SPEChpc™ 2021 Small Result

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Lenovo Global Technology

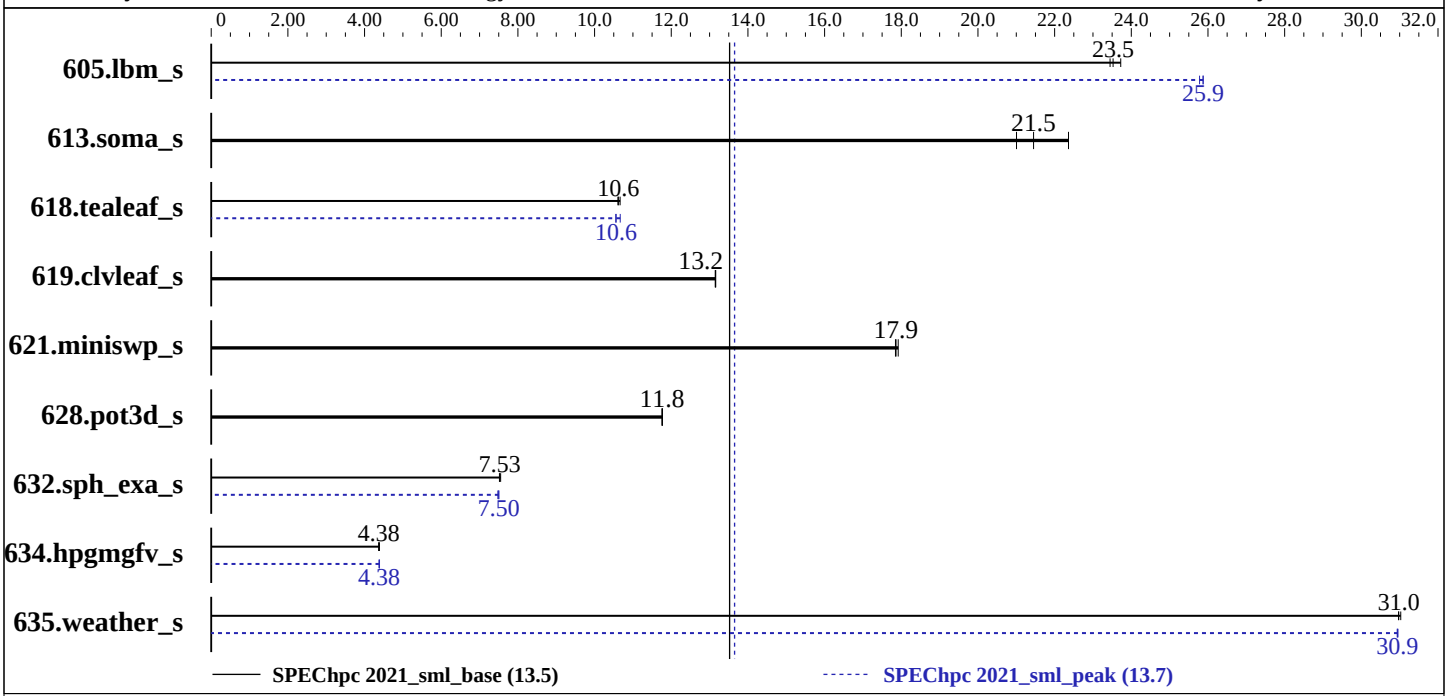
ThinkSystem SR675 V3 (AMD EPYC 9654, Nvidia H100-PCIe-80G)

SPEChpc 2021_sml_base = 13.5

SPEChpc 2021_sml_peak = 13.7

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Oct-2023



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
605.lbm_s	ACC	8	1	65.3	23.7	66.1	23.4	**65.9**	**23.5**	ACC	8	1	**59.9**	**25.9**	59.9	25.9	60.1	25.8
613.soma_s	ACC	8	1	71.6	22.4	76.2	21.0	**74.6**	**21.5**	ACC	8	1	71.6	22.4	76.2	21.0	**74.6**	**21.5**
618.tealeaf_s	ACC	8	1	**193**	**10.6**	192	10.7	193	10.6	ACC	8	1	194	10.6	**194**	**10.6**	192	10.7
619.clvleaf_s	ACC	8	1	125	13.1	**125**	**13.2**	125	13.2	ACC	8	1	125	13.1	**125**	**13.2**	125	13.2
621.miniswp_s	ACC	8	1	61.4	17.9	61.6	17.8	**61.6**	**17.9**	ACC	8	1	61.4	17.9	61.6	17.8	**61.6**	**17.9**
628.pot3d_s	ACC	8	1	**142**	**11.8**	142	11.8	142	11.8	ACC	8	1	**142**	**11.8**	142	11.8	142	11.8
632.sph_exa_s	ACC	8	1	305	7.55	306	7.52	**306**	**7.53**	ACC	8	1	308	7.48	**307**	**7.50**	307	7.50
634.hpgmgfv_s	ACC	8	1	222	4.39	223	4.37	**223**	**4.38**	ACC	8	1	223	4.38	**223**	**4.38**	222	4.39
635.weather_s	ACC	8	1	83.9	31.0	83.8	31.0	**83.9**	**31.0**	ACC	8	1	**84.0**	**30.9**	84.0	30.9	84.0	31.0

