State of North Carolina NG911 GIS Project Introduction

June 4, 2019
E9-1-1 vs. Next Generation 9-1-1
E9-1-1 critical database
MSAG (Master Street Address Guide)

Tabular database of street names, address ranges, routing numbers (ESN)

Validates addresses before 9-1-1 call

Provides routing information for 9-1-1 call to the correct 9-1-1 center (PSAP)

Control address format for querying GIS data

Maintained by Public Safety*

*Housed with Telcos
E9-1-1 process – GIS department today

GIS Department

PSAP

Telcos / Database Provider

- GIS
- CAD
- MSAG
- Telco Records
- Mobile Systems
- ALI
NG9-1-1 critical database
GIS database

GIS database:
- Street centerline
- Address Points
- Boundaries

Location Validation Function (LVF)
Validates addresses before 9-1-1 call

Emergency Call Routing Function (ECRF)
Routes call to the correct 9-1-1 center (PSAP)

Maintained by GIS department
NG9-1-1 process – GIS department, soon
Impacts of NG9-1-1 on GIS programs

- New responsibility level – Education!
- New data model standard specifically for NG9-1-1
- Maintenance update process and schedule
- Discrepancy report resolution
- Extract, Transform, Load (ETL) – local, regional, or state level
Preserve local schema – ETL process
(Extract, Transform, Load)
June 16, 2018

NENA Standard for NG9-1-1 GIS Data Model was approved!

NENA-STA-006.1-2018

And it only took 8 years....
Fitting it all together

- If YOU build your data to the standard...
- and your NEIGHBOR builds their data to the standard...
- and THEIR neighbor builds their data to the standard...
Key Points

- NENA NG9-1-1 GIS Data Model Standard
  - Supports legacy E9-1-1 and transitional systems
  - Offers set list attributes to ensure data integrity
  - Local data model change for mandatory & conditional attributes
  - Spatial reference MUST be WGS84 (not locally)
Required GIS layers

- Street Centerline: Standard location layer
- Address Points: May not contain all address locations, Landmarks, problem addressing areas, etc.
- PSAP Boundary: Most important call routing functionality
- Emergency Service Boundaries: Not limited to fire, law, medical, Separate layers
- Provisioning Boundary: GIS data provisioning authority, Only features within boundary

No Gaps or Overlaps
Strongly recommended

- Street Name Alias Table
- States or Equivalents
- Counties or Equivalents
- Incorporated Municipal Boundary
- Unincorporated Community Boundary
- Neighborhood Community Boundary
- Landmark Name Part Table
- Complete Landmark Name Alias Table

Being reviewed with CLDXF doc update
Recommended

- Railroad Centerline
- Hydrology Line
- Hydrology Polygon
- Cell Sector Location
- Mile Marker Location

PSAP

CAD
Attribute Requirements

Mandatory

Data field MUST NOT be blank

Conditional

If attribute value exists, it MUST be provided

If no value Blank or Null

Optional

An attribute value MAY or MAY NOT be provided in the data file
Notable Mandatory Attributes

- Discrepancy Agency ID: Agency that receives a Discrepancy Report (DR), should a discrepancy be discovered, and will take responsibility for ensuring discrepancy resolution. This may or may not be the same as the 9-1-1 Authority.
  - E.g. Durham911.nc.us.gov; Richmond911.nc.us

- Incorporated Municipality: Municipality name or “UNINCORPORATED”

- ESN and MSAG Community: Mandatory through transition to NG911
Notable Mandatory Attributes | NENA Globally Unique ID

- Each feature (record) must have a globally unique ID. When coalesced together with other local 9-1-1 authority’s data into the NG9-1-1 system the ID must continue to have only one occurrence.
Notable Mandatory Attributes | NENA Globally

Unique ID

Unique across ALL GIS layers (RCL)

Unique for EACH GIS feature (123456)

Unique across merged databases (county.st.us)

Reporting & resolution of discrepancy errors

Example:
RCL123456@county.st.us
# Street Name Elements

<table>
<thead>
<tr>
<th>CLDXF</th>
<th>Legacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Street Name Pre Modifier</td>
<td>▪ Legacy Street Name Pre Directional</td>
</tr>
<tr>
<td>▪ Street Name Pre Directional</td>
<td>▪ Legacy Street Name</td>
</tr>
<tr>
<td>▪ Street Name Pre Type</td>
<td>▪ Legacy Street Name Type</td>
</tr>
<tr>
<td>▪ Street Name Pre Type Separator</td>
<td>▪ Legacy Street Name Post Directional</td>
</tr>
<tr>
<td>▪ Street Name*</td>
<td></td>
</tr>
<tr>
<td>▪ Street Name Post Type</td>
<td>▪ Legacy Street Name Post Type</td>
</tr>
<tr>
<td>▪ Street Name Post Directional</td>
<td></td>
</tr>
<tr>
<td>▪ Street Name Post Modifier</td>
<td></td>
</tr>
</tbody>
</table>

**GEOCOMM**
Example 3

CLDXF Fields

- Street Name Pre Modifier
- Street Name Pre Directional NORTH
- Street Name Pre Type UNITED STATES HIGHWAY
- Street Name Pre Separator
- Street Name 63
- Street Name Post Type
- Street Name Post Directional
- Street Name Post Modifier BYPASS

