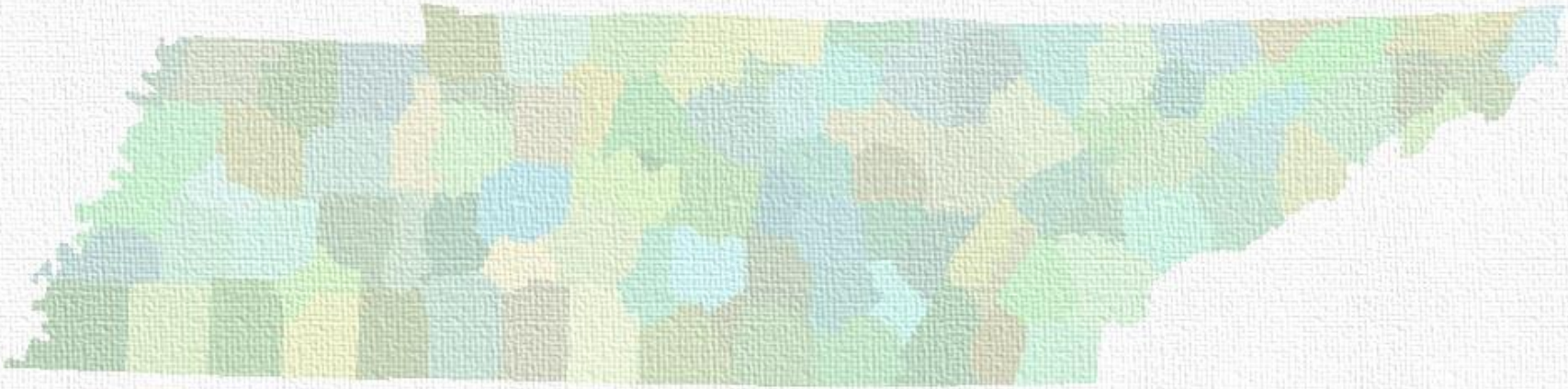
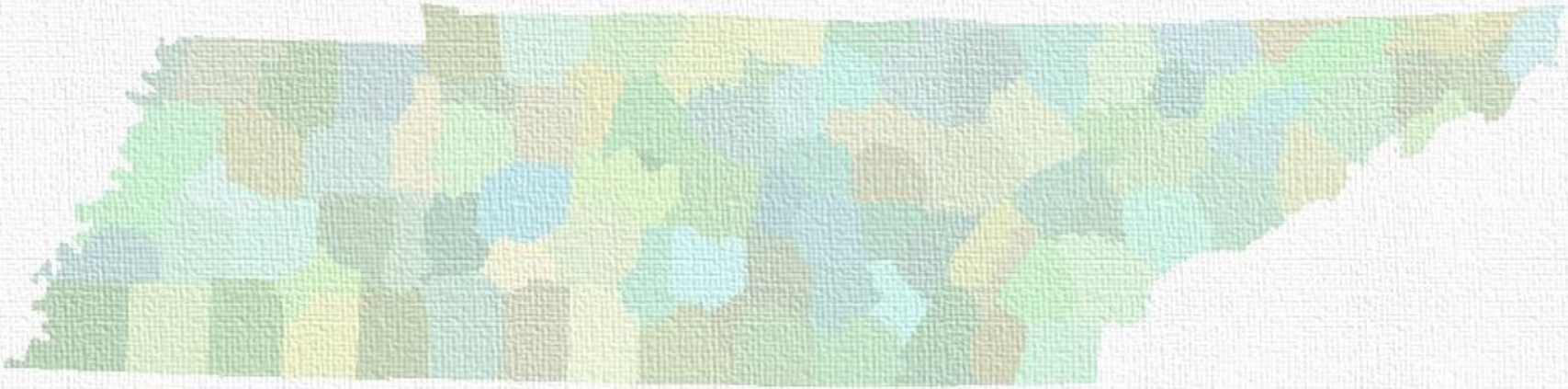


