# SPEChpc™ 2021 Small Result

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## Lenovo Global Technology

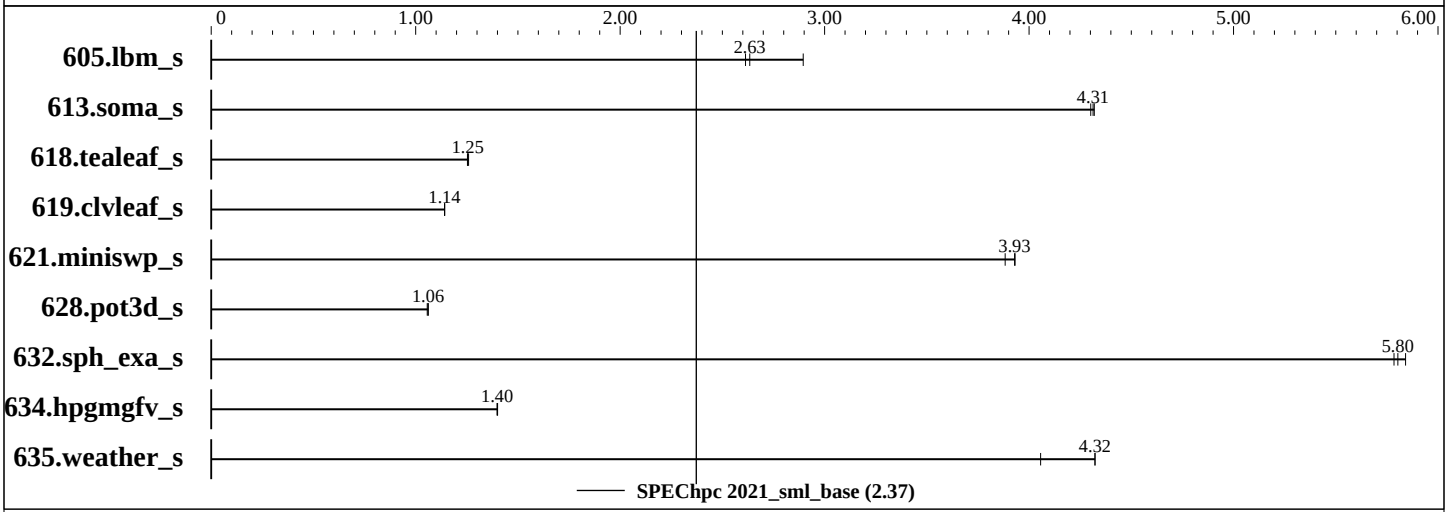
## ThinkSystem SR665 (AMD EPYC 7763)

SPEChpc 2021_sml_base = 2.37

SPEChpc 2021_sml_peak = Not Run

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

**Test Date:** Aug-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Oct-2020




## 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 | 64 | 8 | 535 | 2.90 | 593 | 2.61 | **588** | **2.63** | | | | | | | | | |
| 613.soma_s | OMP | 64 | 8 | **371** | **4.31** | 372 | 4.30 | 370 | 4.32 | | | | | | | | | |
| 618.tealeaf_s | OMP | 64 | 8 | 1636 | 1.25 | **1634** | **1.25** | 1629 | 1.26 | | | | | | | | | |
| 619.clvleaf_s | OMP | 64 | 8 | 1446 | 1.14 | **1445** | **1.14** | 1445 | 1.14 | | | | | | | | | |
| 621.miniswp_s | OMP | 64 | 8 | **280** | **3.93** | 283 | 3.88 | 280 | 3.93 | | | | | | | | | |
| 628.pot3d_s | OMP | 64 | 8 | 1585 | 1.06 | **1579** | **1.06** | 1579 | 1.06 | | | | | | | | | |
| 632.sph_exa_s | OMP | 64 | 8 | 398 | 5.78 | **396** | **5.80** | 394 | 5.84 | | | | | | | | | |
| 634.hpgmgfv_s | OMP | 64 | 8 | **697** | **1.40** | 696 | 1.40 | 697 | 1.40 | | | | | | | | | |
| 635.weather_s | OMP | 64 | 8 | 641 | 4.06 | **602** | **4.32** | 601 | 4.32 | | | | | | | | | |

**SPEChpc 2021_sml_base =** **2.37**

**SPEChpc 2021_sml_peak =** **Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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**Test Date:** Aug-2021
**Hardware Availability:** Mar-2021
**Software Availability:** Oct-2020

