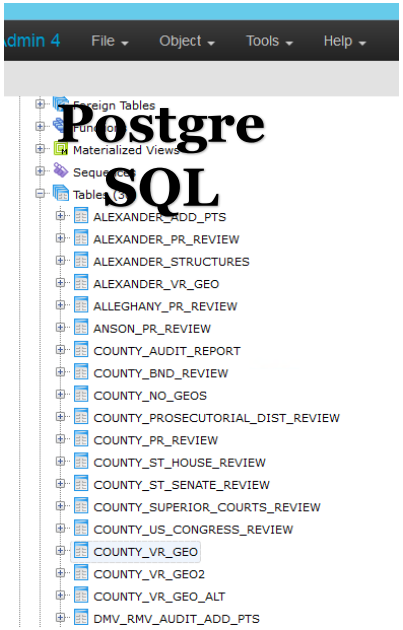
# NC Bipartisan State Board of Elections & Ethics Enforcement

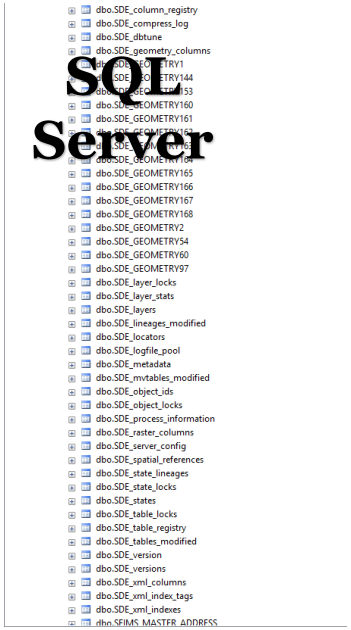
## ELECTIONS OPEN SOURCE GIS IMPLEMENTATION

BALU CHEPURI

# Why Open Source?

- Annual licensing costs – ESRI and Microsoft.
- Process are more efficient.
- Cleaner backend data structure.



# Tools

| Current - ESRI | Proposed – Open Source |
|---|---|
| ArcGIS Desktop | qGIS |
| ArcGIS Server | PostGIS, Geoserver,PgRouting |
| SQL Server | PostgreSQL |
| ESRI API for Javascript | OpenLayers |
| Python | Python, OGR (GDAL) Library, OSM Nominatim |
| | |

# GIS Projects

1. GIS Audit: Statewide Election Jurisdictional Audit – **Almost Done!!**
2. On Demand Audit: On Demand Election Jurisdictional Audit – **Almost done!!**
3. Interactive GIS: GIS Feature services + interactive map – **Work in progress!!**
4. API's for geocoding addresses and driving directions – **Yet to begin.**
    1. Open Streetmap Nominatim for driving directions??
    2. PgRouting – Routing functionality for PostgreSQL/PostGIS

# Project 1: GIS Audit

**Task**: To automate the process to validate statewide voters jurisdiction assignment against spatial data on a weekly basis.

**Output**: Reports, Shp files, KMZ and Feature Services.

**Process flow**: voter info (sql business tables) + Address Points + Jurisdiction boundaries.
All voters x 7 jurisdictions
Results – kmz, shp, ArcGIS Feature Service for interactive map.

