SPEChpc™ 2021 Small Result

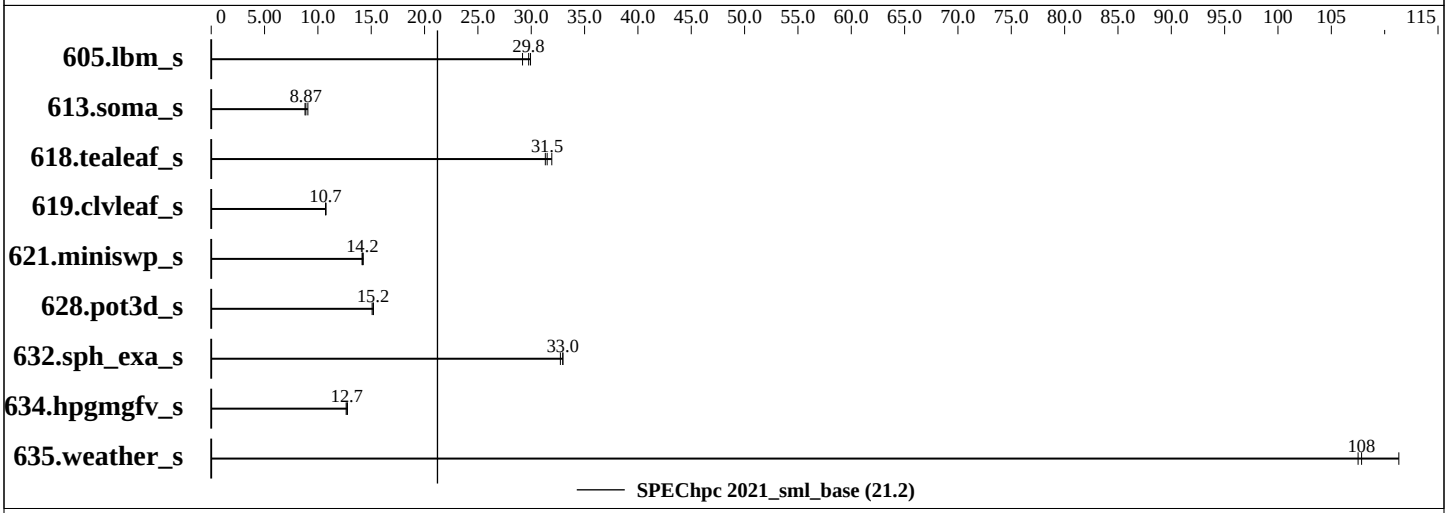
Information Technology Services Office, HKUST
(Test Sponsor: The Hong Kong University of Science and Technology)
HPC4 - AMD EPYC 9754 (Dual Socket)
Dell PowerEdge R6625

SPEChpc 2021_sml_base = 21.2

SPEChpc 2021_sml_peak = Not Run

hpc2021 License: 7401
Test Sponsor: The Hong Kong University of Science and Technology
Tested by: Information Technology Services Office

Test Date: Dec-2025
Hardware Availability: Sep-2024
Software Availability: Sep-2024



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	512	8	53.1	29.2	**52.1**	**29.8**	51.8	29.9									
613.soma_s	OMP	512	8	**180**	**8.87**	182	8.79	177	9.06									
618.tealeaf_s	OMP	512	8	**65.1**	**31.5**	65.5	31.3	64.2	31.9									
619.clvleaf_s	OMP	512	8	153	10.8	**154**	**10.7**	154	10.7									
621.miniswp_s	OMP	512	8	**77.6**	**14.2**	77.8	14.1	77.2	14.3									
628.pot3d_s	OMP	512	8	111	15.1	**110**	**15.2**	110	15.2									
632.sph_exa_s	OMP	512	8	69.8	33.0	70.3	32.7	**69.8**	**33.0**									
634.hpgmgfv_s	OMP	512	8	77.1	12.6	**76.6**	**12.7**	76.3	12.8									
635.weather_s	OMP	512	8	23.4	111	**24.1**	**108**	24.2	108									

SPEChpc 2021_sml_base = 21.2
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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 Cluster
Compute Node:	DELL PowerEdge R6625 (AMD EPYC 9754)
Interconnect:	Cisco Nexus 9332D-GX2B
Compute Nodes Used:	16
Total Chips:	32
Total Cores:	4096
Total Threads:	4096
Total Memory:	12 TB
Total Accelerators:	0
Max. Peak Threads:	--

Software Summary

Compiler:	Intel(R) oneAPI DPC++/C++ Compiler 2025.0.4.20241205
MPI Library:	Open MPI 5.0.6
Other MPI Info:	--
Other Software:	--
Base Parallel Model:	OMP
Base Ranks Run:	512
Base Threads Run:	8
Peak Parallel Models:	Not Run
Minimum Peak Ranks:	--
Maximum Peak Ranks:	--
Max. Peak Threads:	--
Min. Peak Threads:	--

Node Description: DELL PowerEdge R6625 (AMD EPYC 9754)

