Team Tsinghua
Student Cluster Competition
@SC'19

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Team Members

Prof. Jidong Zhai

Dr. Wentao Han

Chenggang Zhao
Reproducibility

Jiaao He
Arch
HPL/HPCG
SST

Kezhao Huang
VPIC

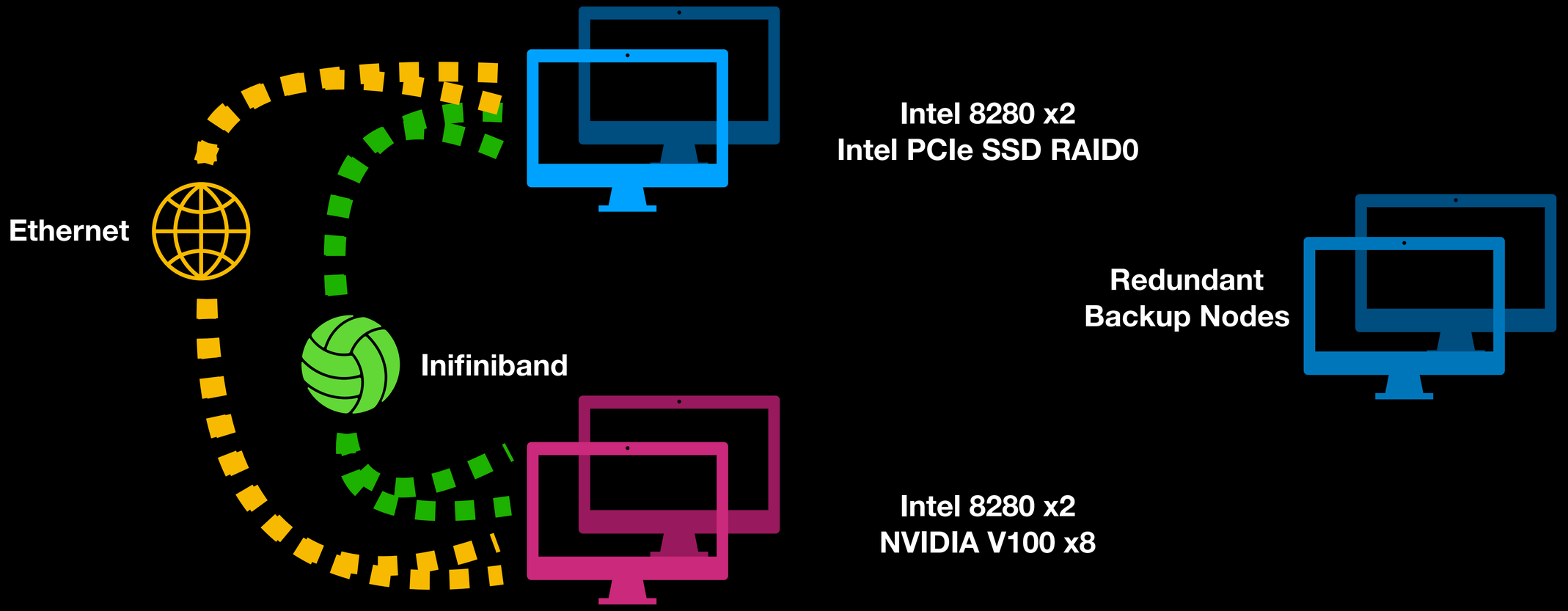
Chen Zhang
Reproducibility

Shengqi Chen
Networking
IO-500
SST

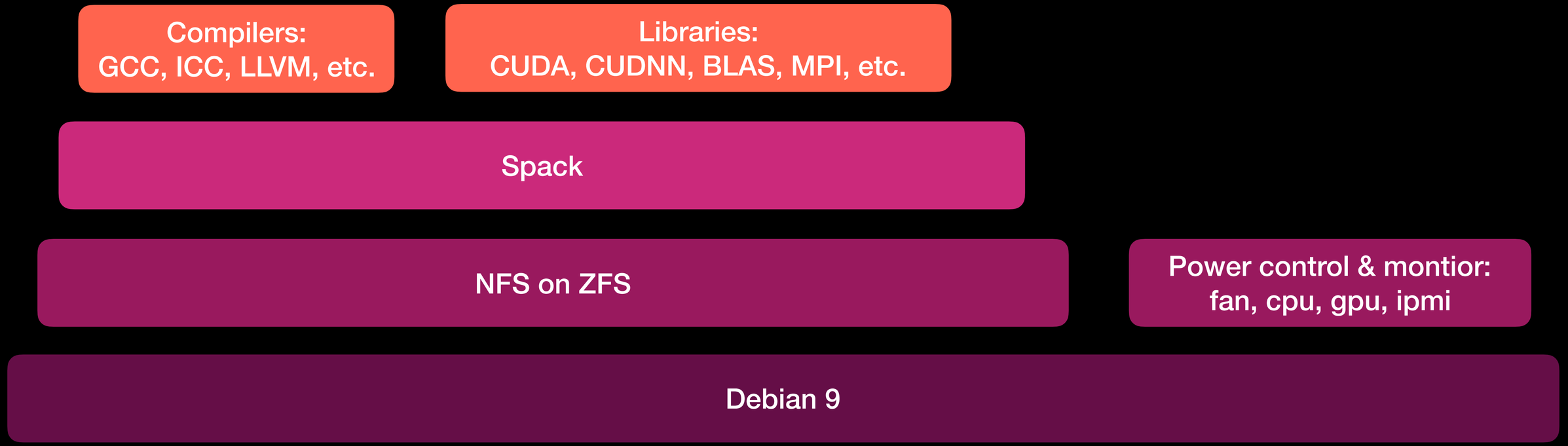
Liyan Zheng
VPIC

Junior Backups
