



# SPEChpc™ 2021 Small Result

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## Lenovo Global Technology

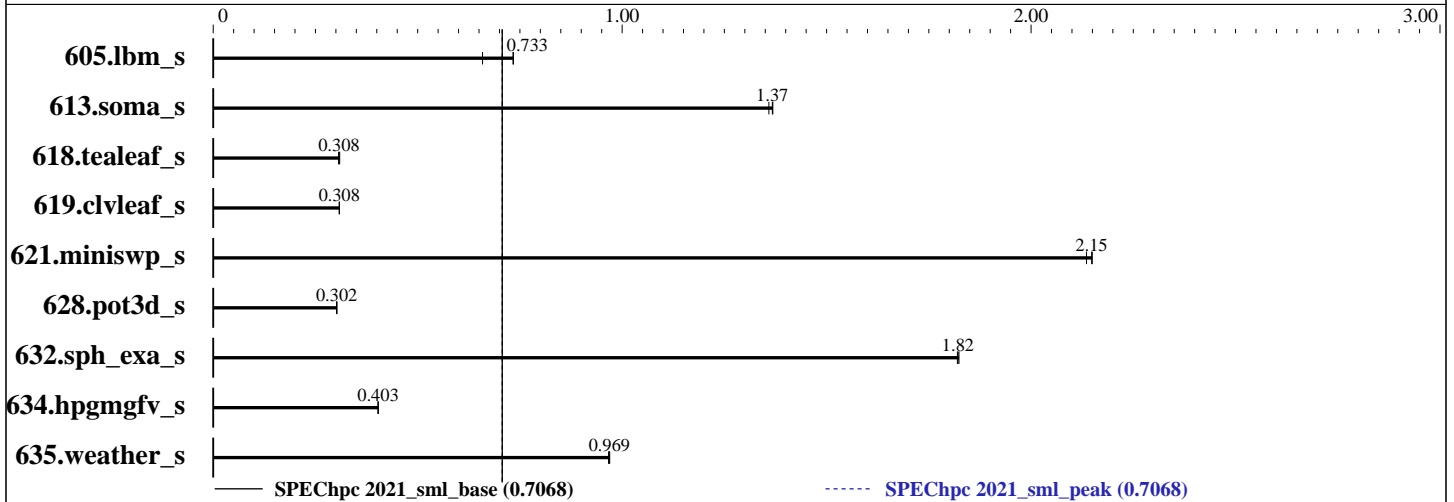
SPEChpc 2021\_sml\_base = 0.7068

## ThinkSystem SR665 (AMD EPYC 7773X)

SPEChpc 2021\_sml\_peak = 0.7068

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

Test Date: Jul-2022  
Hardware Availability: Jul-2022  
Software Availability: Jul-2022



## 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	OMP	16	8	2353	0.659	2111	0.734	<b>2114</b>	<b>0.733</b>	OMP	16	8	2353	0.659	2111	0.734	<b>2114</b>	<b>0.733</b>
613.soma_s	OMP	16	8	<b>1170</b>	<b>1.37</b>	1177	1.36	1169	1.37	OMP	16	8	<b>1170</b>	<b>1.37</b>	1177	1.36	1169	1.37
618.tealeaf_s	OMP	16	8	6687	0.307	6628	0.309	<b>6657</b>	<b>0.308</b>	OMP	16	8	6687	0.307	6628	0.309	<b>6657</b>	<b>0.308</b>
619.clvleaf_s	OMP	16	8	5349	0.308	5349	0.308	<b>5349</b>	<b>0.308</b>	OMP	16	8	5349	0.308	5349	0.308	<b>5349</b>	<b>0.308</b>
621.miniswp_s	OMP	16	8	<b>512</b>	<b>2.15</b>	512	2.15	515	2.14	OMP	16	8	<b>512</b>	<b>2.15</b>	512	2.15	515	2.14
628.pot3d_s	OMP	16	8	5550	0.302	5542	0.302	<b>5542</b>	<b>0.302</b>	OMP	16	8	5550	0.302	5542	0.302	<b>5542</b>	<b>0.302</b>
632.sph_exa_s	OMP	16	8	<b>1263</b>	<b>1.82</b>	1261	1.82	1264	1.82	OMP	16	8	<b>1263</b>	<b>1.82</b>	1261	1.82	1264	1.82
634.hpgmgfv_s	OMP	16	8	2418	0.403	2416	0.404	<b>2417</b>	<b>0.403</b>	OMP	16	8	2418	0.403	2416	0.404	<b>2417</b>	<b>0.403</b>
635.weather_s	OMP	16	8	<b>2684</b>	<b>0.969</b>	2689	0.967	2682	0.970	OMP	16	8	<b>2684</b>	<b>0.969</b>	2689	0.967	2682	0.970

