



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

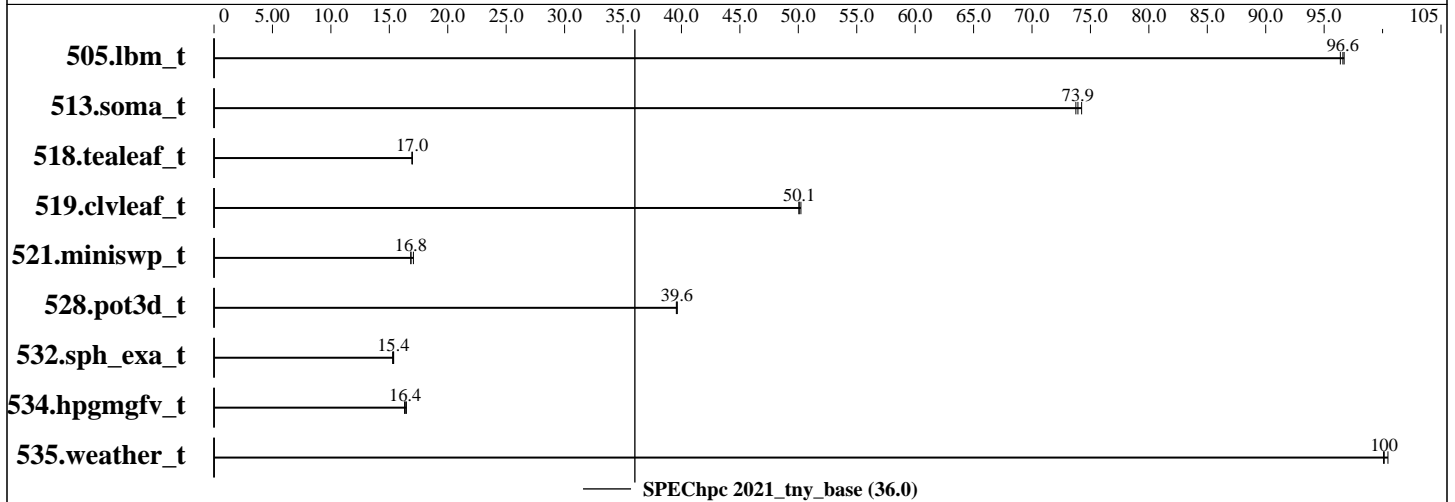
SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

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

**Test Date:** Aug-2021  
**Hardware Availability:** Aug-2021  
**Software Availability:** Aug-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	ACC	4	1	23.3	96.4	<b><u>23.3</u></b>	<b><u>96.6</u></b>	23.3	96.7										
513.soma_t	ACC	4	1	49.8	74.2	50.2	73.8	<b><u>50.0</u></b>	<b><u>73.9</u></b>										
518.tealeaf_t	ACC	4	1	97.3	17.0	97.3	17.0	<b><u>97.3</u></b>	<b><u>17.0</u></b>										
519.clvleaf_t	ACC	4	1	33.0	50.1	<b><u>32.9</u></b>	<b><u>50.1</u></b>	32.9	50.2										
521.miniswp_t	ACC	4	1	93.8	17.1	95.0	16.8	<b><u>95.0</u></b>	<b><u>16.8</u></b>										
528.pot3d_t	ACC	4	1	<b><u>53.6</u></b>	<b><u>39.6</u></b>	53.7	39.6	53.6	39.6										
532.sph_exa_t	ACC	4	1	127	15.4	128	15.3	<b><u>127</u></b>	<b><u>15.4</u></b>										
534.hpgmgfv_t	ACC	4	1	<b><u>71.8</u></b>	<b><u>16.4</u></b>	71.4	16.5	72.1	16.3										
535.weather_t	ACC	4	1	32.1	100	<b><u>32.2</u></b>	<b><u>100</u></b>	32.2	100										

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

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

**Test Date:** Aug-2021  
**Hardware Availability:** Aug-2021  
**Software Availability:** Aug-2021

### Hardware Summary

Type of System: Homogenous Cluster  
Compute Node: ThinkSystem SD650-N V2  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
File Server Node: ThinkSystem SD650-N V2  
Compute Nodes Used: 1  
Total Chips: 2  
Total Cores: 76  
Total Threads: 76  
Total Memory: 512 GB  
Max. Peak Threads: --

