SPEChpc™ 2021 Small Result

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Lenovo Global Technology

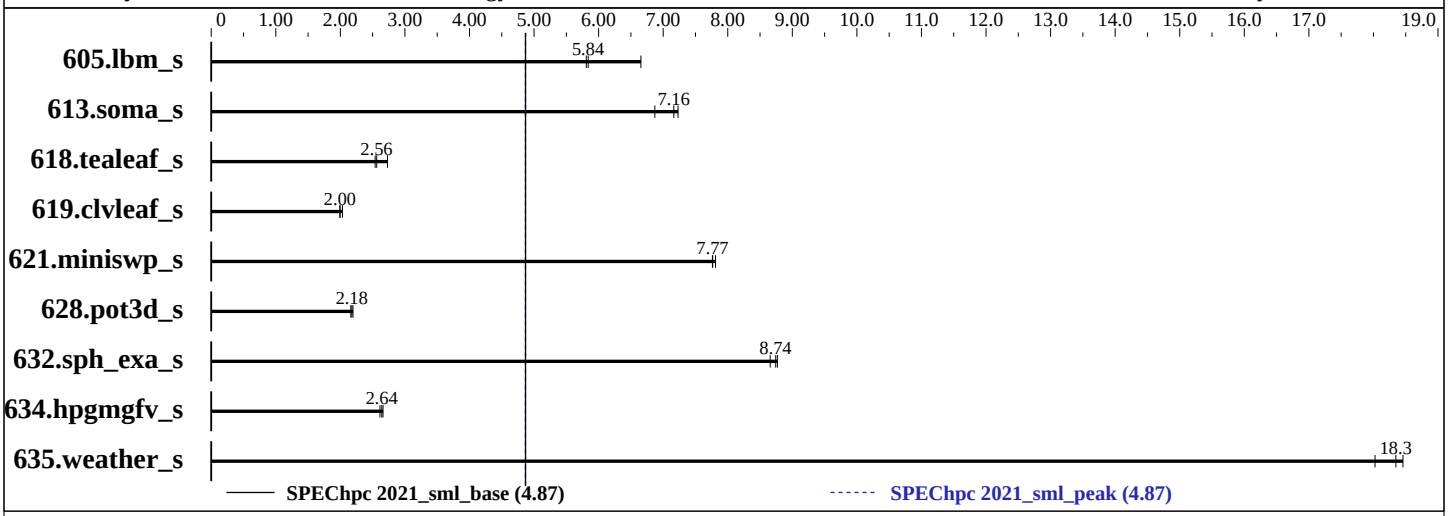
ThinkSystem SR665 V3 (AMD EPYC 9654)

SPEChpc 2021_sml_base = 4.87

SPEChpc 2021_sml_peak = 4.87

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

Test Date: Jan-2023
Hardware Availability: Nov-2022
Software Availability: Nov-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	96	8	233	6.65	267	5.81	**265**	**5.84**	OMP	96	8	233	6.65	267	5.81	**265**	**5.84**
613.soma_s	OMP	96	8	221	7.23	233	6.87	**223**	**7.16**	OMP	96	8	221	7.23	233	6.87	**223**	**7.16**
618.tealeaf_s	OMP	96	8	751	2.73	**800**	**2.56**	807	2.54	OMP	96	8	751	2.73	**800**	**2.56**	807	2.54
619.clvleaf_s	OMP	96	8	812	2.03	**827**	**2.00**	828	1.99	OMP	96	8	812	2.03	**827**	**2.00**	828	1.99
621.miniswp_s	OMP	96	8	141	7.81	**142**	**7.77**	142	7.76	OMP	96	8	141	7.81	**142**	**7.77**	142	7.76
628.pot3d_s	OMP	96	8	763	2.20	**769**	**2.18**	775	2.16	OMP	96	8	763	2.20	**769**	**2.18**	775	2.16
632.sph_exa_s	OMP	96	8	**263**	**8.74**	266	8.66	262	8.77	OMP	96	8	**263**	**8.74**	266	8.66	262	8.77
634.hpgmgfv_s	OMP	96	8	**369**	**2.64**	366	2.66	373	2.61	OMP	96	8	**369**	**2.64**	366	2.66	373	2.61
635.weather_s	OMP	96	8	144	18.0	**142**	**18.3**	141	18.5	OMP	96	8	144	18.0	**142**	**18.3**	141	18.5

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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: Nov-2022

Hardware Summary

Type of System:	Homogeneous Cluster
Compute Node:	ThinkSystem SR665 V3
Interconnect:	Nvidia Mellanox ConnectX-6 HDR
Compute Nodes Used:	4
Total Chips:	8
Total Cores:	768
Total Threads:	1536
Total Memory:	6 TB
Max. Peak Threads:	8

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:	96
Base Threads Run:	8
Peak Parallel Models:	OMP
Minimum Peak Ranks:	96
Maximum Peak Ranks:	96
Max. Peak Threads:	8
Min. Peak Threads:	8

Node Description: ThinkSystem SR665 V3

Hardware

Number of nodes:	4
Uses of the node:	Compute
Vendor:	Lenovo Global Technology
Model:	ThinkSystem SR665 V3
CPU Name:	AMD EPYC 9654
CPU(s) orderable:	1,2 chips
Chips enabled:	2
Cores enabled:	192
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:	1536 GB (24 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 SR665 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 $[top]/4nodes -np ranks -genv OMP_NUM_THREADS=$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]
------------------------------------------------------------------------------
```

(Continued on next page)

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.

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