Adding Offline Customized Map Server Functionality to a CAPI Laptop

Eric White
University of Wisconsin Survey Center
University of Wisconsin-Madison
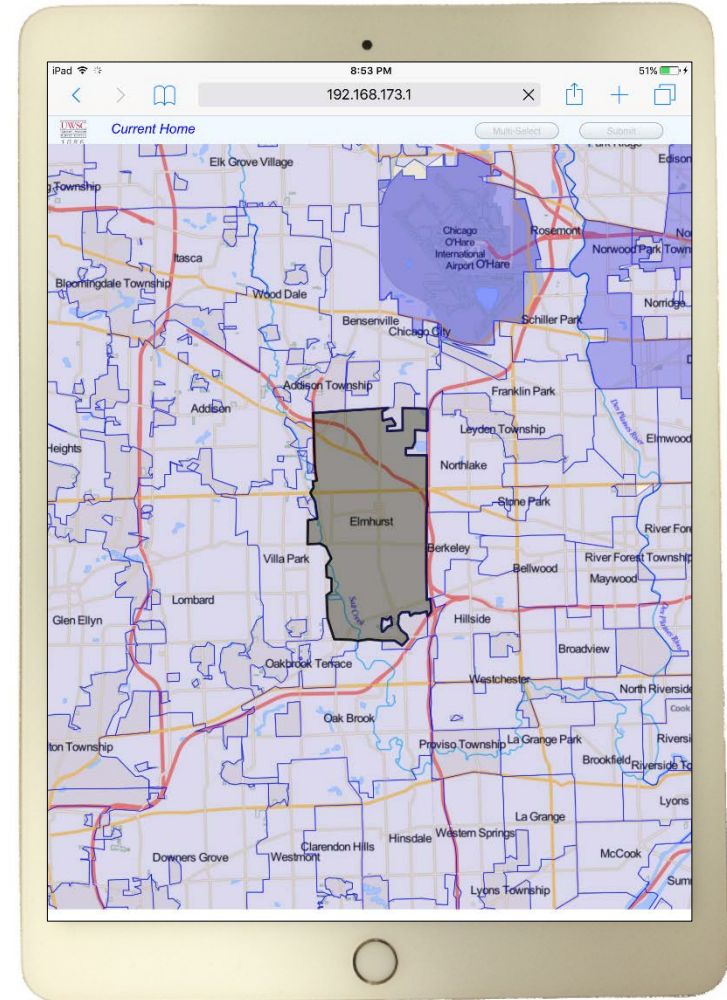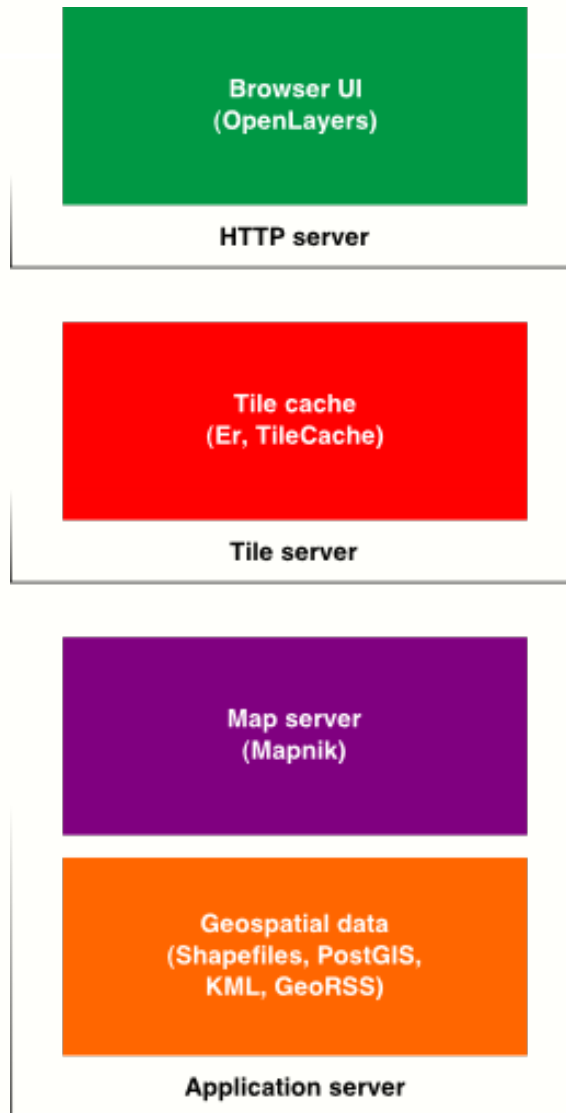
IFD&TC

