



# SPEChpc™ 2021 Small Result

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## Lenovo Global Technology

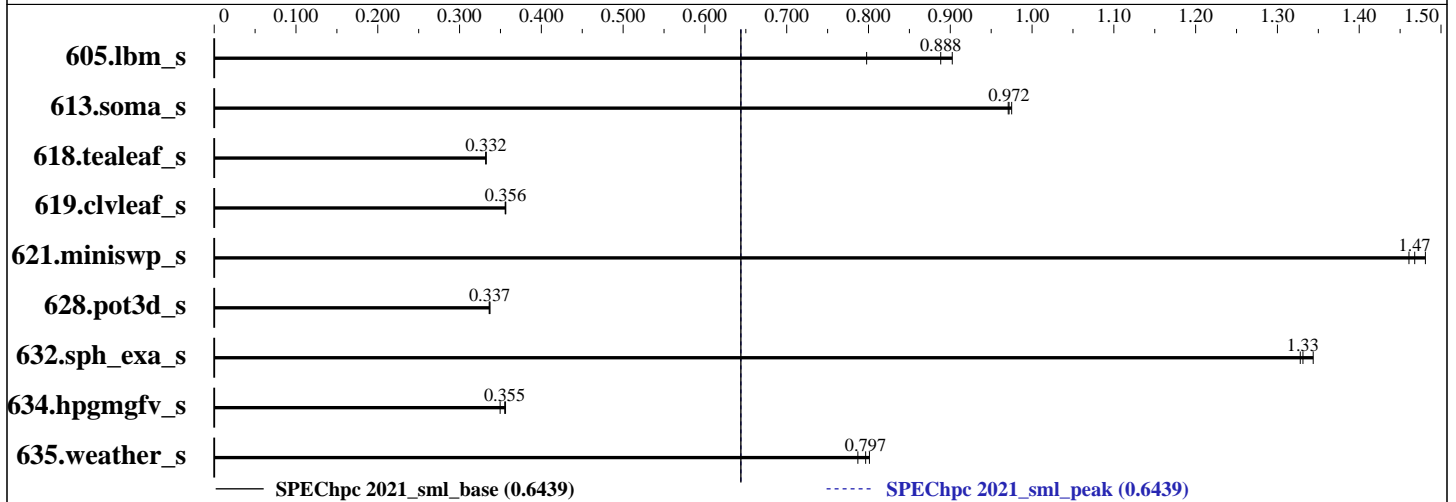
SPEChpc 2021\_sml\_base = 0.6439

### ThinkSystem SR655 V3 (AMD EPYC 9654P)

SPEChpc 2021\_sml\_peak = 0.6439

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

**Test Date:** Jan-2023  
**Hardware Availability:** Feb-2023  
**Software Availability:** Feb-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	MPI	96	1	<b>1745</b>	<b>0.888</b>	1943	0.798	1718	0.902	MPI	96	1	<b>1745</b>	<b>0.888</b>	1943	0.798	1718	0.902
613.soma_s	MPI	96	1	<b>1646</b>	<b>0.972</b>	1648	0.971	1641	0.975	MPI	96	1	<b>1646</b>	<b>0.972</b>	1648	0.971	1641	0.975
618.tealeaf_s	MPI	96	1	6166	0.332	6175	0.332	<b>6168</b>	<b>0.332</b>	MPI	96	1	6166	0.332	6175	0.332	<b>6168</b>	<b>0.332</b>
619.clvleaf_s	MPI	96	1	<b>4632</b>	<b>0.356</b>	4628	0.357	4638	0.356	MPI	96	1	<b>4632</b>	<b>0.356</b>	4628	0.357	4638	0.356
621.miniswp_s	MPI	96	1	743	1.48	753	1.46	<b>749</b>	<b>1.47</b>	MPI	96	1	743	1.48	753	1.46	<b>749</b>	<b>1.47</b>
628.pot3d_s	MPI	96	1	4982	0.336	<b>4971</b>	<b>0.337</b>	4970	0.337	MPI	96	1	4982	0.336	<b>4971</b>	<b>0.337</b>	4970	0.337
632.sph_exa_s	MPI	96	1	1732	1.33	<b>1728</b>	<b>1.33</b>	1712	1.34	MPI	96	1	1732	1.33	<b>1728</b>	<b>1.33</b>	1712	1.34
634.hpgmgfv_s	MPI	96	1	2789	0.350	<b>2745</b>	<b>0.355</b>	2737	0.356	MPI	96	1	2789	0.350	<b>2745</b>	<b>0.355</b>	2737	0.356
635.weather_s	MPI	96	1	3304	0.787	<b>3264</b>	<b>0.797</b>	3245	0.801	MPI	96	1	3304	0.787	<b>3264</b>	<b>0.797</b>	3245	0.801

