Extending Gateways into the Field: Geospatial Extensions and Remote Data Services

Gateways 2017

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+ Geospatial Features

- Geospatial Data Analysis Building Blocks
- An NSF, Data Infrastructure Building Blocks (DIBBS) project

- Communities
- Projects
- Tools
- Publications

- ***iData***: storage with metadata
- Map viewer
- Map-based search
- Tools: GeoBuilder, MultiSpec
- pyMapLib

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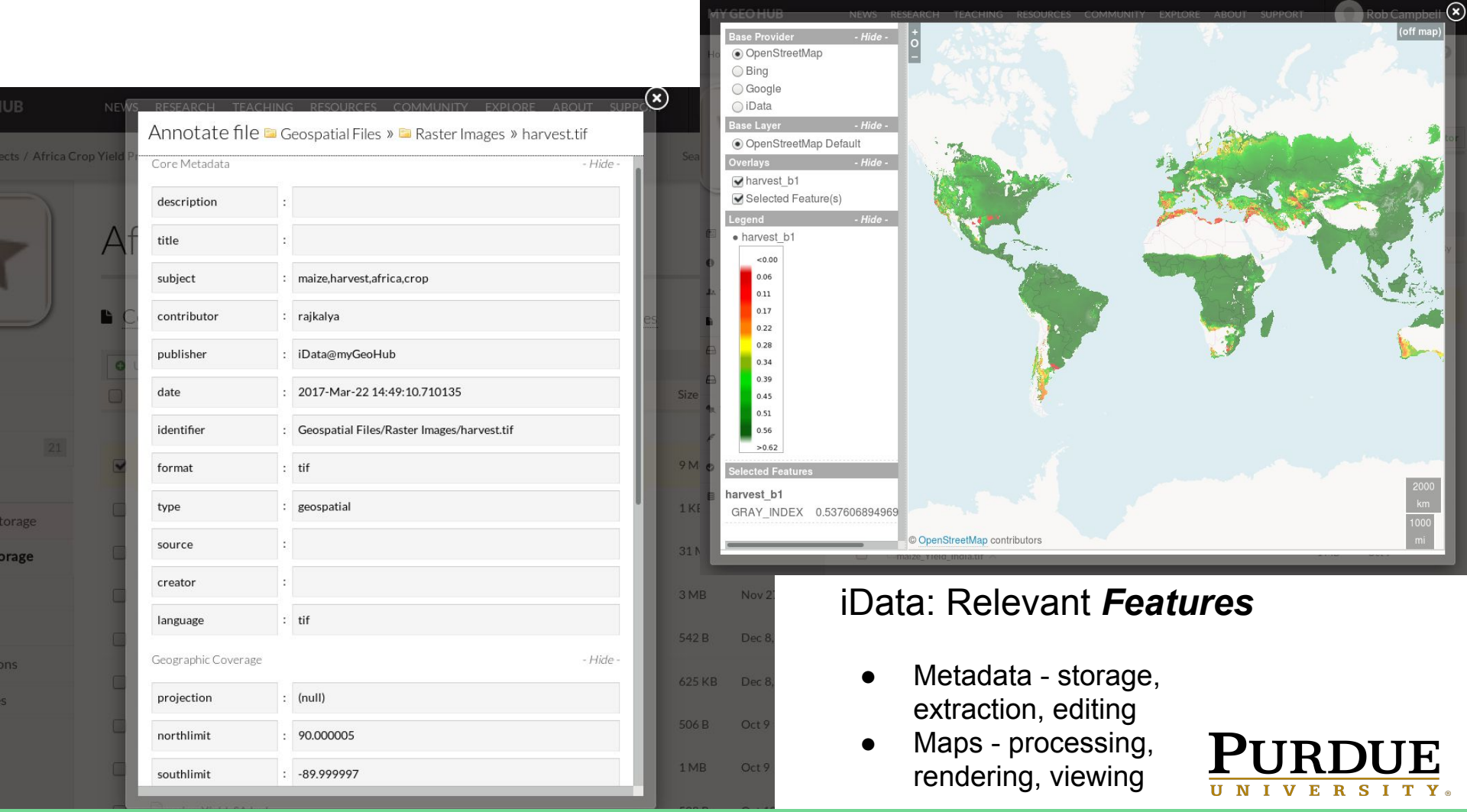

iData: Relevant ***Features***

- Metadata - storage, extraction, editing
- Maps - processing, rendering, viewing