Hardware

Number of nodes:	16
Uses of the node:	Compute
Vendor:	Dell Inc.
Model:	PowerEdge R6625
CPU Name:	AMD EPYC 9754 128-Core Processor
CPU(s) orderable:	2 chips
Chips enabled:	2
Cores enabled:	256
Cores per chip:	128
Threads per core:	1
CPU Characteristics:	2.25 - 3.1 GHz, HT Disabled
CPU MHz:	2250
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	256 MB I+D on chip per chip 16 MB shared / 8 cores
Other Cache:	None
Memory:	768 GB (24 x 32 GB DDR5-4800 at 4800MHz)
Disk Subsystem:	DELL PERC H355 Front (2TB)
Other Hardware:	Immersion Cooling (Direct Liquid Cooling)
Accel Count:	--
Accel Model:	--
Accel Vendor:	--
Accel Type:	--
Accel Connection:	--
Accel ECC enabled:	--
Accel Description:	--
Adapter:	Mellanox ConnectX-6 HDR MT28908
Number of Adapters:	1
Slot Type:	PCIe 4.0 x16

(Continued on next page)

Software

Accelerator Driver:	None
Adapter:	Mellanox ConnectX-6 HDR MT28908
Adapter Driver:	24.10-2.1.8.0
Adapter Firmware:	20.41.1000
Operating System:	Rocky Linux 9.5 5.14.0-503.40.1.el9_5.x86_64
Local File System:	tmpfs
Shared File System:	Dell OneFS via NFS v3
System State:	Run level 5
Other Software:	None

Node Description: DELL PowerEdge R6625 (AMD EPYC 9754)

Hardware (Continued)

Data Rate:	200 Gbit/s
Ports Used:	1
Interconnect Type:	RoCE v2

Interconnect Description: Cisco Nexus 9332D-GX2B

Hardware

Vendor:	Cisco
Model:	Cisco Nexus 9332D-GX2B
Switch Model:	RoCE v2 Ethernet Switch
Number of Switches:	
Number of Ports:	32
Data Rate:	400 Gbit/s
Firmware:	--
Topology:	--
Primary Use:	MPI & RDMA Traffic, NFS

Software

: --

Submit Notes

```
The config file option 'submit' was used.
 SLURM Scheduler 22.05
 mpirun -n ${ranks} --mca topo ^treematch --bind-to numa numactl -l $command
```

General Notes

```
Environment variables set by runhpc before the start of the run:
OMP_DYNAMIC = "false"
OMP_PLACES = "cores"
OMP_PROC_BIND = "close"
UCX_TLS = "rc,knem,sm"
```

Compiler Version Notes

```
==============================================================================
 CXXC 632.sph_exa_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler 2025.0.4 (2025.0.4.20241205)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
  /opt/shared/.spack-edge/opt/spack/linux-rocky9-x86_64_v4/gcc-11.5.0.spack/intel-oneapi-compilers-2025.0.4-sn26au2eyxigpsati3gb5oxmtku6s5uo/compiler/2025.0/bin/compiler
```

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Compiler Version Notes (Continued)

```
Configuration file:
  /opt/shared/.spack-edge/opt/spack/linux-rocky9-x86_64_v4/gcc-11.5.0.spack/intel-oneapi-compilers-2025.0.4-sn26au2eyxigpsati3gb5oxmtku6s5uo/compiler/2025.0/bin/compiler/../icpx.cfg
------------------------------------------------------------------------------

==============================================================================
 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 2025.0.4 (2025.0.4.20241205)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir:
  /opt/shared/.spack-edge/opt/spack/linux-rocky9-x86_64_v4/gcc-11.5.0.spack/intel-oneapi-compilers-2025.0.4-sn26au2eyxigpsati3gb5oxmtku6s5uo/compiler/2025.0/bin/compiler
Configuration file:
  /opt/shared/.spack-edge/opt/spack/linux-rocky9-x86_64_v4/gcc-11.5.0.spack/intel-oneapi-compilers-2025.0.4-sn26au2eyxigpsati3gb5oxmtku6s5uo/compiler/2025.0/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
 FC  619.clvleaf_s(base) 628.pot3d_s(base) 635.weather_s(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.4 20241205
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`mpicc`

C++ benchmarks:
`mpicxx`

Fortran benchmarks:
`mpifort`

Base Portability Flags

605.lbm_s: `-lstdc++`
613.soma_s: `-lstdc++`
618.tealeaf_s: `-lstdc++`
621.miniswp_s: `-lstdc++`
632.sph_exa_s: `-std=c++14 -lstdc++`
634.hpgmgfv_s: `-lstdc++`

Base Optimization Flags

C benchmarks:
```
-march=common-avx512 -Ofast -flto -ffast-math
-mprefer-vector-width=512 -qopenmp -ansi-alias
```

C++ benchmarks:
```
-march=common-avx512 -Ofast -flto -ffast-math
-mprefer-vector-width=512 -qopenmp -ansi-alias
```

Fortran benchmarks:
```
-march=common-avx512 -Ofast -flto -ffast-math
-mprefer-vector-width=512 -qopenmp -nostandard-realloc-lhs
-align array64byte
```

Base Other Flags

C benchmarks:
```
-Wno-incompatible-function-pointer-types
```

C++ benchmarks:
```
-Wno-incompatible-function-pointer-types
```


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

Tested with SPEChpc2021 v1.1.10 on 2025-12-25 07:17:21+0800.
Report generated on 2025-12-25 08:00:24 by hpc2021 PDF formatter v112.