### Software Summary

Compiler: Nvidia HPC SDK 21.5  
MPI Library: Open MPI 4.0.5  
Other MPI Info: --  
Other Software: --  
Base Parallel Model: ACC  
Base Ranks Run: 4  
Base Threads Run: 1  
Peak Parallel Models: Not Run  
Minimum Peak Ranks: --  
Maximum Peak Ranks: --  
Max. Peak Threads: --  
Min. Peak Threads: --

## Node Description: ThinkSystem SD650-N V2

### Hardware

Number of nodes: 1  
Uses of the node: compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SD650-N V2  
CPU Name: Intel Xeon Platinum 8368Q  
CPU(s) orderable: 2 chips  
Chips enabled: 2  
Cores enabled: 76  
Cores per chip: 38  
Threads per core: 1  
CPU Characteristics: Turbo up to 3.7 GHz  
CPU MHz: 2600  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1280 KB I+D on chip per core  
L3 Cache: 57 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)  
Disk Subsystem: 1 x 480 GB 2.5" SSD  
Other Hardware: None  
Accel Count: 4  
Accel Model: Tesla A100 SXM4 40GB  
Accel Vendor: Nvidia Corporation  
Accel Type: GPU  
Accel Connection: NVLink  
Accel ECC enabled: Yes  
Accel Description: Nvidia Tesla A100 SXM4 40GB  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200 Gb/s  
Ports Used: 1  
Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

### Software

Accelerator Driver: 460.32.03  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.1-2.3.7  
Adapter Firmware: 20.28.1002  
Operating System: Red Hat Enterprise Linux Server release 8.3,  
Kernel 4.18.0-193.el8.x86\_64  
Local File System: xfs  
Shared File System: NFS  
System State: Multi-user, run level 3  
Other Software: None



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

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

**Test Date:** Aug-2021  
**Hardware Availability:** Aug-2021  
**Software Availability:** Aug-2021

### Node Description: ThinkSystem SD650-N V2

#### Hardware

Number of nodes: 1  
Uses of the node: Fileserver  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SD650-N V2  
CPU Name: Intel Xeon Platinum 8368Q  
CPU(s) orderable: 2 chips  
Chips enabled: 2  
Cores enabled: 76  
Cores per chip: 38  
Threads per core: 1  
CPU Characteristics: Turbo up to 3.7 GHz  
CPU MHz: 2600  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1280 KB I+D on chip per core  
L3 Cache: 57 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)  
Disk Subsystem: 1 x 960 GB NVME 2.5" SSD  
Other Hardware: None  
Accel Count: 4  
Accel Model: Tesla A100 SXM4 40GB  
Accel Vendor: Nvidia  
Accel Type: GPU  
Accel Connection: Nvidia Tesla A100 SXM4 40GB  
Accel ECC enabled: Yes  
Accel Description: Nvidia Tesla A100 SXM4 40GB  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200 Gb/s  
Ports Used: 1  
Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

#### Software

Accelerator Driver: N/A  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.1-2.3.7  
Adapter Firmware: 20.28.1002  
Operating System: Red Hat Enterprise Linux Server release 8.3  
Local File System: xfs  
Shared File System: N/A  
System State: Multi-User, run level 3  
Other Software: None

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

#### Hardware

Vendor: Nvidia  
Model: Nvidia Mellanox ConnectX-6 HDR  
Switch Model: N/A  
Number of Switches: 0  
Number of Ports: 0  
Data Rate: N/A  
Firmware: N/A  
Topology: Direct Connect

#### Software

: --

(Continued on next page)



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

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

**Test Date:** Aug-2021  
**Hardware Availability:** Aug-2021  
**Software Availability:** Aug-2021

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

#### Hardware (Continued)

Primary Use: MPI Traffic, NFS Access

### Submit Notes

Individual Ranks were bound to the CPU cores on the same NUMA node as the GPU using 'numactl' within the following "bind.pl" perl script:

