



SPEChpc™ 2021 Tiny Result

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Intel

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

SPEChpc 2021_tny_base = 135

SPEChpc 2021_tny_peak = 142

hpc2021 License: 13

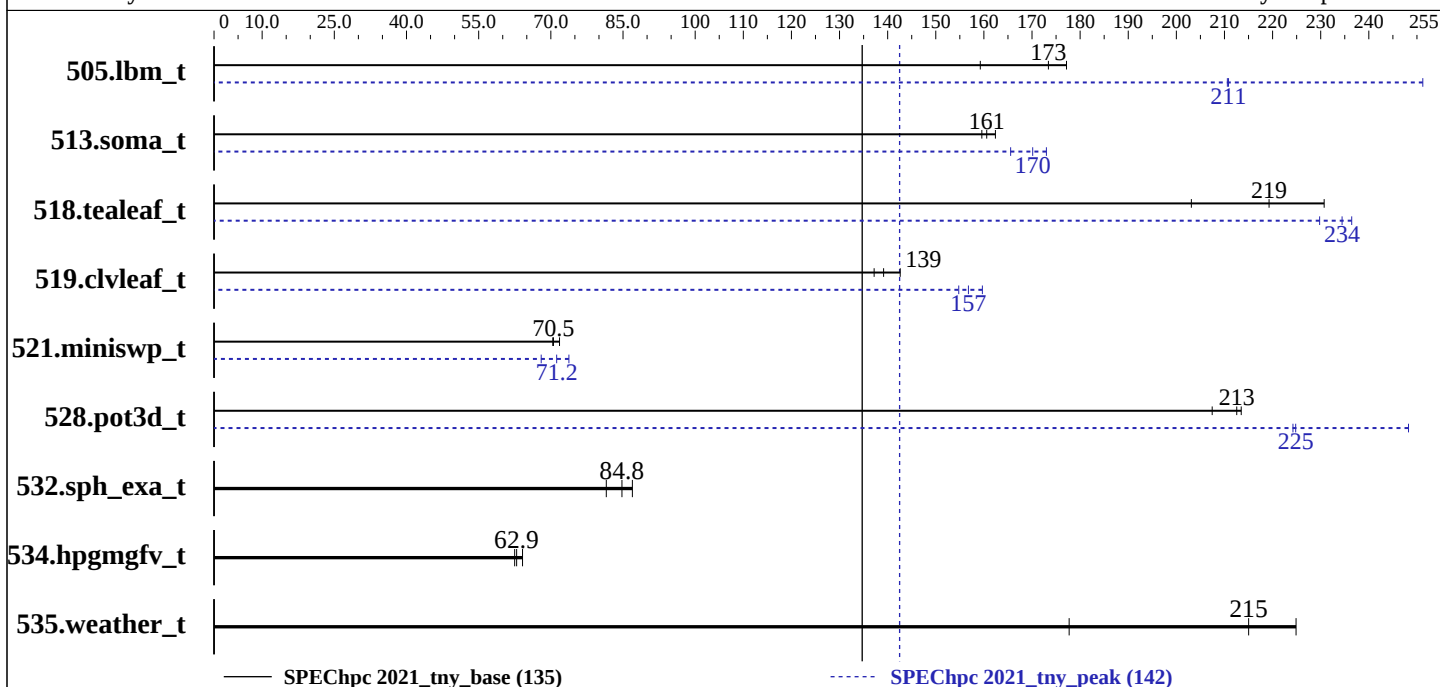
Test Sponsor: Intel

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
505.lbm_t	OMP	128	28	14.1	159	<u>13.0</u>	<u>173</u>	12.7	177	OMP	448	8	8.96	251	10.7	211
513.soma_t	OMP	128	28	22.8	162	<u>23.0</u>	<u>161</u>	23.2	160	OMP	64	56	21.4	173	<u>21.7</u>	<u>170</u>
518.tealeaf_t	OMP	128	28	7.15	231	8.12	203	<u>7.53</u>	<u>219</u>	OMP	64	56	7.18	230	6.98	236
519.clvleaf_t	OMP	128	28	11.6	143	12.0	137	<u>11.9</u>	<u>139</u>	OMP	64	56	10.3	160	<u>10.5</u>	<u>157</u>
521.miniswp_t	OMP	128	28	22.3	71.8	<u>22.7</u>	<u>70.5</u>	22.7	70.4	OMP	64	56	21.7	73.8	23.5	68.0
528.pot3d_t	OMP	128	28	<u>10.0</u>	<u>213</u>	10.2	207	9.95	213	OMP	256	14	8.56	248	<u>9.45</u>	<u>225</u>
532.sph_exa_t	OMP	128	28	22.4	86.9	23.9	81.5	<u>23.0</u>	<u>84.8</u>	OMP	128	28	22.4	86.9	23.9	81.5
534.hpgmgfv_t	OMP	128	28	18.3	64.1	<u>18.7</u>	<u>62.9</u>	18.8	62.5	OMP	128	28	18.3	64.1	<u>18.7</u>	<u>62.9</u>
535.weather_t	OMP	128	28	14.3	225	18.1	178	<u>15.0</u>	<u>215</u>	OMP	128	28	14.3	225	18.1	178

