SPEChpc™ 2021 Small Result

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Lenovo Global Technology

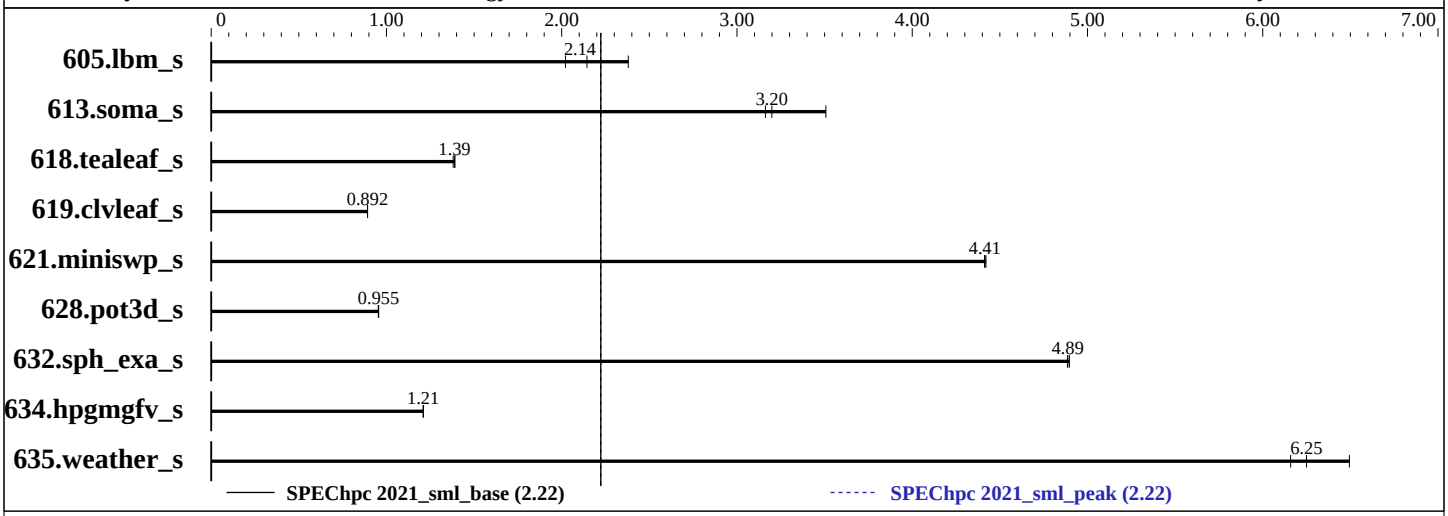
ThinkSystem SR665 (AMD EPYC 7773X)

SPEChpc 2021_sml_base = 2.22

SPEChpc 2021_sml_peak = 2.22

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	48	8	651	2.38	767	2.02	**723**	**2.14**	OMP	48	8	651	2.38	767	2.02	**723**	**2.14**
613.soma_s	OMP	48	8	506	3.16	456	3.51	**500**	**3.20**	OMP	48	8	506	3.16	456	3.51	**500**	**3.20**
618.tealeaf_s	OMP	48	8	1475	1.39	1485	1.38	**1475**	**1.39**	OMP	48	8	1475	1.39	1485	1.38	**1475**	**1.39**
619.clvleaf_s	OMP	48	8	1849	0.892	1850	0.892	**1850**	**0.892**	OMP	48	8	1849	0.892	1850	0.892	**1850**	**0.892**
621.miniswp_s	OMP	48	8	**249**	**4.41**	249	4.42	249	4.41	OMP	48	8	**249**	**4.41**	249	4.42	249	4.41
628.pot3d_s	OMP	48	8	**1754**	**0.955**	1757	0.953	1753	0.955	OMP	48	8	**1754**	**0.955**	1757	0.953	1753	0.955
632.sph_exa_s	OMP	48	8	471	4.89	**471**	**4.89**	470	4.90	OMP	48	8	471	4.89	**471**	**4.89**	470	4.90
634.hpgmgfv_s	OMP	48	8	805	1.21	806	1.21	**806**	**1.21**	OMP	48	8	805	1.21	806	1.21	**806**	**1.21**
635.weather_s	OMP	48	8	400	6.49	**416**	**6.25**	422	6.16	OMP	48	8	400	6.49	**416**	**6.25**	422	6.16

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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: Jul-2022
Hardware Availability: Jul-2022
Software Availability: Jul-2022

Hardware Summary

Type of System:	Homogenous
Compute Node:	ThinkSystem SR665
Interconnect:	Nvidia Mellanox ConnectX-6 HDR
Compute Nodes Used:	3
Total Chips:	6
Total Cores:	384
Total Threads:	768
Total Memory:	3 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:	48
Base Threads Run:	8
Peak Parallel Models:	OMP
Minimum Peak Ranks:	48
Maximum Peak Ranks:	48
Max. Peak Threads:	8
Min. Peak Threads:	8

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 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

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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

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
Copyright (C) 1985-2021 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
```

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Compiler Version Notes (Continued)

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

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`

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`

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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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