



Computing experience from Cuba

Humboldt Highway II - computer cluster on renewable energies

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InSTEC - UH

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2. Dealing with JBOC
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Overview

Two main computing systems:

Rocky

- Runs on Rock Cluster 6.2
- Total of 52 cores across 8 nodes. Gigabit network
- With a battery backup in case of power outage, only sufficient for saving current jobs states (snapshot) and shutdown gracefully

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- Dedicated to simulations and data analysis for Molecular Dynamics, Nanomaterials, Nuclear Reactors, Climate Forecasting...

Two main computing systems:

Just a **B**unch **O**f **C**omputers

- Ubuntu 20.04 Desktop + Slurm Workload Manager
- Workstations/HPC
- Total of 52 CPU cores + 4 GPUs across 4 nodes. Gigabit network
- Only draws power from the national electric system. In the event of a power outage it's knock out, no protection count.

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Dealing with JBOC

Weak aspects of the setup

- Mix of enterprise and consumer CPUs/GPUs
- Shared file system via NFS between the nodes (no NAS nor redundant storage)
- Rudimentary supporting infrastructure, i.e, battery backup, full time ambient cooling

Time allocation

- Coordination between department members
- Prioritize senior year students with related their thesis work
- Help other departments when possible

Getting Work Done

For students

- **JBOC** is essential in several bachelor thesis every year
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For researchers

- In theoretical research is key to have reliable computing ready to support or disprove our propositions
- New techniques and procedures come up every day and be able to test them often requires state of the art computing resources (but we still give them a try)

Focus on larger tasks which are able to fully utilize computer resources in the shortest possible period of time

- Generate MC events for further analysis workflows (often by different people)
- Simulate complex detector geometries and configurations
- Analyze MC data, fit to measurements, validate hypothesis (explore new ways to do it)
- Experiment with distributed systems and parallel execution (better process communication and synchronization)

Room for Improvement

The path to improve is threefold

- Update almost 10 year old hardware, slow and power inefficient
- Ensure continuous operation despite power grid inconsistencies, at least enough time to shutdown gracefully
- Promote conscious usage of computer sources and energy

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Much more could be done... and in a better, greener, way





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