Legacy Fields

- Street Name Pre Directional N
- Street Name US HWY 63 BYPASS HWY 63 BYPASS HIGHWAY 63 BYPASS US HIGHWAY 63 BYPASS
- Street Name Post Type
- Street Name Post Directional
GIS Data Hub
What is GIS Data Hub?
GIS Data Hub Overview

1. Log in to GIS Data Hub
2. Navigate to Upload page
3. Upload GIS Data
4. GDH Performs QC (less than 24 hours*)
5. GDH sends email notification with link for results & a report
6. Log in to GDH; Automatic Download of Results
7. Dashboard with Current Accuracy (Always Available)

*Most results will be available in 1 to 2 hours.
Access to GIS Data Hub

GIS Data Hub link

- https://gdh.geo-comm.com/GMS_API

User configuration

- Invitation email is sent for registration and password creation
- Permissions can be set to allow individual users to upload data, download results, view the Dashboard and download converted dataset in desired schema
Access to GIS Data Hub
GIS Data and Database Uploads | Consistency is Important!

CONSISTENCY FROM UPLOAD TO UPLOAD IS IMPORTANT!

GIS data file names and schema needs to be consistent

ALI and MSAG database sheet tab names need to be consistent

Browse to your zip file or drag and drop your zip file that contains your GIS data, ALI, MSAG or any of the three.
GIS Data Hub – Behind the Scenes

Secure web browser-based configuration management
QC Results Notification E-mail and Download Link

Hello,

Data for North Carolina - NCRichmond has been processed by GeoComm's GIS Data Hub.

The export package for 'QC Results' is ready for download.

Please contact the GIS Team if you have any questions.

Thank you,
GeoComm GIS Team
gis@geo-comm.com

Download Your Files

Copyright © Geo-Comm
QC Summary Report & Dashboard

Summary report is created with each quality control check run
<table>
<thead>
<tr>
<th>Available Documentation &amp; Supporting Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Guide</strong></td>
</tr>
<tr>
<td>• The User Guide includes the QC Plan</td>
</tr>
<tr>
<td>• The QC check table lists applicable exception codes</td>
</tr>
<tr>
<td><strong>GDH Help File</strong></td>
</tr>
<tr>
<td>• All available QC checks are described in the help file</td>
</tr>
<tr>
<td>• Exception codes associated with each QC check are listed in the help file</td>
</tr>
<tr>
<td><strong>Resolver</strong></td>
</tr>
<tr>
<td>• Can be installed locally and added into ArcMap</td>
</tr>
<tr>
<td>• Allows for exception code field population with one click by linking to features using the unique ID</td>
</tr>
</tbody>
</table>
Workflow Diagram and User Guide Review

Workflow diagram
- GeoComm Process Overview
- Data submission, QC Error Report and Remediation Management

Data conversion and quality control checks – User Guide QC Plan
- ETL fallouts
- Ingest validation
- General QC checks
- SSAP QC checks
- RCL QC checks
- Boundary layer QC checks
- Synchronization QC checks
Review of QC Process Results

Summary Report
ETLFallouts.csv
QCFallouts.csv
QCFallouts.gdb

GIS data QC results
ALI database and MSAG synchronization checks
Summary reports
Dashboard
GIS Data Exceptions

An even address was assigned to the odd side of the road in previous years. The addressing authority does not want to re-address the structure. This even address will be found as an error in the QC checks. What do I do? It isn’t an error that I can correct!
QC Exception Codes

- Exception codes are used to notify GIS Data Hub that a feature is an anomaly and that an identified error is an quality control check exception.
Quality Control Checks

The GIS Data Hub performs quality control checks on the submitted GIS data to ensure addresses are synchronized, roads are connected, standards are met, errors are identified, and more. These QC checks are flexible to add or take away from what they do so the limit of QC checks are virtually unlimited. When executed, the application begins the process of running a series of quality control (QC) checks to ensure current, accurate data. Processing occurs on a first in first out basis. The more information that is processed, and the more customized the schemas, the longer the processing takes.

Following is a list of common QC checks types that may be processed.

- Boundary Layer QC Checks Read more...
- General QC Checks Read more...
- Ingest Validation QC Checks Read more...
- Road Centerline QC Checks Read more...
- SSAP QC Checks Read more...
- Synchronization QC Checks Read more...

Overlapping Address Range Values

The Road Centerline - Overlapping Address Range Values quality control (QC) check identifies where roads have overlapping address ranges in a given community or zone. Overlapping ranges can produce poor geocoding results, as a given address may fall within range of multiple different segments. If these segments are spatially distant from one another, an emergency responder could be routed to a location far away from the actual incident.

**Example**

In the example below, a call coming in from 154 9th Ave could geocode to either of the street segments in red, putting responders on the wrong block.

The check takes into account several potential overlap scenarios.

- Overlapping ranges are found on named streets.
- Overlapping ranges are generated on named streets due to the use of an alias name. For instance, say the segment 100-159 Main St is also known by it’s alias State Highway 20; if State Highway 20 has a range of 2-118 exists somewhere else in the community, then an overlap is generated when using the alias for Main St.
- Overlapping ranges are generated when streets with generic names such as driveway or parking lot have ranges and appear multiple times in a dataset.
Questions

Jessica Frye, GeoComm Project Manager
320-281-2554
jfrye@geo-comm.com

Brandon Moore, King-Moore
276-356-8224
moore@king-moore.com

Mapping the Future of 9-1-1