NEXT GENERATION 9-1-1

Tennessee Information for Public Safety

TIPS: 2015 Q1 Update

Presented by OIR-GIS Services

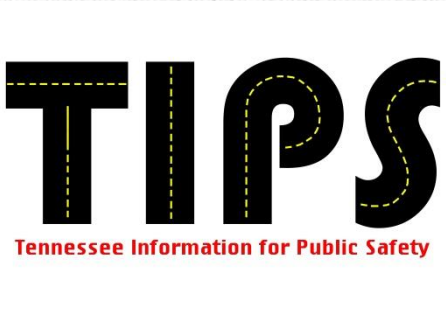


Next Generation 9-1-1

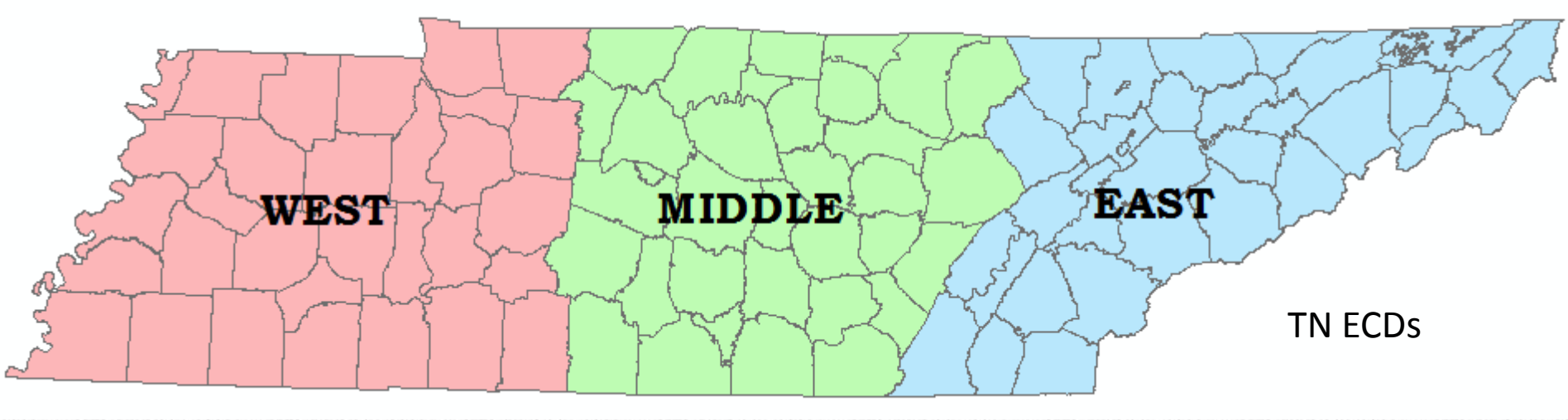
WHAT IT IS AND HOW IT WORKS

GIS and NG911

- Tennessee Information for Public Safety (TIPS)
  - Conforms to National Emergency Number Association (NENA) Standards
    - Street Centerlines
    - Address Points
    - Emergency Service Number (ESN) Polys
  - Uniform GIS Platform
    - ESRI ArcGIS Based
      - Not using Arc at all Districts
      - Product provided is ArcGIS Based
    - Currently receiving weekly updates
      - All 100 Emergency Communications Districts (ECDs)



Regional Stats



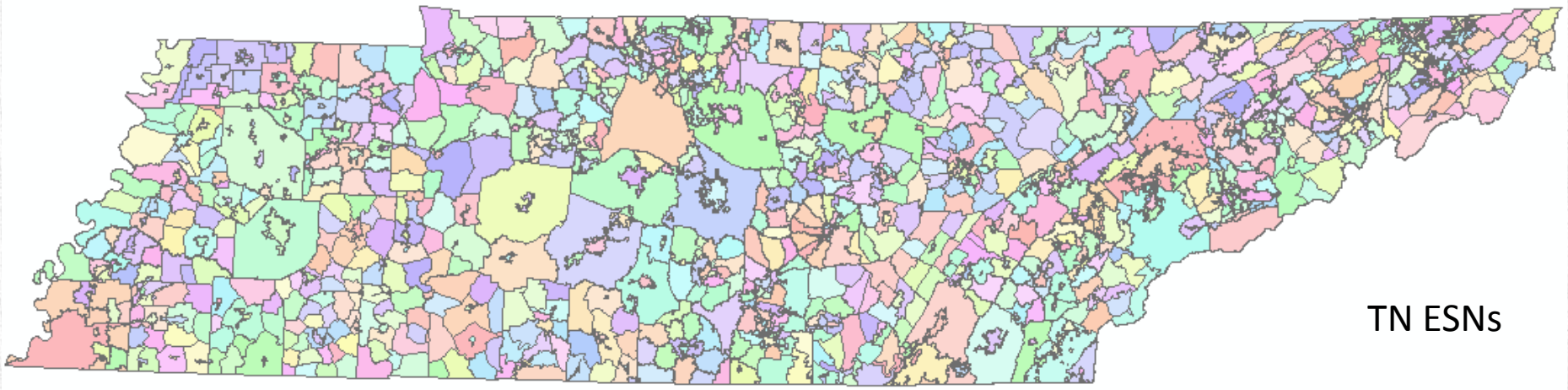
- The Stats:
  - 100 ECDs broken up by region
    - 94 county ECDs
      - Overton and Pickett Co in Middle TN are combined into one district
    - 6 municipal ECDs
      - 5 of which are in East TN
      - 1 in Middle TN

Next Gen vs. Current System

- Critical parts in current system:
  - MSAG (Master Street Address Guide)
  - ALI (Automatic Location ID)
    - Separately maintained, apart from GIS
    - Provided by phone co – record of each phone line
      - Tied to addresses
- Problems with current system
  - Separate records
    - Multi step process to update MSAG, ALI and GIS
  - Potential for missing addresses/streets in GIS
- Solution: Next Generation 9-1-1
  - Next Gen employs seamless integration of GIS into 9-1-1
    - GIS is Everything
      - ECDs' GIS data will be default "correct" dataset moving forward
      - Phone co records (ALI) will be validated against GIS data
    - Edit GIS data – Done!

