

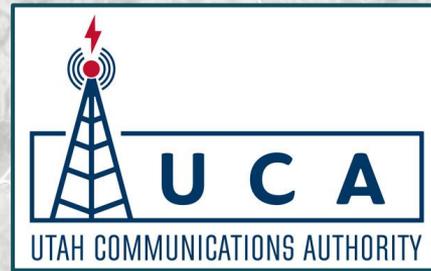
Consolidating Utah's GIS Data for Next Generation 911 (NG911)



Erik Neemann
9 July 2019

Overview

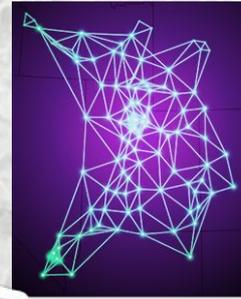
- Background
- Data Consolidation Efforts
- Utah's NG911 Roadmap
- Challenges



AGRC

Automated Geographic Reference Center

- State of Utah's GIS office
- Established in 1989 via Utah Code 63F-1-506
- State Geographic Information Database (SGID)
- TURN GPS Reference Network
- GIS & Web development
- Discover - Imagery & Basemap services
- Funded through combination of state funds and project work



"Encourage and facilitate the effective use of geospatial information and technology for Utah"

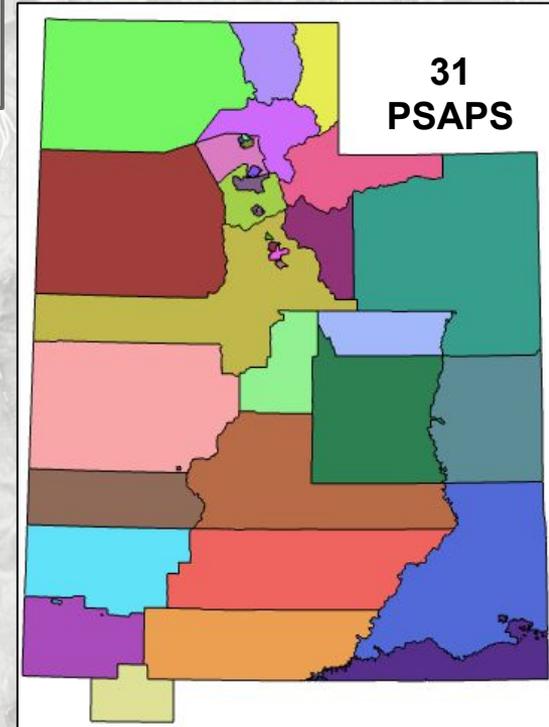
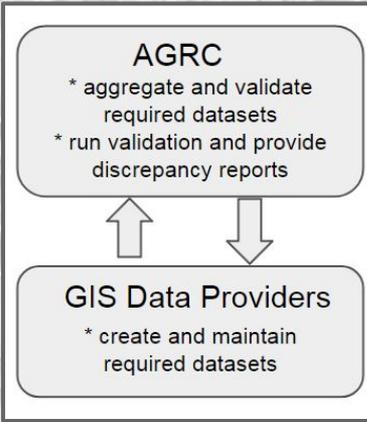
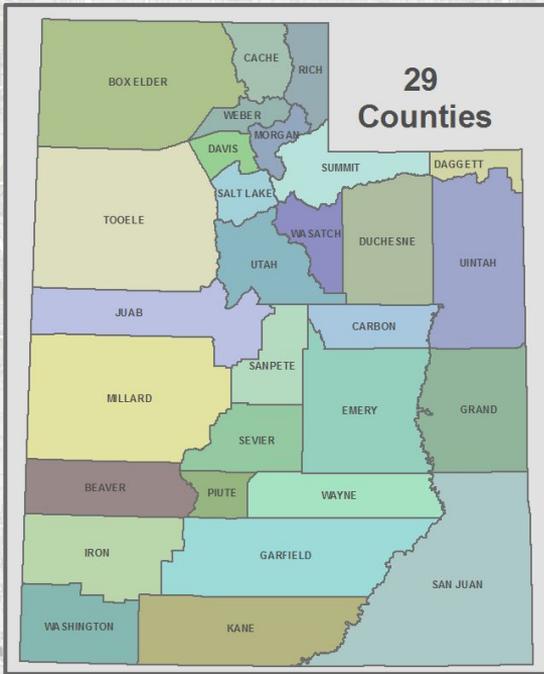
Current 911 System (E911)