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Africa Crop Yield Prediction

Project **collaborator**

Connections » iData storage » Geospatial Files

- Updates
- Info
- Team 21
- **Files**
- Default Storage
- **iData storage**
- To Do
- Notes
- Publications
- Databases

Upload

	Name	Size	Modified	By
	Parent folder			
☐	Raster Images		Dec 8, 2016	
☑	IMG_20170117_145403.jpg	24 KB	Jan 17	
☐	loc-image.jpeg	208 KB	Dec 12, 2016	

HUBzero ***Projects***

- Collaborative file storage
- Upload / download
- Preview
- Launch tools
- Create publications
- Annotate with metadata

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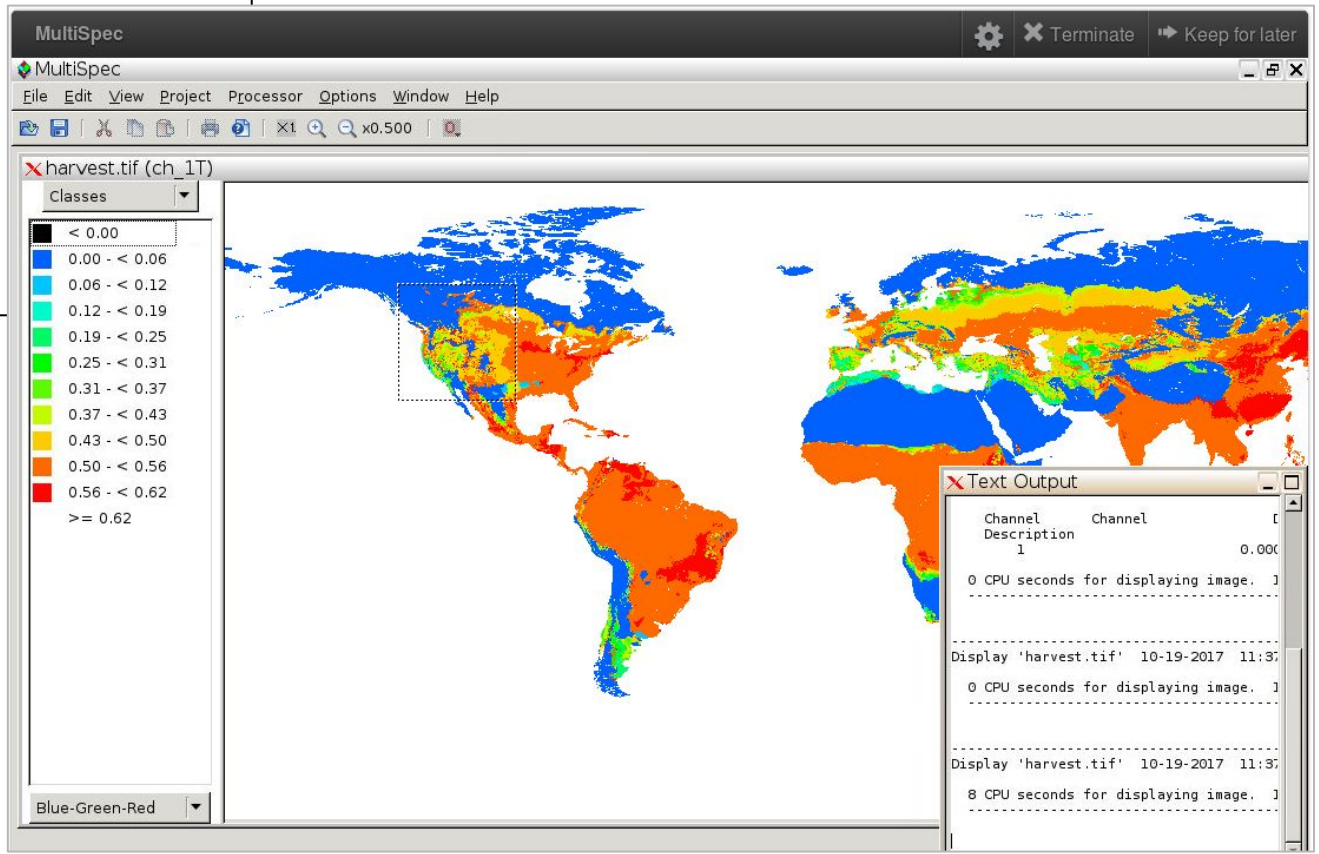
HUBzero ***Tools***