Emergency Service Numbers

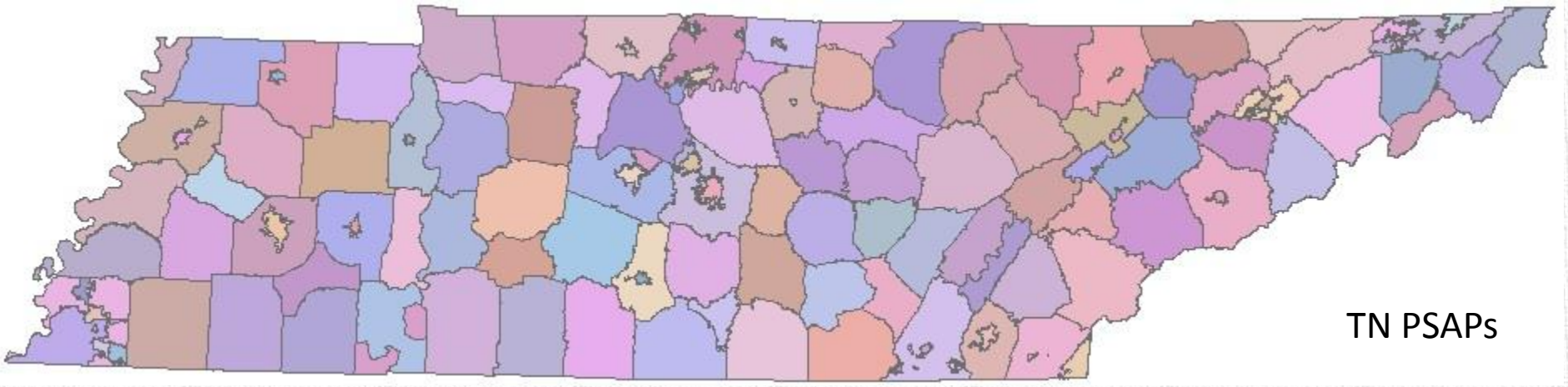
- All 100 ECDs have seamless call routing (ESN) boundaries in State GIS database
  - Nearly 2,000 ESN polygons within the State of TN
- Did You Know?
  - TN has no “official” county boundaries
    - Each County (and ECD) maintains their own boundary
      - None match
    - TDOT maps and signs are simply “close approximations”
  - OIR GIS orchestrated Herculean task of matching all ESN (Emergency Service Number) boundaries
    - Used for call routing only



TN ESNs

Public Safety Answering Points

- PSAPs polygons are related to ESNs
  - Routing information is tied to the PSAPID field within ESNs
    - Call plots (Lat/Lon from ALI validated point)
    - Lat/Lon falls within a PSAP polygon
    - Call routes to that particular PSAP
  - For visual reference, ESNs are dissolved here on the PSAPID field
    - Some ECDs have multiple PSAPs



TN PSAPs

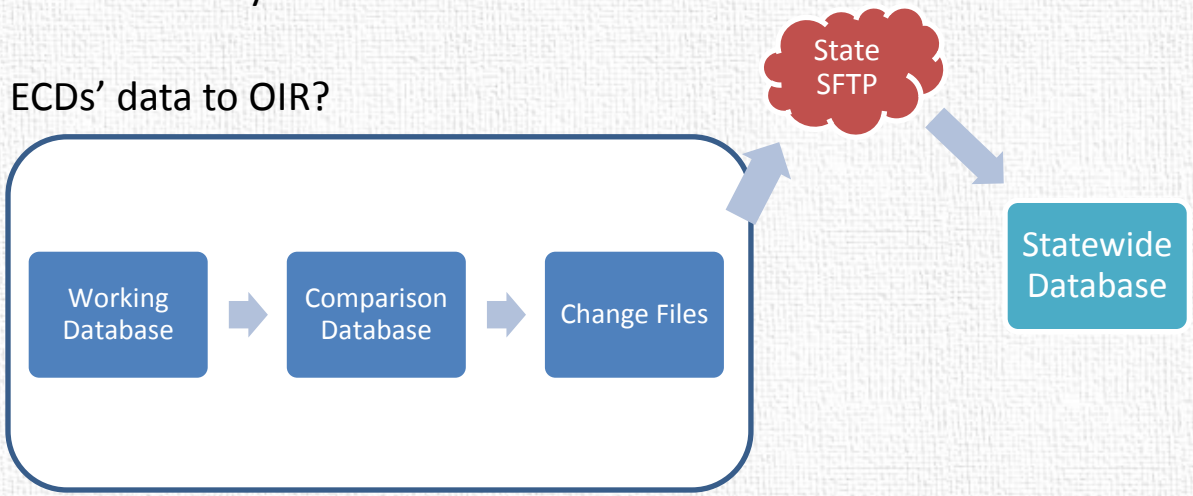
GIS for Next Gen 9-1-1: Update

- Near Future
  - Statewide database will be replicated between Nashville and Seattle/Phoenix
    - Phoenix is backup database
    - Testing and vetting happening now
  - TCS, based in Seattle, validates the address and street data against ALI records
  - Data then sent back to TN for use in NetTN system
    - Used for **initial call routing**
  - Jackson area will be first to deploy
    - Should be live by sometime late Q1 of 2015