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Introduction and background

- UWSC developing collaborative interviewing process using tablets
- Chicago Communities Study required a web application with mapping functionality
  - Participants must be able to tap and select cities, towns, and neighborhoods
  - Tablet must communicate with survey instrument on laptop
  - Must run entirely offline
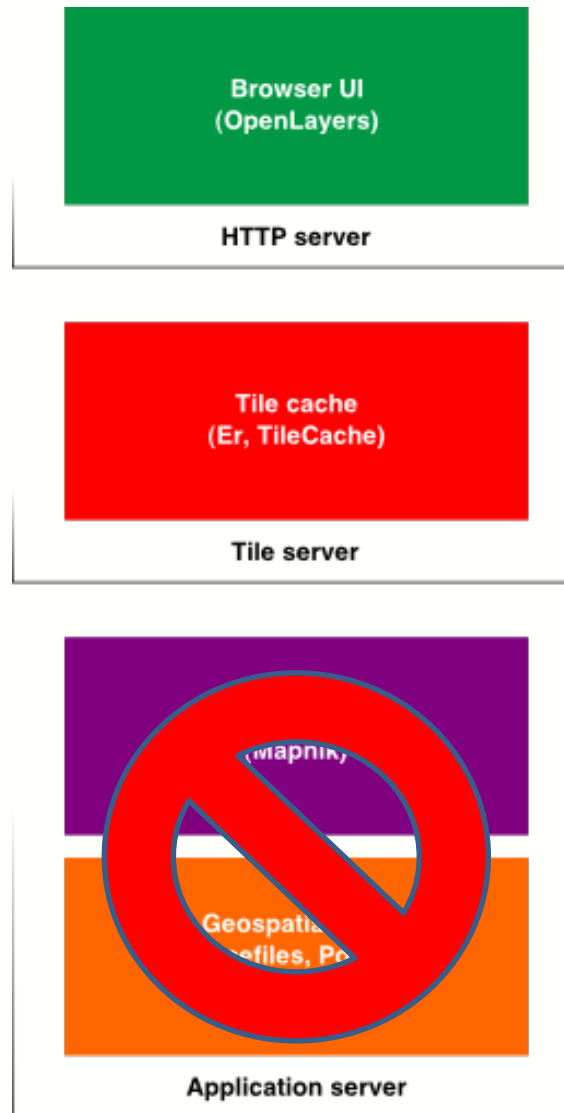
Web map application stack

Browser UI
(OpenLayers)

HTTP server

Tile cache
(Er, TileCache)

Tile server

Map server
(Mapnik)

Geospatial data
(Shapefiles, PostGIS,
KML, GeoRSS)

Application server

http://alistapart.com/article/takecontrolofyourmaps

What do we really need?

- We are working with a known, limited geographic area (Chicagoland area)
- We can prepare the map tiles ahead of time without needing to dynamically create them using geospatial data
- If we can prepare the tiles ahead of time we only need a tile server

Web map application stack

Browser UI
(OpenLayers)

HTTP server

IIS7
internet information services

Tile cache
(Er, TileCache)

Tile server

Tile Stache

(Mapnik)

Geospati...
...efiles, P...

Application server

Tilestache FTW

- TileStache is "the map server"
  - Written in Python
  - A number of packages and supporting applications required
  - Some manual configuration on Windows
  - Open source
    - Allowed us to tweak the code to work with local wifi network solution