- Desktop applications
- Hosted on hub server
- Remote desktop
- Within browser



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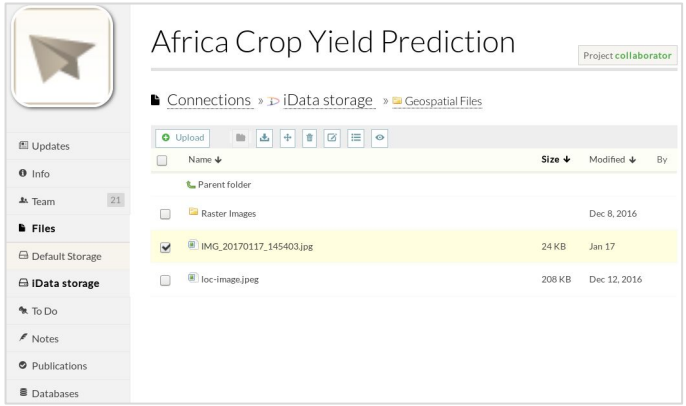
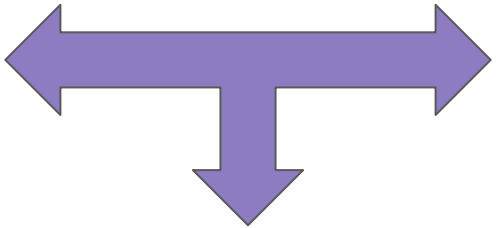
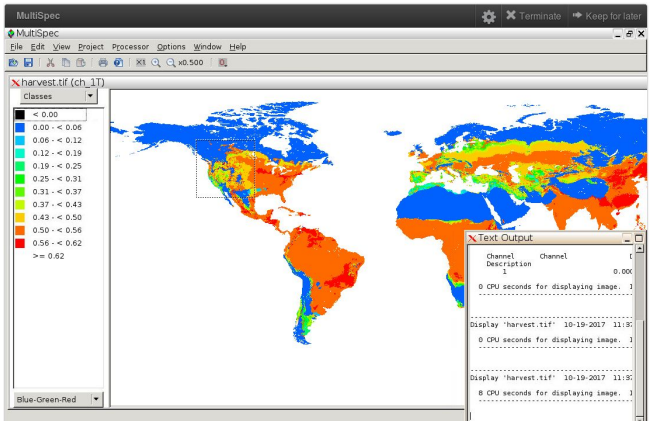
iData

- Access from projects and tools
- Files stored within iRODS, accessed via FUSE mount
- Metadata annotation
- Geospatial processing
- Tool launch from select file(s)







iRODS

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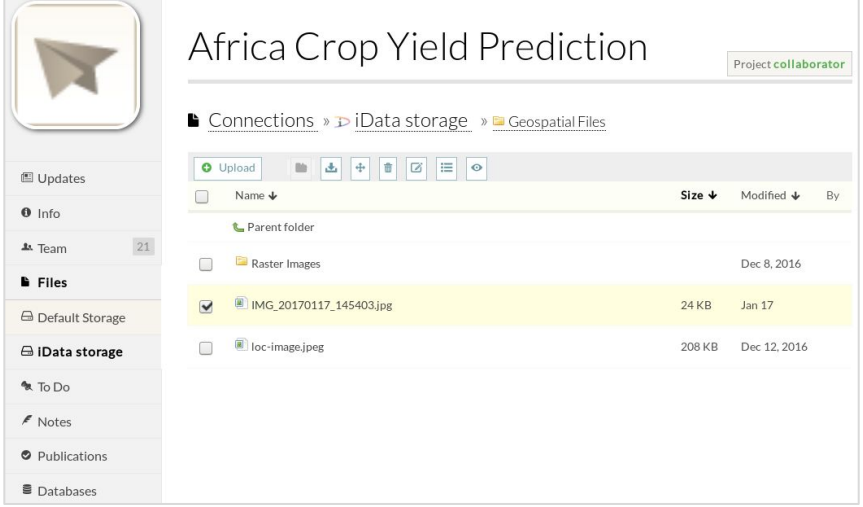
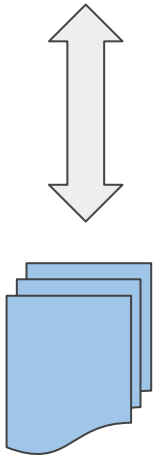
Opening up access...