NetTN TENNESSEE BROADBAND
The Options are Endless

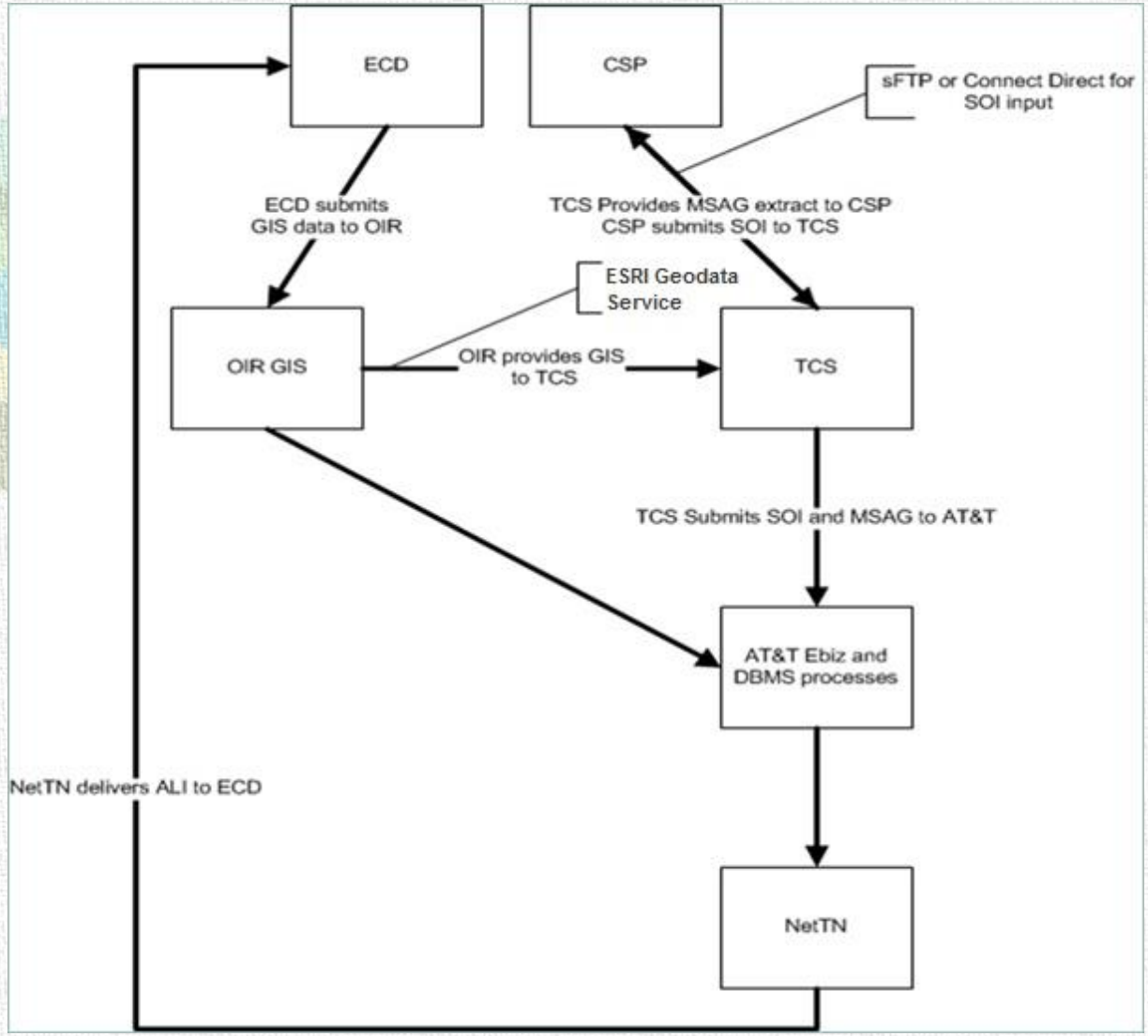
GIS for Next Gen 9-1-1

- Functional relationships
  - TN Emergency Communications Board (ECB) contracted with OIR GIS Services to administer the GIS portion of the project
    - 3 regional technicians were put in place to assist Emergency Communication Districts (ECD's)
    - Standardized TIPS Schema allows easy integration into statewide DB
  - Data changes upload from ECDs to OIR
    - Change detection program has been installed to detect local changes which are sent weekly to OIR-GIS and loaded into a statewide DB
    - Why not replicate all ECDs' data to OIR?
      - Not all ECDs using ArcGIS