- Virtual Router on each laptop so all of this runs in its own local wifi network
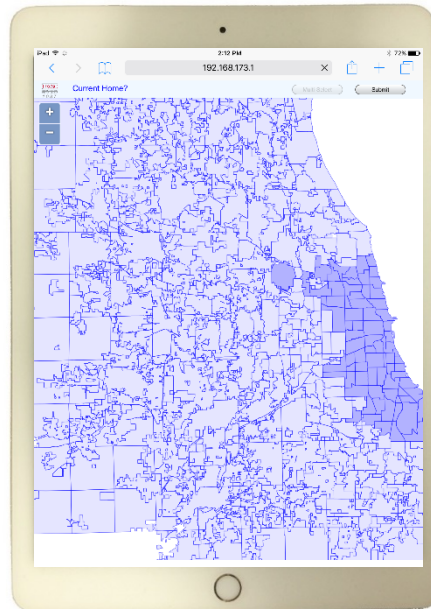
Boundary layer only
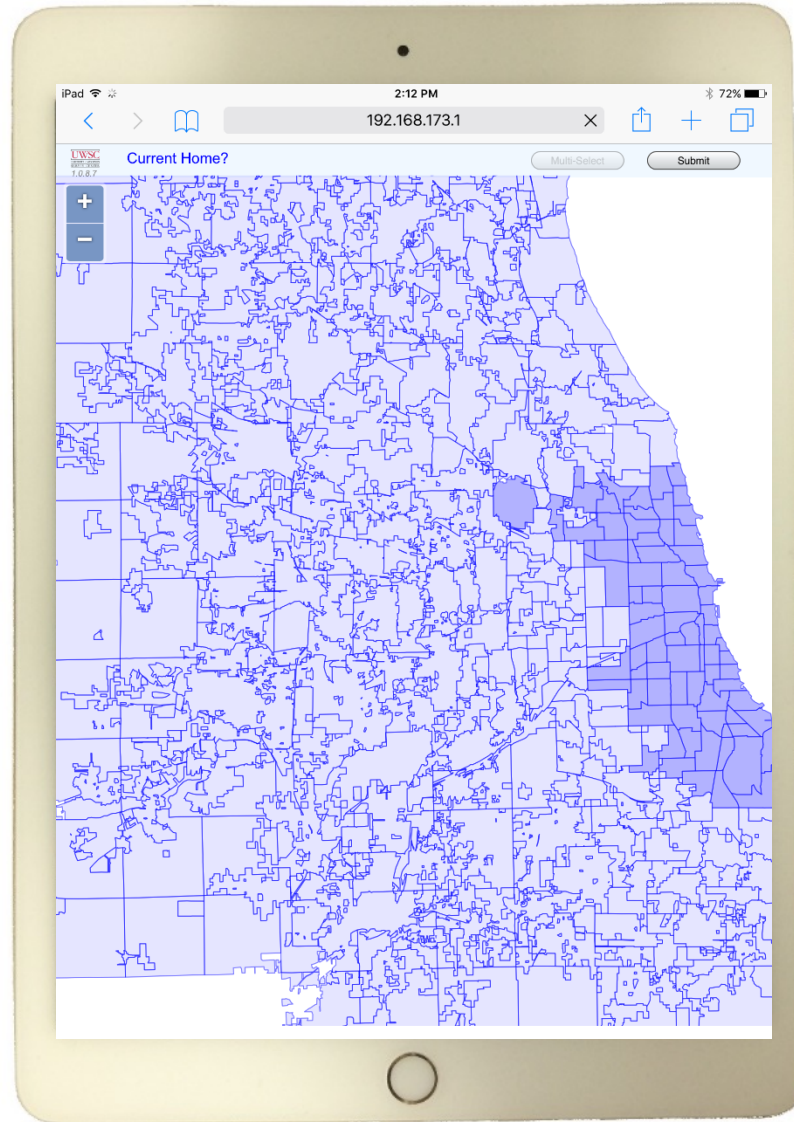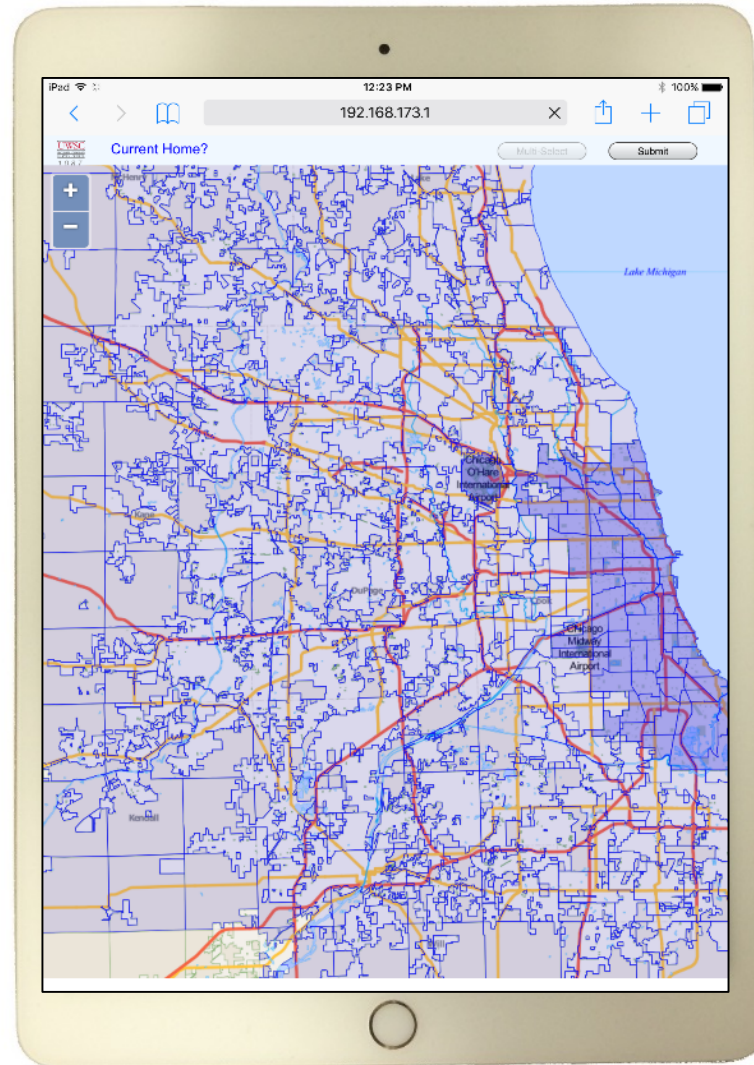
Map components – boundary layer