File Transfer:

Native HUBzero support for **HTTP** and **SFTP** extended to iData -enabled projects

- ✓ Automated metadata extraction
- ✓ Geospatial processing
- ✓ iData storage



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Extending access...

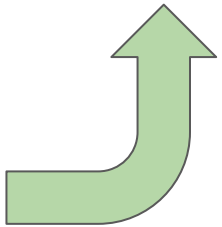
Adding methods to HUBzero's Projects REST API

Existing methods:

- List projects to which user belongs — GET .../**list**
- Get project info — GET .../**id**
- List project team members — GET .../**team**
- List project files — GET .../**files**
- Get file info — GET .../**get**
- Create folder in project — GET .../**makedirectory**
- Delete file or folder from project — GET .../**delete**
- Insert/update a project file — GET .../**insert**, .../**update**
- Move/rename a file or folder — GET .../**move,** .../**rename**
- Upload/download a file — GET .../**download,** POST .../**upload**

New API methods:

- List project-files connections — GET .../**connections**
- Get file annotation — GET .../**getmetadata**
- Set file annotation — GET .../**setmetadata**
- Upload & combine file chunks — GET,POST .../**chunkedUpload**



✓ Automated metadata extraction
✓ Geospatial processing
✓ iData storage

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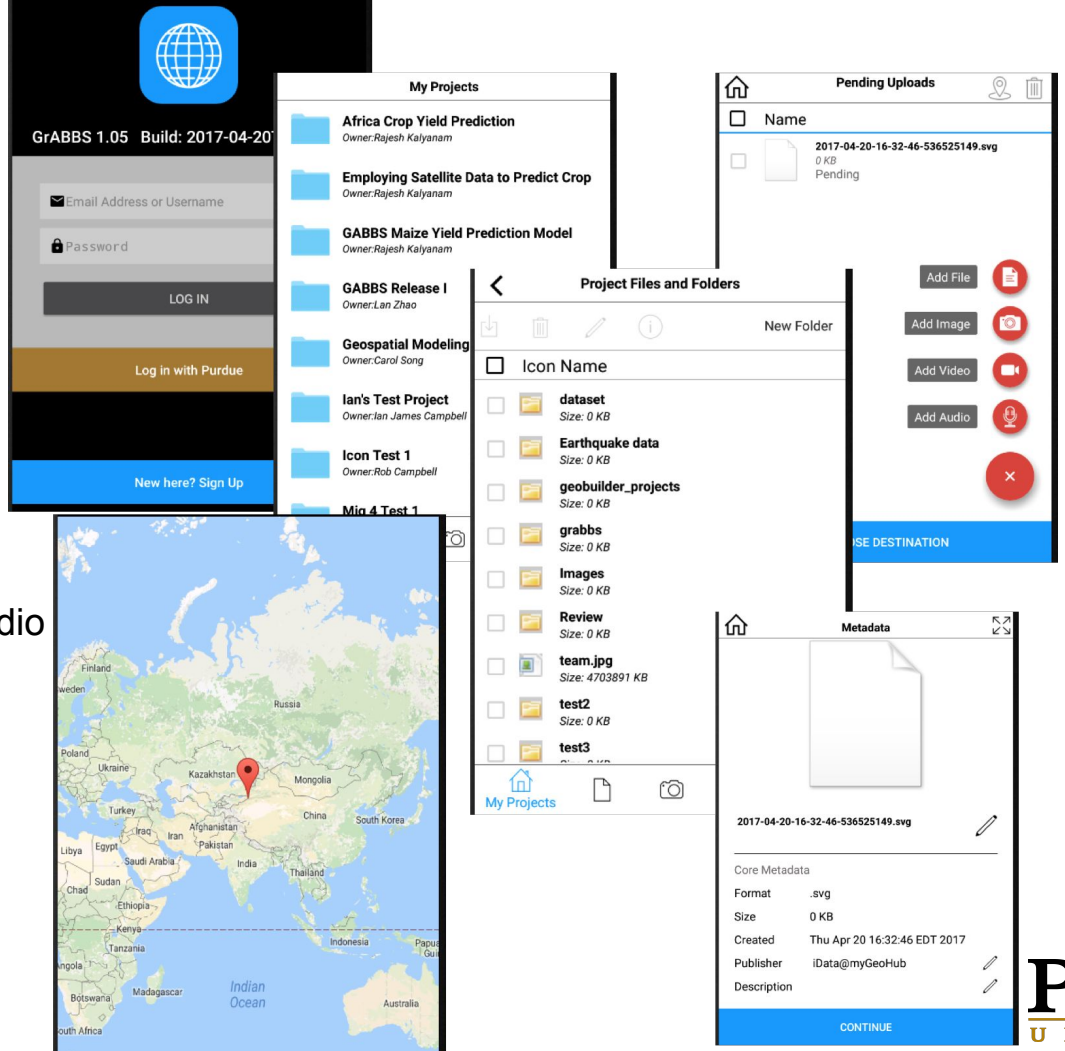
GrABBs