Working in all aspects

Cluster Architecture

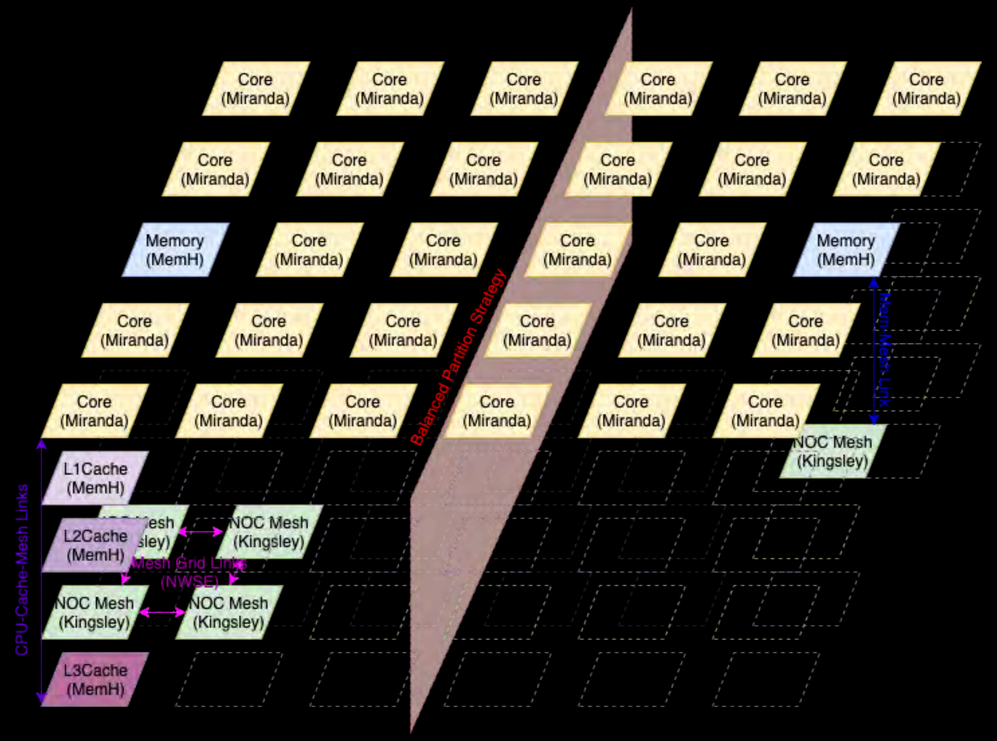


Software Stack



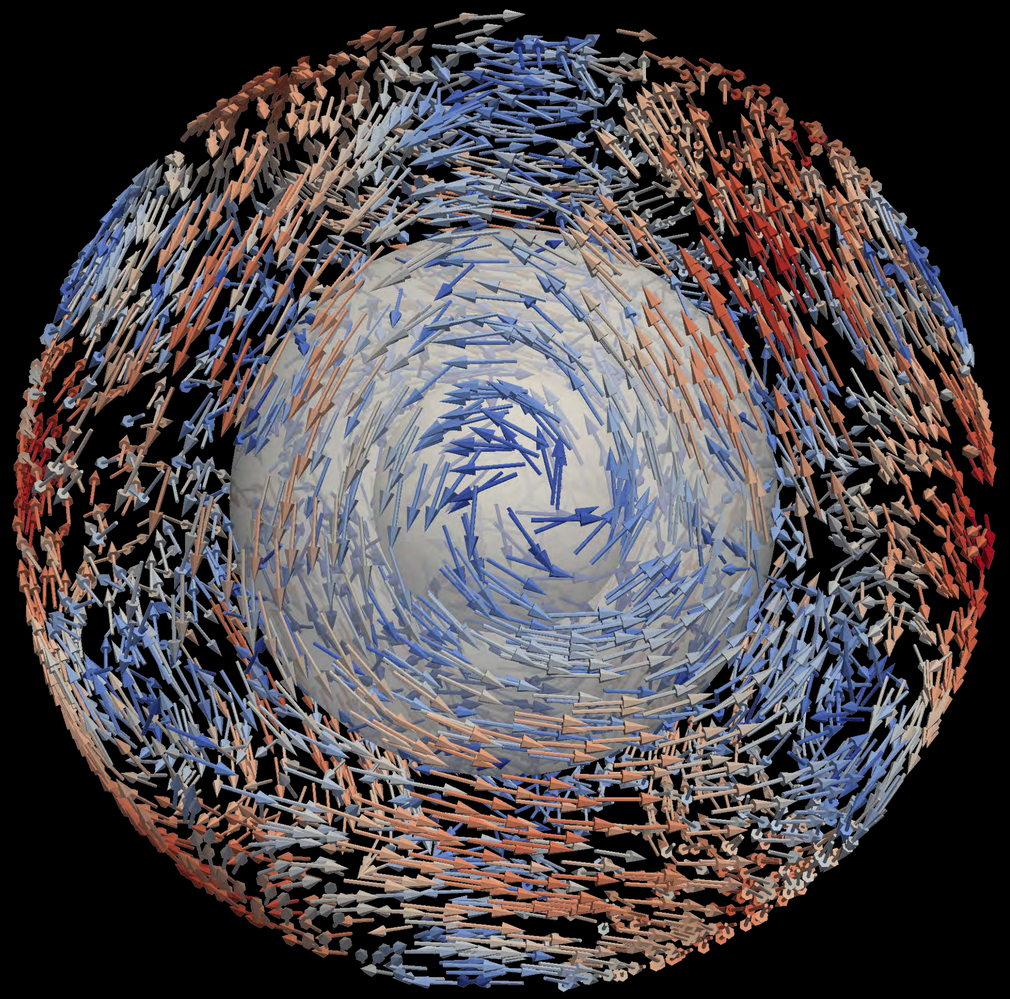
SST - Computer Simulator

- Compilers: GCC, ICC (with bugs fixed), LLVM
- Core: Manual partitioner + Human Intelligence
- Components:
  - Miranda: Callback lookup table -> 7x speedup
  - MemH: Optimized data structure initialization -> 1.1x speedup
  - Ember: Remove debug log generation -> 1.05x speedup



Reproduction - Planet Normal Modes

- Local data generation
- Accurate runtime estimation
- One-key task scheduler with fancy functions
  - Switch datasets
  - Run monitor
  - Auto plotting



VPIC

- Well-vectorized, largely scalable, computation intensive
- Performance insensitive across nodes (with IB)
- Optimize AVX load instruction imbalance by specifying core affinity -> 1.2x speedup