



# SPEChpc™ 2021 Tiny Result

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## Lenovo Global Technology

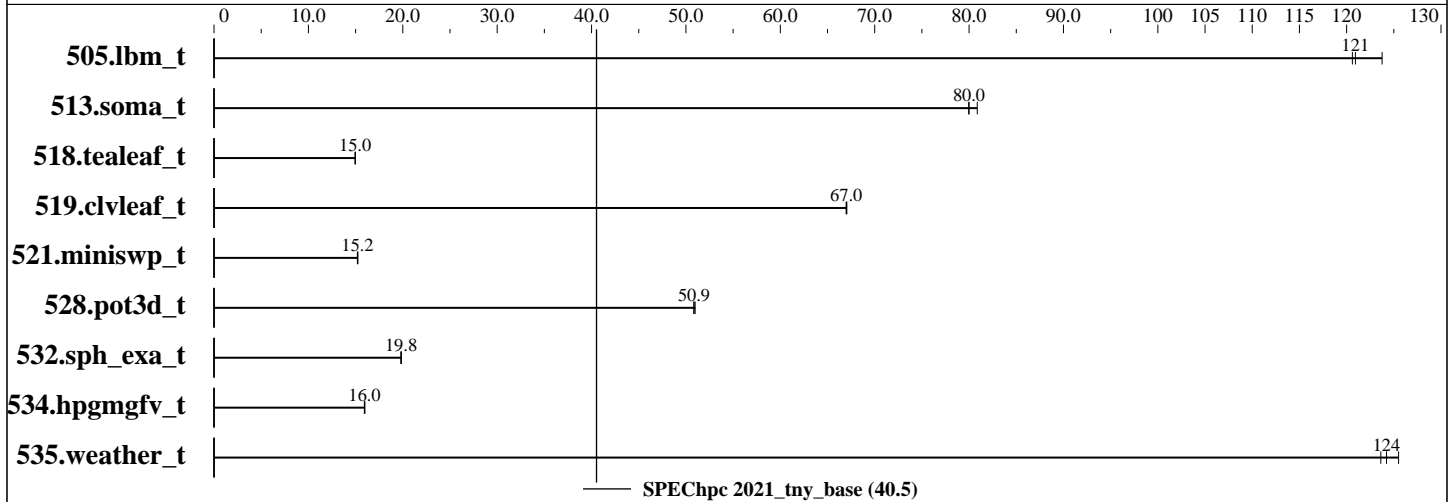
SPEChpc 2021\_tny\_base = 40.5

SPEChpc 2021\_tny\_peak = Not Run

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-40G)

**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	6	1	18.2	124	<u>18.6</u>	<u>121</u>	18.7	121									
513.soma_t	ACC	6	1	45.8	80.9	46.3	80.0	<u>46.2</u>	<u>80.0</u>									
518.tealeaf_t	ACC	6	1	110	15.0	110	15.0	<u>110</u>	<u>15.0</u>									
519.clvleaf_t	ACC	6	1	24.6	67.0	<u>24.6</u>	<u>67.0</u>	24.6	67.0									
521.miniswp_t	ACC	6	1	105	15.2	105	15.2	<u>105</u>	<u>15.2</u>									
528.pot3d_t	ACC	6	1	41.7	51.0	<u>41.8</u>	<u>50.9</u>	41.8	50.8									
532.sph_exa_t	ACC	6	1	98.3	19.8	98.4	19.8	<u>98.4</u>	<u>19.8</u>									
534.hpgmgfv_t	ACC	6	1	73.5	16.0	73.8	15.9	<u>73.6</u>	<u>16.0</u>									
535.weather_t	ACC	6	1	<u>26.0</u>	<u>124</u>	26.1	124	25.7	126									

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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  
Compute Node: ThinkSystem SR670 V2  
Interconnect: None  
File Server Node: ThinkSystem SR670 V2  
Compute Nodes Used: 1  
Total Chips: 2  
Total Cores: 80  
Total Threads: 80  
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: None  
Other Software: --  
Base Parallel Model: ACC  
Base Ranks Run: 6  
Base Threads Run: 1  
Peak Parallel Models: Not Run  
Minimum Peak Ranks: --  
Maximum Peak Ranks: --  
Max. Peak Threads: --  
Min. Peak Threads: --