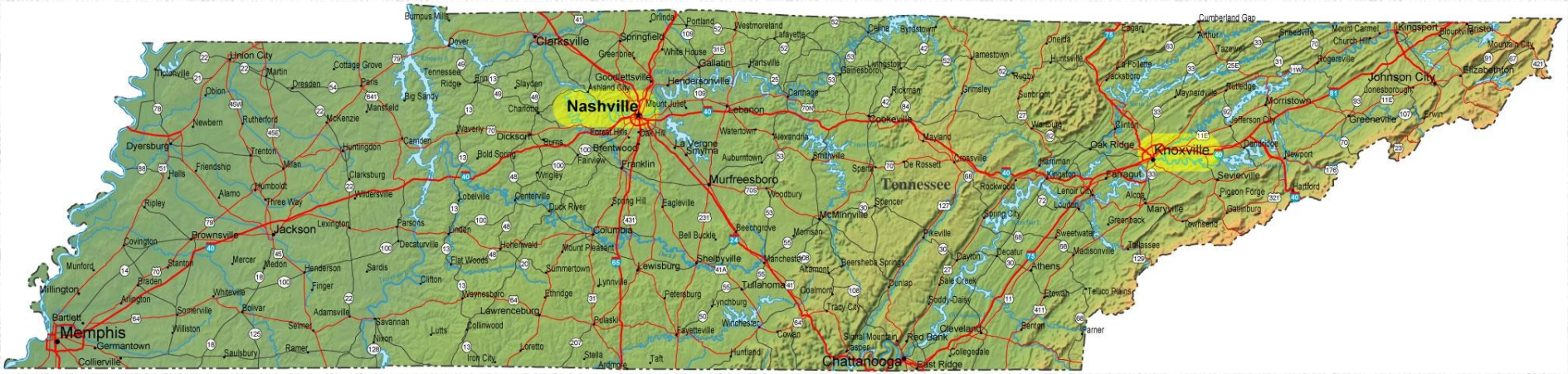
Data Life Cycle

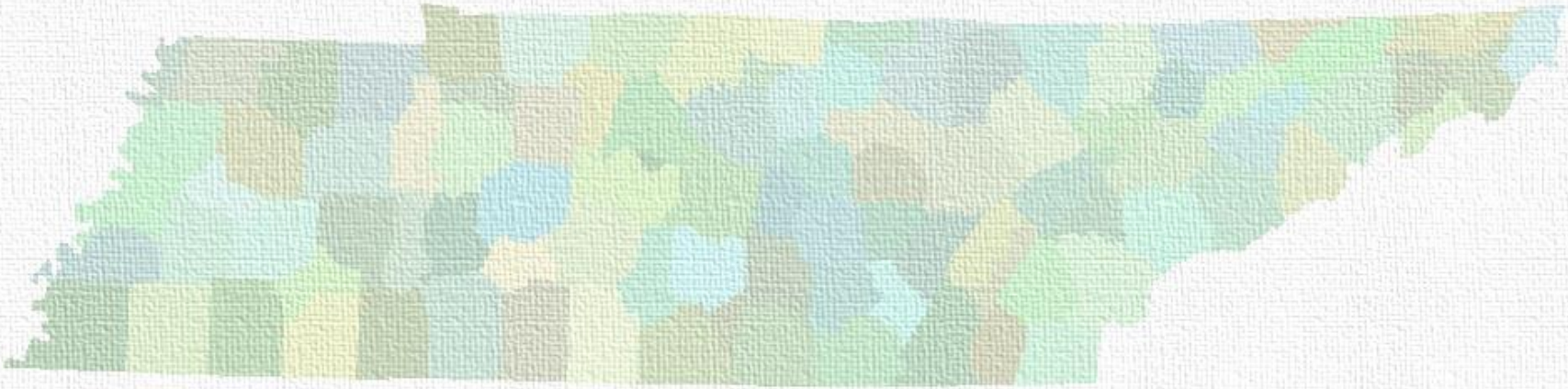
- Continued…
  - GIS data is sent to TCS and AT&T via Enterprise GIS
    - TeleCommunications Systems (TCS) uses GIS data to create ALI database
    - AT&T creates MSAG and delivers to NetTN System for use in live call routing
      - Location Validation Function
      - ESNs are used to route to Public Safety Answering Point (PSAP)



Next Gen: Data Centers

- NetTN:
  - Data backups stored in Nashville and Knoxville
    - Regional hubs in Memphis, Nashville, Chattanooga, Knoxville, Tri-Cities
      - Each has a dedicated high speed connection to at least two other regional hubs
  - System Used for initial call routing
    - Call routing is not the same as dispatch
    - Dispatching is up to each district and separate from 9-1-1
      - Most districts take calls and perform dispatching