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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 D50DNP2MFALACB (Xeon 8480+)
Interconnect: Mellanox HDR
Compute Nodes Used: 32
Total Chips: 64
Total Cores: 3584
Total Threads: 7168
Total Memory: 16 TB
Total Accelerators: 0
Max. Peak Threads: 56

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: 128
Base Threads Run: 28
Peak Parallel Models: OMP
Minimum Peak Ranks: 64
Maximum Peak Ranks: 448
Max. Peak Threads: 56
Min. Peak Threads: 8

Node Description: Intel Server D50DNP2MFALACB (Xeon 8480+)

Hardware

Number of nodes: 32
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



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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

=====

```
CXXC 532.sph_exa_t(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/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 2023.1.0 (2023.1.0.20230320)
Target: x86_64-unknown-linux-gnu
```

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Compiler Version Notes (Continued)

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 519.clvleaf_t(peak)

ifort (IFORT) 2021.9.0 20230302

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=====

FC 519.clvleaf_t(base) 528.pot3d_t(base, peak) 535.weather_t(base, peak)

ifx (IFX) 2023.1.0 20230320

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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: -lstdc++ -std=c++14

513.soma_t: -lstdc++ -std=c++14

518.tealeaf_t: -lstdc++ -std=c++14

521.miniswp_t: -lstdc++ -std=c++14

534.hpgmgfv_t: -lstdc++ -std=c++14



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Base Optimization Flags

C benchmarks:

-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flt0
-funroll-loops

C++ benchmarks:

-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flt0
-funroll-loops

Fortran benchmarks:

-O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp -ffast-math -flt0
-funroll-loops -nostandard-realloc-lhs -align array64byte

Base Other Flags

C benchmarks (except as noted below):

-Ispecmpitime -Wno-incompatible-function-pointer-types

521.miniswp_t: -Ispecmpitime/ -Wno-incompatible-function-pointer-types

534.hpgmgfv_t: -Ispecmpitime -Wno-incompatible-function-pointer-types

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

519.clvleaf_t: -Ispecmpitime

Peak Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpiicpc -cxx=icpx

Fortran benchmarks (except as noted below):

mpiifort -fc=ifx

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Peak Compiler Invocation (Continued)

519.clvleaf_t: mpiifort

Peak Portability Flags

505.lbm_t: -lstdc++ -std=c++14
513.soma_t: -lstdc++ -std=c++14
518.tealeaf_t: -lstdc++ -std=c++14
521.miniswp_t: -lstdc++ -std=c++14
534.hpgmgfv_t: -lstdc++ -std=c++14

Peak Optimization Flags

C benchmarks:

505.lbm_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp
-ffast-math -flto -funroll-loops

513.soma_t: Same as 505.lbm_t

518.tealeaf_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp
-ffast-math -flto -funroll-loops
-qopt-streaming-stores=always

521.miniswp_t: Same as 505.lbm_t

534.hpgmgfv_t: basepeak = yes

C++ benchmarks:

532.sph_exa_t: basepeak = yes

Fortran benchmarks:

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

528.pot3d_t: -O3 -Ofast -xCORE-AVX512 -mprefer-vector-width=512
-qopt-multiple-gather-scatter-by-shuffles -fiopenmp

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Peak Optimization Flags (Continued)

528.pot3d_t (continued):
-ffast-math -flto -funroll-loops -nostandard-realloc-lhs
-align array64byte

535.weather_t: basepeak = yes

Peak Other Flags

C benchmarks (except as noted below):

-Ispecmpitime -Wno-incompatible-function-pointer-types

521.miniswp_t: -Ispecmpitime/ -Wno-incompatible-function-pointer-types

534.hpgmgfv_t: -Ispecmpitime -Wno-incompatible-function-pointer-types

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

519.clvleaf_t: -Ispecmpitime

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

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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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