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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:** Jul-2022

### Hardware Summary

Type of System: Homogenous  
Compute Node: ThinkSystem SR665  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
Compute Nodes Used: 1  
Total Chips: 2  
Total Cores: 128  
Total Threads: 256  
Total Memory: 1 TB  
Max. Peak Threads: 8

### Software Summary

Compiler: Intel C/C++/Fortran Compiler 2021.5.0  
MPI Library: Open MPI 4.0.5  
Other MPI Info: --  
Other Software: --  
Base Parallel Model: OMP  
Base Ranks Run: 16  
Base Threads Run: 8  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 16  
Maximum Peak Ranks: 16  
Max. Peak Threads: 8  
Min. Peak Threads: 8

## Node Description: ThinkSystem SR665

### Hardware

Number of nodes: 1  
Uses of the node: Compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR665  
CPU Name: AMD EPYC 7773X  
CPU(s) orderable: 1,2 chips  
Chips enabled: 2  
Cores enabled: 128  
Cores per chip: 64  
Threads per core: 2  
CPU Characteristics: Max Boost Clock up to 3.5 GHz  
CPU MHz: 2200  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 512 KB I+D on chip per core  
L3 Cache: 768 MB I+D on chip per chip  
96 MB shared / 8 cores  
Other Cache: None  
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200A-R)  
Disk Subsystem: 1x ThinkSystem 2.5" 5300 480GB SSD  
Other Hardware: None  
Accel Count: --  
Accel Model: --  
Accel Vendor: --  
Accel Type: --  
Accel Connection: --  
Accel ECC enabled: --  
Accel Description: --  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200 Gbits/s  
Ports Used: 1

### Software

Accelerator Driver: --  
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 8.5,  
Kernel 4.18.0-348.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 SR665

#### Hardware (Continued)

Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

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

##### Hardware

Vendor: Nvidia  
Model: Nvidia Mellanox ConnectX-6 HDR  
Switch Model: QM8700  
Number of Switches: 1  
Number of Ports: 40  
Data Rate: 200 Gb/s  
Firmware: 3.9.0606  
Topology: Mesh  
Primary Use: MPI Traffic, NFS Access

##### Software

: --

### Submit Notes

The config file option 'submit' was used.  
submit = mpirun --allow-run-as-root --oversubscribe -genv coll\_hcoll\_enable 1  
-x HCOLL\_ENABLE\_NBC=1 -x HCOLL\_MAIN\_IB=mlx5\_0:1 -mca pml ucx  
-hostfile /home/HPC2021F1.0.1/config/4nodes --map-by ppr:16:node:pe=8

### Compiler Version Notes

=====  
CC 605.lbm\_s(base) 613.soma\_s(base) 618.tealeaf\_s(base) 621.miniswp\_s(base)  
634.hpgmgfv\_s(base)  
=====

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.5.0 Build 20211109\_000000  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.  
=====

=====  
CXXC 632.sph\_exa\_s(base)  
=====

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on  
Intel(R) 64, Version 2021.5.0 Build 20211109\_000000  
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## Compiler Version Notes (Continued)

FC 619.clvleaf\_s(base) 628.pot3d\_s(base) 635.weather\_s(base)

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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on  
Intel(R) 64, Version 2021.5.0 Build 20211109\_000000  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.  
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## Base Compiler Invocation

C benchmarks:  
mpicc

C++ benchmarks:  
mpicxx

Fortran benchmarks:  
mpifort

## Base Portability Flags

613.soma\_s: -DSPEC\_NO\_VAR\_ARRAY\_REDUCE

## Base Optimization Flags

C benchmarks:  
-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp -ansi-alias

C++ benchmarks:  
-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp -ansi-alias

Fortran benchmarks:  
-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp

## Peak Optimization Flags

C benchmarks:  
605.lbm\_s: basepeak = yes

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## Peak Optimization Flags (Continued)

613.soma\_s: basepeak = yes  
618.tealeaf\_s: basepeak = yes  
621.miniswp\_s: basepeak = yes  
634.hpgmgfv\_s: basepeak = yes  
C++ benchmarks:  
632.sph\_exa\_s: basepeak = yes  
Fortran benchmarks:  
619.clvleaf\_s: basepeak = yes  
628.pot3d\_s: basepeak = yes  
635.weather\_s: basepeak = yes

The flags file that was used to format this result can be browsed at  
[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2021-10-20.html](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2021-10-20.html)

You can also download the XML flags source by saving the following link:  
[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2021-10-20.xml](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2021-10-20.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).

Tested with SPEChpc2021 v1.0.1 on 2022-07-08 07:29:58-0400.  
Report generated on 2022-07-26 12:16:18 by hpc2021 PDF formatter v1.0.3.  
Originally published on 2022-07-26.