



SPEChpc™ 2021 Tiny Result

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Intel

Hatch: Intel Server D50DNP1SB (Xeon Platinum 8480+)

SPEChpc 2021_tny_base = 21.9

SPEChpc 2021_tny_peak = 24.3

hpc2021 License: 13

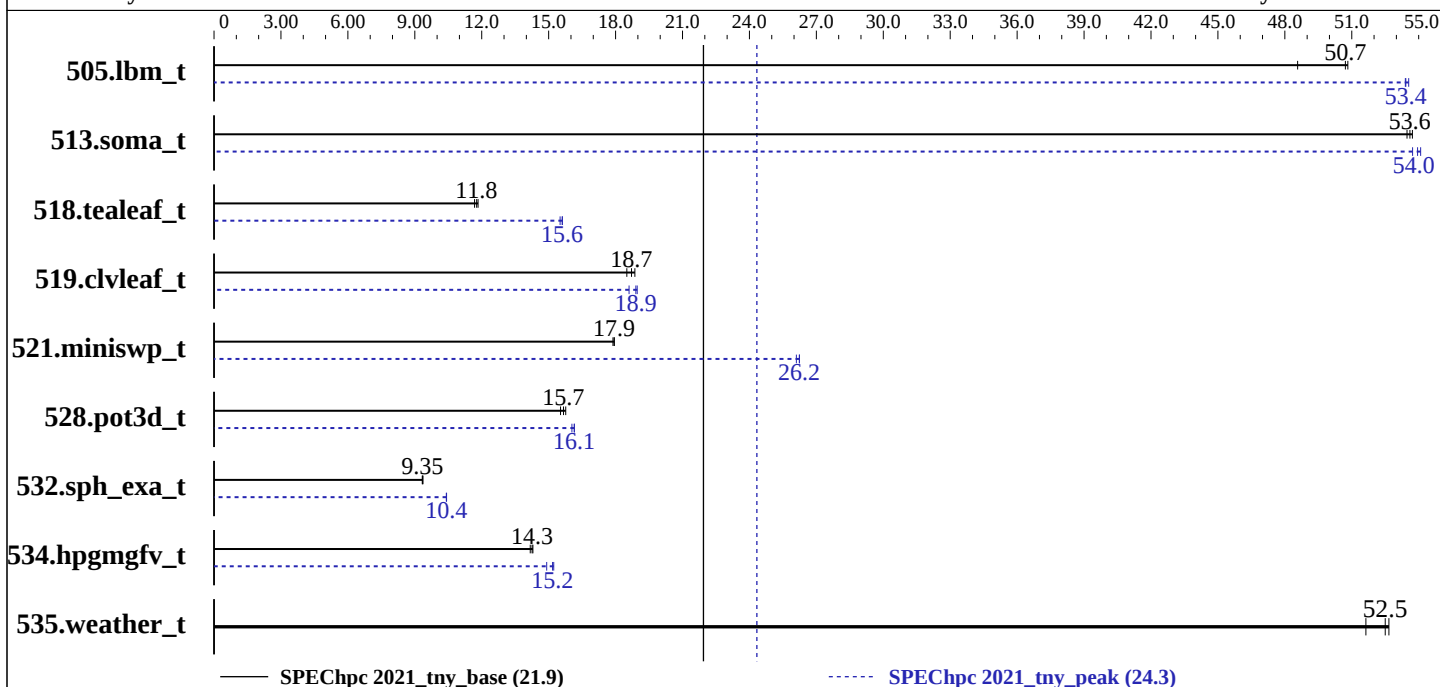
Test Sponsor: Intel

Tested by: Intel

Test Date: Apr-2025

Hardware Availability: Jan-2023

Software Availability: Jun-2025



Results Table

Benchmark	Base								Peak							
	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio
505.lbm_t	TGT	2	56	46.3	48.6	44.3	50.8	44.4	50.7	TGT	2	56	42.0	53.6	42.1	53.4
513.soma_t	TGT	2	56	68.9	53.7	69.0	53.6	69.2	53.5	TGT	2	56	68.6	54.0	68.4	54.1
518.tealeaf_t	TGT	2	56	141	11.7	139	11.8	140	11.8	TGT	2	56	106	15.6	106	15.6
519.clvleaf_t	TGT	2	56	87.5	18.9	89.2	18.5	88.2	18.7	TGT	2	56	88.7	18.6	87.0	19.0
521.miniswp_t	TGT	2	56	89.2	17.9	89.2	17.9	89.5	17.9	TGT	2	56	61.3	26.1	61.0	26.2
528.pot3d_t	TGT	2	56	137	15.5	135	15.8	136	15.7	TGT	2	56	132	16.2	132	16.1
532.sph_exa_t	TGT	2	56	209	9.35	208	9.37	209	9.33	TGT	2	56	187	10.4	187	10.4
534.hpgmgfv_t	TGT	2	56	82.2	14.3	82.9	14.2	82.4	14.3	TGT	2	56	77.4	15.2	78.8	14.9
535.weather_t	TGT	2	56	61.2	52.7	62.5	51.6	61.4	52.5	TGT	2	56	61.2	52.7	62.5	51.6

