



SPEChpc™ 2021 Tiny Result

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Intel

Hatch: Intel Server D50DNP1SB (Xeon Platinum 8480+)

SPEChpc 2021_tny_base = 86.8

SPEChpc 2021_tny_peak = 95.2

hpc2021 License: 13

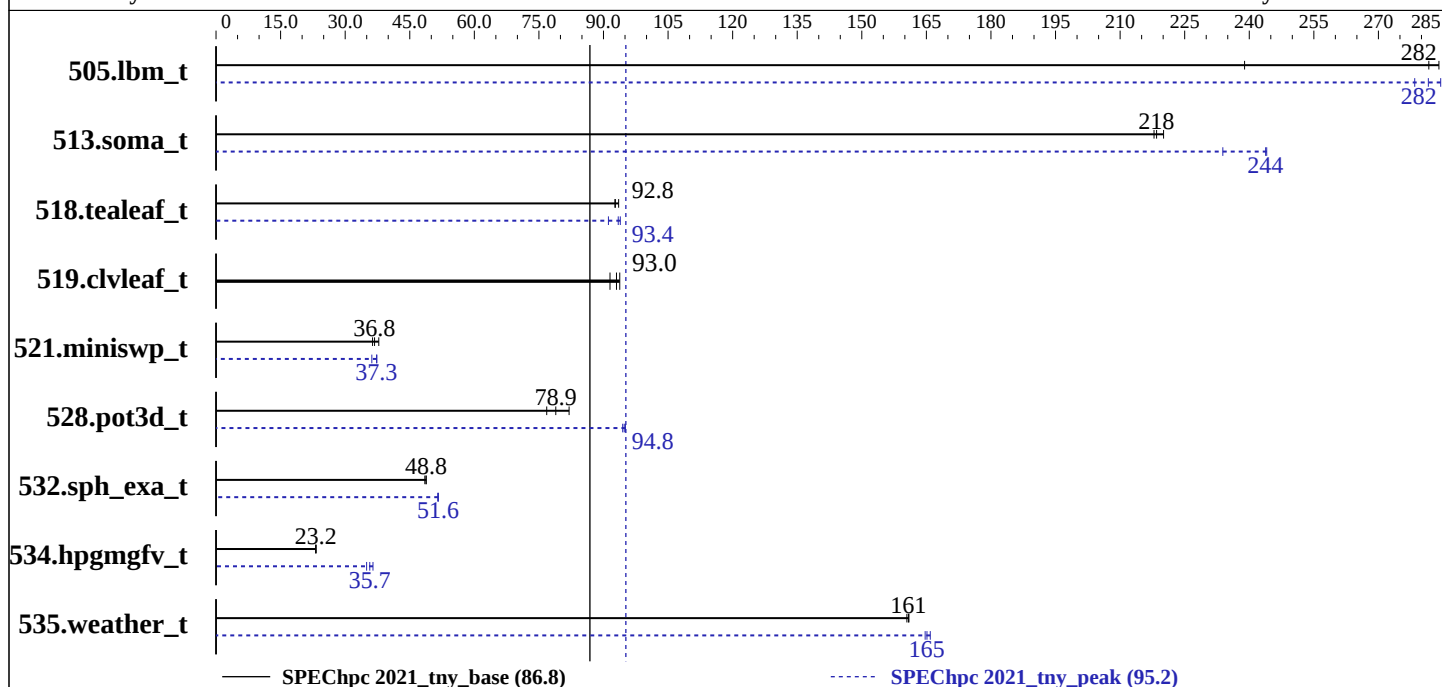
Test Sponsor: Intel

Tested by: Intel

Test Date: Apr-2025

Hardware Availability: Jan-2023

Software Availability: Mar-2025



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	Seconds	Ratio
505.lbm_t	TGT	16	1	9.42	239	<u>7.99</u>	<u>282</u>	7.92	284	TGT	16	1	7.91	284	8.08	278	<u>7.99</u>	<u>282</u>		
513.soma_t	TGT	16	1	17.0	218	<u>16.9</u>	<u>218</u>	16.8	220	TGT	16	1	15.8	234	<u>15.2</u>	<u>244</u>	15.2	244		
518.tealeaf_t	TGT	16	1	<u>17.8</u>	<u>92.8</u>	17.8	92.7	17.6	93.5	TGT	16	1	17.6	93.9	<u>17.7</u>	<u>93.4</u>	18.1	91.1		
519.clvleaf_t	TGT	16	1	<u>17.7</u>	<u>93.0</u>	17.6	93.8	18.0	91.5	TGT	16	1	<u>17.7</u>	<u>93.0</u>	17.6	93.8	18.0	91.5		
521.miniswp_t	TGT	16	1	44.0	36.4	<u>43.5</u>	<u>36.8</u>	42.3	37.8	TGT	16	1	44.2	36.2	<u>42.9</u>	<u>37.3</u>	42.8	37.3		
528.pot3d_t	TGT	16	1	25.9	82.0	27.7	76.8	<u>26.9</u>	<u>78.9</u>	TGT	16	1	22.5	94.5	<u>22.4</u>	<u>94.8</u>	22.3	95.1		
532.sph_exa_t	TGT	16	1	39.9	48.8	40.2	48.5	<u>40.0</u>	<u>48.8</u>	TGT	16	1	37.8	51.6	37.8	51.5	<u>37.8</u>	<u>51.6</u>		
534.hpgmgfv_t	TGT	16	1	50.6	23.2	50.8	23.1	<u>50.6</u>	<u>23.2</u>	TGT	16	1	32.2	36.5	33.6	35.0	<u>32.9</u>	<u>35.7</u>		
535.weather_t	TGT	16	1	20.1	160	<u>20.1</u>	<u>161</u>	20.0	161	TGT	16	1	19.4	166	<u>19.5</u>	<u>165</u>	19.6	165		

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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: 2
Total Chips: 4
Total Cores: 224
Total Threads: 448
Total Memory: 2 TB
Max. Peak Threads: 1

Software Summary

Compiler: Intel oneAPI Compiler 2025.1.0
MPI Library: Intel MPI Library 2021.15 for Linux OS
Other MPI Info: None
Other Software: None
Base Parallel Model: TGT
Base Ranks Run: 16
Base Threads Run: 1
Peak Parallel Models: TGT
Minimum Peak Ranks: 16
Maximum Peak Ranks: 16
Max. Peak Threads: 1
Min. Peak Threads: 1

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

Hardware

Number of nodes: 2
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: 4
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

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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"
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:
505 513 518 521 528 532 534 535

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
Max compute units per Tile	512

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Platform Notes (Continued)

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

=====

CXXC 532.sph_exa_t(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler 2025.1.0 (2025.1.0.20250317)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/lfs/lfs17/mknyazev/intel/2025.1/oneapi/compiler/2025.1/bin/compiler
Configuration file:
/lfs/lfs17/mknyazev/intel/2025.1/oneapi/compiler/2025.1/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 2025.1.0 (2025.1.0.20250317)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