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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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Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Oct-2023

Hardware Summary

Type of System:	Homogeneous Cluster
Compute Node:	ThinkSystem SR675 V3
Compute Nodes Used:	1
Total Chips:	2
Total Cores:	192
Total Threads:	192
Total Memory:	768 GB
Total Accelerators:	8
Max. Peak Threads:	1

Software Summary

Compiler:	Nvidia HPC SDK 23.5
MPI Library:	Open MPI 4.0.5
Other MPI Info:	None
Other Software:	--
Base Parallel Model:	ACC
Base Ranks Run:	8
Base Threads Run:	1
Peak Parallel Models:	ACC
Minimum Peak Ranks:	8
Maximum Peak Ranks:	8
Max. Peak Threads:	1
Min. Peak Threads:	1

Node Description: ThinkSystem SR675 V3

Hardware

Number of nodes:	1
Uses of the node:	compute
Vendor:	Lenovo Global Technology
Model:	ThinkSystem SR655 V3
CPU Name:	AMD EPYC 9654
CPU(s) orderable:	1 chips
Chips enabled:	2
Cores enabled:	192
Cores per chip:	96
Threads per core:	1
CPU Characteristics:	Intel Turbo Boost Technology 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
Other Cache:	None
Memory:	768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Disk Subsystem:	1x ThinkSystem 2.5" 5300 480GB SSD
Other Hardware:	None
Accel Count:	8
Accel Model:	Tesla H100 PCIe 80GB
Accel Vendor:	Nvidia Corporation
Accel Type:	GPU
Accel Connection:	PCIe Gen5 x16
Accel ECC enabled:	Yes
Accel Description:	Nvidia Tesla H100 PCIe 80GB
Adapter:	Mellanox ConnectX-7 NDR
Number of Adapters:	1
Slot Type:	PCI-Express 5.0 x8
Data Rate:	400 Gb/s
Ports Used:	1
Interconnect Type:	Nvidia Mellanox ConnectX-7 NDR

Software

Accelerator Driver:	535.54.03
Adapter:	Mellanox ConnectX-7 NDR
Adapter Driver:	5.9-0.5.5
Adapter Firmware:	28.33.0508
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:	XFS
System State:	Multi-user, run level 3
Other Software:	None

Submit Notes

```
The config file option 'submit' was used.
```

Compiler Version Notes

```
==============================================================================
 CC  605.lbm_s(base, peak) 613.soma_s(base, peak) 618.tealeaf_s(base, peak)
     621.miniswp_s(base, peak) 634.hpgmgfv_s(base, peak)
------------------------------------------------------------------------------
nvc 23.5-0 64-bit target on x86-64 Linux -tp zen3
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------

==============================================================================
 CXXC 632.sph_exa_s(base, peak)
------------------------------------------------------------------------------
nvc++ 23.5-0 64-bit target on x86-64 Linux -tp zen3
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------

==============================================================================
 FC  619.clvleaf_s(base, peak) 628.pot3d_s(base, peak) 635.weather_s(base,
     peak)
------------------------------------------------------------------------------
nvfortran 23.5-0 64-bit target on x86-64 Linux -tp zen3
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------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90

Base Portability Flags

605.lbm_s: `-DSPEC_OPENACC_NO_SELF`
632.sph_exa_s: `--c++17`

Base Optimization Flags

C benchmarks:
`-Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu -Minfo=accel -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:
`-Ispecmpitime -w`

C++ benchmarks:
`-Ispecmpitime -w`

Fortran benchmarks (except as noted below):
`-w`

619.clvleaf_s: `-Ispecmpitime -w`

Peak Compiler Invocation

C benchmarks:
`mpicc`

C++ benchmarks:
`mpicxx`

Fortran benchmarks:
`mpif90`

Peak Portability Flags

605.lbm_s: `-DSPEC_OPENACC_NO_SELF`

Peak Optimization Flags

C benchmarks:

605.lbm_s: `-fast -acc=gpu -O3 -Mfprelaxed -Mnouniform -DSPEC_ACCEL_AWARE_MPI`

613.soma_s: `basepeak = yes`

618.tealeaf_s: `-fast -acc=gpu -Msafeptr -DSPEC_ACCEL_AWARE_MPI`

621.miniswp_s: `basepeak = yes`

634.hpgmgfv_s: `-fast -acc=gpu -static-nvidia -DSPEC_ACCEL_AWARE_MPI`

C++ benchmarks:
`-fast -acc=gpu -O3 -Mfprelaxed -Mnouniform -Mstack_arrays -static-nvidia -DSPEC_ACCEL_AWARE_MPI`

Fortran benchmarks:

619.clvleaf_s: `basepeak = yes`

628.pot3d_s: `basepeak = yes`

635.weather_s: `-DSPEC_ACCEL_AWARE_MPI -fast -acc=gpu -O3 -Mfprelaxed -Mnouniform -Mstack_arrays -static-nvidia`

Peak Other Flags

C benchmarks:
`-Ispecmpitime -w`

C++ benchmarks:
`-Ispecmpitime -w`

Fortran benchmarks (except as noted below):
`-w`

(Continued on next page)

Peak Other Flags (Continued)

619.clvleaf_s: `-Ispecmpitime -w`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.2022-08-24.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.2022-08-24.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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