Blue Sky, Gathering Clouds

Adventures in Merging Two Major Facilities in the Cloud

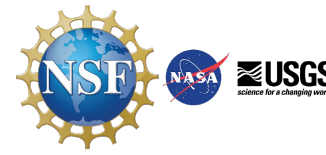Robert Casey – EarthScope Consortium

GAGE/SAGE Cloud Effort

- <u>GAGE</u>: NSF Major Facility serving the needs of Geodesy research

- <u>SAGE</u>: NSF Major Facility serving the needs of Seismology research

- <u>EarthScope</u>: Combines GAGE and SAGE facilities under a single operating entity -- (Incorporated January 2023)

- <u>Goal</u>: Bring forth a new era of interoperable and highly scalable services in support of new frontier geophysical research

- <u>CI Plan</u>: 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
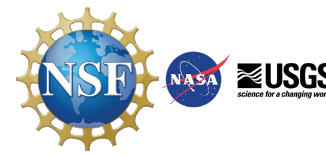
- 'Senior Users' (stakeholders) helped identify use case stories for the cloud system.

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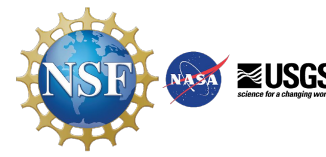
- Train your team to think in *cloud-y* architectural principles
- Seek out <u>standards</u> to align data, code, and processes to
- Maintain a <u>clear vision</u> that is shared with the team repeatedly
- Use <u>encouragement</u> and <u>mentorship</u> to drive away fear and doubt
- <u>Establish and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

Thank you