SPEChpc™ 2021 Tiny Result

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Lenovo Global Technology

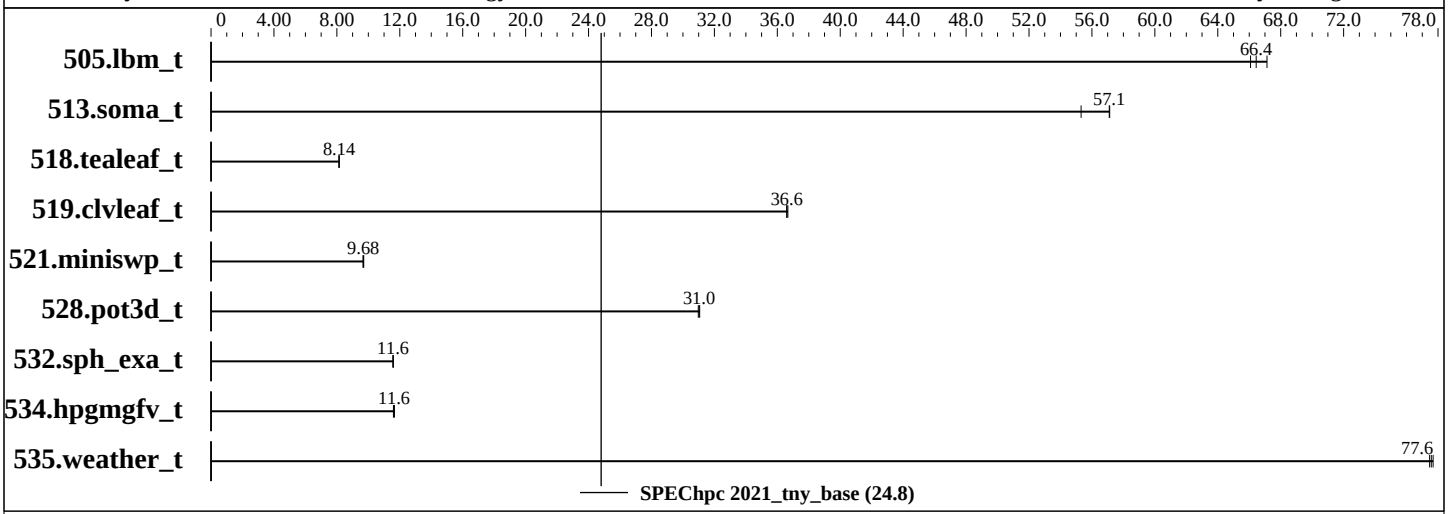
ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-40G)

SPEChpc 2021_tny_base = 24.8

SPEChpc 2021_tny_peak = Not Run

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	3	1	33.5	67.1	**33.9**	**66.4**	34.0	66.1									
513.soma_t	ACC	3	1	66.9	55.3	**64.8**	**57.1**	64.8	57.1									
518.tealeaf_t	ACC	3	1	203	8.14	203	8.14	**203**	**8.14**									
519.clvleaf_t	ACC	3	1	45.0	36.7	45.1	36.6	**45.1**	**36.6**									
521.miniswp_t	ACC	3	1	166	9.66	**165**	**9.68**	165	9.71									
528.pot3d_t	ACC	3	1	68.6	31.0	68.4	31.1	**68.5**	**31.0**									
532.sph_exa_t	ACC	3	1	169	11.6	**168**	**11.6**	168	11.6									
534.hpgmgfv_t	ACC	3	1	101	11.6	**101**	**11.6**	101	11.7									
535.weather_t	ACC	3	1	**41.6**	**77.6**	41.6	77.5	41.5	77.7									

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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: Aug-2021

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:	3
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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Test Date: Aug-2021
Hardware Availability: Aug-2021
Software Availability: Aug-2021

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

(Continued on next page)

Software

: --

Interconnect Description: None

Hardware (Continued)

Primary Use: None

Submit Notes

```
Indiviual 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
```

(Continued on next page)

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
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
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------------------------------------------------------------------------------
```

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`
`-DSPEC_ACCEL_AWARE_MPI`

(Continued on next page)

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

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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