

Phantom Cluster – A Mechanism for Deploying Pre- configured Cluster Computing Environment

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Motivation – harvesting free cycles

- What if when the supercomputer is fully occupied, but I need a small job done soon?
- What is that I don't have access to big machines, but I do need to compute?
- People love free stuff. So do we.
- Where can I find the free cycles that are dependable?
- In this attempt, we propose a mechanism to convert the classroom computers into a computing cluster. In addition, with proper amount of computers activated for a specific period of time, the consumption of energy could be minimized.
- Like a phantom, it comes out of "no where" and disappear in the thin air.

What is Phantom Cluster?

- Pre-configured cluster environment
 - transform individual PCs into a pre-configured cluster without touching existing environment on the PCs
- Multiple roles of a single hardware
 - PCs in the computerized classroom
- Power Saving
 - Wake up exact amount of PCs that are needed
 - Power off when jobs are done

The tool kit

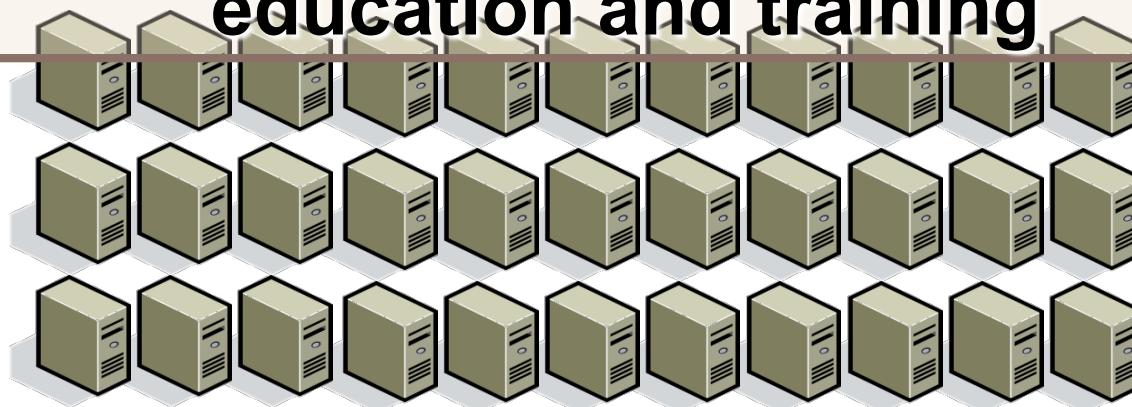
- Phantom Cluster tool kit
 - Diskless
 - Based on Diskless Remote Boot in Linux (DRBL) of NCHC
 - Leave the existing system alone
 - Genetic cluster management tools
 - Customized Software developed specifically for the phantom cluster

