



# SPEChpc™ 2021 Tiny Result

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## Intel

SPEChpc 2021\_tny\_base = 17.4

SPEChpc 2021\_tny\_peak = 19.2

Endeavour: Intel Server M50CYP2UR208 (Intel Xeon Platinum 8360Y)

hpc2021 License: 13

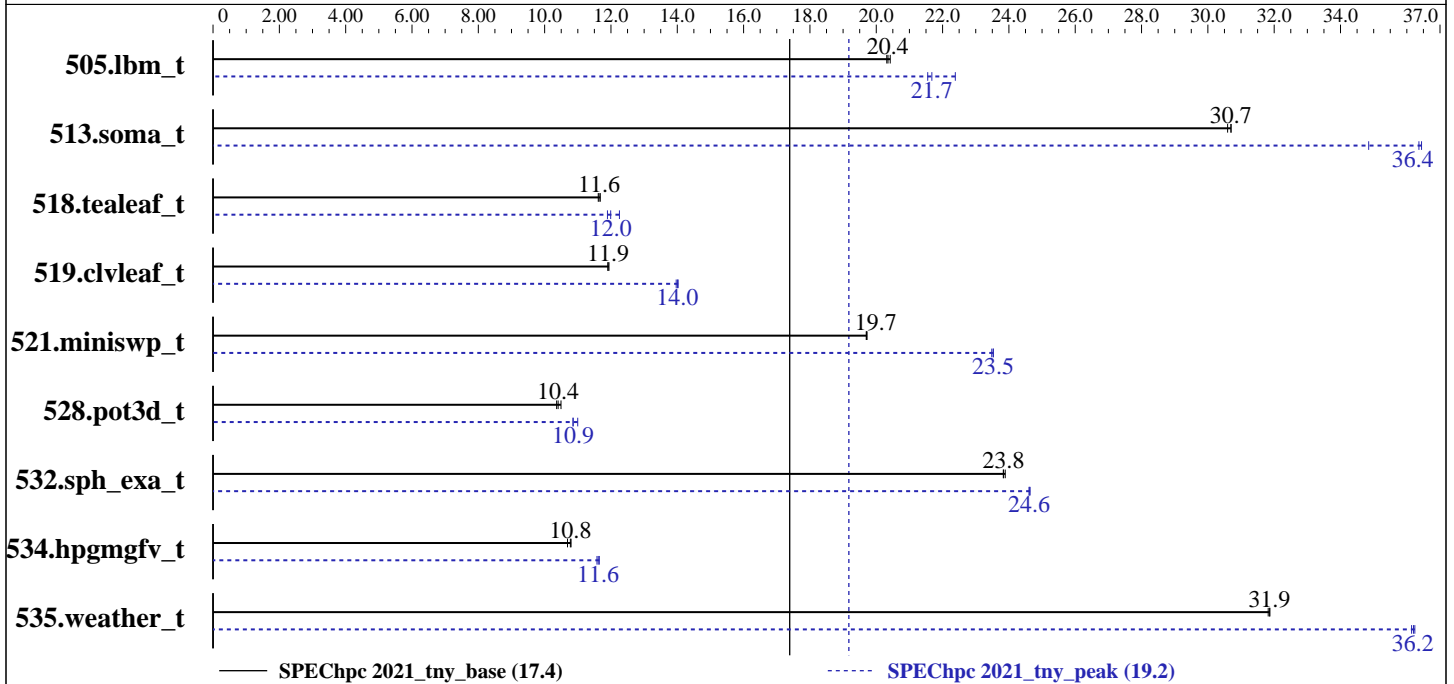
Test Sponsor: Intel

Tested by: Intel

Test Date: Sep-2021

Hardware Availability: Jul-2021

Software Availability: Jul-2021



## 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
505.lbm_t	OMP	48	12	111	20.3	<b>111</b>	<b>20.4</b>	110	20.4	OMP	24	12	104	21.6	<b>104</b>	<b>21.7</b>	101	22.4
513.soma_t	OMP	48	12	121	30.7	<b>121</b>	<b>30.7</b>	121	30.6	OMP	8	72	102	36.4	<b>102</b>	<b>36.4</b>	106	34.8
518.tealeaf_t	OMP	48	12	<b>142</b>	<b>11.6</b>	142	11.6	141	11.7	OMP	24	12	139	11.9	<b>135</b>	<b>12.3</b>	<b>138</b>	<b>12.0</b>
519.cvlleaf_t	OMP	48	12	139	11.9	<b>139</b>	<b>11.9</b>	138	11.9	OMP	16	18	118	14.0	118	14.0	<b>118</b>	<b>14.0</b>
521.miniswp_t	OMP	48	12	<b>81.2</b>	<b>19.7</b>	81.2	19.7	81.1	19.7	OMP	8	36	<b>68.0</b>	<b>23.5</b>	68.0	23.5	68.1	23.5
528.pot3d_t	OMP	48	12	<b>204</b>	<b>10.4</b>	205	10.4	203	10.5	OMP	48	6	193	11.0	<b>196</b>	<b>10.9</b>	196	10.9
532.sph_exa_t	OMP	48	12	81.8	23.8	<b>81.8</b>	<b>23.8</b>	81.6	23.9	OMP	24	12	<b>79.2</b>	<b>24.6</b>	79.2	24.6	79.1	24.6
534.hpgmgfv_t	OMP	48	12	110	10.7	109	10.8	<b>109</b>	<b>10.8</b>	OMP	8	72	101	11.6	<b>101</b>	<b>11.6</b>	101	11.6
535.weather_t	OMP	48	12	101	31.9	101	31.8	<b>101</b>	<b>31.9</b>	OMP	72	4	<b>89.1</b>	<b>36.2</b>	89.2	36.1	89.0	36.2

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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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**Tested by:** Intel

**Test Date:** Sep-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Jul-2021

### Hardware Summary

Type of System: Homogenous Cluster  
Compute Node: Intel Server M50CYP2UR208 (Xeon 8360Y)  
Interconnect: Mellanox HDR  
File Server Node: LustreFS  
Compute Nodes Used: 4  
Total Chips: 8  
Total Cores: 288  
Total Threads: 576  
Total Memory: 1 TB  
Max. Peak Threads: 72

### Software Summary

Compiler: Intel oneAPI Compiler 2021.3.0  
MPI Library: Intel MPI Library for Linux\* OS, Version 2021.2 Build 20210302  
Other MPI Info: None  
Other Software: None  
Base Parallel Model: OMP  