- Analog system reliant on data tables to route 911 calls to appropriate Public Safety Answering Point (PSAP)
 - Master Street Address Guide (MSAG)
 - Maintained by PSAPs
 - Automatic Location Identification (ALI)
 - Maintained by telecom
- Landline/VOIP calls linked to static addresses with pre-determined PSAP
- Wireless calls routed based on cell tower sector, then lat/lon information (typical accuracy within ~30-500 m)



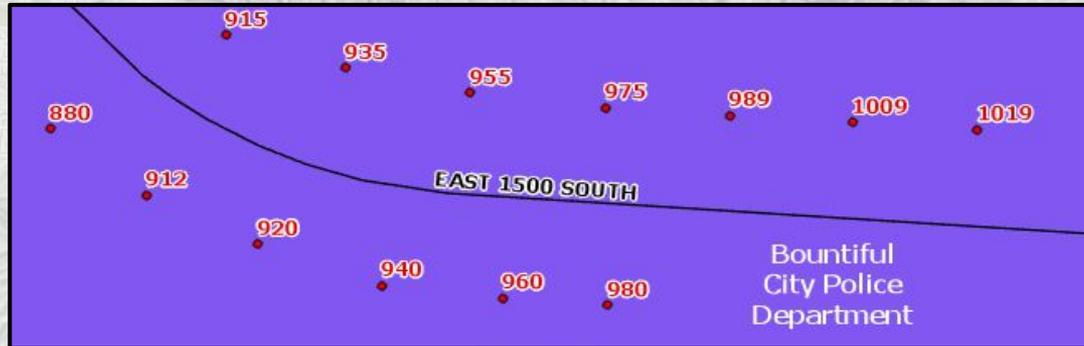
**MSAG
Table**

	A	B	C	D	E	F	G	H	I	J	K	L
1	DIR	STREET	LOW	HIGH	COMM	ST	O_E	ESN	DATE MODIFIED	EXCHANGE	ENTITY	MSAG
37	E	500 SOUTH	1	600	NEPHI	UT	B	430	4/29/1996		29	JUABUT
38	E	570 SOUTH	400	600	NEPHI	UT	B	430	4/29/1996		29	JUABUT
39	E	600 NORTH	1	900	NEPHI	UT	B	430	4/29/1996		29	JUABUT
40	E	600 SOUTH	1	300	NEPHI	UT	B	430	4/29/1996		29	JUABUT
41	E	635 SOUTH	498	498	NEPHI	UT	B	430	4/29/1996		29	JUABUT
42	E	700 NORTH	1	950	NEPHI	UT	B	430	4/29/1996		29	JUABUT



Next Generation 911 (NG911)

- Internet Protocol (IP)-based communications system with upgraded call handling equipment
 - Enables additional data streams (text, photos, video, sensor, IoT, etc.)
- Calls routed to PSAPs based on GIS data
 - PSAP boundaries
 - Road centerlines
 - Address points
- Dynamic routing possible by changing PSAP boundaries during emergencies, downtime, or high call volume



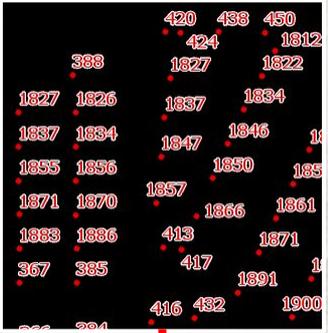
Data Consolidation Efforts

- Aggregate data from counties into statewide database (SGID)
 - Frequency based on population
 - Roads, Address Points, Parcels
- Road centerline editing database pushed to production database monthly
 - Schema parallels NG911, but isn't exact
- Other statewide data compiled and updated as needed