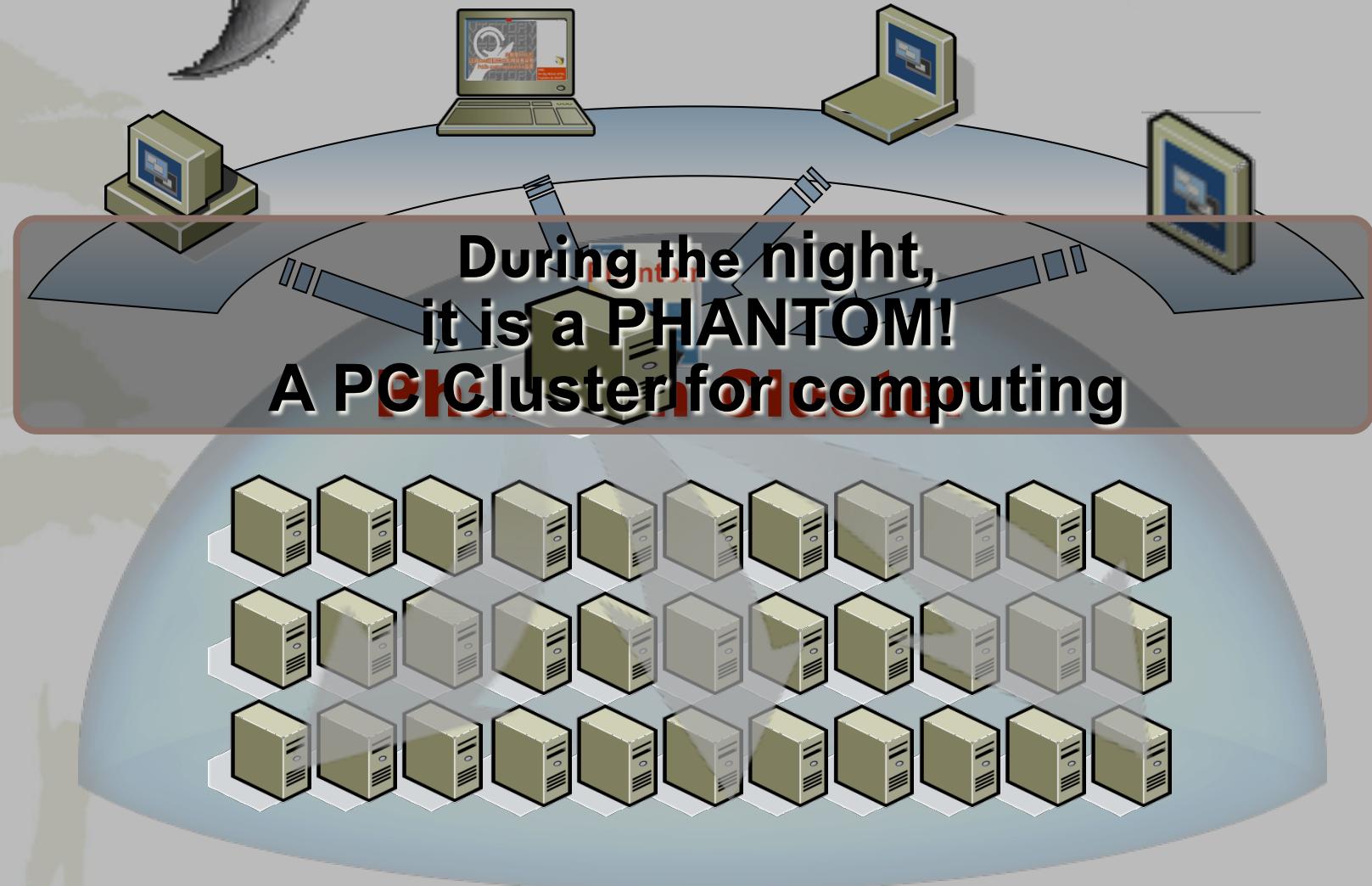


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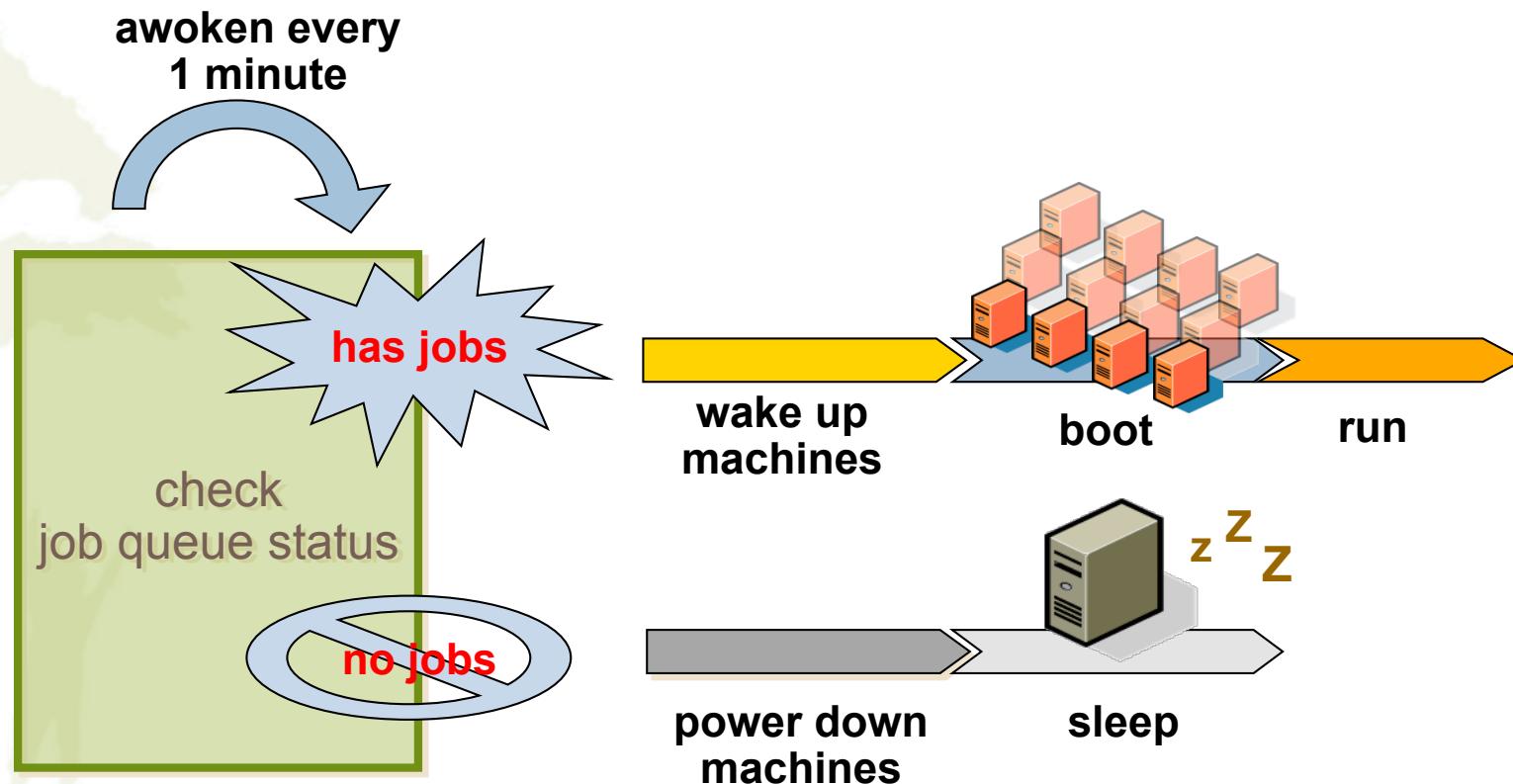
In the daytime,
it is a computerized classroom for
education and training





