Research Computing in the Cloud
February 24, 2014
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Motivation

Research Computing Environment

- Desire to refocus staff technical efforts
- Occasional need to scale resources
- Keep costs flat or reduced
- Architecture allows gradual transition
- “Embarassingly parallel” batch computing ideal
RCE architecture

User
- Secure login via NX
- Request remote job

Resource Manager
- Assign job to node(s)

Interactive nodes
- Login nodes
- Large memory nodes

Batch nodes

Secure Storage
- Secure Backup

Local
Remote
Hybrid RCE cloud architecture

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- Secure login via NX
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Interactive nodes
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Resource Manager
- Local
- Remote

Secure Storage
- Secure Backup
Contributions

• Hybrid cloud resource management software
  o Expand and contract cluster size “elastically”

• Networking with the Amazon cloud
  o Establish Virtual Private Clouds (via VPNs)
  o Leverage Internet 2 connection

• Generalizing system administrative infrastructure
• Put batch-cloud into production
• Transition other RCE tiers into cloud
• Expand to other private and public clouds
  o e.g., Odyssey, XSEDE, other cloud vendors
Takeaways

• Using the cloud for your domain
  o Evaluate whether cloud resources make sense
  o Evaluate existing tools to do what you need
  o Talk to and leverage Harvard cloud community