### Hardware Summary

| | |
|---|---|
| Type of System: | Homogenous |
| Compute Node: | ThinkSystem SR665 |
| Interconnect: | Nvidia Mellanox ConnectX-6 HDR |
| File Server Node: | ThinkSystem SR665 |
| Compute Nodes Used: | 4 |
| Total Chips: | 8 |
| Total Cores: | 512 |
| Total Threads: | 512 |
| Total Memory: | 2 TB |
| Max. Peak Threads: | -- |

### Software Summary

| | |
|---|---|
| Compiler: | Intel C/C++/Fortran Compiler 20.4 |
| MPI Library: | Open MPI 4.0.5 |
| Other MPI Info: | -- |
| Other Software: | -- |
| Base Parallel Model: | OMP |
| Base Ranks Run: | 64 |
| Base Threads Run: | 8 |
| Peak Parallel Models: | Not Run |
| Minimum Peak Ranks: | -- |
| Maximum Peak Ranks: | -- |
| Max. Peak Threads: | -- |
| Min. Peak Threads: | -- |

## Node Description: ThinkSystem SR665

### Hardware

| | |
|---|---|
| Number of nodes: | 4 |
| Uses of the node: | Compute |
| Vendor: | Lenovo Global Technology |
| Model: | ThinkSystem SR665 |
| CPU Name: | AMD EPYC 7763 |
| CPU(s) orderable: | 1,2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 128 |
| Cores per chip: | 64 |
| Threads per core: | 1 |
| CPU Characteristics: | Max Boost Clock up to 3.5 GHz |
| CPU MHz: | 2450 |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 512 KB I+D on chip per core |
| L3 Cache: | 256 MB I+D on chip per chip<br>32 MB shared / 8 cores |
| Other Cache: | None |
| Memory: | 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R) |
| Disk Subsystem: | 1 x 480 GB 2.5" 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 Gb/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 8.3,<br>Kernel 4.18.0-193.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

## Node Description: ThinkSystem SR665

### Hardware

| | |
|---|---|
| Number of nodes: | 1 |
| Uses of the node: | Fileserver |
| Vendor: | Lenovo Global Technology |
| Model: | ThinkSystem SR665 |
| CPU Name: | AMD EPYC 7763 |
| CPU(s) orderable: | 1,2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 128 |
| Cores per chip: | 64 |
| Threads per core: | 1 |
| CPU Characteristics: | Max Boost Clock up to 3.5 GHz |
| CPU MHz: | 2450 |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 512 KB I+D on chip per core |
| L3 Cache: | 256 MB I+D on chip per chip<br>32 MB shared / 8 cores |
| Other Cache: | None |
| Memory: | 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R) |
| Disk Subsystem: | 1 x 480 GB 2.5" 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 Gb/s |
| Ports Used: | 1 |
| Interconnect Type: | Nvidia Mellanox ConnectX-6 HDR |

### 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 8.3 |
| Local File System: | xfs |
| Shared File System: | N/A |
| System State: | Multi-User, run level 3 |
| Other Software: | None |

**Interconnect Description: Nvidia Mellanox ConnectX-6 HDR**

### Hardware

| | |
|---|---|
| Vendor: | Nvidia |
| Model: | Nvidia Mellanox ConnectX-6 HDR |
| Switch Model: | QM8700 Series |
| 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 ${MPIRUN_OPTS} --allow-run-as-root --oversubscribe
--bind-to numa -map-by numa
-mca coll_hcoll_enable 1 -x HCOLL_ENABLE_NBC=1
-x HCOLL_MAIN_IB=mlx5_0:1 -mca pml ucx
-hostfile /home/HPC2021K35/config/6nodes -npernode 128 -np $ranks $command
```

## General Notes

```
Environment variables set by runhpc before the start of the run:
UCX_MEMTYPE_CACHE = "n"
UCX_TLS = "self,shm,cuda_copy"
```

## 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 for applications running on Intel(R) 64,
  Version 19.1.3.304 Build 20200925_000000
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.
------------------------------------------------------------------------------

==============================================================================
 CXXC 632.sph_exa_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.1.3.304 Build 20200925_000000
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.
------------------------------------------------------------------------------

==============================================================================
 FC  619.clvleaf_s(base) 628.pot3d_s(base) 635.weather_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.3.304 Build 20200925_000000
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-may-2021 UTC.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpifort

## Base Portability Flags

613.soma_s: -DSPEC_NO_VAR_ARRAY_REDUCE
621.miniswp_s: -DUSE_KBA -DUSE_ACCELDIR
632.sph_exa_s: -DSPEC_USE_LT_IN_KERNELS

## 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

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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