



SJTU Team in SC19 Student Cluster Competition: A lightning talk

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Introduction to our team

- From a student association organized by CHPC of SJTU.
- Consists of 6 undergraduate team members that majors in computer science, electrical engineering, chemistry and physics.
- Teams from our association participated in multiple student cluster competitions over the years.





Cluster configuration

- RDMA Interconnect: Mellanox FDR Infiniband
- 6 x Inspur NF5280M5 chassis and motherboard
- Per node:
 - 2 x Intel Xeon Gold 6240 Processors
 - 384 GB DDR4 RAM, 12 channels in total
 - 1 x Intel 910 Series 400GB PCIe SSD
- Other peripheral hardware:
 - 8 x NVIDIA V100 32GB PCIe accelerators (on two nodes)
 - 1 x Intel P3600 800GB PCIe SSD





Cluster configuration

- Main storage filesystem: BeeGFS (<https://beegfs.io>)
- Node OS: CentOS 7.6 (boots from network)
- Environment modules for network-shared software installations.
- MPI implementations: Intel Parallel Studio XE 2019, OpenMPI (various versions and build configurations)



Working on applications

VPIC

- Found the internal computing kernel timer not very reliable. (MPI barrier)
- Choosing and tuning parallel filesystem for it's IO-boundedness.
- Hotspot optimization with CUDA.

SST

- Choosing the best component partitioning scheme on our cluster (Zoltan)
- Figuring out its scalability and choosing task layout accordingly.

Reproducibility Challenge (GEP)

- Figured out the variables we can tune for experiment cases.
- Generated a few cases for testing based on our understanding of these variables.



Our strategy

- Build a versatile, general-purpose HPC cluster.
- Double-check for correctness when optimizing applications.
- Only do what is possible to be done.
- Try to learn something new everyday in our SCC adventure!



Thank you
for listening!

