



BiFrost

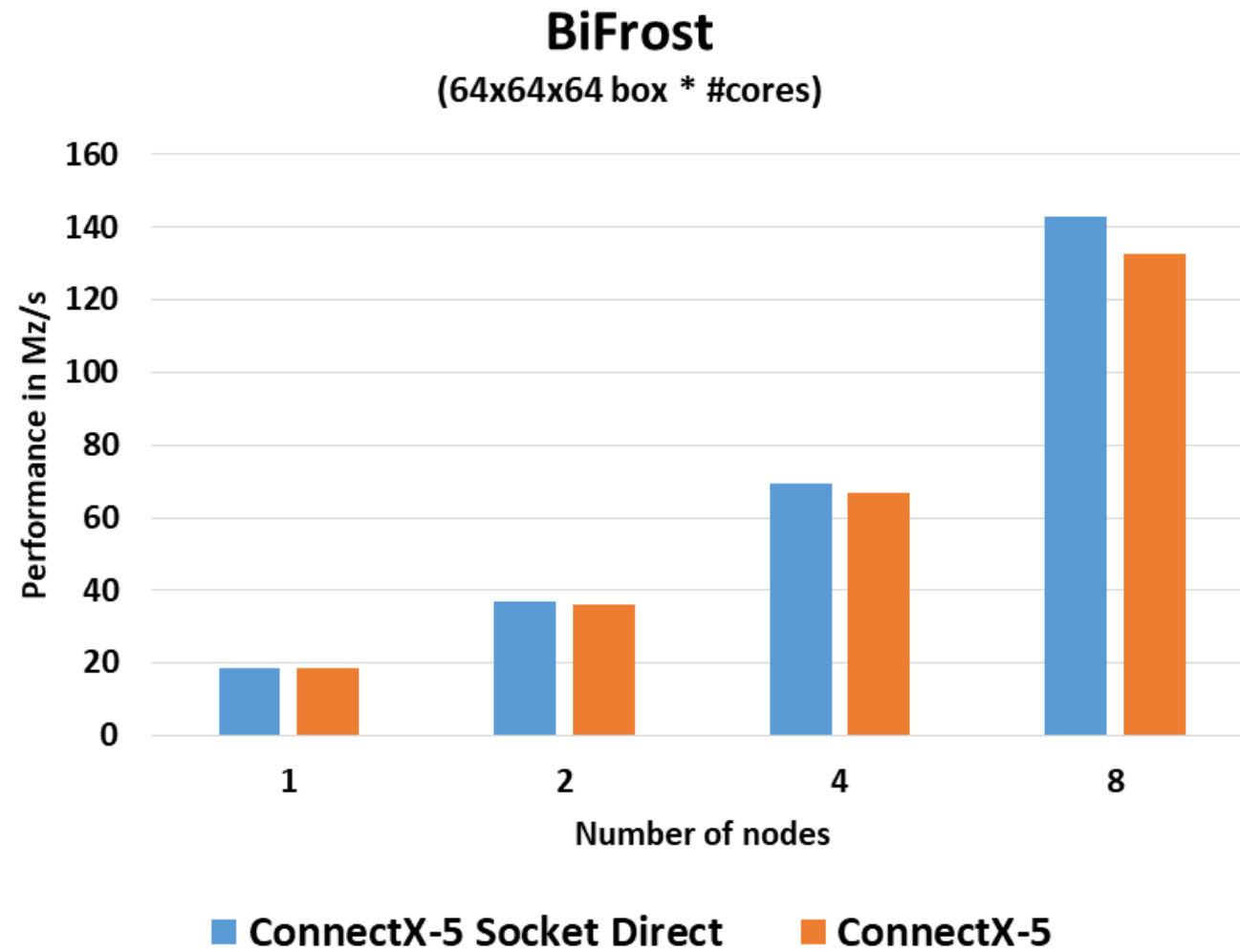
Performance Evaluation and Benchmarking

Aug 2018

- **BiFrost applications is being used for simulating stellar atmospheres**
- **To understand the details of the atmosphere it is necessary to simulate the whole atmosphere since the different layers interact strongly**
- **These physical regimes are very diverse and it takes a highly efficient massively parallel numerical code to solve the associated equations.**
- **The code is subjected not in the public domain**
- **More high level details on the application can be found [here](#).**

- **Providing best practices for BiFrost over AMD EYPC based platform**
- **The presented results will demonstrate**
 - The considerations for higher productivity and efficiency
 - Network scalability

- **Supermicro AS -2023US-TR4 8-node cluster (“Venus”)**
 - Dual Socket AMD EPYC 7551 32-Core Processor @ 2.00GHz
 - Mellanox ConnectX-5 EDR 100Gb/s InfiniBand/Ethernet
 - Mellanox Switch-IB 2 SB7800 36-Port 100Gb/s EDR InfiniBand switches
 - Memory: 256GB DDR4 2677MHz RDIMMs per node
 - 240GB 7.2K RPM SSD 2.5" hard drive per node
- **Software**
 - OS: Red Hat 7.5
 - Driver: MLNX_OFED 4.4.1
 - Compilers: Intel compilers 2018.3.222
 - MPI: HPC-X v2.2
 - Application Version: BiFrost v1.1
 - Test case: CFD on 64x64x64 box/core
 - IO Type: Lustre
 - Metric: Application-reported elapsed time, Mz/s



MPIRun command for ConnectX-5 Socket Direct

- **mpirun -np 512 -bind-to core -report-bindings -mca coll_hcoll_enable 0 -x UCX_MAX_EAGER_LANES=2 -x UCX_MAX_RNDV_LANES=2 -x UCX_NET_DEVICES=mlx5_2:1,mlx5_4:1 -mca btl_openib_if_include mlx5_2:1,mlx5_4:1 -x MALLOC_MMAP_MAX_=0 -x MALLOC_TRIM_THRESHOLD_=-1 ~/Bifrost_bench_v1.1/RUNS/photo_tr.x.hpcx-2.2.0**

Thank You

