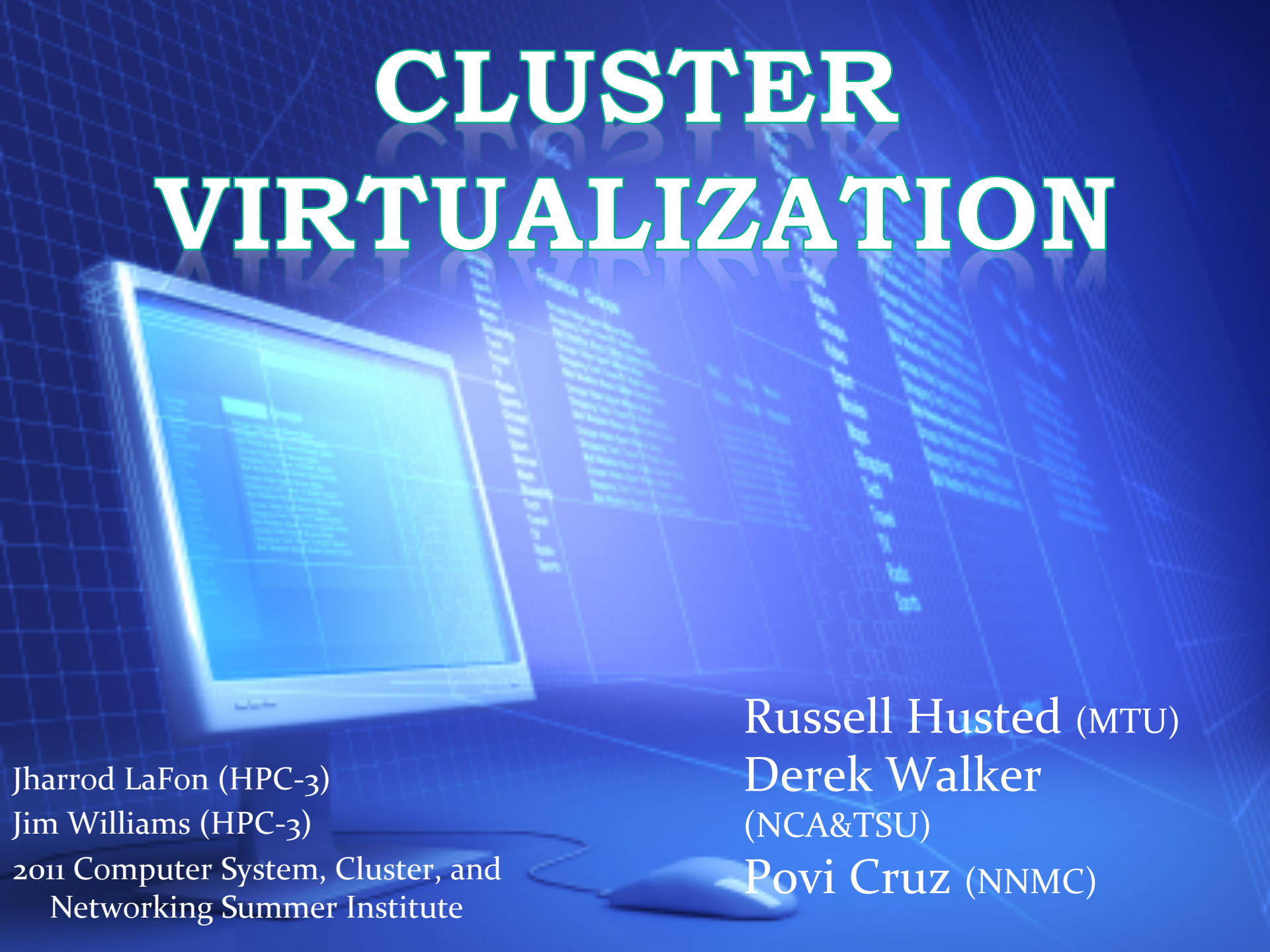
CLUSTER VIRTUALIZATION



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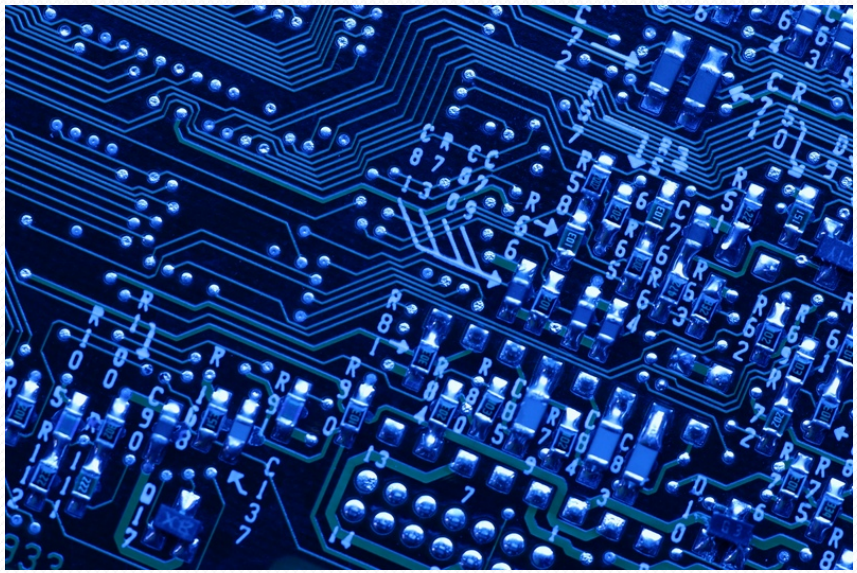
Presentation Overview

