



# SPEChpc™ 2021 Tiny Result

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## Lenovo Global Technology

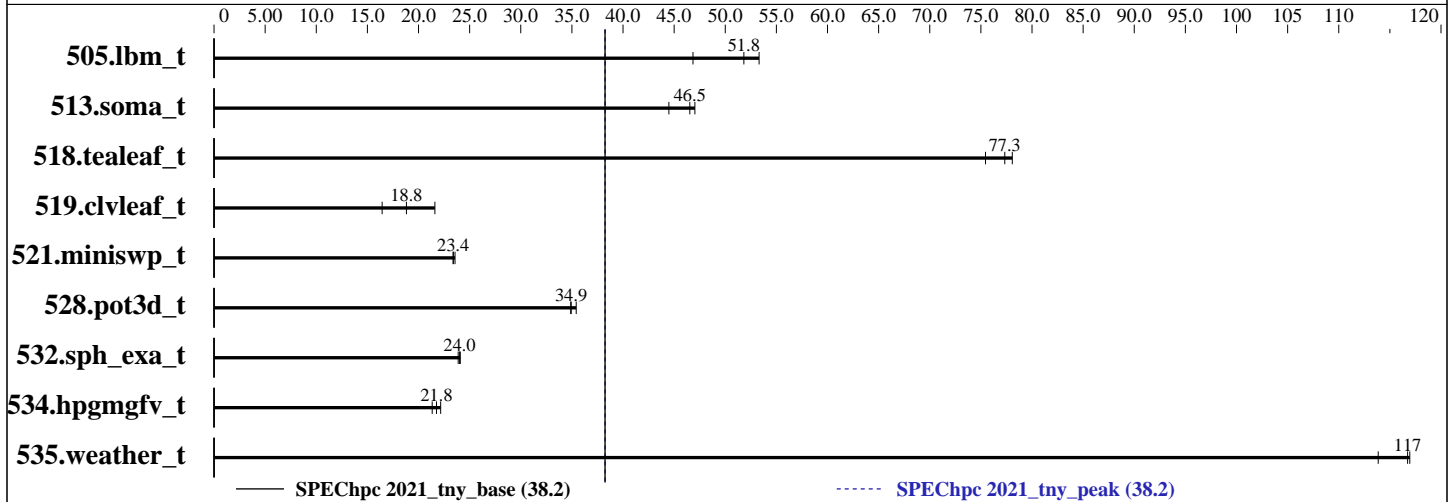
SPEChpc 2021\_tny\_base = 38.2

## ThinkSystem SR665 V3 (AMD EPYC 9654)

SPEChpc 2021\_tny\_peak = 38.2

hpc2021 License: 28  
Test Sponsor: Lenovo Global Technology  
Tested by: Lenovo Global Technology

Test Date: Jan-2023  
Hardware Availability: Nov-2022  
Software Availability: Nov-2022



## 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   | 72    | 8         | 48.0        | 46.8        | <b>43.4</b> | <b>51.8</b> | 42.2        | 53.3        | OMP   | 72    | 8         | 48.0        | 46.8        | <b>43.4</b> | <b>51.8</b> | 42.2        | 53.3        |
| 513.soma_t    | OMP   | 72    | 8         | <b>79.5</b> | <b>46.5</b> | 78.7        | 47.0        | 83.2        | 44.5        | OMP   | 72    | 8         | <b>79.5</b> | <b>46.5</b> | 78.7        | 47.0        | 83.2        | 44.5        |
| 518.tealeaf_t | OMP   | 72    | 8         | <b>21.3</b> | <b>77.3</b> | 21.1        | 78.1        | 21.9        | 75.5        | OMP   | 72    | 8         | <b>21.3</b> | <b>77.3</b> | 21.1        | 78.1        | 21.9        | 75.5        |
| 519.clvleaf_t | OMP   | 72    | 8         | 76.4        | 21.6        | 100         | 16.4        | <b>87.7</b> | <b>18.8</b> | OMP   | 72    | 8         | 76.4        | 21.6        | 100         | 16.4        | <b>87.7</b> | <b>18.8</b> |
| 521.miniswp_t | OMP   | 72    | 8         | <b>68.4</b> | <b>23.4</b> | 67.9        | 23.6        | 68.4        | 23.4        | OMP   | 72    | 8         | <b>68.4</b> | <b>23.4</b> | 67.9        | 23.6        | 68.4        | 23.4        |
| 528.pot3d_t   | OMP   | 72    | 8         | 60.9        | 34.9        | <b>60.8</b> | <b>34.9</b> | 60.0        | 35.4        | OMP   | 72    | 8         | 60.9        | 34.9        | <b>60.8</b> | <b>34.9</b> | 60.0        | 35.4        |
| 532.sph_exa_t | OMP   | 72    | 8         | <b>81.2</b> | <b>24.0</b> | 81.7        | 23.9        | 81.0        | 24.1        | OMP   | 72    | 8         | <b>81.2</b> | <b>24.0</b> | 81.7        | 23.9        | 81.0        | 24.1        |
| 534.hpgmgfv_t | OMP   | 72    | 8         | 55.1        | 21.3        | 53.0        | 22.2        | <b>54.0</b> | <b>21.8</b> | OMP   | 72    | 8         | 55.1        | 21.3        | 53.0        | 22.2        | <b>54.0</b> | <b>21.8</b> |
| 535.weather_t | OMP   | 72    | 8         | 27.6        | 117         | <b>27.6</b> | <b>117</b>  | 28.3        | 114         | OMP   | 72    | 8         | 27.6        | 117         | <b>27.6</b> | <b>117</b>  | 28.3        | 114         |

