Raspberry Pi Computing Cluster

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Project Aim

"Produce a Cluster of Raspberry Pi Computers capable of executing Plasma simulation codes from the Plasma Theory and Simulation group at Michigan State University. "

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What is a Cluster?

A computer cluster is a single "unit" consisting of multiple computers that are linked through a network.

The networked computers can then be used as a single, more powerful machine.

Clusters excel at Performing operations on large data sets or batch style operations.

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Why Cluster?

Performance

Redundancy

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Why Raspberry Pi?

Raspberry Pi	4 cores running at 1.4Ghz	1GB of Ram	With each node drawing 5.1W Max	16GB of storage	£36.61
Raspberry Pi Cluster	24 cores running at 1.4Ghz each	With 6GB of ram	Drawing just over 30.6 W	And ~100GB of storage	£289.90
PC Similarly Priced (Dell OptiPlex 3050)	2 Cores Running at 3.4Ghz	4GB of Ram	Drawing 65W	500GB of storage	£349.00

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Parallelisation of Plasma Codes

- A clusters Performance depends on the type of task
- Tasks that can be split into different parts and executed simultaneously can take advantage
- The Plasma Theory and Simulation Group write codes for plasma simulation
- These are particle-in-cell codes with Monte Carlo collision (MCC) models
- Repeated Random Sampling
- Ideal candidate for Parallelisation

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Obstacles

Dependencies

Networking

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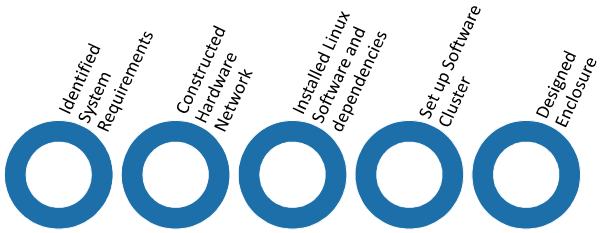
Progress



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Roadmap

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Questions

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