Base Ranks Run: 48  
Base Threads Run: 12  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 8  
Maximum Peak Ranks: 72  
Max. Peak Threads: 72  
Min. Peak Threads: 4

### Node Description: Intel Server M50CYP2UR208 (Xeon 8360Y)

#### Hardware

Number of nodes: 4  
Uses of the node: Compute  
Vendor: Intel  
Model: Intel Server M50CYP2UR208 (Xeon 8360Y)  
CPU Name: Intel Xeon Platinum 8360Y  
CPU(s) orderable: 1, 2 chips  
Chips enabled: 2  
Cores enabled: 72  
Cores per chip: 36  
Threads per core: 2  
CPU Characteristics: Turbo Boost Technology up to 3.5 GHz  
CPU MHz: 2400  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1536 KB I+D on chip per core  
L3 Cache: 54 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx8 PC4-3200R)  
Disk Subsystem: 1 x 960 GB SATA 2.5" SSD  
Other Hardware: None  
Accel Count: None  
Accel Model: --  
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

#### Software

Accelerator Driver: --  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.1-2.5.8.0  
Adapter Firmware: 20.29.2002  
Operating System: CentOS Linux release 8.4.2105  
4.18.0-240.22.1.el8\_3.crt2.x86\_64  
Local File System: NFS  
Shared File System: Lustre FS  
System State: Multi-user  
Other Software: --

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### Node Description: Intel Server M50CYP2UR208 (Xeon 8360Y)

#### Hardware (Continued)

Interconnect Type: Mellanox HDR

### Node Description: LustreFS

#### Hardware

Number of nodes: 1  
Uses of the node: Fileserver  
Vendor: Intel  
Model: Inspur NF5280M5  
CPU Name: Intel Xeon Gold 6244  
CPU(s) orderable: 1-2 chips  
Chips enabled: 2  
Cores enabled: 16  
Cores per chip: 8  
Threads per core: 2  
CPU Characteristics: Intel Xeon Gold  
CPU MHz: 3600  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 512 KB I+D on chip per core  
L3 Cache: 25344 KB I+D on chip per chip  
Other Cache: None  
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666R)  
Disk Subsystem: 1 x 1 TB 12 Gbps SAS 2.5" SSD  
Other Hardware: None  
Accel Count: --  
Accel Model: --  
Accel Vendor: --  
Accel Type: --  
Accel Connection: --  
Accel ECC enabled: --  
Accel Description: --  
Adapter: Mellanox ConnectX-4 EDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 100 Gb/s  
Ports Used: 2  
Interconnect Type: Mellanox EDR

