Geospatial Software Institute Community Survey Results

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Dynamic Geospatial Research Environment

- Opportunities and challenges
- How to best support geospatial software users in this environment?
Geospatial Software Institute (GSI)

• Multi-year NSF planning grant for GSI (OAC-1743184)

• Currently active community institutes:
  – Institute for Research and Innovation in Software for High Energy Physics
  – Science Gateways Community Institute (SGCI)
GSI Planning Objectives

• Assemble a team of geospatial experts
  – Academia, government, industry

• Develop a strategic plan
  – Vision, direction, purpose, goals
Steps for Planning GSI

• Series of 3 workshops
• Engagement/outreach opportunities
• Determine community needs and requirements
How to find out more about the Geospatial Community?

• Survey geospatial software users!
• Survey Team:
  – William Barley, Shaowen Wang, Anand Padmanabhan, Yan Liu, Becky Vandewalle
• Initial survey, follow-up survey
Survey Design

• What do we want to discover from survey participants?
  – Who are they? Their needs?

• Geospatial software use

• Perceived limitations

• What types of research questions are currently limited by limitations of geospatial software
Survey Sections

- Introduction
- Geospatial Software Used/Frequency of Use
- What do you use geospatial software for?
- Data/Analysis/Computation
- Software Development
- Access/Sharing/Publishing
- Demographics
Survey Implementation

• Qualtrics
  – Web-based survey platform
• Voluntary
• IRB
Finding Participants

• GIS Listservs
  – AAG, AGILE, CRYOLIST, CyberGIS, Geo4all, SIGSPATIAL, SESYNC, UCGIS, XSEDE

• Open invitation at workshops/conference talks
Analysis Methods

• Descriptive charts/statistics
• Qualitative coding
Results

• Responses from Jan-Dec 2018
• 526 responses
  – ~446 with usable data
  – 271 completed all questions
• 29% Female, 66% Male
• 62% Academic, 19% Government, 17% Industry/Non-profit
Overview

- 82% use geospatial software \( \geq 1 \times \) per week
- 90% see tools as extremely/very important to their work

Overall satisfaction:

- Extremely satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Extremely dissatisfied
Geospatial Software Uses

- Processing Data
- Running Analyses
- Visualizing Output
- Integrating Datasets
- Modeling/Simulation

Frequency

- Daily
- Weekly
- Monthly
- Semesterly
- 1x year
- <1x year
- Never
Satisfaction

![Bar chart showing satisfaction levels across different tasks: Processing Data, Running Analyses, Visualizing Output, Integrating Datasets, and Modeling/Simulation. The chart compares the levels of satisfaction on a scale from 'Ex. satisfied' to 'Ex. dissatisfied'.]
An Example Analysis

Data Size

Computing Platform

Charts by W. Barley
Limitations

42% of users reported their work was limited by inadequacies in geospatial software (n=329)
Limitations

- Steep learning curve
- Difficult to find appropriate tools
- Inconsistent data availability and suitability
- Difficulty integrating heterogeneous data
- Too fast or too slow development rate
- Buggy, fragile software ecosystem
- Poor inter-tool compatibility, tool scope
- Costly resource access (for data, computation)
- Computing limitations
Directions

• Integrating complex heterogeneous data
• Analyzing larger datasets
• Forecasting and modeling
• Scientific exploration
Thoughts

• “Often, research questions are confronted with having to use a myriad of tools, resulting in a Frankenstein approach to produce a desired outcome”

• “While it is essential to keep innovating software and methods, it happens at a pace that's difficult to keep up with”

• “I don't want to anticipate all the science questions that can be considered if we had access to amazing geospatial software”
Future Work

• Write up and publish survey results
• Next workshop, final survey
Thank you!

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Visit the GSI website: http://gsi.cigi.illinois.edu/