



# SPEChpc™ 2021 Small Result

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## Lenovo Global Technology

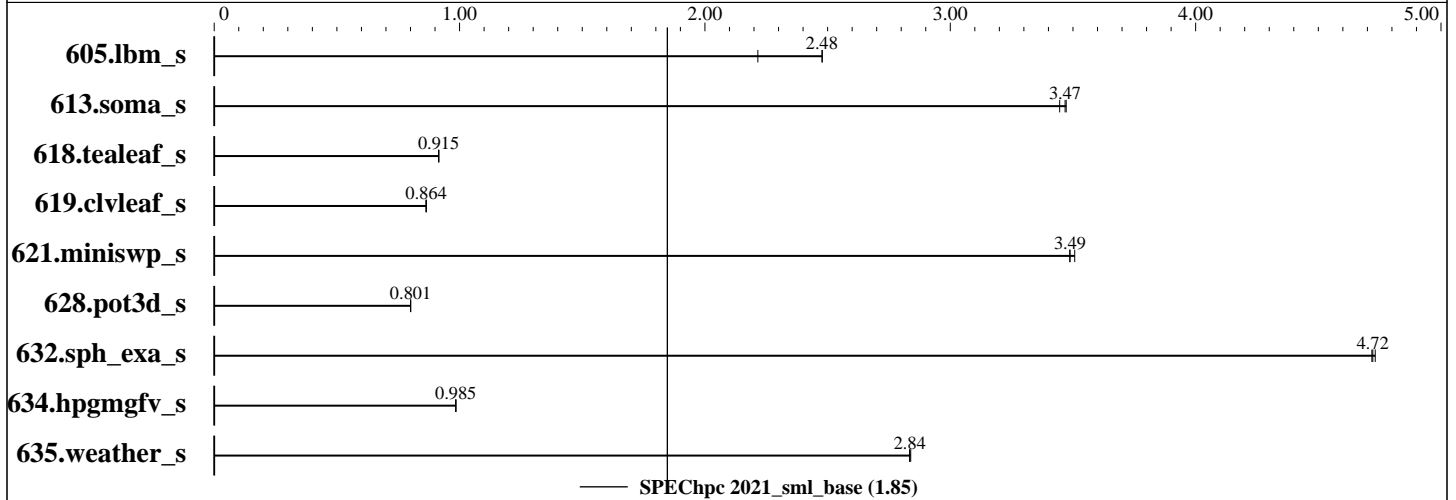
SPEChpc 2021\_sml\_base = 1.85

## ThinkSystem SR665 (AMD EPYC 7763)

SPEChpc 2021\_sml\_peak = Not Run

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

Test Date: Aug-2021  
Hardware Availability: Mar-2021  
Software Availability: Oct-2020



## 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	48	8	625	2.48	700	2.22	<b>626</b>	<b>2.48</b>									
613.soma_s	OMP	48	8	461	3.47	464	3.45	<b>461</b>	<b>3.47</b>									
618.tealeaf_s	OMP	48	8	2242	0.915	<b>2241</b>	<b>0.915</b>	2239	0.916									
619.clvleaf_s	OMP	48	8	<b>1910</b>	<b>0.864</b>	1909	0.864	1911	0.864									
621.miniswp_s	OMP	48	8	315	3.49	<b>315</b>	<b>3.49</b>	314	3.51									
628.pot3d_s	OMP	48	8	<b>2092</b>	<b>0.801</b>	2092	0.801	2094	0.800									
632.sph_exa_s	OMP	48	8	487	4.72	486	4.73	<b>487</b>	<b>4.72</b>									
634.hpgmgfv_s	OMP	48	8	<b>990</b>	<b>0.985</b>	990	0.984	990	0.985									
635.weather_s	OMP	48	8	916	2.84	917	2.83	<b>917</b>	<b>2.84</b>									

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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 SR665  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
File Server Node: ThinkSystem SR665  
Compute Nodes Used: 3  
Total Chips: 6  
Total Cores: 384  
Total Threads: 384  
Total Memory: 1536 GB  
Max. Peak Threads: --

### Software Summary

Compiler: Intel C/C++/Fortran Compiler 20.4  
MPI Library: Open MPI 4.0.5  
Other MPI Info: --  
Other Software: --  
Base Parallel Model: OMP  
Base Ranks Run: 48  
Base Threads Run: 8  
Peak Parallel Models: Not Run  
Minimum Peak Ranks: --  
Maximum Peak Ranks: --  
Max. Peak Threads: --  
Min. Peak Threads: --

## Node Description: ThinkSystem SR665

### Hardware

Number of nodes: 3  
Uses of the node: Compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR665  
CPU Name: AMD EPYC 7763  
CPU(s) orderable: 1,2 chips  
Chips enabled: 2  
Cores enabled: 128  
Cores per chip: 64  
Threads per core: 1  
CPU Characteristics: Max Boost Clock up to 3.5 GHz  
CPU MHz: 2450  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 512 KB I+D on chip per core  
L3 Cache: 256 MB I+D on chip per chip  
32 MB shared / 8 cores  
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: --  
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 Gb/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 8.3,  
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 SR665

#### Hardware (Continued)

Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

### Node Description: ThinkSystem SR665

#### Hardware

Number of nodes: 1  
Uses of the node: Fileserver  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR665  
CPU Name: AMD EPYC 7763  
CPU(s) orderable: 1,2 chips  
Chips enabled: 2  
Cores enabled: 128  
Cores per chip: 64  
Threads per core: 1  
CPU Characteristics: Max Boost Clock up to 3.5 GHz  
CPU MHz: 2450  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 512 KB I+D on chip per core  
L3 Cache: 256 MB I+D on chip per chip  
32 MB shared / 8 cores  
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: --  
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 Gb/s  
Ports Used: 1  
Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

#### 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 8.3  
Local File System: xfs  
Shared File System: N/A  
System State: Multi-User, run level 3  
Other Software: None



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

#### Hardware

#### Software

Vendor: Nvidia : --  
Model: Nvidia Mellanox ConnectX-6 HDR  
Switch Model: QM8700 Series  
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

### Submit Notes

The config file option 'submit' was used.  
submit = mpirun \${MPIRUN\_OPTS} --allow-run-as-root --oversubscribe  
--bind-to numa -map-by numa  
-mca coll\_hcoll\_enable 1 -x HCOLL\_ENABLE\_NBC=1  
-x HCOLL\_MAIN\_IB=mlx5\_0:1 -mca pml ucx  
-hostfile /home/HPC2021K35/config/6nodes -npernode 128 -np \$ranks \$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 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 for applications running on Intel(R) 64,  
Version 19.1.3.304 Build 20200925\_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
icc: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.  
-----

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

-----  
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.3.304 Build 20200925\_000000

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## Compiler Version Notes (Continued)

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.

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

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.1.3.304 Build 20200925\_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
ifort: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.  
=====

## Base Compiler Invocation

C benchmarks:  
mpicc

C++ benchmarks:  
mpicxx

Fortran benchmarks:  
mpifort

## Base Portability Flags

613.soma\_s: -DSPEC\_NO\_VAR\_ARRAY\_REDUCE  
621.miniswp\_s: -DUSE\_KBA -DUSE\_ACCELDIR  
632.sph\_exa\_s: -DSPEC\_USE\_LT\_IN\_KERNELS

## 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



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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 2018-07-14 06:21:21-0400.  
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