Power Saving Mechanism

PCs can be woken up automatically when jobs are submitted and powered down after the completion of jobs



Video

■ Scenario of Phantom application

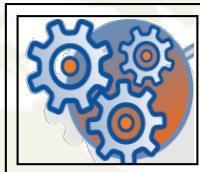


Features of Phantom Cluster



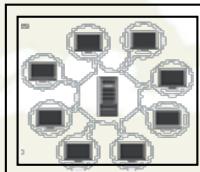
Easy Installation and Using

Only one RPM was Integrated in DRBL environment



Green Computing

Minimizes the extra cost and electric power consumption



Resource Sharing

Aggregates computing resources across distributed PCs



Manageability

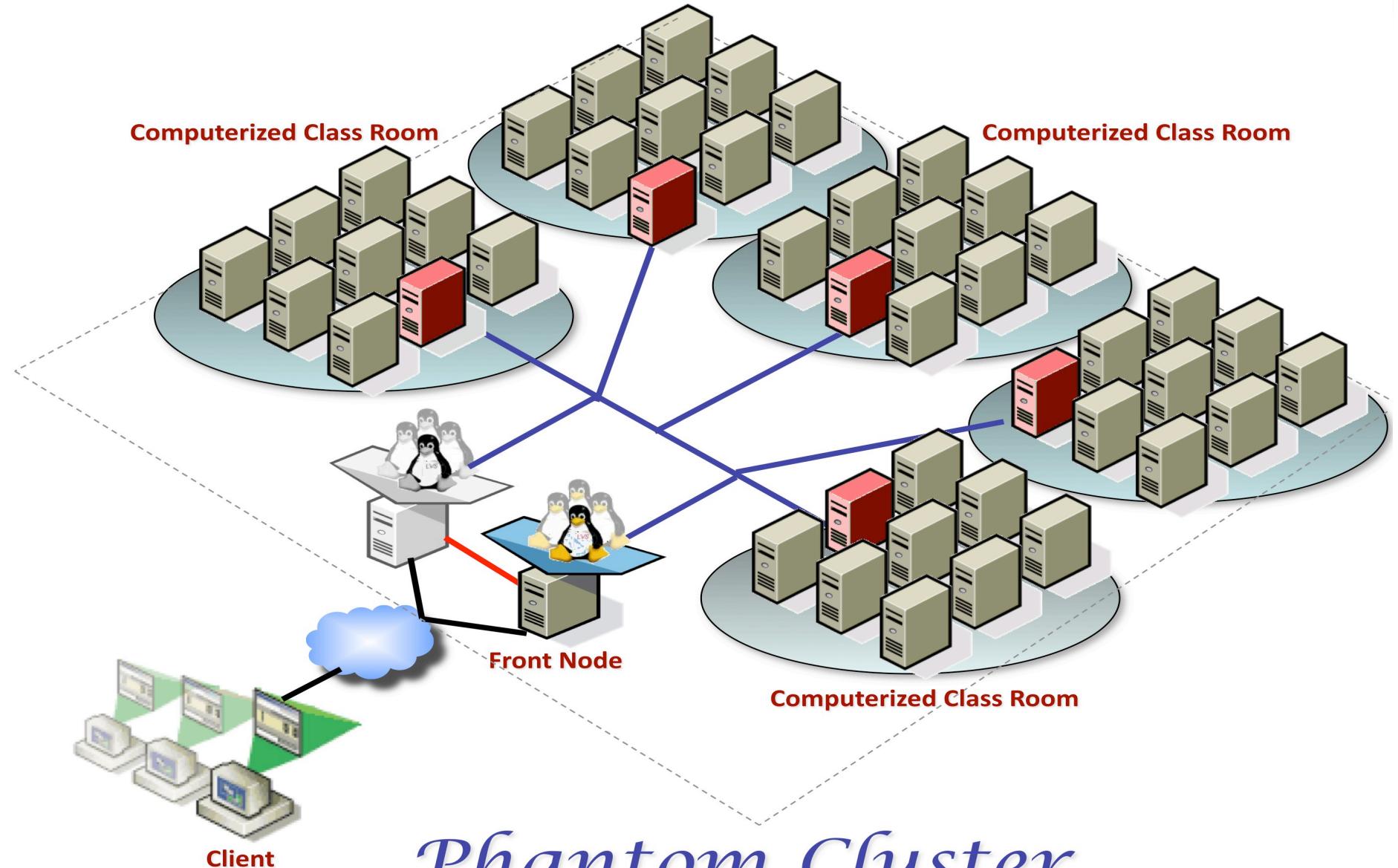
Manages one homogeneous system image only



