Geoanalytics @RENCI

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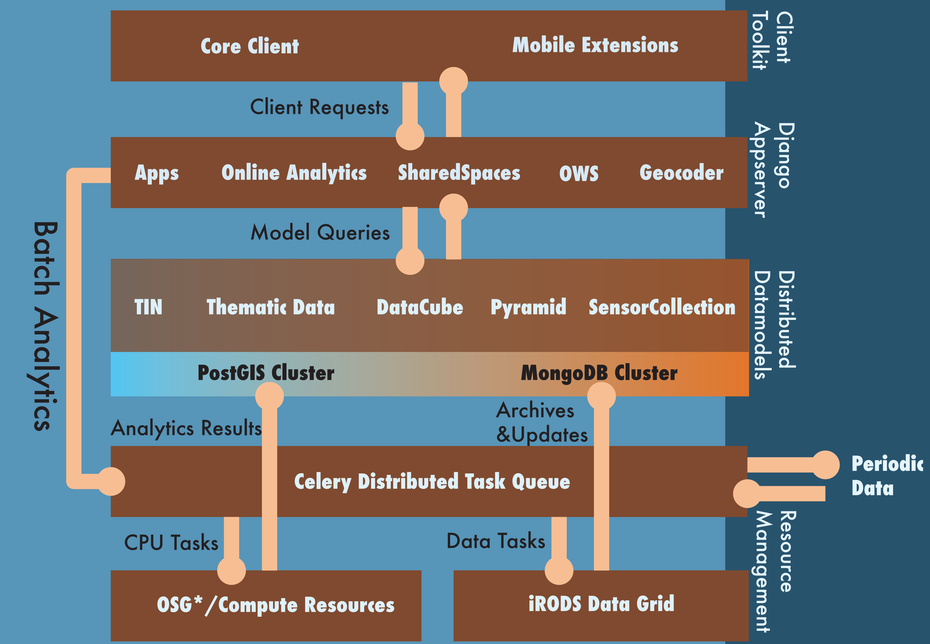
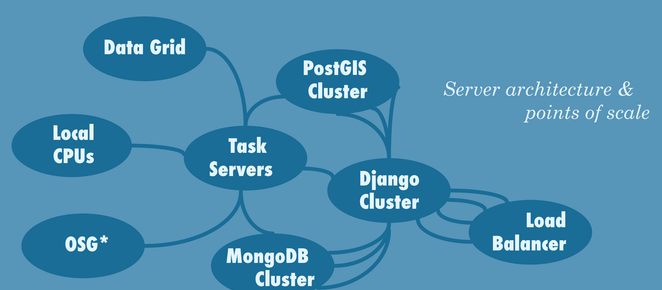
"A cyberinfrastructure for building rich, geography-aware applications **quickly** that enable the sharing of data, tools, and perhaps most importantly, **understanding.**"

Geoanalytics Architecture





Server architecture & points of scale

Open Source Core:

Core Client Technologies:
jQuery
OpenLayers
OpenStreetMap
Sencha
jQueryUI (deprecated)
Ext4 data models
HTML5 Location Services

Mobile Extensions:
PhoneGap
Sencha Touch

Server Technologies:
Python
Django/GeoDjango
Mongoengine

Database Technologies:
MongoDB
PostGIS 2.0 / Postgres 9.0

Resource Management:
iRODS
Celery
PBSQueue
OSG (to be integrated)

Next Steps:

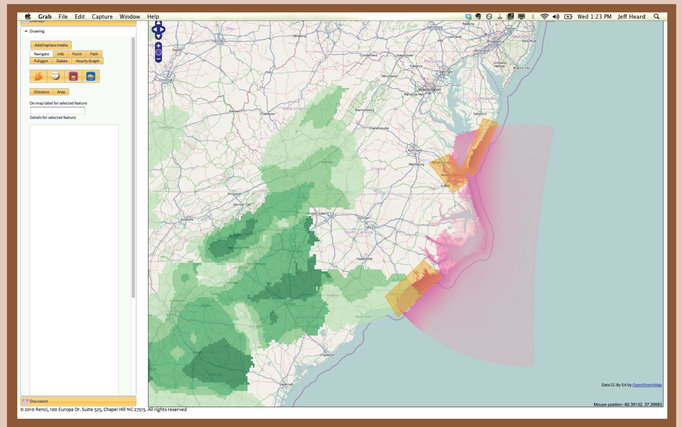
Federation and SSO

*Open Science Grid connectivity**

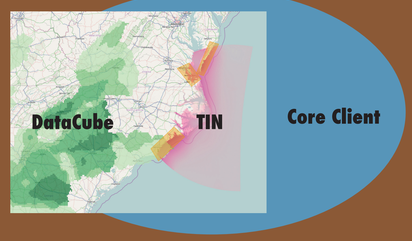
Wider deployment

New applications

Client techology integration



The Big Board is a collaborative web application built on top of Goeanalytics that performs "Teleconferencing over maps." Users login to a conference room that is populated with a set of tools and possible overlays. The tools allow one to annotate and inspect the map. Annotations, overlays, and user's locations can be shared to all other collaborators within the map.



Overlays shown on this Big Board conference room include examples of the TIN and DataCube models. In the case of the TIN, the data is a SLOSH model of a Category 4 Hurricane impacting the Pamlico Sound area of the Carolina coast. In the case of the DataCube, we are using the Celery Task Queue to ingest hourly forecasts from the NWS National Digital Forecast Database. Data is then rendered to WMS in realtime and overlayed onto the map.

Additionally, the Big Board uses Django, jQuery, OpenStreetMaps, and OpenLayers to bring all the data together to make a conference room.

Geoanalytics is built on the notion that large datasets widely distributed are "normal" and should be easy to integrate as we have in the Big Board.

Geographic data has become **Big Data.**

Multiple disciplines touched by RENCI require geographically-aware applications.

GIS doesn't scale to Big Data, neither in terms of:

The software
- *Commercial GIS can be shoehorned into anything, but common problems are hard.*
- *Open source GIS is a gauntlet of programs from different sources with differing limitations, requiring different kinds of expertise.*

Solution development cycle.
- *GIS systems encourage data and logic silos, whereas data is increasingly too big to make replication practical.*
- *Data management has been largely ignored in GIS, but it is essential for Big*

We are developing a system to...

Speed the progress of and transform science that depends on geographic Big Data by commoditizing its management, analytics, and distribution.

Scale horizontally to Big Data, its update frequency, access patterns, and management requirements.

Integrate sensible data management solutions to scale.

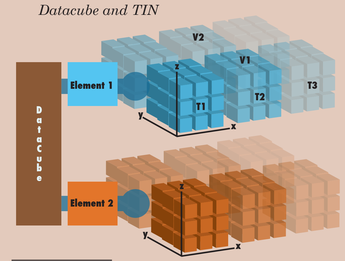
Vet, recommend, and federate open source geography tools to reduce the barrier of entry to using big geographic data for science.

Provide pathways to accomplish common tasks, reducing the complexity of getting things done.

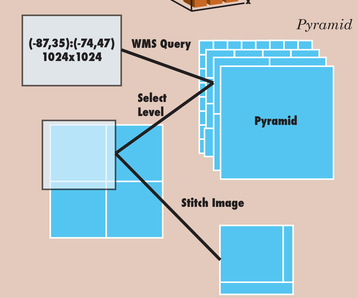
Be able to rapidly develop and deploy prototypes and solutions.

Custom Data Models

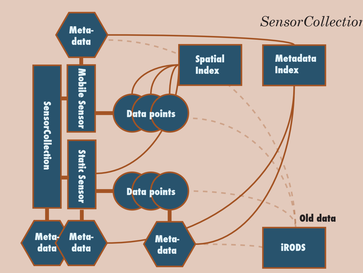
Datacube and TIN



Pyramid



SensorCollection



Work on Geoanalytics has been supported by collaborative agreements with the National Weather Service (WxEM: Weather for Emergency Management) and the National Archives (CI-BER: Cyberinfrastructure for Billions of Electronic Records).