## Node Description: ThinkSystem SR670 V2

### Hardware

Number of nodes: 1  
Uses of the node: compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR670 V2  
CPU Name: Intel Xeon Platinum 8380  
CPU(s) orderable: 2 chips  
Chips enabled: 2  
Cores enabled: 80  
Cores per chip: 40  
Threads per core: 1  
CPU Characteristics: Intel Turbo Boost Technology up to 3.4 GHz  
CPU MHz: 2300  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1280 KB I+D on chip per core  
L3 Cache: 60 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 4 TB NVMe SSD  
Other Hardware: None  
Accel Count: 8  
Accel Model: Tesla A100 PCIe 40GB  
Accel Vendor: Nvidia Corporation  
Accel Type: GPU  
Accel Connection: PCIe Gen4 x16  
Accel ECC enabled: Yes  
Accel Description: Nvidia Tesla A100 PCIe 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: 470.42.01  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.2-1.0.4  
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: XFS  
System State: Multi-user, run level 3  
Other Software: None



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### Node Description: ThinkSystem SR670 V2

#### Hardware

Number of nodes: 1  
Uses of the node: Fileserver  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR670 V2  
CPU Name: Intel Xeon Platinum 8380  
CPU(s) orderable: 2 chips  
Chips enabled: 2  
Cores enabled: 80  
Cores per chip: 40  
Threads per core: 1  
CPU Characteristics: Turbo up to 3.4 GHz  
CPU MHz: 2300  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1280 KB I+D on chip per core  
L3 Cache: 60 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 4 TB NVMe SSD  
Other Hardware: None  
Accel Count: 8  
Accel Model: Tesla A100 PCIe 40GB  
Accel Vendor: Nvidia  
Accel Type: GPU  
Accel Connection: Nvidia Tesla A100 PCIe 40GB  
Accel ECC enabled: Yes  
Accel Description: Nvidia Tesla A100 PCIe 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: None  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.2-1.0.4  
Adapter Firmware: 20.28.1002  
Operating System: Red Hat Enterprise Linux Server release 8.3  
Local File System: xfs  
Shared File System: None  
System State: Multi-User, run level 3  
Other Software: None

### Interconnect Description: None

#### Hardware

Vendor: None  
Model: None  
Switch Model: None  
Number of Switches: 0  
Number of Ports: 0  
Data Rate: None  
Firmware: None  
Topology: None

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#### Software

: --



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### Interconnect Description: None

#### Hardware (Continued)

Primary Use: None

### 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 --allow-run-as-root -x UCX\_MEMTYPE\_CACHE=n  
-host localhost:8 -np \$ranks perl \$[top]/bind.pl \$command

### 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)
-----
nvc 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
NVIDIA Compilers and Tools
```

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### Compiler Version Notes (Continued)

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

nvc++ 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake  
NVIDIA Compilers and Tools  
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=====  
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  
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### Base Compiler Invocation

C benchmarks:  
mpicc

C++ benchmarks:  
mpicxx

Fortran benchmarks:  
mpif90

### Base Portability Flags

532.sph\_exa\_t: --c++17

### Base Optimization Flags

C benchmarks:  
-Mfprelaxed -Mnouniform -Mstack\_arrays -fast -acc=gpu  
-DSPEC\_ACCEL\_AWARE\_MPI

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## Base Optimization Flags (Continued)

C++ benchmarks:

-Mfprelaxed -Mnouniform -Mstack\_arrays -fast -acc=gpu  
-DSPEC\_ACCEL\_AWARE\_MPI

Fortran benchmarks:

-DSPEC\_ACCEL\_AWARE\_MPI -Mfprelaxed -Mnouniform -Mstack\_arrays -fast  
-acc=gpu

## 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)

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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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