Cost Effectiveness

Computer classroom can be economical to afford and expand

Integration

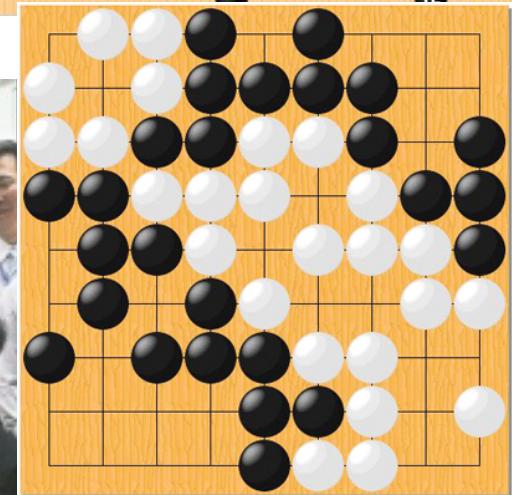
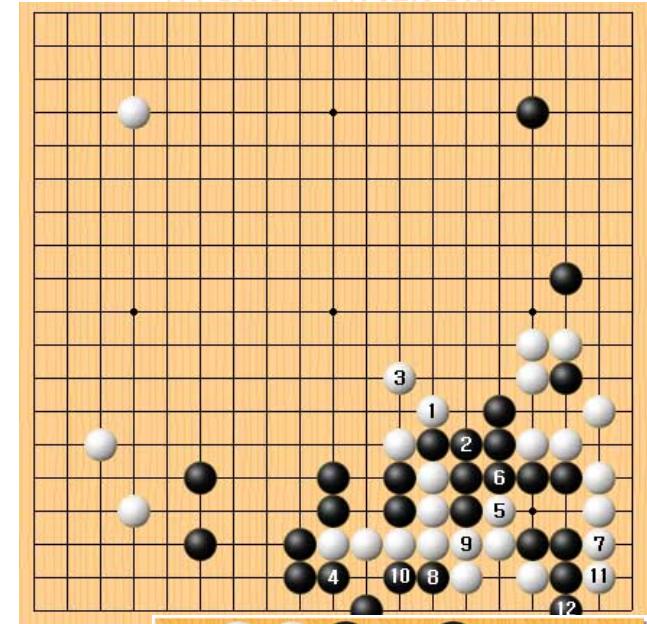


Phantom Cluster

Recent Fun

■ The game of go

- 2009/10/26, MoGoTW team formed
- Computer against human
- Play with champion Chou of “go”
- 9 X 9 board, quick hand (<10 min.)
- Computer won 1 out of 3 games
- “prepare” the cluster specifically for the game



What next?

- Meta-scheduling (on going)
 - How to coordinate multiple ghosts into a bigger ghost?
- Job migration
 - What if PCs are needed before a job is done?
 - What if individual computer should fail during a parallel job?
- Customized environment (?)
 - Environment designed specifically for an application
 - Distributed along with the application to the hardware

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Thank You For Sharing Ideas