## Lenovo Global Technology

**ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-80G)**

### hpc2021 License: 28

### Test Sponsor: Lenovo Global Technology

### Tested by: Lenovo Global Technology

### SPEChpc 2021_tny_base = 38.1

### SPEChpc 2021_tny_peak = Not Run

### Test Date: Aug-2021

### Hardware Availability: Aug-2021

### Software Availability: Aug-2021

### Results Table

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**SPEChpc 2021_tny_base = 38.1**

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*Lenovo Global Technology*

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**SPEChpc 2021_tny_base = 38.1**

**SPEChpc 2021_tny_peak = Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
# SPEChpc™ 2021 Tiny Result

**Lenovo Global Technology**

SPEChpcTM 2021 Tiny Result

Lenovo Global Technology

SPEChpc 2021_tny_base = 38.1

SPEChpc 2021_tny_peak = Not Run

**hpc2021 License:** 28

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

<table>
<thead>
<tr>
<th>Hardware Summary</th>
<th>Software Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of System: Homogenous</td>
<td>Compiler: Nvidia HPC SDK 21.5</td>
</tr>
<tr>
<td>Compute Node: ThinkSystem SR670 V2</td>
<td>MPI Library: Open MPI 4.0.5</td>
</tr>
<tr>
<td>Interconnect: None</td>
<td>Other MPI Info: None</td>
</tr>
<tr>
<td>File Server Node: ThinkSystem SR670 V2</td>
<td>Other Software: None</td>
</tr>
<tr>
<td>Compute Nodes Used: 1</td>
<td>Base Parallel Model: ACC</td>
</tr>
<tr>
<td>Total Chips: 2</td>
<td>Base Ranks Run: 7</td>
</tr>
<tr>
<td>Total Cores: 80</td>
<td>Base Threads Run: 1</td>
</tr>
<tr>
<td>Total Threads: 80</td>
<td>Peak Parallel Models: Not Run</td>
</tr>
<tr>
<td>Total Memory: 512 GB</td>
<td>Minimum Peak Ranks: None</td>
</tr>
<tr>
<td>Max. Peak Threads: --</td>
<td>Maximum Peak Ranks: None</td>
</tr>
</tbody>
</table>

**Node Description: ThinkSystem SR670 V2**

<table>
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<tr>
<th>Hardware</th>
<th>Software</th>
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<tbody>
<tr>
<td>Number of nodes: 1</td>
<td>Accelerator Driver: 470.42.01</td>
</tr>
<tr>
<td>Uses of the node: compute</td>
<td>Adapter: Mellanox ConnectX-6 HDR</td>
</tr>
<tr>
<td>Vendor: Lenovo Global Technology</td>
<td>Adapter Driver: 5.2-1.0.4</td>
</tr>
<tr>
<td>Model: ThinkSystem SR670 V2</td>
<td>Adapter Firmware: 20.28.1002</td>
</tr>
<tr>
<td>CPU Name: Intel Xeon Platinum 8380</td>
<td>Operating System: Red Hat Enterprise Linux Server release 8.3, Kernel 4.18.0-193.el8.x86_64</td>
</tr>
<tr>
<td>CPU(s) orderable: 2 chips</td>
<td>Local File System: xfs</td>
</tr>
<tr>
<td>Chips enabled: 2</td>
<td>Shared File System: XFS</td>
</tr>
<tr>
<td>Cores enabled: 80</td>
<td>System State: Multi-user, run level 3</td>
</tr>
<tr>
<td>Cores per chip: 40</td>
<td>Other Software: None</td>
</tr>
<tr>
<td>Threads per core: 1</td>
<td>Other Hardware: None</td>
</tr>
</tbody>
</table>

**CPU Characteristics:** Intel Turbo Boost Technology up to 3.4 GHz

**CPU MHz:** 2300

**Primary Cache:** 32 KB I + 48 KB D on chip per core

**Secondary Cache:** 1280 KB I+D on chip per core

**L3 Cache:** 60 MB I+D on chip per chip

**Other Cache:** None

**Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)

**Disk Subsystem:** 1 x 4 TB NVMe SSD

**Other Hardware:** None

**Accel Count:** 8

**Accel Model:** Tesla A100 PCIe 80GB

**Accel Vendor:** Nvidia Corporation

**Accel Type:** GPU

**Accel Connection:** PCIe Gen4 x16

**Accel ECC enabled:** Yes

**Accel Description:** Nvidia Tesla A100 PCIe 80GB

**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
## Lenovo Global Technology

**SPEChpc 2021 Tiny Result**

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-80G)

