Blue Sky, Gathering Clouds

Adventures in Merging Two Major Facilities in the Cloud

Robert Casey – EarthScope Consortium
GAGE/SAGE Cloud Effort

- **GAGE**: NSF Major Facility serving the needs of Geodesy research
- **SAGE**: NSF Major Facility serving the needs of Seismology research
- **EarthScope**: Combines GAGE and SAGE facilities under a single operating entity -- (Incorporated January 2023)
- **Goal**: Bring forth a new era of interoperable and highly scalable services in support of new frontier geophysical research
- **CI Plan**: Migrate on-prem facilities entirely to the cloud
How it Started

Source: Ideanote
How it’s Going

A slight exaggeration

…but close…

Source: Flickr/freshwater2006
Steps in Design and Implementation

• Developed vision and project name: “Common Cloud Platform”
• Identified major tasks and key leadership. Kickoff meeting.
• Engaged with key stakeholders (community) to gather requirements.
• Brought in Cyberinfrastructure experts (CI Compass) to advise design and development.
• Developed Concept of Operations, Requirements, and Design documents.
• Set up implementation teams based on components.
Community Involvement

• ‘Senior Users’ (stakeholders) helped identify use case stories for the cloud system.
• About two-dozen separate use cases were recorded and documented.
• Use cases were incorporated into the Concept of Operations.
• GAGE and SAGE held joint workshops where cloud platform concepts were presented and attendees could offer observations.
• Announcements to the public went out electronically describing the Common Cloud Platform Concept.
Time Passes -- Progress

We learned many lessons on the road to cloud migration.....

Source: Sky News
Lessons in Cloud Development

- **Identify early** where your ‘cliffs’ are in the migration timeline
  - Data facility lease, equipment EOL, software license expiry

- Select a cloud platform or vendor **before** you design
  - Going from cloud-agnostic to vendor-specific means 50-75% re-work

- **Be prepared** to pivot from system refactor to system rehome
  - Alter the plan to lifting the monolith if you run out of time
  - Can your legacy workflows exist alongside green field workflows?

- **Implementation reality** eats big up-front design for lunch
  - Don’t spend too much of your time producing project documentation
  - Get on the target platform, get coding, document as you go
Success as the Cloud Takes Shape

• Train your team to think in cloud-y architectural principles
• Seek out standards to align data, code, and processes to
• Maintain a clear vision that is shared with the team repeatedly
• Use encouragement and mentorship to drive away fear and doubt
• Establish and enforce deployment and access security
• Work collaboratively, utilize what your team has already built
• Monitor and observe your deployed resources
• Think BIG, Think MULTITUDES
Thank you