When GIS Based Routing is Deployed

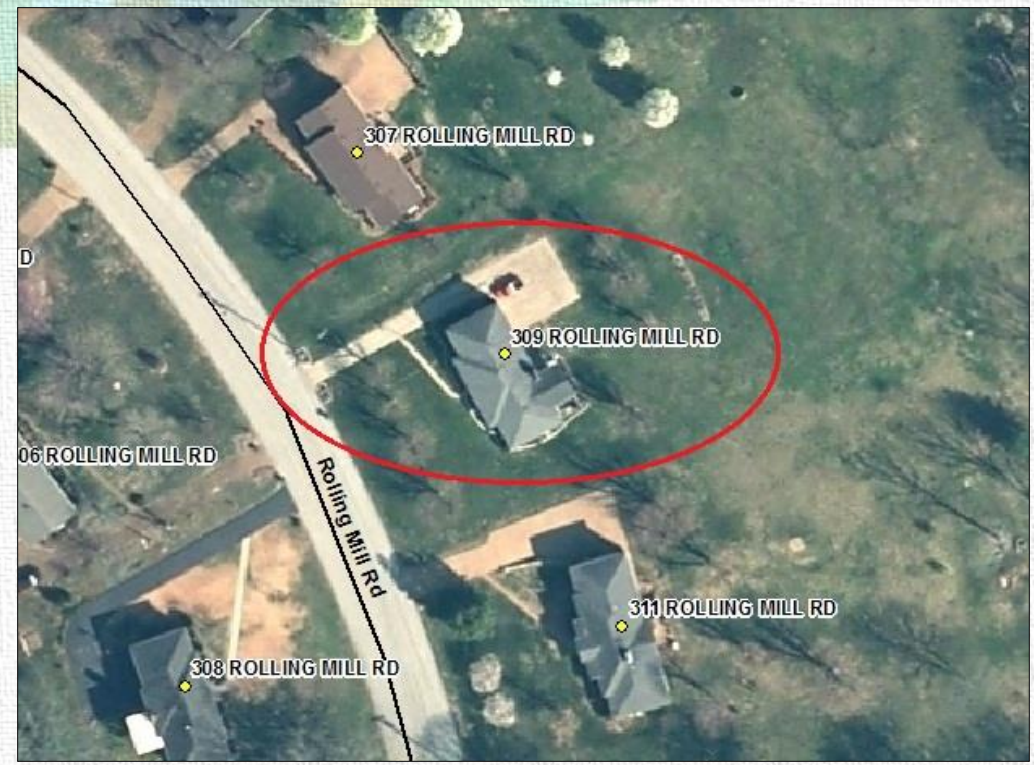
THE 4-1-1 ON 9-1-1 CALL PROCESSING

Land Line: Using GIS

- The Lat/Lon data is tied to the address point
- If the point is in the GIS data, it will be found and the call sent to the appropriate PSAP
  - This is the goal – every point in the GIS data
  - Ensures fastest call routing
  - What if the point isn't found?
    - We go to the next tier
    - Rely on centerline data
  - First, let's look at an "ideal" example:

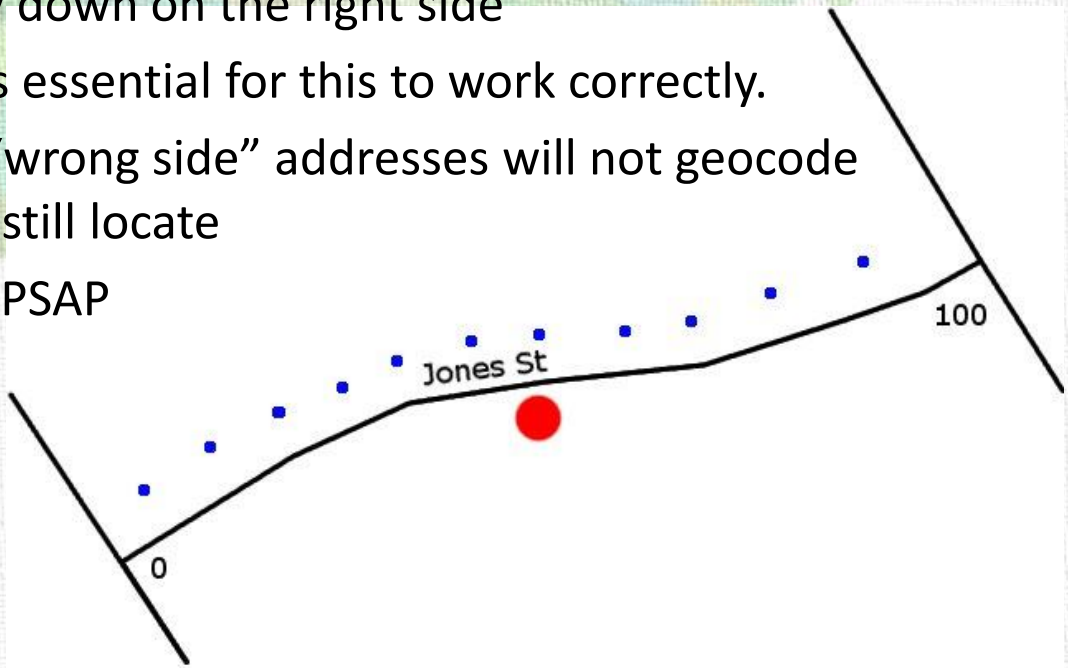
Land Line: Address Point

- Example:
  - Call comes in from 309 Rolling Mill Rd
    - Address is in GIS data
    - Point is located and mapped
    - Call is sent to PSAP
  - 9-1-1 is Done!
    - PSAP handles call from here
    - Dispatch, etc. is up to ECD



Land Line: Without Point

- Second line of defense: Geocoding
  - Takes minimal additional time
  - Example: 50 Jones St
  - Address is geocoded halfway down on the right side
    - A standardized schema is essential for this to work correctly.
    - “Out-of-sequence” and “wrong side” addresses will not geocode correctly – but will likely still locate
  - Call is routed to appropriate PSAP



