# SPEChpc™ 2021 Tiny Result



## HKUST HPC Infra. Center: Dell AMD 9754

(Test Sponsor: The HK Univ. of Science and Technology)

Dell PowerEdge R6625

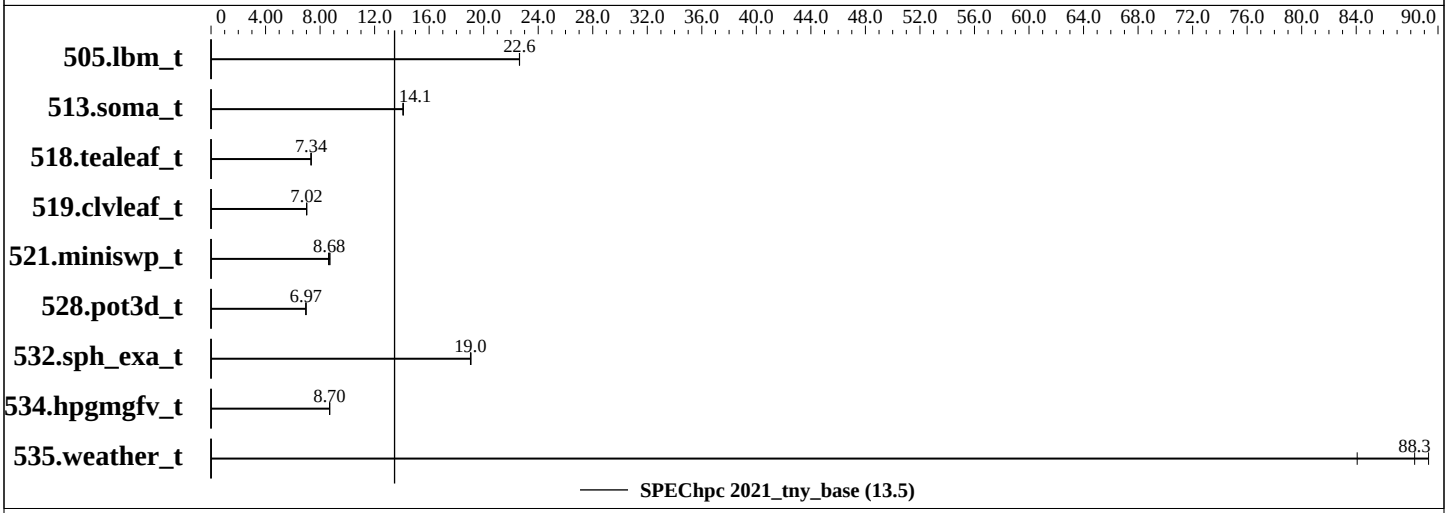
AMD EPYC 9754 (2 x 128-Core)

SPEChpc 2021_tny_base = 13.5

SPEChpc 2021_tny_peak = Not Run

**hpc2021 License:** 7401
**Test Sponsor:** The HK Univ. of Science and Technology
**Tested by:** Information Technology Services Office

**Test Date:** May-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 |
| 505.lbm_t | MPI | 256 | 1 | **99.4** | **22.6** | 99.4 | 22.6 | 99.5 | 22.6 | | | | | | | | | |
| 513.soma_t | MPI | 256 | 1 | 262 | 14.1 | **262** | **14.1** | 263 | 14.1 | | | | | | | | | |
| 518.tealeaf_t | MPI | 256 | 1 | 225 | 7.34 | 225 | 7.34 | **225** | **7.34** | | | | | | | | | |
| 519.clvleaf_t | MPI | 256 | 1 | 235 | 7.02 | 235 | 7.01 | **235** | **7.02** | | | | | | | | | |
| 521.miniswp_t | MPI | 256 | 1 | 183 | 8.73 | **184** | **8.68** | 186 | 8.62 | | | | | | | | | |
| 528.pot3d_t | MPI | 256 | 1 | 305 | 6.97 | **305** | **6.97** | 306 | 6.95 | | | | | | | | | |
| 532.sph_exa_t | MPI | 256 | 1 | 102 | 19.0 | **102** | **19.0** | 102 | 19.1 | | | | | | | | | |
| 534.hpgmgfv_t | MPI | 256 | 1 | 135 | 8.70 | 135 | 8.71 | **135** | **8.70** | | | | | | | | | |
| 535.weather_t | MPI | 256 | 1 | 38.4 | 84.1 | 36.1 | 89.3 | **36.5** | **88.3** | | | | | | | | | |

**SPEChpc 2021_tny_base = 13.5**

**SPEChpc 2021_tny_peak = Not Run**

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

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**Software Availability:** Sep-2024