- Boundary layer defined 866 communities
  - Started with open data provided by Cook county
  - Augmented with other data sources to include coverage for smaller townships
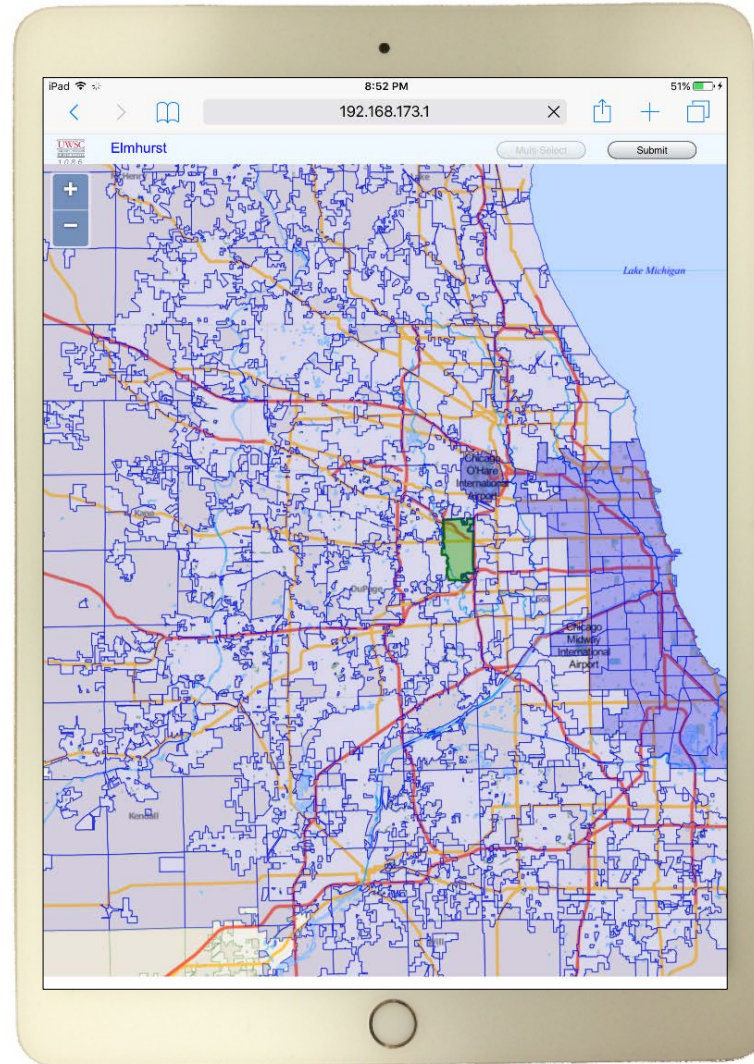 - Worked closely with UW Applied Population Laboratory (APL)
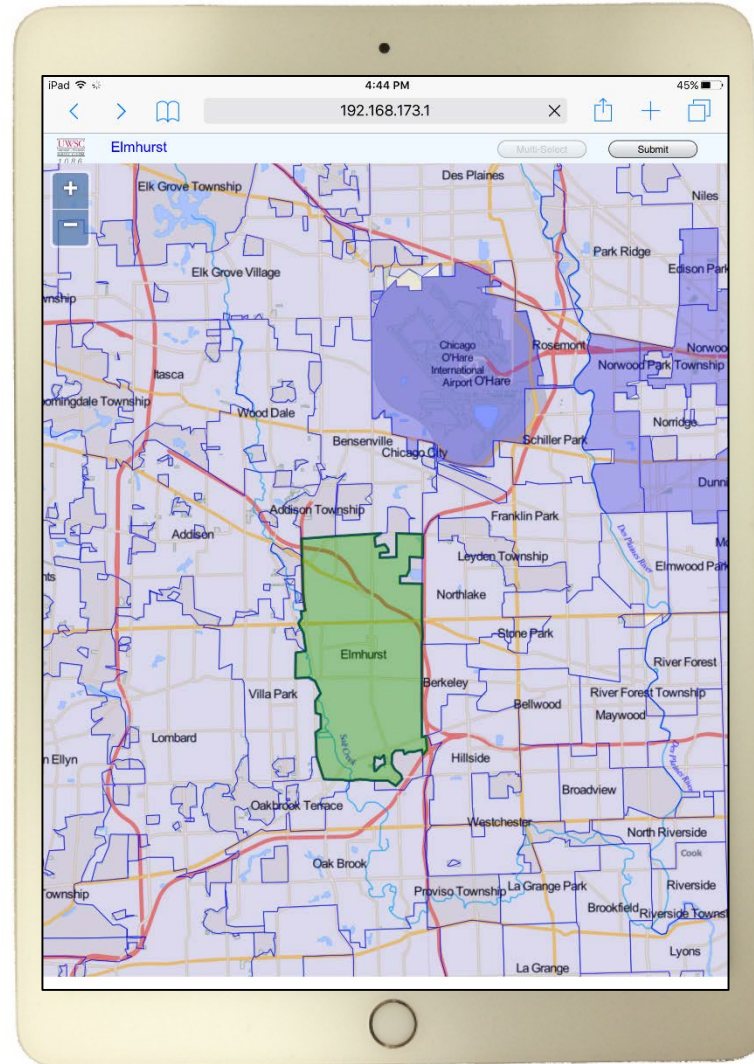
Boundary layer with underlying map tiles

Boundary layer with underlying map tiles

Boundary layer with underlying map tiles

Making the map tiles

- Open Street Map (OSM) data
  - Tiles produced using Mapbox TileMill
- Exported to MBTiles format
  - TileStache can render maps from MBTiles
  - MBTiles stores map tiles in a SQLite database
  - Our file was only 91KB in size
  - 5 zoom levels
    - Each zoom level needs about 4x more tiles

Beyond a tile server

- Dynamically drawn maps require map application server (map server and underlying geospatial data)
- Mapnik, MapServer, GeoServer, and more
- OSM data can be extracted and used locally
  - Preferably work with regional subsets
  - Entire planet dataset is nearly 40 GB compressed
- Might be easier to do on non-Windows systems

Key resources

- http://gis.stackexchange.com/questions/98490/how-do-i-serve-mbtiles-with-tilestache?
- http://blog.apps.chicagotribune.com/2011/03/08/making-maps-1/
- http://build-failed.blogspot.com/2012/03/custom-map-tiles-part-3-tilestache.html

Thank You!

For copies of this presentation or more information, contact:

Eric White

ewhite@ssc.wisc.edu

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