Geospatial-enabled Data Exploration and Computation through Data Infrastructure Building Blocks

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5th NDS Workshop, Chapel Hill, NC
April 6, 2016
Today, a scientist... ...

- Locks up my laptop!
- How do I display my data on a map?
- Lost track of multiple datasets, results
- How do I set it up for my collaborators to run?
- Now my paper has been published. Can I link the figure in the paper to this software?

Pre-saved grid-cell level estimates, containing 'iso'

Merge by 'iso'

User-defined mapping file, containing 'iso'

Choose Market Access

Merged file

Aggregate grids to 'region'

Update grid-cell value

Map

- CET elasticity
- Land supply elasticity
- Land conversion area
Tool created by Jing Liu & Nelson Villoria, Agricultural Economics
Data exploration & sharing

- No programming
- Almost instant visualization & data sharing
Users need more than maps

Systems to support various computation paradigms

Plots, bar graphs

Spreadsheets

Spatial-temporal data

Image galleries
Geospatial data and computing building blocks – NSF DIBBS project

- Geospatial data processing, analysis and visualization support inside HUBzero
- Map library, Rapid Tool Development API (Rappture) with geospatial extension for developing online applications without web programming
- Online data management system linked to user tools
- DIY online interactive tool and data publishing (with DOI), publications linked to viewers and interactive tools
HUBzero Platform for Scientific Collaborations

HUBzero

Joomla! Framework
Linux / Apache / MySQL / PHP

Hub Installation
Web Server
Execution Host
Execution Host

User

Rappture Toolkit

Cloud/Cluster Computing Resources
Secure Container

http://hubzero.org
GABBS rendering architecture

MapBuilder

MyGeoHub.org

Rappture Toolkit

Map library

Datasets

iData Share, Browse, and Discover

Other Dataset Go to My Datasets

File Transfer

Rendering Server

PostGIS

WMS/TMS/WFS

Google / Bing / MapQuest

Submit Server

File Transfer

iRODS User’s Home Directory

Google / Bing / MapQuest
Versatile Map Library

- Python wrapper of QGIS for creating basic map objects
- Built-in map controls for user interaction
- Map widgets that can be embedded in user-created online tools without programming
Maize Harvest Yields

By Rajesh Kalyanam
Purdue University

Maize economic yield values in metric tons

Abstract
This dataset contains a netCDF file with economic yield for a single crop, maize in metric tons.

Cite this work

[Provide citation information here]
Working with broader communities

Tools for sharing data and models

Tools for publishing data & models (DOI)

Computing resources

Training & learning platform

Collaboration platform

Tools for navigate and access data

GABBS – MyGeoHub.org
Project information

• 10/2013 – 9/2017
• Partial releases 2015-2016
• Full release: late 2016
• 2nd release: 2017
• GABBS deliverables
  – Map builder, data explorer tools
  – Image processing tools
  – Geospatial data management and publishing, service API
  – Libraries and APIs for building geospatial tools
  – Scientific use cases in multiple disciplines
  – Open source software, Amazon AWS instances, hosting service
• Collaborating with other CI projects on interoperability
Questions, suggestions, and feature requests are welcome!

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NSF project info: http://mygeohub.org/groups/gabbs

Join us on MyGeoHub.org!
Acknowledgement

This work is supported in part by the NSF grant #1261727