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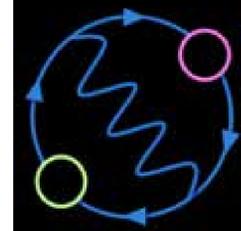
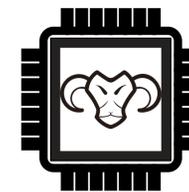
Veritas, Probitas, Iustitia



SC22

Dallas, TX | hpc  
accelerates.

# KambingCluster



TEMP  
Theoretical & Computational  
Condensed Matter Physics

## Members

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## Advisors

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## Team Introduction

Universitas Indonesia has long used High Performance Computing for several research, especially in Faculty of Mathematics and Natural Science. Desiring for the more knowledge of HPC effective implementation, and usage, this year Universitas Indonesia students decides to participate in Student Cluster Competition 2022. Our participation is supported by our Alumnus and Researchers such as Wileam Y. Phan, S.Si., MS, and Dr.Sc. Adam Badra Cahaya, B.Sc., M.Sc..

## Strategies

### Task Management

#### SLURM

- Ensure computation tasks is managed well according to HPC limits
- Has centralized manager, which suitable with our master HPC node
- Relatively easy to usage, since no kernel modifications needed
- Exclusive workload and arbitrary contention ensures our job on HPC won't be taken at the same time and be serialized

### Applications

#### OpenMPI

- Open-source MPI with wide support for schedulers
- Portable and tunable by end-user
- Supporting wide arrays of OS, suitable for our HPC Red Hat systems like CentOS or Rocky Linux
- Suitable language APIs with our programs with wide C++ usage

#### MiniVite

- Benchmark graph computation in our HPL, with single Louvain method in distributed memory
- Compatible with our OpenMPI library
- Testbed for graph clustering, community detection, and parallel graph computation in our HPC system

#### HPL (LinPACK)

- Ensuring maximum performance is extracted with custom parameter, suitable with our CPU dominated HPC
- Dense system of linear equation solver as measure of parallel and serial computation on our hardware
- Test and compare our HPC Intel CPU performance between Intel own MPI + MKL and other systems such as OpenBLAS

### Package Management

#### SPACK

- Easing package building
- Widely used in supercomputers wide multiple systems
- Since our frequent usage is for condensed matter physics computation, usage of SPACK will make installation of scientific application like NAMD, QuantumEspresso, etc easier
- Support our programs with multiple programming languages like C, C++, Fortran, and Python