SPEChpc™ 2021 Small Result

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Lenovo Global Technology

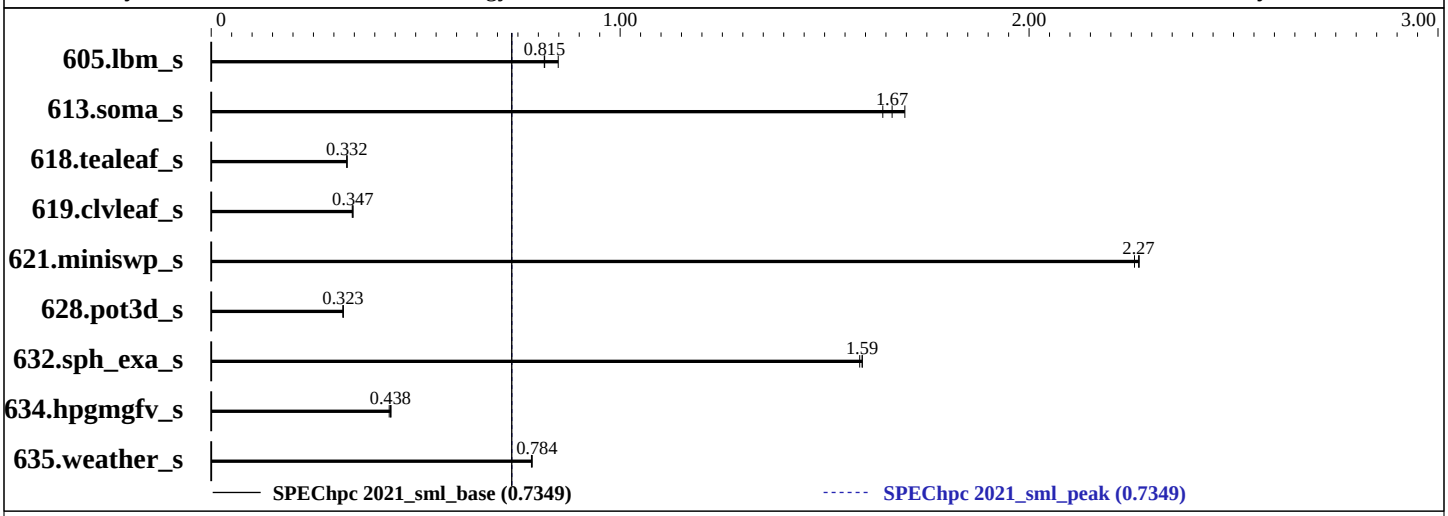
ThinkSystem SR655 V3 (AMD EPYC 9654P)

SPEChpc 2021_sml_base = 0.7349

SPEChpc 2021_sml_peak = 0.7349

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	OMP	12	16	1903	0.815	**1901**	**0.815**	1827	0.849	OMP	12	16	1903	0.815	**1901**	**0.815**	1827	0.849
613.soma_s	OMP	12	16	943	1.70	974	1.64	**961**	**1.67**	OMP	12	16	943	1.70	974	1.64	**961**	**1.67**
618.tealeaf_s	OMP	12	16	**6175**	**0.332**	6178	0.332	6175	0.332	OMP	12	16	**6175**	**0.332**	6178	0.332	6175	0.332
619.clvleaf_s	OMP	12	16	4785	0.345	4761	0.347	**4762**	**0.347**	OMP	12	16	4785	0.345	4761	0.347	**4762**	**0.347**
621.miniswp_s	OMP	12	16	**485**	**2.27**	487	2.26	485	2.27	OMP	12	16	**485**	**2.27**	487	2.26	485	2.27
628.pot3d_s	OMP	12	16	5196	0.322	**5190**	**0.323**	5189	0.323	OMP	12	16	5196	0.322	**5190**	**0.323**	5189	0.323
632.sph_exa_s	OMP	12	16	1450	1.59	**1445**	**1.59**	1445	1.59	OMP	12	16	1450	1.59	**1445**	**1.59**	1445	1.59
634.hpgmgfv_s	OMP	12	16	**2224**	**0.438**	2217	0.440	2240	0.435	OMP	12	16	**2224**	**0.438**	2217	0.440	2240	0.435
635.weather_s	OMP	12	16	**3316**	**0.784**	3313	0.785	3320	0.783	OMP	12	16	**3316**	**0.784**	3313	0.785	3320	0.783

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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: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Feb-2023

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:	16

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:	OMP
Base Ranks Run:	12
Base Threads Run:	16
Peak Parallel Models:	OMP
Minimum Peak Ranks:	12
Maximum Peak Ranks:	12
Max. Peak Threads:	16
Min. Peak Threads:	16

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

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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

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++ -DSPEC_NO_VAR_ARRAY_REDUCE`
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 -fiopenmp -ansi-alias`

C++ benchmarks:
`-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp`

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
`-ansi-alias`

Fortran benchmarks:
`-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp -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`

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Peak Optimization Flags (Continued)

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.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`

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEChpc2021 v1.1.7 on 2018-06-24 13:00:30-0400.
Report generated on 2023-02-22 12:25:43 by hpc2021 PS formatter v1.0.3.
Originally published on 2023-02-22.