### Hardware Summary

| | |
|---|---|
| Type of System: | SMP |
| Compute Node: | DELL PowerEdge R6625 (AMD EPYC 9754) |
| Interconnect: | Cisco Nexus 9332D-GX2B |
| Compute Nodes Used: | 1 |
| Total Chips: | 2 |
| Total Cores: | 256 |
| Total Threads: | 512 |
| Total Memory: | 768 GB |
| Total Accelerators: | 0 |
| Max. Peak Threads: | -- |

### Software Summary

| | |
|---|---|
| Compiler: | Intel(R) oneAPI DPC++/C++ Compiler 2025.0.4.20241205 |
| MPI Library: | Intel(R) MPI Library for Linux* OS 2021.14.20250213-0d7f579 |
| Other MPI Info: | -- |
| Other Software: | -- |
| Base Parallel Model: | MPI |
| Base Ranks Run: | 256 |
| Base Threads Run: | 1 |
| 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: | 1 |
| Uses of the node: | Compute |
| Vendor: | Dell Inc. |
| Model: | Dell PowerEdge R6625 |
| CPU Name: | AMD EPYC 9754 |
| CPU(s) orderable: | 2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 256 |
| Cores per chip: | 128 |
| Threads per core: | 2 |
| CPU Characteristics: | Base 2.25 GHz, Boost up to 3.1 GHz |
| 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<br>16 MB shared / 8 cores |
| Other Cache: | None |
| Memory: | 768 GB (24 x 32 GB DDR5-4800 at 4800MHz) |
| Disk Subsystem: | 2 x 2 TB SAS SSD (Raid 1) |
| 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 |

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### 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<br>5.14.0-503.40.1.el9_5.x86_64<br>git-0970460-ID94f55d9 |
| Local File System: | tmpfs |
| Shared File System: | Dell OneFS via NFS v3 |
| System State: | Run level 5 |
| Other Software: | None |

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**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.
 mpirun -np $rank $command
```

## General Notes

```
Environment variables set by runhpc before the start of the run:
I_MPI_PIN = "1"
I_MPI_PIN_CELL = "core"
I_MPI_PIN_PROCESSOR_LIST = "all"
I_MPI_PIN_RESPECT_HCA = "0"

 Additional Information:
 Command line: align_va_addr=on amd_pstate=passive audit=0
 cgroup_no_v1=all cgroup_no_v1=named clocksource=tsc crashkernel=0
 debugfs=on default_hugepagesz=2M hugetlb_free_vmemmap=1 iommu=pt
 ipv6.disable=1 mitigations=off net.naming-scheme=v238 numa_balancing=disable
 selinux=0 tsc=reliable workqueue.default_affinity_scope=numa
```

## Compiler Version Notes

```
==============================================================================
 CXXC 532.sph_exa_t(base)
------------------------------------------------------------------------------
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
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-2025.0.4-6frph2hu6pm6omjaqjksd4rf53ylgjfa/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-2025.0.4-6frph2hu6pm6omjaqjksd4rf53ylgjfa/compiler/2025.0/bin/compiler/../icpx.cfg
------------------------------------------------------------------------------

==============================================================================
 CC  505.lbm_t(base) 513.soma_t(base) 518.tealeaf_t(base) 521.miniswp_t(base)
      534.hpgmgfv_t(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-2025.0.4-6frph2hu6pm6omjaqjksd4rf53ylgjfa/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-2025.0.4-6frph2hu6pm6omjaqjksd4rf53ylgjfa/compiler/2025.0/bin/compiler/../icx.cfg
------------------------------------------------------------------------------

==============================================================================
 FC  519.clvleaf_t(base) 528.pot3d_t(base) 535.weather_t(base)
------------------------------------------------------------------------------
ifx (IFX) 2025.0.4 20241205
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`mpiicc -cc=icx`

C++ benchmarks:
`mpiicpc -cxx=icpx`

Fortran benchmarks:
`mpiifort -fc=ifx`

## Base Portability Flags

505.lbm_t: `-lstdc++`

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## Base Portability Flags (Continued)

513.soma_t: `-lstdc++`
518.tealeaf_t: `-lstdc++`
521.miniswp_t: `-lstdc++`
532.sph_exa_t: `-std=c++14 -lstdc++`
534.hpgmgfv_t: `-lstdc++`

## Base Optimization Flags

C benchmarks:
`-march=common-avx512 -Ofast -flto -ffast-math`
`-mprefer-vector-width=512 -qopt-streaming-stores always -ansi-alias`

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

Fortran benchmarks:
`-march=common-avx512 -Ofast -flto -ffast-math`
`-mprefer-vector-width=512 -qopt-streaming-stores always`
`-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 v1.1.8 on 2025-05-23 09:17:32+0800.
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