- Project Motivation
- Eucalyptus Components
- Compute Components
- Storage
- Challenges
- Moving Forward

Project Motivation

- Small clusters are needed
- Similar to Amazon EC2, cloud service
  - National Security issues
- Create, manage and modify virtual systems
- Low cost software and hardware



So….what is cloud computing?

- A proven concept that allows on demand network access to a shared bundle of configurable computing resources.
- Rapidly provisioned resources released with minimal management effort or service provider interaction.
- Facilitated distribution on licenses for clients.
- Realize the true client-server model.

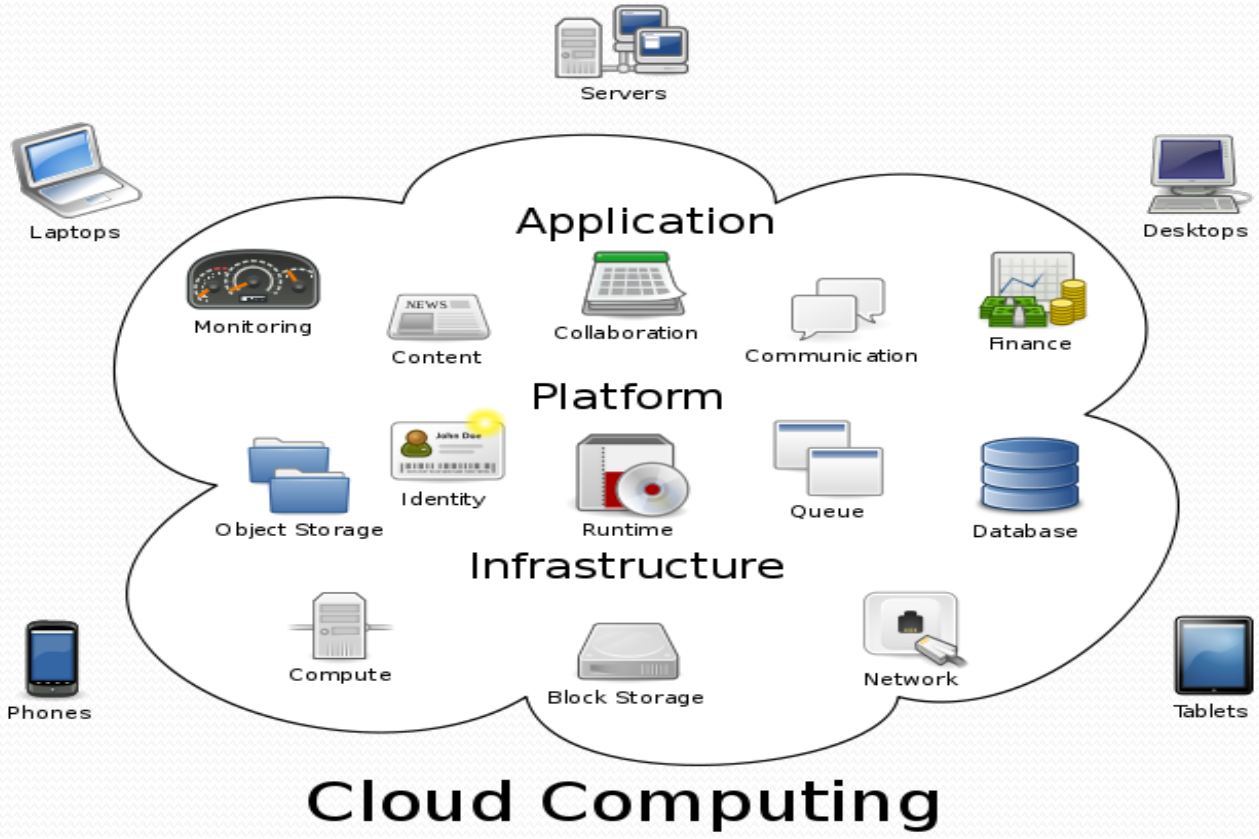
Descriptions

Amazon Elastic Compute Cloud (Amazon EC2)

Private cloud

- A particular type of cloud that is locally restricted in a private network.
- For national labs such as LANL – Private clouds would be a must.
- Using Eucalyptus – similar to Amazon's cloud service EC2.
- Clients instantiate their environment via a web browser.

