



SPEChpc™ 2021 Tiny Result

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Lenovo Global Technology

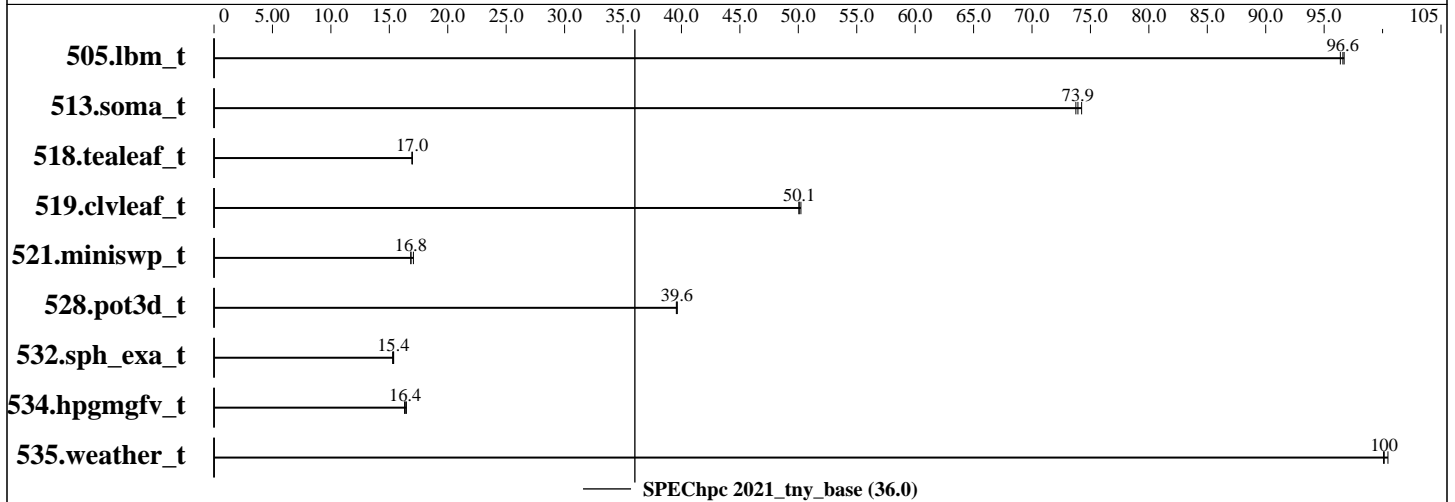
SPEChpc 2021_tny_base = 36.0

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

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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 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



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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

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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)
=====
```

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Compiler Version Notes (Continued)

nvc 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
NVIDIA Compilers and Tools
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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
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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 -Minfo=accel
-DSPEC_ACCEL_AWARE_MPI

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Base Optimization Flags (Continued)

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

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

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.

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