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

**SPEChpc 2021_tny_base = 38.1**

**SPEChpc 2021_tny_peak = Not Run**

### Node Description: ThinkSystem SR670 V2

#### Hardware

- **Number of nodes:** 1
- **Uses of the node:** Fileserver
- **Vendor:** Lenovo Global Technology
- **Model:** ThinkSystem SR670 V2
- **CPU Name:** Intel Xeon Platinum 8380
- **CPU(s) orderable:** 2 chips
- **Chips enabled:** 2
- **Cores enabled:** 80
- **Cores per chip:** 40
- **Threads per core:** 1
- **CPU Characteristics:** Turbo up to 3.4 GHz
- **CPU MHz:** 2300
- **Primary Cache:** 32 KB I + 48 KB D on chip per core
- **Secondary Cache:** 1280 KB I+D on chip per core
- **L3 Cache:** 60 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)
- **Disk Subsystem:** 1 x 4 TB NVMe SSD
- **Other Hardware:** None
- **Accel Count:** 8
- **Accel Model:** Tesla A100 PCIe 80GB
- **Accel Vendor:** Nvidia
- **Accel Type:** GPU
- **Accel Connection:** Nvidia Tesla A100 PCIe 80GB
- **Accel ECC enabled:** Yes
- **Accel Description:** Nvidia Tesla A100 PCIe 80GB
- **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:** None
- **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:** None
- **System State:** Multi-User, run level 3
- **Other Software:** None

### Interconnect Description: None

#### Hardware

- **Vendor:** None
- **Model:** None
- **Switch Model:** None
- **Number of Switches:** 0
- **Number of Ports:** 0
- **Data Rate:** None
- **Firmware:** None
- **Topology:** None

(Continued on next page)
## Lenovo Global Technology

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-80G)

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**SPEChpc 2021_tny_base = 38.1**

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### Submit Notes

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

```perl
my %bind;
$bind{0} = "1-3";
$bind{1} = "4-7";
$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);
```

The config file option 'submit' was used.

**submit = mpirun --allow-run-as-root -x UCX_MEMTYPE_CACHE=n -host localhost:8 -np $ranks perl ${top}/bind.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

```bash
CC  505.lbm_t(base) 513.soma_t(base) 518.tealeaf_t(base) 521.miniswp_t(base)
   534.hpgmgfv_t(base)
```

---

nvc 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake

NVIDIA Compilers and Tools

(Continued on next page)
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### Compiler Version Notes (Continued)

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CXXC 532.sph_exa_t (base)

- nvc++ 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
- NVIDIA Compilers and Tools

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FC 519.clvleaf_t (base) 528.pot3d_t (base) 535.weather_t (base)

- nvfortran 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
- NVIDIA Compilers and Tools

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-------------------------------

### Base Compiler Invocation

- **C benchmarks**:
  - mpicc

- **C++ benchmarks**:
  - mpicxx

- **Fortran benchmarks**:
  - mpif90

### Base Portability Flags

- 521.miniswp_t: -DUSE_KBA -DUSE_ACCELDIR
- 532.sph_exa_t: -DSPEC_USE_LT_IN KERNELS --c++17

### Base Optimization Flags

- **C benchmarks**:
  - -Mfprelaxed
  - -Mnouniform
  - -Mstack_arrays
  - -fast
  - -acc=gpu
  - -DSPEC_ACCEL_AWARE_MPI

(Continued on next page)
SPECTM 2021 Tiny Result

Lenovo Global Technology

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-80G)

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SPEChpc2021_tny_peak = Not Run

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

Test Date: Aug-2021
Hardware Availability: Aug-2021
Software Availability: Aug-2021

Base Optimization Flags (Continued)

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

Fortran benchmarks:
-DSPEC_ACCEL_AWARE_MPI -Mfprelaxed -Mnouniform -Mstack_arrays -fast
-acc=gpu

Base Other Flags

C benchmarks:
-w

C++ benchmarks:
-w

Fortran benchmarks:
-w

The flags file that was used to format this result can be browsed at

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/nv2021_flags.xml

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

Tested with SPEChpc2021 v1.0.1 on 2021-08-20 12:51:46-0400.
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