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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 D50DNP1SB (Xeon Platinum 8480+)
Interconnect: Mellanox HDR
Compute Nodes Used: 1
Total Chips: 2
Total Cores: 112
Total Threads: 224
Total Memory: 1 TB
Max. Peak Threads: 56

Software Summary

Compiler: Intel oneAPI Compiler 2025.2.0
MPI Library: Intel MPI Library 2021.15 for Linux OS
Other MPI Info: None
Other Software: None
Base Parallel Model: TGT
Base Ranks Run: 2
Base Threads Run: 56
Peak Parallel Models: TGT
Minimum Peak Ranks: 2
Maximum Peak Ranks: 2
Max. Peak Threads: 56
Min. Peak Threads: 56

Node Description: Intel Server D50DNP1SB (Xeon Platinum 8480+)

Hardware

Number of nodes: 1
Uses of the node: Compute
Vendor: Intel
Model: Intel Server D50DNP1SB (2 x Intel Xeon Platinum 8480+, 2.0GHz)
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: 1 TB (16x64 GB DDR5 2Rx4 PC5-4800B-R)
Disk Subsystem: 1 x 1 1TB NVMe M.2 INTEL SSDPELKH010T8
Other Hardware: None
Accel Count: 1
Accel Model: Intel Data Center GPU Max 1550
Accel Vendor: Intel
Accel Type: GPU
Accel Connection: PCIe Gen5 x16
Accel ECC enabled: yes
Accel Description: Intel Data Center GPU Max 1550
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: 25.05.32567
Adapter: Mellanox ConnectX-6 HDR
Adapter Driver: --
Adapter Firmware: 20.38.1900
Operating System: SUSE Linux Enterprise Server 15 SP6
6.4.0-150600.23.42-default
Local File System: lustre
Shared File System: LUSTRE FS
System State: Run level 5
Other Software: None

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Node Description: Intel Server D50DNP1SB (Xeon Platinum 8480+)

Hardware (Continued)

Interconnect Type: Mellanox HDR

Interconnect Description: Mellanox HDR

Hardware

Vendor: Mellanox
Model: Mellanox HDR
Switch Model: Mellanox Technologies MT28908 Family InfiniBand Switch
Number of Switches: 12
Number of Ports: 40
Data Rate: 200 Gbit/s
Firmware: 20.38.1900
Topology: Fat-tree
Primary Use: MPI Traffic, LustreFS traffic

Software

: --

Submit Notes

The config file option 'submit' was used.

General Notes

Environment variables set by runhpc before the start of the run:

LIBOMPTARGET_LEVEL_ZERO_USE_IMMEDIATE_COMMAND_LIST = "all"

KMP_AFFINITY=compact,1,granularity=thread

I_MPI_FABRICS=shm:ofi

I_MPI_OFFLOAD=1

I_MPI_OFFLOAD_CELL=tile

I_MPI_OFFLOAD_TOPOLIB=level_zero

I_MPI_OFFLOAD_CELL_LIST=0,1,2,3,4,5,6,7

For the following tests src.alt was used in PEAK:

513 518 519 521 528 532 534

Platform Notes

Device Vendor	Intel
Device Version	OpenCL 3.0 NEO
Driver Version	25.05.32567
Base clock	900MHz
Max clock frequency	1600MHz
Tiles	2
Slices per Tile	1

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Platform Notes (Continued)

Max compute units per Tile	512
Sub-slices per slice	64
EUs per sub-slice	8
Threads per EU	8
Max work item dimensions	3
Max work item sizes	1024x1024x1024
Max work group size	1024
Preferred work group size multiple	32
Max sub-groups per work group	64
Sub-group sizes	16, 32
L1 Cache per EU	65536
L2 cache size	427819008
Global memory size	137438953472
Address bits	64, Little-Endian

Compiler Version Notes

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CXXC 532.sph_exa_t(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler 2025.2.0 (2025.x.0.20250326)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/lfs/lfs17/mknyazev/intel/nightly/20250326/compiler/latest/bin/compiler
Configuration file:
/lfs/lfs17/mknyazev/intel/nightly/20250326/compiler/latest/bin/compiler/./icpx.cfg