Mobile App

- API reference / demo
- Android & iOS
- Authenticate to hub
- Browse project files
- Capture images, video, audio
- File upload, download
- Plot collected data on map



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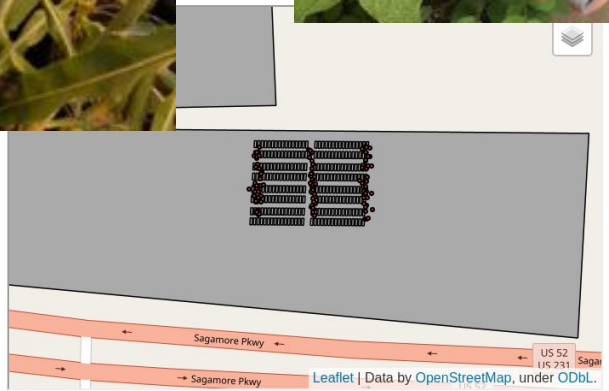

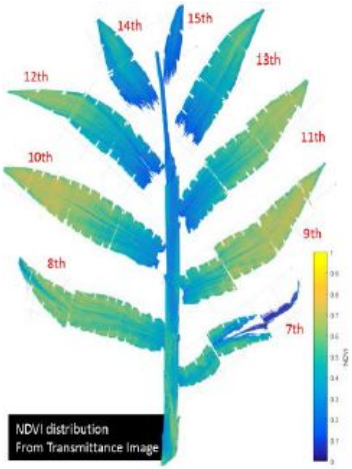

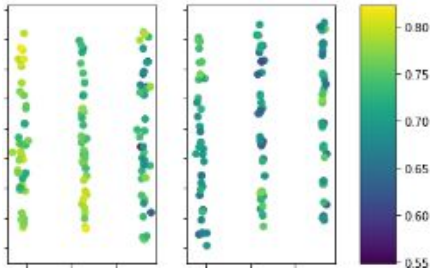

Use Case

Plant Phenotyping

- Field data collection device
- Crop assessment
- Uploads geolocated data to hub project via API
- Dr Jian Jin, Assoc. Professor of Agriculture & Biological Engineering, Purdue Univ.

