

LittleFe: An Inexpensive, Portable HPC Cluster for Parallel Programming and Distributed Computing Education

BW/UPEP Institute

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What is Little-Fe?

- 6 node computational cluster
- Portable
- Inexpensive (about \$2,500USD)
- Low friction, uses the Bootable Cluster CD distribution and a single system image
- Supports shared memory, distributed memory, and GP-GPU based parallel models

Why is LittleFe Useful?

- Enables parallel programming and high performance computing education anywhere
 - Classrooms, conferences, workshops, presentations
 - Developing countries
 - Airports while waiting for your colleagues...
- Almost all of the available HPC cycles go to research, teaching comes a distant second
- To teach HPC and parallel programming effectively you need predictable, consistent access to HPC resources:
 - Immediate feedback, compute it now
 - Realistic science problems

Why is LittleFe Useful?

- Not reasonable to teach HPC/CS in a uniprocessor environment, difficult or impossible to illustrate:
 - Decomposition - domain, functional
 - Speedup
 - Efficiency
 - Parallel models - message passing, shared memory, GP-GPU, hybrid
- Cluster design laboratory
 - Power and heat
 - Packaging
 - Many issues are applicable to cluster engineering generally
- No need to have a local systems guru for you to teach parallel programming, distributed computing and computational science

Hardware Manifest - v4, the CudaFe Cube

- 6 - Atom based 2 core CPUs with NVIDIA GT218 GP-GPU chipsets, 2GB RAM
- 1 - 160 GB 7200 RPM 8MB cache 2.5" form-factor SATA disk drive
- 1 - 8-port GB Ethernet switch
- 1 - PB-360P-12 switching transformer
- 1 - Custom frame
- 1 - Pelican 1610 Case

How to Get Your Own LittleFe

- Complete parts manifests, design documents and assembly instructions are available at <http://LittleFe.net>
- Send \$2,500USD to Charlie Peck (in small unmarked bills please)