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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: Homogeneous Cluster  
Compute Node: ThinkSystem SR655 V3  
Interconnect: Nvidia Mellanox ConnectX-6 HDR  
Compute Nodes Used: 1  
Total Chips: 1  
Total Cores: 96  
Total Threads: 192  
Total Memory: 768 GB  
Max. Peak Threads: 1

### Software Summary

Compiler: Intel oneAPI Compiler 2022.1.0  
MPI Library: Intel MPI Library for Linux OS, Build 20220227  
Other MPI Info: --  
Other Software: --  
Base Parallel Model: MPI  
Base Ranks Run: 96  
Base Threads Run: 1  
Peak Parallel Models: MPI  
Minimum Peak Ranks: 96  
Maximum Peak Ranks: 96  
Max. Peak Threads: 1  
Min. Peak Threads: 1

## Node Description: ThinkSystem SR655 V3

### Hardware

Number of nodes: 1  
Uses of the node: Compute  
Vendor: Lenovo Global Technology  
Model: ThinkSystem SR655 V3  
CPU Name: AMD EPYC 9654P  
CPU(s) orderable: 1 chips  
Chips enabled: 1  
Cores enabled: 96  
Cores per chip: 96  
Threads per core: 2  
CPU Characteristics: Max Boost Clock 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  
32 MB shared / 8 cores  
Other Cache: None  
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-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: Nvidia 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: Nvidia Mellanox ConnectX-6 HDR  
Adapter Driver: 5.7-1.0.2  
Adapter Firmware: 20.28.1002  
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: None  
System State: Multi-user, run level 3  
Other Software: None

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### Node Description: ThinkSystem SR655 V3

#### Hardware (Continued)

Interconnect Type: 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 = mpiexec -hostfile ${top}/6nodes -np ranks -genv OMP_NUM_THREADS=$threads -ppn % {NRNK} $command
```

### Compiler Version Notes

```
=====
FC 619.clvleaf_s(base) 628.pot3d_s(base) 635.weather_s(base)
-----
```

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

ifx: command line error: no files specified; for help type "ifx -help"

```
=====
CC 605.lbm_s(base) 613.soma_s(base) 618.tealeaf_s(base) 621.miniswp_s(base)
634.hpgmgfv_s(base)
-----
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused

[-Wunused-command-line-argument]

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## Compiler Version Notes (Continued)

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused  
[-Wunused-command-line-argument]  
=====

## Base Compiler Invocation

C benchmarks:  
mpiicc -cc=icx  
  
C++ benchmarks:  
mpiicpc -cxx=icx  
  
Fortran benchmarks:  
mpiifort -fc=ifx

## Base Portability Flags

605.lbm\_s: -lstdc++  
613.soma\_s: -lstdc++  
618.tealeaf\_s: -lstdc++  
619.clvleaf\_s: -lstdc++  
621.miniswp\_s: -lstdc++  
628.pot3d\_s: -lstdc++  
632.sph\_exa\_s: -lstdc++  
634.hpgmgfv\_s: -lstdc++  
635.weather\_s: -lstdc++

## Base Optimization Flags

C benchmarks:  
-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -ansi-alias  
  
C++ benchmarks:  
-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -ansi-alias

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## Base Optimization Flags (Continued)

Fortran benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo  
-nostandard-realloc-lhs -align array64byte

## Base Other Flags

C benchmarks:

-Ispecmpitime

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

619.clvleaf\_s: -Ispecmpitime

## Peak Optimization Flags

C benchmarks:

605.lbm\_s: basepeak = yes

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



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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.2022-11-10.html](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.html)

You can also download the XML flags source by saving the following link:  
[http://www.spec.org/hpc2021/flags/Intel\\_compiler\\_flags.2022-11-10.xml](http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.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).

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