



# SPEChpc™ 2021 Tiny Result

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## Lenovo Global Technology

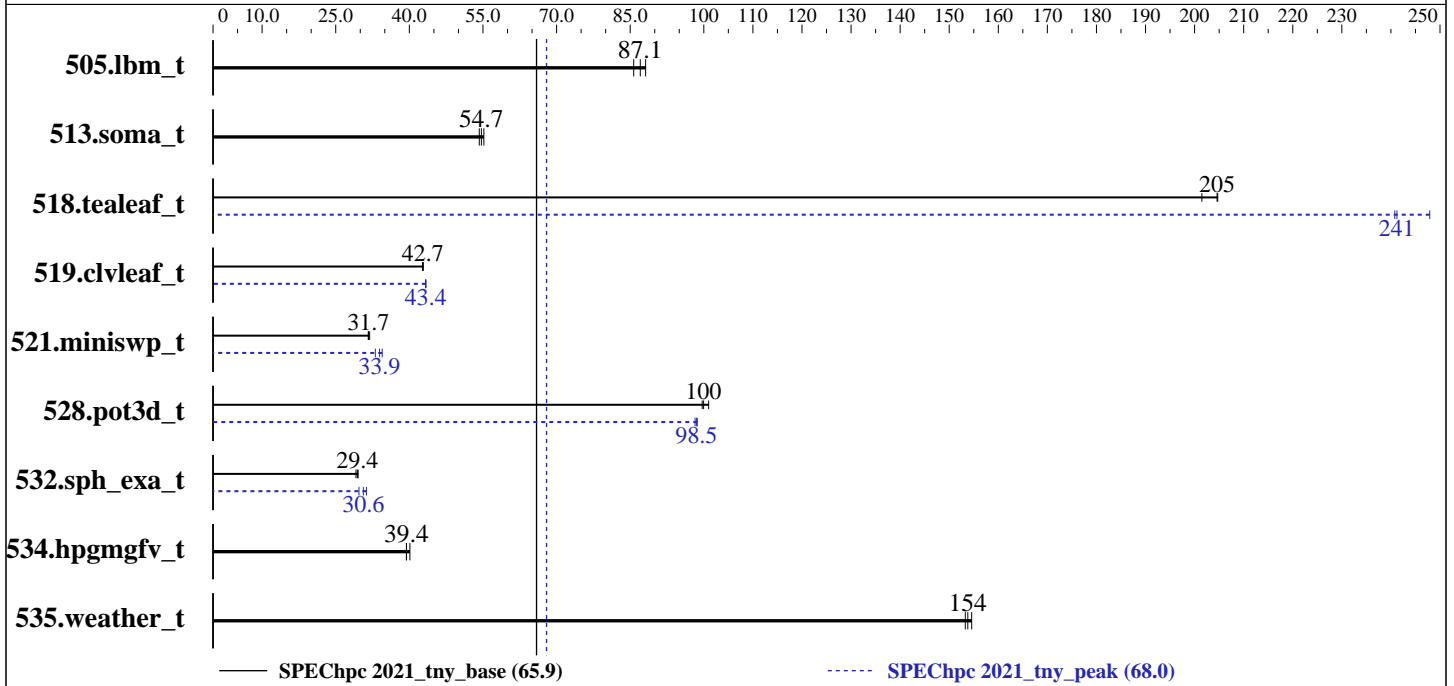
SPEChpc 2021\_tny\_base = 65.9

## ThinkSystem SR665 V3 (AMD EPYC 9654)

SPEChpc 2021\_tny\_peak = 68.0

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	144	8	25.5	88.1	26.3	85.7	<b><u>25.8</u></b>	<b><u>87.1</u></b>	OMP	144	8	25.5	88.1	26.3	85.7	<b><u>25.8</u></b>	<b><u>87.1</u></b>
513.soma_t	OMP	144	8	67.0	55.2	<b><u>67.7</u></b>	<b><u>54.7</u></b>	68.2	54.3	OMP	144	8	67.0	55.2	<b><u>67.7</u></b>	<b><u>54.7</u></b>	68.2	54.3
518.tealeaf_t	OMP	144	8	<b><u>8.07</u></b>	<b><u>205</u></b>	8.19	201	8.06	205	OMP	288	4	6.85	241	<b><u>6.84</u></b>	<b><u>241</u></b>	6.66	248
519.civleaf_t	OMP	144	8	38.6	42.7	38.5	42.8	<b><u>38.6</u></b>	<b><u>42.7</u></b>	OMP	288	4	38.0	43.4	38.1	43.3	<b><u>38.1</u></b>	<b><u>43.4</u></b>
521.miniswp_t	OMP	144	8	50.6	31.6	<b><u>50.5</u></b>	<b><u>31.7</u></b>	50.1	31.9	OMP	12	96	<b><u>47.2</u></b>	<b><u>33.9</u></b>	46.4	34.5	48.4	33.1
528.pot3d_t	OMP	144	8	21.0	101	<b><u>21.3</u></b>	<b><u>100</u></b>	21.3	99.7	OMP	288	4	21.6	98.2	21.5	98.7	<b><u>21.6</u></b>	<b><u>98.5</u></b>
532.sph_exa_t	OMP	144	8	66.9	29.1	<b><u>66.3</u></b>	<b><u>29.4</u></b>	66.0	29.6	OMP	24	48	<b><u>63.7</u></b>	<b><u>30.6</u></b>	62.4	31.3	65.6	29.7
534.hpgmgfv_t	OMP	144	8	29.3	40.1	29.8	39.4	<b><u>29.8</u></b>	<b><u>39.4</u></b>	OMP	144	8	29.3	40.1	29.8	39.4	<b><u>29.8</u></b>	<b><u>39.4</u></b>
535.weather_t	OMP	144	8	<b><u>21.0</u></b>	<b><u>154</u></b>	20.9	155	21.0	153	OMP	144	8	<b><u>21.0</u></b>	<b><u>154</u></b>	20.9	155	21.0	153

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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: Homogeneous Cluster  
Compute Node: ThinkSystem SR665 V3  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
Compute Nodes Used: 6  
Total Chips: 12  
Total Cores: 1152  
Total Threads: 2304  
Total Memory: 9 TB  
Max. Peak Threads: 96

### 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: 144  
Base Threads Run: 8  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 12  
Maximum Peak Ranks: 288  
Max. Peak Threads: 96  
Min. Peak Threads: 4

## Node Description: ThinkSystem SR665 V3

### Hardware

Number of nodes: 6  
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 ${top}/6nodes -np ranks -genv OMP_NUM_THREADS=$threads -ppn % {NRNK} $command
```

### Compiler Version Notes

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

```
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, 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 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, peak)  
=====

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:  
mpicpc -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.cvlleaf\_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

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## Base Optimization Flags (Continued)

C++ benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp  
-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 Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpicpc -cxx=icx

Fortran benchmarks:

mpiifort -fc=ifx

## Peak Portability Flags

Same as Base Portability Flags



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## Peak Optimization Flags

C benchmarks:

505.lbm\_t: basepeak = yes

513.soma\_t: basepeak = yes

518.tealeaf\_t: -Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo  
-fiopenmp -ansi-alias

521.miniswp\_t: Same as 518.tealeaf\_t

534.hpgmgfv\_t: basepeak = yes

C++ benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp  
-ansi-alias

Fortran benchmarks:

519.clvleaf\_t: -Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo  
-fiopenmp -nostandard-realloc-lhs -align array64byte

528.pot3d\_t: Same as 519.clvleaf\_t

535.weather\_t: basepeak = yes

## Peak 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



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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).

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