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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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**Software Availability:** Nov-2022

### Hardware Summary

Type of System: Homogeneous Cluster  
Compute Node: ThinkSystem SR665 V3  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
Compute Nodes Used: 3  
Total Chips: 6  
Total Cores: 576  
Total Threads: 1152  
Total Memory: 4608 GB  
Max. Peak Threads: 8

### Software Summary

Compiler: Intel oneAPI Compiler 2022.1.0  
MPI Library: Intel MPI Library for Linux OS, Build 20220227  
Other MPI Info: --  
Other Software: --  
Base Parallel Model: OMP  
Base Ranks Run: 72  
Base Threads Run: 8  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 72  
Maximum Peak Ranks: 72  
Max. Peak Threads: 8  
Min. Peak Threads: 8

## Node Description: ThinkSystem SR665 V3

### Hardware

Number of nodes: 3  
Uses of the node: Compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR665 V3  
CPU Name: AMD EPYC 9654  
CPU(s) orderable: 1,2 chips  
Chips enabled: 2  
Cores enabled: 192  
Cores per chip: 96  
Threads per core: 2  
CPU Characteristics: Max Boost Clock up to 3.7 GHz  
CPU MHz: 2400  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 1 MB I+D on chip per core  
L3 Cache: 384 MB I+D on chip per chip  
32 MB shared / 8 cores  
Other Cache: None  
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)  
Disk Subsystem: 1x ThinkSystem 2.5" 5300 480GB SSD  
Other Hardware: None  
Accel Count: --  
Accel Model: --  
Accel Vendor: --  
Accel Type: --  
Accel Connection: --  
Accel ECC enabled: --  
Accel Description: --  
Adapter: Nvidia Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200 Gb/s  
Ports Used: 1

### Software

Accelerator Driver: --  
Adapter: Nvidia Mellanox ConnectX-6 HDR  
Adapter Driver: 5.7-1.0.2  
Adapter Firmware: 20.28.1002  
Operating System: Red Hat Enterprise Linux Server release 8.6,  
Kernel 4.18.0-372.9.1.el8.x86\_64  
Local File System: xfs  
Shared File System: None  
System State: Multi-user, run level 3  
Other Software: None

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### Node Description: ThinkSystem SR665 V3

#### Hardware (Continued)

Interconnect Type: ConnectX-6 HDR

#### Interconnect Description: Nvidia Mellanox ConnectX-6 HDR

##### Hardware

Vendor: Nvidia  
Model: Nvidia Mellanox ConnectX-6 HDR  
Switch Model: QM8700  
Number of Switches: 1  
Number of Ports: 40  
Data Rate: 200 Gb/s  
Firmware: 3.9.0606  
Topology: Mesh  
Primary Use: MPI Traffic, NFS Access

##### Software

: --

### Submit Notes

The config file option 'submit' was used.

```
submit = mpiexec -hostfile ${top}/3nodes -np ranks -genv OMP_NUM_THREADS=$threads -ppn % {NRNK} $command
```

### Compiler Version Notes

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

ifx: command line error: no files specified; for help type "ifx -help"

```
=====
CC 505.lbm_t(base) 513.soma_t(base) 518.tealeaf_t(base) 521.miniswp_t(base)
534.hpgmgfv_t(base)
-----
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused

[-Wunused-command-line-argument]

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## Compiler Version Notes (Continued)

=====  
CXXC 532.sph\_exa\_t(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused  
[-Wunused-command-line-argument]  
=====

## Base Compiler Invocation

C benchmarks:  
mpiicc -cc=icx  
  
C++ benchmarks:  
mpiicpc -cxx=icx  
  
Fortran benchmarks:  
mpiifort -fc=ifx

## Base Portability Flags

505.lbm\_t: -lstdc++  
513.soma\_t: -lstdc++ -DSPEC\_NO\_VAR\_ARRAY\_REDUCE  
518.tealeaf\_t: -lstdc++  
519.clvleaf\_t: -lstdc++  
521.miniswp\_t: -lstdc++  
528.pot3d\_t: -lstdc++  
532.sph\_exa\_t: -lstdc++  
534.hpgmgfv\_t: -lstdc++  
535.weather\_t: -lstdc++

## Base Optimization Flags

C benchmarks:  
-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp  
-ansi-alias  
  
C++ benchmarks:  
-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp

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## Base Optimization Flags (Continued)

C++ benchmarks (continued):

-ansi-alias

Fortran benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp  
-nostandard-realloc-lhs -align array64byte

## Base Other Flags

C benchmarks (except as noted below):

-Ispecmpitime

521.miniswp\_t: -Ispecmpitime/

534.hpgmgfv\_t: -Ispecmpitime

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

519.clvleaf\_t: -Ispecmpitime

## Peak Optimization Flags

C benchmarks:

505.lbm\_t: basepeak = yes

513.soma\_t: basepeak = yes

518.tealeaf\_t: basepeak = yes

521.miniswp\_t: basepeak = yes

534.hpgmgfv\_t: basepeak = yes

C++ benchmarks:

532.sph\_exa\_t: basepeak = yes

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

519.cvlleaf\_t: basepeak = yes

528.pot3d\_t: basepeak = yes

535.weather\_t: basepeak = yes

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

[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2022-11-10.html](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.html)

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

[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2022-11-10.xml](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.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 v1.1.7 on 2018-06-22 22:36:55-0400.  
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