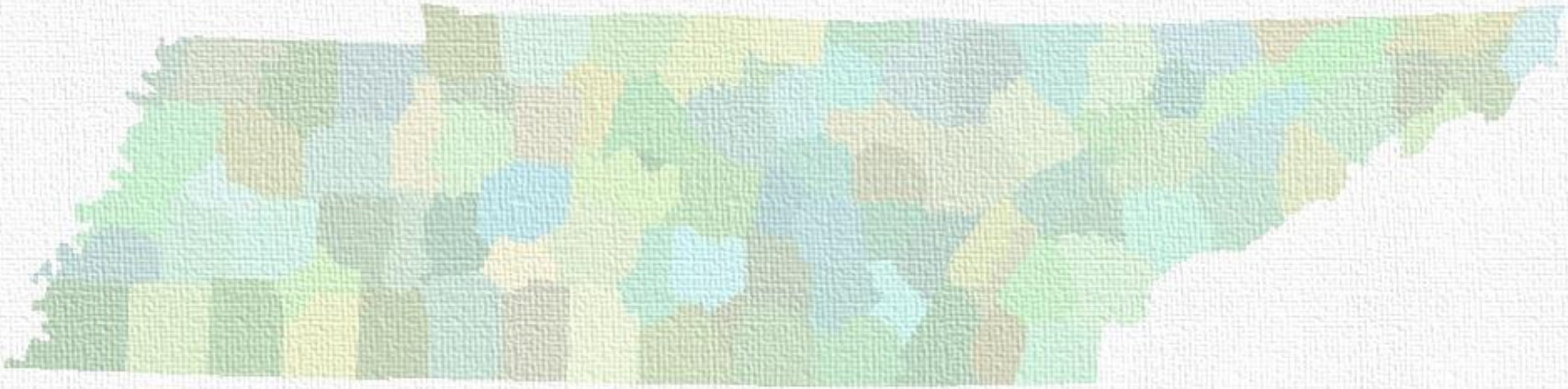
- If centerline doesn’t exist, or range doesn’t exist, we go to third line of defense

Land Line: Without Point – Worst Case

- What happens if the call can't be geocoded?
  - Goes to regional default data center
- Hypothetical Example:
  - Call comes in from somewhere in Maury County
  - Unable to locate point
    - Geocode attempt
  - Unable to geocode
    - Doesn't plot within an ESN
  - Sent to Nashville office
    - PSAP answers and transfers
      - Time delay!!
        - » Avoid this scenario!

Cellular Phone Calls

- Handled solely by location
  - No address information is involved as in land-line calls
  - AT&T bases locations off of cell tower triangulation
  - All other carriers use GPS location
    - All initialized phones have GPS receiver capability
- When call is received:
  - Phase 1
    - Displays location at “handling tower”
      - Happens immediately
  - Phase 2
    - Refined location based on carrier method
    - Takes a few seconds for Phase 2 to come to PSAP
      - Maximum time delay dictated by FCC