#### Software

Accelerator Driver: --  
Adapter: Mellanox ConnectX-4 EDR  
Adapter Driver: 5.1-2.5.8.0  
Adapter Firmware: 20.29.2002  
Operating System: CentOS Linux release 7.8.2003  
4.18.0-240.22.1.el8\_3.crt2.x86\_64  
Local File System: None  
Shared File System: Lustre FS  
System State: Multi-User  
Other Software: None



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## Interconnect Description: Mellanox HDR

### Hardware

### Software

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: 20.29.2002  
Topology: Fat-tree  
Primary Use: MPI Traffic

: --

## Submit Notes

The config file option 'submit' was used.

## Compiler Version Notes

```
=====  
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 2021.3.0 (2021.3.0.20210619)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir:  
/global/panfs01/admin/opt/intel/oneAPI/2021.3.0.3219/compiler/2021.3.0/linux/bin  
-----
```

```
=====  
CXXC 532.sph_exa_t(base, peak)  
-----
```

```
Intel(R) oneAPI DPC++/C++ Compiler 2021.3.0 (2021.3.0.20210619)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir:  
/global/panfs01/admin/opt/intel/oneAPI/2021.3.0.3219/compiler/2021.3.0/linux/bin  
-----
```

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

ifx (IFORT) 2021.3.0 Beta 20210619  
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## Compiler Version Notes (Continued)

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## Base Compiler Invocation

C benchmarks:

```
mpiicc -cc=icx -lstdc++(*)
```

C++ benchmarks:

```
mpiicpc -cxx=icx -lstdc++(*)
```

Fortran benchmarks:

```
mpiifort -fc=ifx -lstdc++(*)
```

(\*) Indicates a compiler flag that was found in a non-compiler variable.

## Base Portability Flags

```
513.soma_t: -DSPEC_NO_VAR_ARRAY_REDUCE
521.miniswp_t: -DUSE_KBA -DUSE_ACCELDIR
532.sph_exa_t: -DSPEC_USE_LT_IN_KERNELS
```

## Base Optimization Flags

C benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp
-ansi-alias
```

C++ benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp
-ansi-alias
```

Fortran benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp
-nostandard-realloc-lhs -align array64byte
```

## Peak Compiler Invocation

C benchmarks:

```
mpiicc -cc=icx -lstdc++(*)
```

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## Peak Compiler Invocation (Continued)

C++ benchmarks:

```
mpiiicpc -cxx=icx -lstdc++(*)
```

Fortran benchmarks:

```
mpiifort -fc=ifx -lstdc++(*)
```

(\*) Indicates a compiler flag that was found in a non-compiler variable.

## Peak Portability Flags

```
513.soma_t: -DSPEC_NO_VAR_ARRAY_REDUCE  
521.miniswp_t: -DUSE_KBA -DUSE_ACCELDIR  
532.sph_exa_t: -DSPEC_USE_LT_IN_KERNELS
```

## Peak Optimization Flags

C benchmarks:

```
505.lbm_t: -Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512  
-fiopenmp -ansi-alias
```

```
513.soma_t: -Ofast -ipo -xCORE-AVX512 -fiopenmp -ansi-alias
```

```
518.tealeaf_t: Same as 505.lbm_t
```

```
521.miniswp_t: Same as 505.lbm_t
```

```
534.hpgmgfv_t: -Ofast -ipo -fiopenmp -ansi-alias
```

C++ benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp  
-ansi-alias
```

Fortran benchmarks:

```
519.clvleaf_t: -Ofast -ipo -xCORE-AVX512  
-mllvm -hir-nontemporal-cacheline-count=0 -fiopenmp  
-nonstandard-realloc-lhs -align array64byte
```

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## Peak Optimization Flags (Continued)

528.pot3d\_t: -Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512  
-fiopenmp -nostandard-realloc-lhs -align array64byte

535.weather\_t: Same as 528.pot3d\_t

The flags file that was used to format this result can be browsed at

<http://www.spec.org/hpc2021/flags/Intel-oneAPI-icx2021-official-linux64.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/hpc2021/flags/Intel-oneAPI-icx2021-official-linux64.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

Tested with SPEChpc2021 v1.0.2 on 2021-09-18 16:50:11-0400.  
Report generated on 2023-08-25 18:59:05 by hpc2021 PDF formatter v1.0.3.  
Originally published on 2021-10-20.