Thesis outline

* Abstract
* Introduction
  + HPC software stack and management
    - Managed stack
    - Very security focused
  + Why we need containers
    - User needs vs managed stack
    - Need for isolation
    - Containers Vs VMS
      * Great isolation – lost function with HPC networks
* Literature review
  + container tools, why not docker?
  + The Charliecloud model of maintaining a user space workflow
  + Analyzing container performance not at scale with basic operations
  + Shifter Benchmarking of container start up time with pynamic
  + Lustre parallel FS model for HPC
    - Strenghts and weakness of Lustre
    - How this effects container usage
    - IPOIB
  + The squashfs on Lustre
* Methods
  + Why Charliecloud
  + The pynamic benchmark config and info
  + Kernel squashfs baseline
  + Squashfuse and squashfuse\_ll
  + Squashfs block sizes
  + Lustre config
  + Lustre stripe sizes
  + Lustre stripe patterns
  + Other tests:
    - Recursive Grep across FS
    - Running on NFS for science
* Results
  + Performance of squashfs kernel
  + Squashfuse
* Discussion
* Conclusions