Standards and QC Metrics

QUALITY STANDARDS

Feature Classes

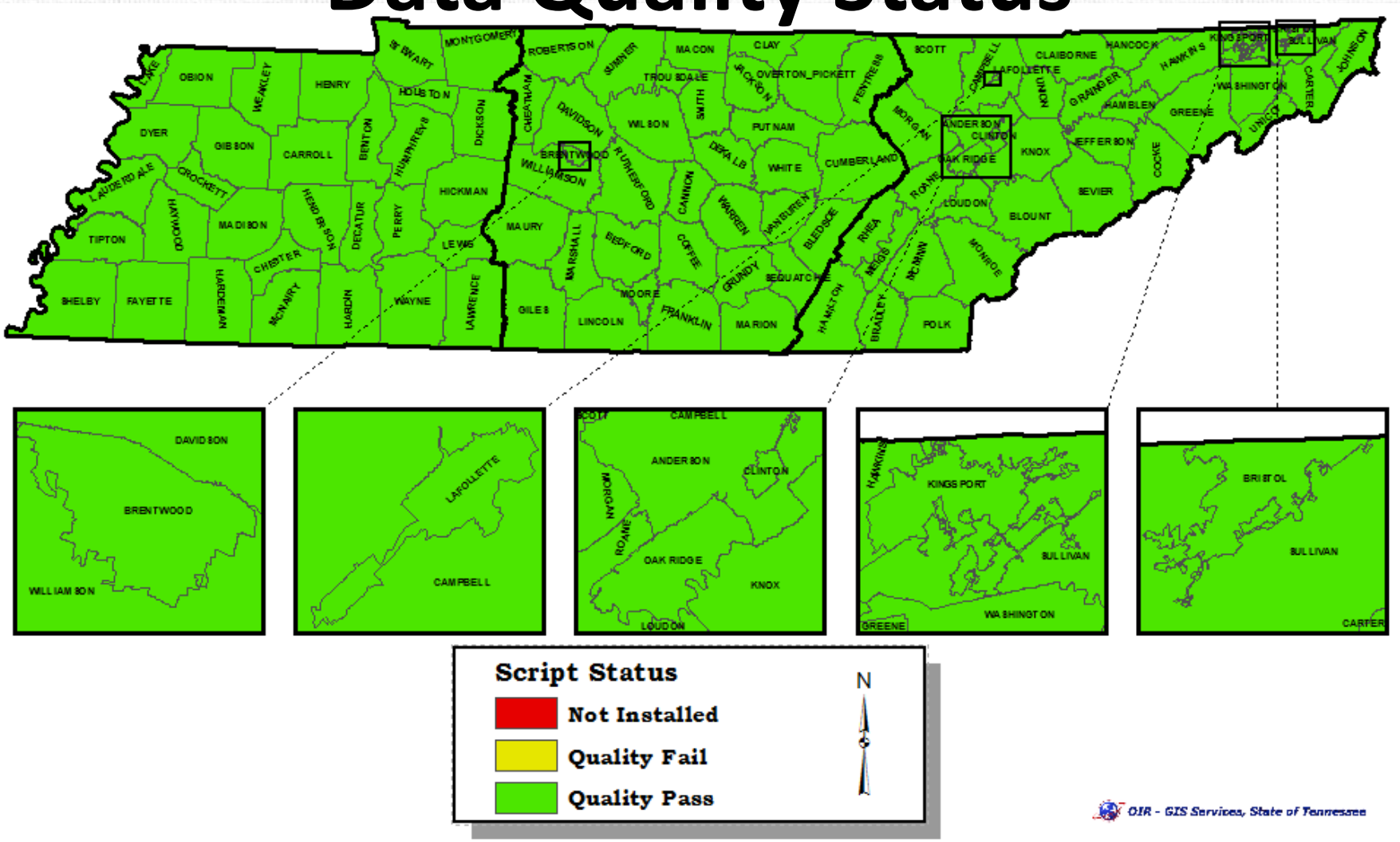
- Address Points and Centerlines
  - Maintained by ECDs
  - Updated via weekly upload to State
    - Conglomerated into single statewide DB
- ESNs
  - Changes directed by ECDs via interactive website
    - Updated as needed
  - Edits maintained by State
    - Not all districts have ability to maintain topology
    - Calls will be routed based on poly
      - Essential that no gaps/overlaps are present

Quality Control Process

- Primary automatic quality checks:
  - Data is checked and filtered prior to upload to State
    - Done via a new version of Change Detect Script (v2.0)
      - Several “pass/fail” fields
      - Other fields lumped together and checked for >2% error rate
    - If any of these parameters fail, the upload is stopped
      - Ensures that we maintain “clean” data in our statewide DB
    - Reports are generated, showing any errors that need to be addressed
      - ECDs are using these to improve the overall quality of their local GIS data
  - Point/poly analysis to ensure address point ESN value matches the ESN polygon where it resides
    - Reports of these errors are also generated for ECD benefit

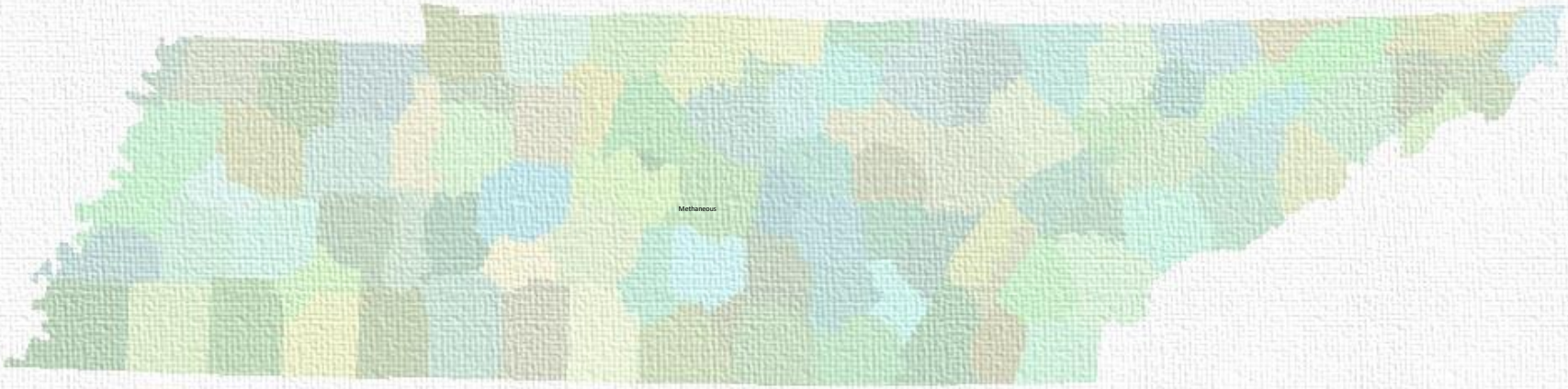
- Other manual periodic quality checks:
  - Topology
  - Compare ALI (Automatic Location ID) table to address points

Data Quality Status



- As of 12/15/2014: All 100 ECDs have data quality at 98% or higher

Questions?



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