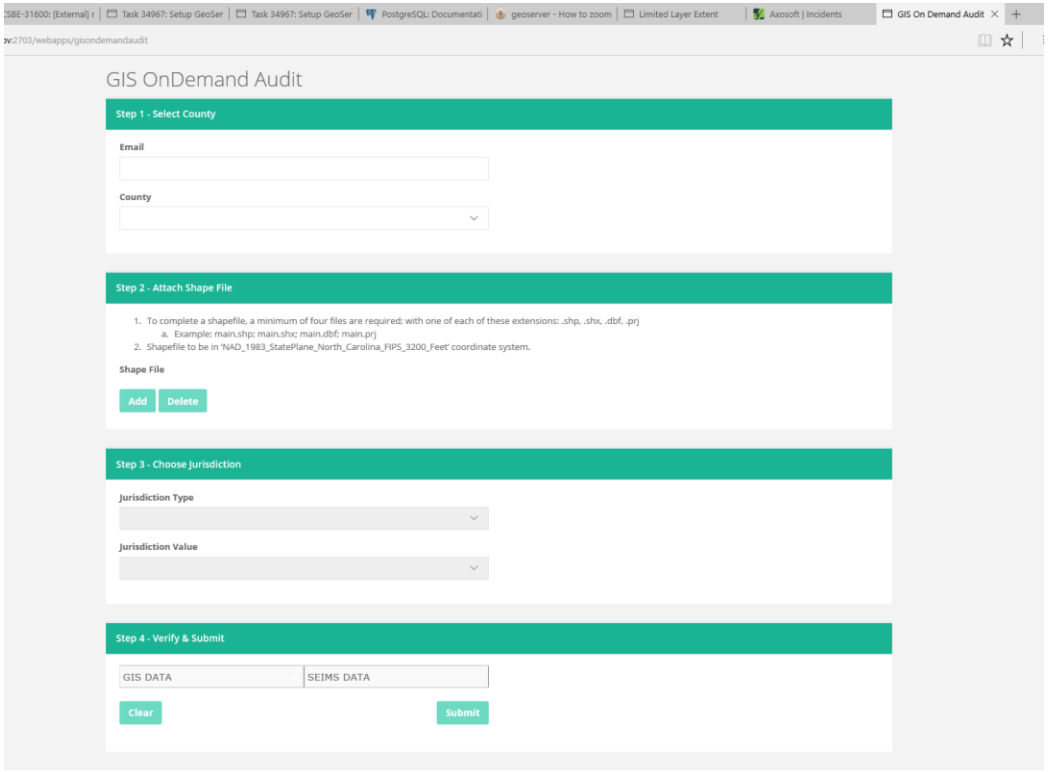
# Project 2: On Demand Audit

**Task**: To enable counties to validate voter jurisdiction assignment including local jurisdictions (County commissioner, School boards etc.,) against spatial data uploaded by county.

**Output**: Shp files, KMZ

**Process flow**: Business data (voter info) + Address Points + Jurisdiction boundaries (shp files uploaded by counties)

# On Demand Audit (Current)



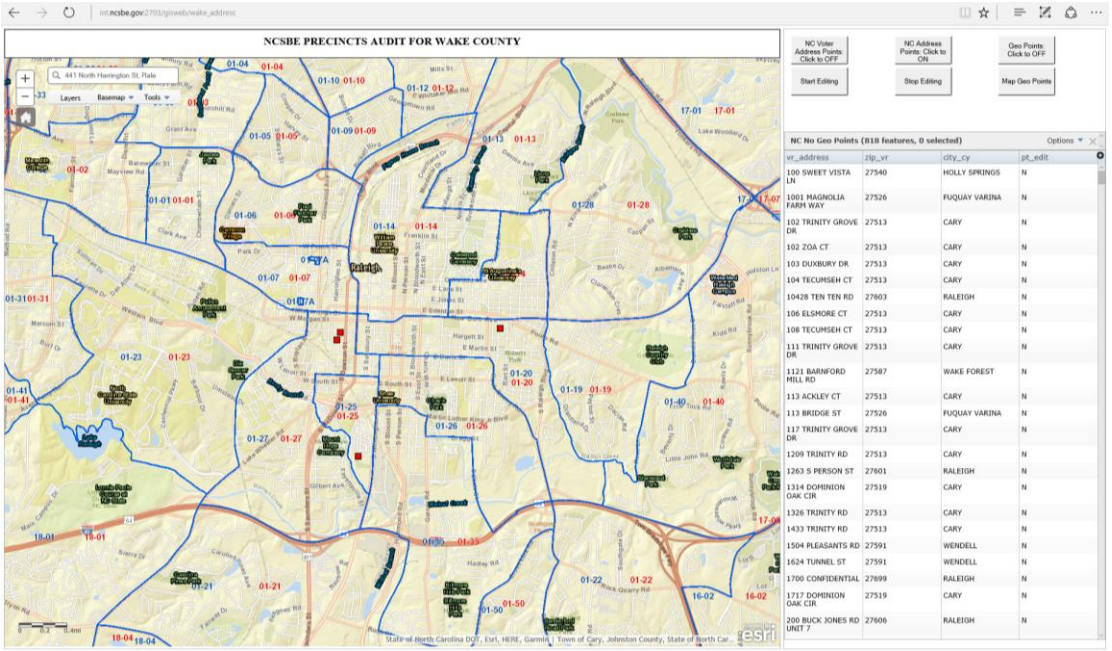
# Project 3: Interactive Map

**Task**: For counties to rectify address points on a web browser and to map addresses.

**Output**: output from GIS Audit:

1. Flagged Voter Address Points
2. Potential Voter Address Points (DMV Addresses and other NC Addresses)
3. Unmapped addresses as list.

# Interactive Map (Current)



# Open Source

# Application Development Process

Key milestones:

- Installation – PostgreSQL, PostGIS, Geoserver and GDAL for python.
- How to execute SQL Server, PostgreSQL procs functions from python?
- Automation in mind (think parameters, create python functions, connect pieces).
- Export data from SQL Server (csv) using python.
- Import csv data into Postgres using python.
- Import spatial data into Postgres (using ogr2ogr) using python
- How to create spatial queries?
- Export output to Shp files, KMZ, update services (using ogr2ogr).
- email using python.
- How to launch jobs using windows scheduler.
- PostGreSQL db management – logged vs non-logged tables, manage indexes, backups, restoring dbs.

# THANK YOU!

QUESTIONS?

Ballingam.Chepuri@ncsbe.gov

919-814-0769