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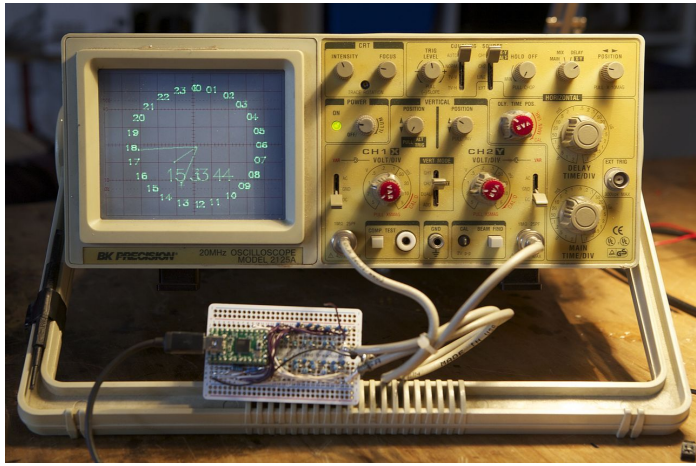
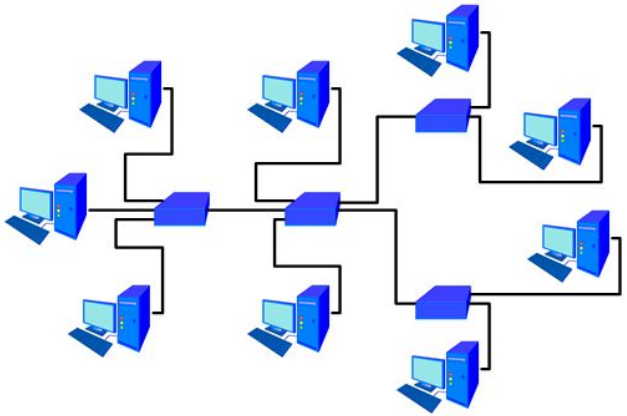
Challenges



- Supporting real-time data refresh



- Scaling up to support large number of simultaneous users

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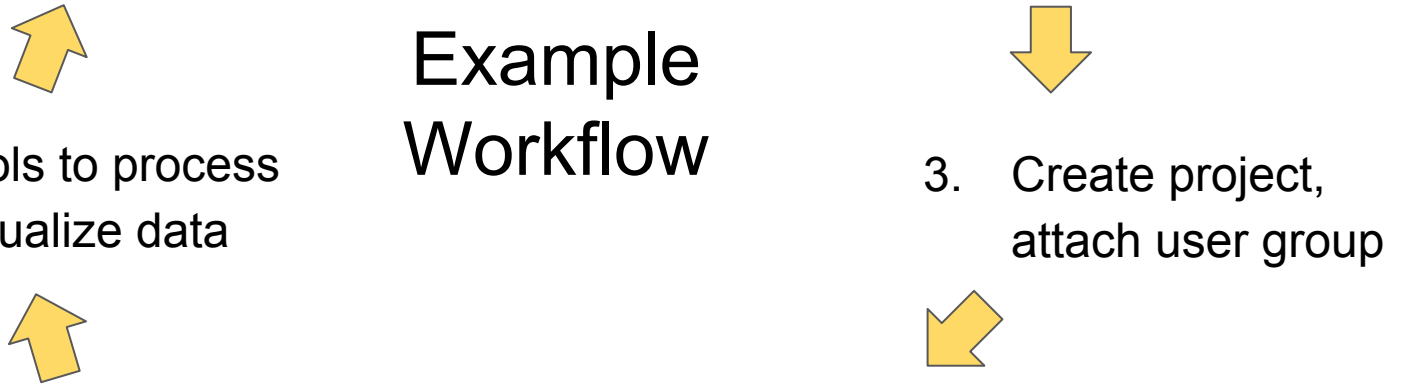
Example Workflow

1. Register as a user on selected hub
2. Create user group, add collaborators
3. Create project, attach user group
4. Create folder in iData storage area
5. Collect data in the field, upload to hub
6. Use tools to process and visualize data
7. Assemble files into publication



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G·A·B·B·S

geospatial data analysis building blocks

More Info

- https://**MyGeoHub**.org
  - Geospatial modeling
  - Data analysis
  - Visualization
  - Group hosting
- GABBs Availability
  - https://mygeohub.org/groups/gabbs/**release**
  - VM images
  - AWS CloudFormation templates
  - Linux packages - RedHat/CentOS

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- Dr. Jian Jin and his team

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