=====

CC 505.lbm_t(base, peak) 513.soma_t(base, peak) 518.tealeaf_t(base, peak)
521.miniswp_t(base, peak) 534.hpgmgfv_t(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler 2025.2.0 (2025.x.0.20250326)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/lfs/lfs17/mknyazev/intel/nightly/20250326/compiler/latest/bin/compiler
Configuration file:
/lfs/lfs17/mknyazev/intel/nightly/20250326/compiler/latest/bin/compiler/./icx.cfg

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FC 519.clvleaf_t(base, peak) 535.weather_t(base, peak)

ifx (IFX) dev.x.0 Mainline 20250326

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Compiler Version Notes (Continued)

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FC 528.pot3d_t(base, peak)

ifx: command line warning #10157: ignoring option '-W'; argument is of wrong type

ifx (IFX) dev.x.0 Mainline 20250326

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Base Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpiicpc -cxx=icpx

Fortran benchmarks:

mpiifort -fc=ifx

Base Portability Flags

505.lbm_t: -DUSE_MPI

513.soma_t: -DUSE_MPI -DSPEC_NO_VAR_ARRAY_REDUCE

518.tealeaf_t: -DUSE_MPI

519.clvleaf_t: -DUSE_MPI

528.pot3d_t: -DUSE_MPI

535.weather_t: -DUSE_MPI

Base Optimization Flags

C benchmarks:

-O3 -xCORE-AVX512 -flto -mprefer-vector-width=512 -ffast-math

-fiopenmp -fopenmp-targets=spir64_gen

-ftarget-register-alloc-mode=pvc:auto

-Xopenmp-target-backend '-device pvc -revision_id 0x2f' -DSPEC_COLLAPSE

-DSPEC_ACCEL_AWARE_MPI -fopenmp-optimistic-collapse

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Base Optimization Flags (Continued)

C++ benchmarks:

-O3 -xCORE-AVX512 -flto -mprefer-vector-width=512 -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f' -DSPEC_COLLAPSE
-DSPEC_ACCEL_AWARE_MPI

Fortran benchmarks:

-DSPEC_COLLAPSE -O3 -xCORE-AVX512 -DSPEC_ACCEL_AWARE_MPI -flto
-mprefer-vector-width=512 -ffast-math -fiopenmp
-fopenmp-targets=spir64_gen -ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-fopenmp-target-loopopt

Base Other Flags

Fortran benchmarks:

528.pot3d_t: -Wno-incompatible-function-pointer-types

Peak Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpiicpc -cxx=icpx

Fortran benchmarks:

mpiifort -fc=ifx

Peak Portability Flags

505.lbm_t: -DUSE_MPI
513.soma_t: -DUSE_MPI -DSPEC_NO_VAR_ARRAY_REDUCE
518.tealeaf_t: -DUSE_MPI
519.clvleaf_t: -DUSE_MPI
528.pot3d_t: -DUSE_MPI
535.weather_t: -DUSE_MPI



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Peak Optimization Flags

C benchmarks:

505.lbm_t: -O3 -xCORE-AVX512 -flto -mprefer-vector-width=512
-ffast-math -fopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:large
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-DSPEC_COLLAPSE -DSPEC_ACCEL_AWARE_MPI
-fopenmp-optimistic-collapse

513.soma_t: -O3 -xCORE-AVX512 -flto -mprefer-vector-width=512
-ffast-math -fopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-DSPEC_COLLAPSE -DSPEC_ACCEL_AWARE_MPI
-fopenmp-optimistic-collapse

518.tealeaf_t: -O3 -xCORE-AVX512 -flto -mprefer-vector-width=512
-ffast-math -fopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-DSPEC_COLLAPSE -DSPEC_ACCEL_AWARE_MPI
-fopenmp-target-loop-stride=global-size
-fopenmp-optimistic-collapse

521.miniswp_t: Same as 513.soma_t

534.hpgmgfv_t: Same as 513.soma_t

C++ benchmarks:

-O3 -xCORE-AVX512 -flto -mprefer-vector-width=512 -ffast-math
-fopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f' -DSPEC_COLLAPSE
-DSPEC_ACCEL_AWARE_MPI

Fortran benchmarks:

519.clvleaf_t: -DSPEC_COLLAPSE -O3 -xCORE-AVX512 -DSPEC_ACCEL_AWARE_MPI
-flto -mprefer-vector-width=512 -ffast-math -fopenmp
-fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-fopenmp-target-loopopt

528.pot3d_t: Same as 519.clvleaf_t

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Peak Optimization Flags (Continued)

535.weather_t: basepeak = yes

Peak Other Flags

Fortran benchmarks:

528.pot3d_t: -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.2025-05-22.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2025-05-22.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 v1.1.9 on 2025-04-21 20:44:03-0400.
Report generated on 2025-05-22 11:01:10 by hpc2021 PDF formatter v1.0.3.
Originally published on 2025-05-21.