Cloud Example



The resources available are known as the cloud

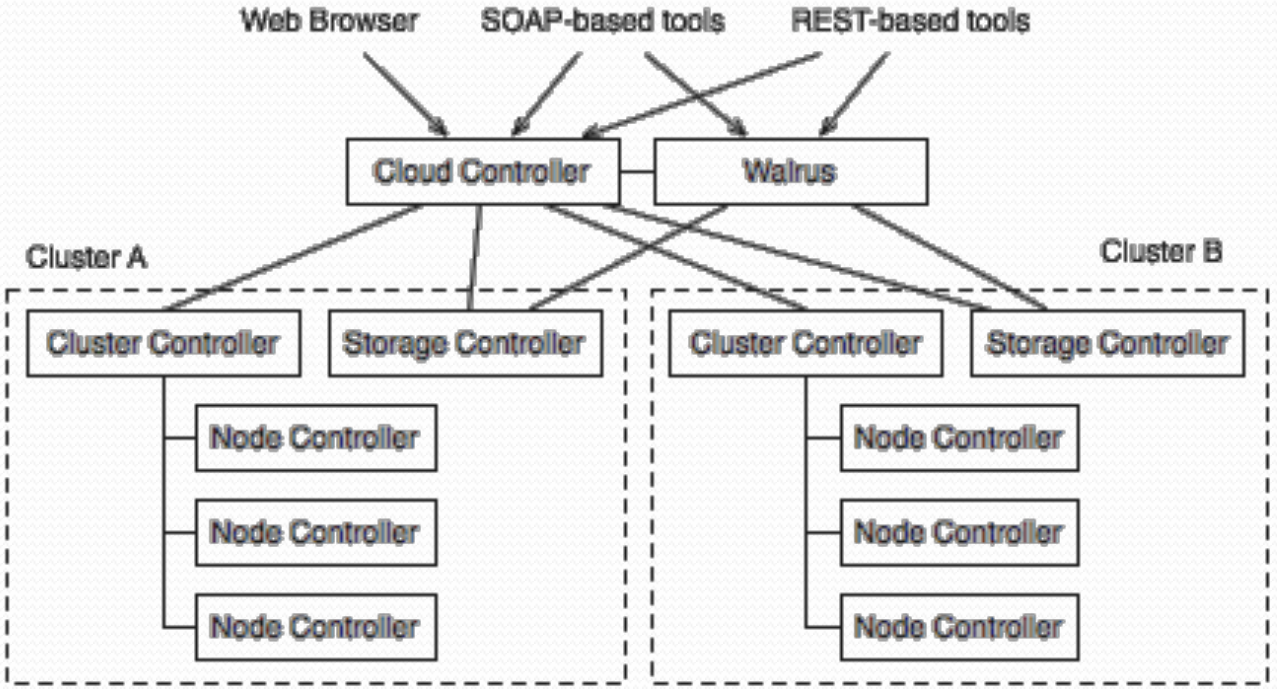
Compute Components

- Cloud Controller
  - Amazon EC2 API
  - Front end
- Cluster controller
  - Multi-cluster clouds
  - I/O to NC
- Node Controller
  - Control node
  - Reports on node

Storage

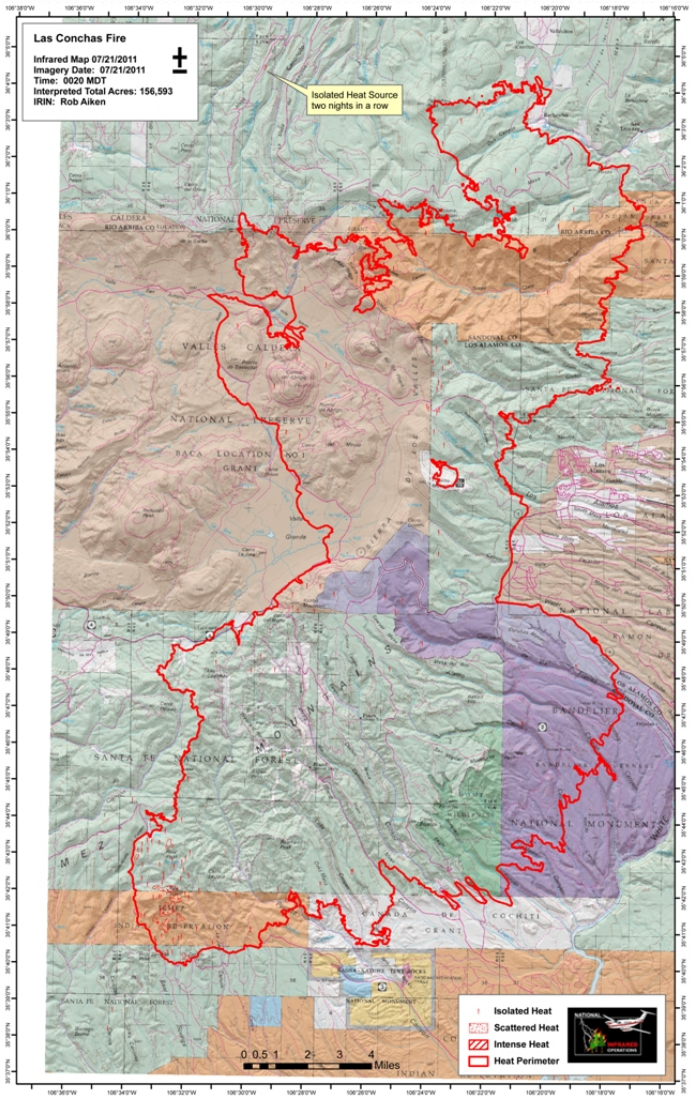
- Walrus
  - Images
  - Checkpoints
- SC
  - NAS
  - SAN
  - NFS
  - Etc…

