Lenovo Global Technology

ThinkSystem SR655 V3 (AMD EPYC 9654P, Nvidia H100-PCIE-80G)

SPEChpc 2021_tny_base = 17.7
SPEChpc 2021_tny_peak = 17.9

Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
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<th>Ratio</th>
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<td>79.0</td>
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</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
**Lenovo Global Technology**  
ThinkSystem SR655 V3 (AMD EPYC 9654P, Nvidia H100-PCIE-80G)

### Hardware Summary

- **Type of System:** Homogeneous Cluster  
- **Compute Node:** ThinkSystem SR655 V3  
- **Total Chips:** 1  
- **Total Cores:** 96  
- **Total Threads:** 96  
- **Total Memory:** 384 GB  
- **Max. Peak Threads:** 1

### Software Summary

- **Compiler:** Nvidia HPC SDK 22.11  
- **MPI Library:** Open MPI 4.0.5  
- **Other MPI Info:** None  
- **Other Software:** --  
- **Base Parallel Model:** ACC  
- **Base Ranks Run:** 1  
- **Base Threads Run:** 1  
- **Peak Parallel Models:** ACC  
- **Minimum Peak Ranks:** 1  
- **Maximum Peak Ranks:** 1  
- **Max. Peak Threads:** 1  
- **Min. Peak Threads:** 1

### Node Description: ThinkSystem SR655 V3

#### Hardware

- **Number of nodes:** 1  
- **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:** 1  
- **CPU Characteristics:** Intel Turbo Boost Technology 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  
- **Memory:** 384 GB (24 x 16 GB 2Rx4 PC5-4800B-R)  
- **Disk Subsystem:** 1x ThinkSystem 2.5" 5300 480GB SSD  
- **Other Hardware:** None  
- **Accel Count:** 8  
- **Accel Model:** Tesla H100 PCIe 80GB  
- **Accel Type:** GPU  
- **Accelerator Driver:** 525.60.13  
- **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 9, Kernel 5.14.0-70.22.1.el9_0.x86_64  
- **Local File System:** xfs  
- **Shared File System:** XFS  
- **System State:** Multi-user, run level 3  
- **Other Software:** None

#### Software

- **Accelerator Driver:** 525.60.13  
- **Adapter:** Mellanox ConnectX-6 HDR  
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## Lenovo Global Technology

ThinkSystem SR655 V3 (AMD EPYC 9654P, Nvidia H100-PCIE-80G)

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<th>SPEChpc 2021_tny_peak = 17.9</th>
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<tbody>
<tr>
<td>hpc2021 License: 28</td>
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<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Feb-2023</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Feb-2023</td>
</tr>
</tbody>
</table>

### Submit Notes

Individual Ranks were bound to the CPU cores on the same NUMA node as the GPU using 'numactl' within the following "bind2.pl" perl script:

```perl
---- Start bind2.pl -----
my %bind;
$bind{0} = "1-3";
$bind{1} = "144-146";
$bind{2} = "8-10";
$bind{3} = "11-14";
$bind{4} = "41-43";
$bind{5} = "44-47";
$bind{6} = "61-63";
$bind{7} = "64-67";
my $rank = $ENV{OMPI_COMM_WORLD_LOCAL_RANK};
my $cmd = "taskset -c $bind{$rank} ";
while (my $arg = shift) {
    $cmd .= "$arg ";
}
my $rc = system($cmd);
exit($rc);
---- End bind.pl -----
```

The config file option 'submit' was used.

```
submit = mpirun --allow-run-as-root -x UCX_MEMTYPE_CACHE=n -host localhost:2 -np $ranks perl $[top]/bind2.pl $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  505.lbm_t(base, peak) 513.soma_t(base, peak) 518.tealeaf_t(base, peak)
     521.miniswp_t(base, peak) 534.hpgmgfv_t(base, peak)
```

```
nvc 22.11-0 64-bit target on x86-64 Linux -tp zen3
NVIDIA Compilers and Tools
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```

```
CXXC 532.sph_exa_t(base, peak)
```

```
nvc++ 22.11-0 64-bit target on x86-64 Linux -tp zen3
NVIDIA Compilers and Tools
```

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Lenovo Global Technology

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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------
==============================================================================
FC  519.clvleaf_t(base, peak) 528.pot3d_t(base, peak) 535.weather_t(base, peak)
------------------------------------------------------------------------------
nvfortran 22.11-0 64-bit target on x86-64 Linux -tp zen3
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------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90

Base Portability Flags

505.lbm_t: -DSPEC_OPENACC_NO_SELF
532.sph_exa_t: --c++17

Base Optimization Flags

C benchmarks:
-fast -acc=gpu -Mfprelaxed -Mnouiform -Mstack_arrays
-DSPEC_ACCEL_AWARE_MPI

C++ benchmarks:
-fast -acc=gpu -Mfprelaxed -Mnouiform -Mstack_arrays
-DSPEC_ACCEL_AWARE_MPI

Fortran benchmarks:
-DSPEC_ACCEL_AWARE_MPI -fast -acc=gpu -Mfprelaxed -Mnouiform
-Mstack_arrays
Lenovo Global Technology

ThinkSystem SR655 V3 (AMD EPYC 9654P, Nvidia H100-PCIE-80G)

SPEChpc 2021 Tiny Result

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Base Other Flags

C benchmarks (except as noted below):
-Ispecmpitime -w

521.miniswp_t: -Ispecmpitime/ -w

534.hpgmgfv_t: -Ispecmpitime -w

C++ benchmarks:
-Ispecmpitime -w

Fortran benchmarks (except as noted below):
-w

519.clvleaf_t: -Ispecmpitime -w

Peak Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90

Peak Portability Flags

505.lbm_t: -DSPEC_OPENACC_NO_SELF

Peak Optimization Flags

C benchmarks:

505.lbm_t: -fast -acc=gpu -O3 -Mfprelaxed -Mnouniform
-DSPEC_ACCEL_AWARE_MPI

513.soma_t: basepeak = yes

(Continued on next page)
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Peak Optimization Flags (Continued)

518.tealeaf_t: -fast -acc=gpu -Msafeptr -DSPEC_ACCEL_AWARE_MPI
521.miniswp_t: basepeak = yes
534.hpgmgfvt: -fast -acc=gpu -static-nvidia -DSPEC_ACCEL_AWARE_MPI

C++ benchmarks:
- fast -acc=gpu -O3 -Mfprelaxed -Mnouniform -Mstack_arrays
- static-nvidia -DSPEC_ACCEL_AWARE_MPI

Fortran benchmarks:
519.clvleaf_t: basepeak = yes
528.pot3d_t: basepeak = yes
535.weather_t: -DSPEC_ACCEL_AWARE_MPI -fast -acc=gpu -O3 -Mfprelaxed
- Mnouniform -Mstack_arrays -static-nvidia

Peak Other Flags

C benchmarks (except as noted below):
- Ispecmpitime -w
521.miniswp_t: -Ispecmpitime/ -w
534.hpgmgfvt: -Ispecmpitime -w

C++ benchmarks:
- Ispecmpitime -w

Fortran benchmarks (except as noted below):
- w
519.clvleaf_t: -Ispecmpitime -w

The flags file that was used to format this result can be browsed at
http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/nv2021_flags_v1.0.3.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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