/lfs/lfs17/mknyazev/intel/2025.1/oneapi/compiler/2025.1/bin/compiler
Configuration file:
/lfs/lfs17/mknyazev/intel/2025.1/oneapi/compiler/2025.1/bin/compiler/./icx.cfg

=====

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

ifx (IFX) 2025.1.0 20250317
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Compiler Version Notes (Continued)

FC 528.pot3d_t(peak)

ifx: command line warning #10034: Unrecognized keyword '-optimistic-collapse' for option '-fopenmp'

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

ifx (IFX) 2025.1.0 20250317

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FC 528.pot3d_t(base)

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

ifx (IFX) 2025.1.0 20250317

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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



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Base Optimization Flags

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  
-fopenmp-optimistic-collapse
```

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
```

Fortran benchmarks:

```
-DSPEC_COLLAPSE -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_ACCEL_AWARE_MPI -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
```



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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

Peak Optimization Flags

C benchmarks:

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

513.soma_t: -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

518.tealeaf_t: -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 -fopenmp-optimistic-collapse

521.miniswp_t: -O3 -xCORE-AVX512 -flto -mprefer-vector-width=512
-ffast-math -fiopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:small
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-DSPEC_COLLAPSE -fopenmp-optimistic-collapse
-fopenmp-targets=spir64_gen="-fp-model=fast"
-fopenmp-target-loopopt

534.hpgmgfv_t: Same as 513.soma_t

C++ benchmarks:

-O3 -xCORE-AVX512 -flto -mprefer-vector-width=512 -ffast-math
-fiopenmp -fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:auto

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Peak Optimization Flags (Continued)

C++ benchmarks (continued):

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

Fortran benchmarks:

519.clvleaf_t: basepeak = yes

528.pot3d_t: -DSPEC_COLLAPSE -O3 -xCORE-AVX512 -flto
-mprefer-vector-width=512 -ffast-math -fiopenmp
-fopenmp-targets=spir64_gen
-ftarget-register-alloc-mode=pvc:large
-Xopenmp-target-backend '-device pvc -revision_id 0x2f'
-fopenmp-optimistic-collapse -DSPEC_ACCEL_AWARE_MPI
-fopenmp-target-loopopt

535.weather_t: -DSPEC_COLLAPSE -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_ACCEL_AWARE_MPI -fopenmp-target-loopopt

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.2025-05-22.00.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2025-05-22.00.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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