Combined


Web Browser
SOAP-based tools
REST-based tools
Cloud Controller
Walrus
Cluster A
Cluster B
Cluster Controller
Storage Controller
Node Controller
Node Controller
Node Controller
Cluster Controller
Storage Controller
Node Controller
Node Controller
Node Controller

Challenges

- Eucalyptus
- Virtualization
- VLANs
- Fire

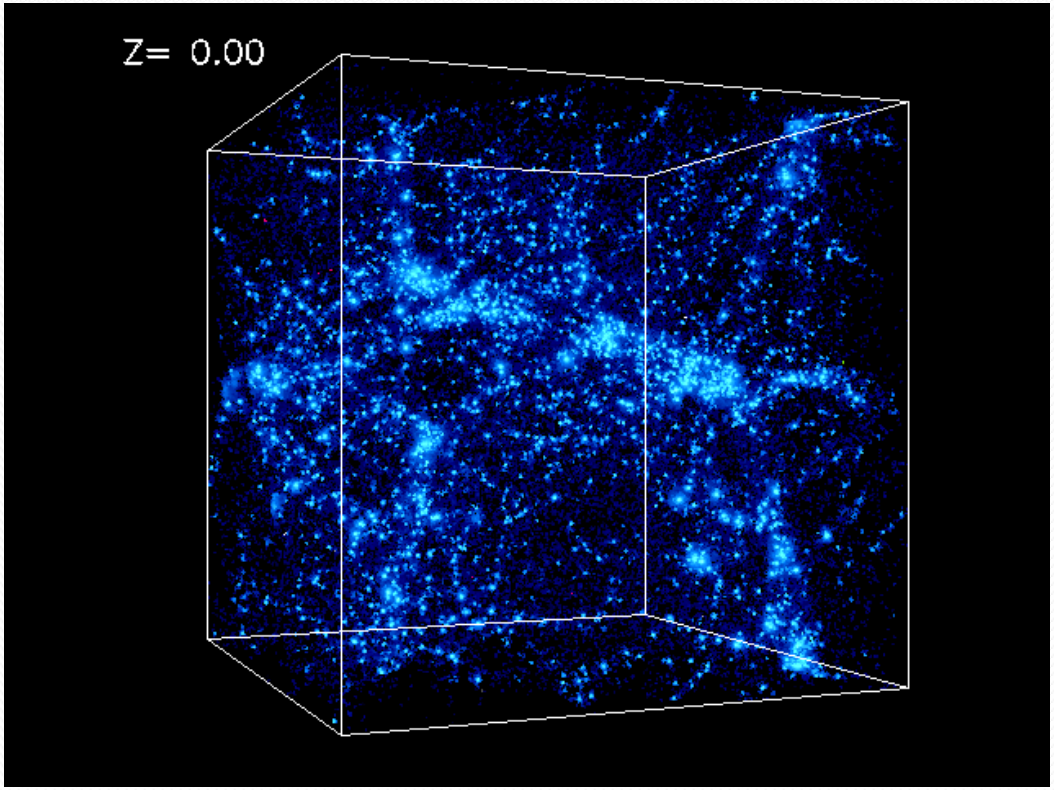


Results?

- Managed to instantiate 1 virtual machine instance from Eucalyptus
- Inconsistent results
- Used XEN to directly run a virtual machine
- Small user base
- Enterprise version vs. open source
- Eucalyptus feasibility

Moving Forward

- Performance tests
  - Compute impact
  - I/O performance
- Scale Larger
- Hardware impact?
- Full scale system
- Explore the enterprise version



Questions?