

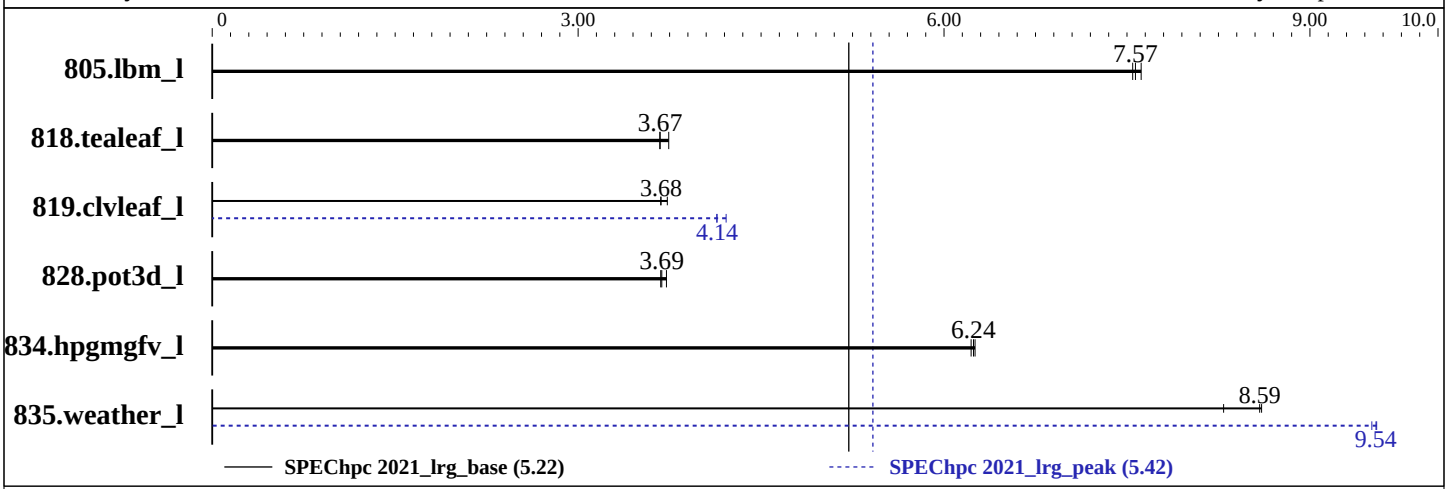
Endeavour: Intel Server D50DNP2MFALACB (Intel Xeon Platinum 8480+)

SPEChpc 2021_lrg_base = 5.22

SPEChpc 2021_lrg_peak = 5.42

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
805.lbm_l	OMP	2048	7	**360**	**7.57**	358	7.62	361	7.55	OMP	2048	7	**360**	**7.57**	358	7.62	361	7.55
818.tealeaf_l	OMP	2048	7	387	3.74	**395**	**3.67**	395	3.67	OMP	2048	7	387	3.74	**395**	**3.67**	395	3.67
819.clvleaf_l	OMP	2048	7	563	3.73	**571**	**3.68**	571	3.68	OMP	2048	7	498	4.21	508	4.14	**507**	**4.14**
828.pot3d_l	OMP	2048	7	1222	3.72	**1234**	**3.69**	1237	3.68	OMP	2048	7	1222	3.72	**1234**	**3.69**	1237	3.68
834.hpgmgfv_l	OMP	2048	7	536	6.25	**537**	**6.24**	538	6.22	OMP	2048	7	536	6.25	**537**	**6.24**	538	6.22
835.weather_l	OMP	2048	7	**399**	**8.59**	398	8.60	413	8.29	OMP	2048	7	359	9.55	**359**	**9.54**	360	9.51

SPEChpc 2021_lrg_base = 5.22

SPEChpc 2021_lrg_peak = 5.42

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

SPEChpc™ 2021 Large Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

Intel

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

SPEChpc 2021_lrg_base = 5.22

SPEChpc 2021_lrg_peak = 5.42

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

Test Date: Jul-2023
Hardware Availability: Jan-2023
Software Availability: Apr-2023

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:	7

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:	2048
Base Threads Run:	7
Peak Parallel Models:	OMP
Minimum Peak Ranks:	2048
Maximum Peak Ranks:	2048
Max. Peak Threads:	7
Min. Peak Threads:	7

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

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  805.lbm_l(base, peak) 818.tealeaf_l(base, peak) 834.hpgmgfv_l(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/icx.cfg
------------------------------------------------------------------------------

==============================================================================
 FC  819.clvleaf_l(peak)
------------------------------------------------------------------------------
ifort (IFORT) 2021.9.0 20230302
Copyright (C) 1985-2023 Intel Corporation.  All rights reserved.
```

(Continued on next page)

Compiler Version Notes (Continued)

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

==============================================================================
 FC  819.clvleaf_l(base) 828.pot3d_l(base, peak) 835.weather_l(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

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`

Base Other Flags

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

Peak Compiler Invocation

C benchmarks:
`mpiicc -cc=icx`

Fortran benchmarks (except as noted below):
`mpiifort -fc=ifx`

819.clvleaf_l: `mpiifort`

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: `basepeak = yes`

818.tealeaf_l: `basepeak = yes`

834.hpgmgfv_l: `basepeak = yes`

Fortran benchmarks:

819.clvleaf_l: `-O3 -Ofast -xCORE-AVX512 -ansi-alias -qopenmp -ipo -qopt-zmm-usage=high -qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs -align array64byte`

828.pot3d_l: `basepeak = yes`

835.weather_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 -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`

SPEChpc is a trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 10:08:18-0400.
Report generated on 2023-09-06 19:36:54 by hpc2021 PS formatter v1.0.3.
Originally published on 2023-09-06.