---- Start bind.pl -----

```
my %bind;
$bind{0} = "1-3";
$bind{1} = "4-7";
$bind{2} = "8-10";
$bind{3} = "11-14";
$bind{4} = "41-43";
$bind{5} = "44-47";
$bind{6} = "61-63";
$bind{7} = "64-67";
my $rank = $ENV{OMPI_COMM_WORLD_LOCAL_RANK};
my $cmd = "taskset -c $bind{$rank} ";
while (my $arg = shift) {
    $cmd .= "$arg ";
}
my $rc = system($cmd);
exit($rc);
```

---- End bind.pl -----

The config file option 'submit' was used.

```
submit = mpirun ${MPIRUN_OPTS} --allow-run-as-root --oversubscribe
-host 192.168.99.171:4,192.168.99.172:4 -x UCX_MEMTYPE_CACHE=n
-mca coll_hcoll_enable 1 -x HCOLL_MAIN_IB=mlx5_0:1 -mca pml ucx
-x UCX_TLS=sm,dc,rc,knem,cuda_copy,cuda_ipc -npernode 4 --map-by core -np $ranks
```

### General Notes

Environment variables set by runhpc before the start of the run:

```
UCX_MEMTYPE_CACHE = "n"
UCX_TLS = "self,shm,cuda_copy"
```

### Compiler Version Notes

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

(Continued on next page)



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

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

**Test Date:** Aug-2021  
**Hardware Availability:** Aug-2021  
**Software Availability:** Aug-2021

### Compiler Version Notes (Continued)

nvc 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake  
NVIDIA Compilers and Tools  
Copyright (c) 2021, NVIDIA CORPORATION. All rights reserved.

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

nvc++ 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake  
NVIDIA Compilers and Tools  
Copyright (c) 2021, NVIDIA CORPORATION. All rights reserved.

-----  
FC 519.clvleaf\_t(base) 528.pot3d\_t(base) 535.weather\_t(base)  
-----

nvfortran 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake  
NVIDIA Compilers and Tools  
Copyright (c) 2021, NVIDIA CORPORATION. All rights reserved.

### Base Compiler Invocation

C benchmarks:

mpicc

C++ benchmarks:

mpicxx

Fortran benchmarks:

mpif90

### Base Portability Flags

521.miniswp\_t: -DUSE\_KBA -DUSE\_ACCELDIR  
532.sph\_exa\_t: -DSPEC\_USE\_LT\_IN\_KERNELS --c++17

### Base Optimization Flags

C benchmarks:

-Mfprelaxed -Mnouniform -Mstack\_arrays -fast -acc=gpu -Minfo=accel

(Continued on next page)



# SPEChpc™ 2021 Tiny Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPEChpc 2021\_tny\_base = 36.0

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SD650-N V2 (Intel Xeon Platinum 8368Q, Tesla A100-SXM-40GB)

**hpc2021 License:** 28

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Aug-2021

**Hardware Availability:** Aug-2021

**Software Availability:** Aug-2021

## Base Optimization Flags (Continued)

C benchmarks (continued):

-DSPEC\_ACCEL\_AWARE\_MPI

C++ benchmarks:

-Mfprelaxed -Mnouniform -Mstack\_arrays -fast -acc=gpu -Minfo=accel

-DSPEC\_ACCEL\_AWARE\_MPI

Fortran benchmarks:

-DSPEC\_ACCEL\_AWARE\_MPI -Mfprelaxed -Mnouniform -Mstack\_arrays -fast

-acc=gpu -Minfo=accel

## Base Other Flags

C benchmarks:

-w

C++ benchmarks:

-w

Fortran benchmarks:

-w

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

[http://www.spec.org/hpc2021/flags/nv2021\\_flags.html](http://www.spec.org/hpc2021/flags/nv2021_flags.html)

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

[http://www.spec.org/hpc2021/flags/nv2021\\_flags.xml](http://www.spec.org/hpc2021/flags/nv2021_flags.xml)

SPEChpc is a trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEChpc2021 v1.0.1 on 2021-08-21 04:23:28-0400.

Report generated on 2023-08-25 18:57:50 by hpc2021 PDF formatter v1.0.3.

Originally published on 2021-10-20.