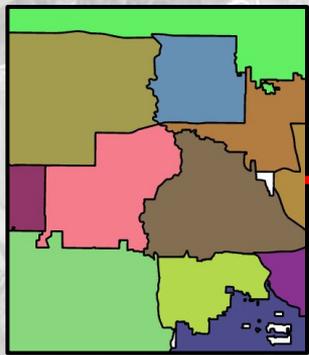


Roads

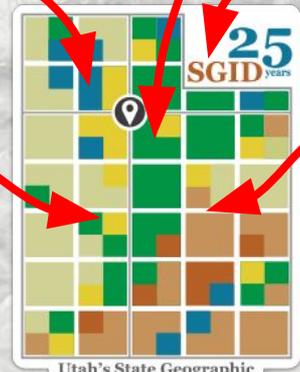
Address Points



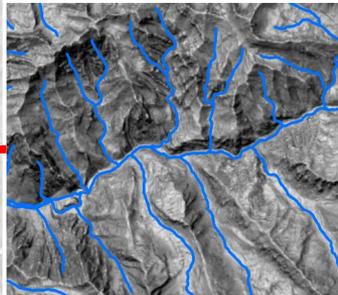
Parcels



Boundaries



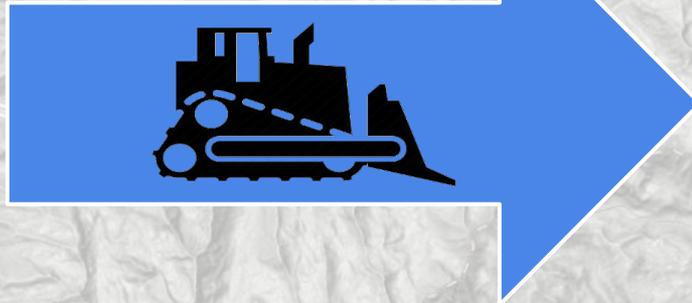
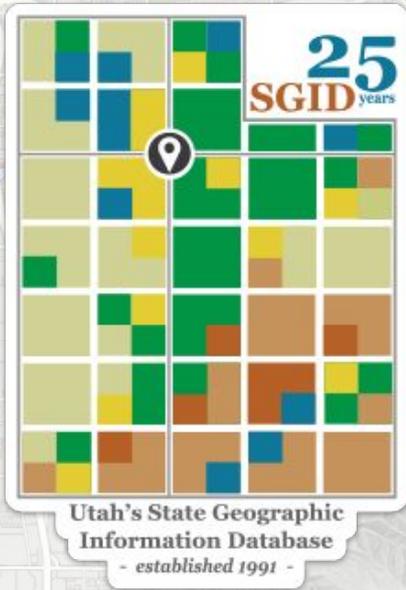
Utah's State Geographic Information Database - established 1991



More...

Data Consolidation Efforts

- Monthly process to Extract, Transform, Load (ETL) data from SGID into NG911 database



A screenshot of a GIS data layer list for a file named "UtahNG911GIS_20190605.gdb". The list includes various data layers such as AddressPoints, CellSiteLocation, Counties, EmergencyMedicalServices, Fire, HydrologyLine, HydrologyPolygon, IncorporatedMunicipality, LandmarkNameCompleteAliasTable, LandmarkNamePartTable, LawEnforcement, MileMarkerLocation, PSAP_Boundaries, RailroadCenterlines, RoadCenterlines, States, StreetNameAliasTable, and UnincorporatedCommunity. A red box in the bottom right corner of the screenshot contains the text "NEXT GENERATION 9-1-1".

- Field Name
- Data Type
- Character Length
- Etc.

Utah NG911 Roadmap

Long-Term



Shared-Editing Environment

Feedback Mechanism

Data Provisioning

ALI & MSAG

Data Preparation

Data Stewards and Responsibilities

Mid-Term



NENA Data Model and Requirements

Standards and Best Practices - State Data Model

Near-Term



Relationships and Coordination



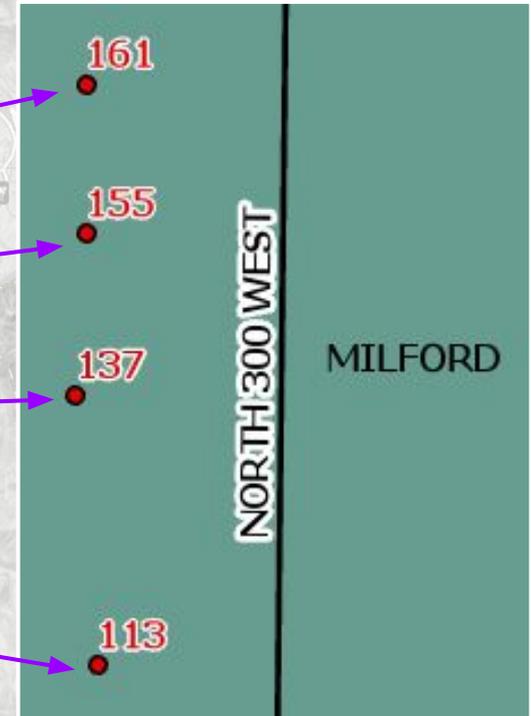
Utah NG911 Roadmap: Near-Term

Data Validation & Cleanup

- **Synchronize ALI/MSAG with GIS Data**
 - Geocode ALI data to ensure validation of all addresses
 - Verify address point exists for each ALI entry
 - MSAG streets represented in GIS format

ESN	HOUSE	SUFF	DIR	STREET	COMMUNITY	TELCO
525	161		N	300 WEST	MILFORD	SEU
525	155		N	300 WEST	MILFORD	SEU
525	137		N	300 WEST	MILFORD	SEU
525	113		N	300 WEST	MILFORD	SEU

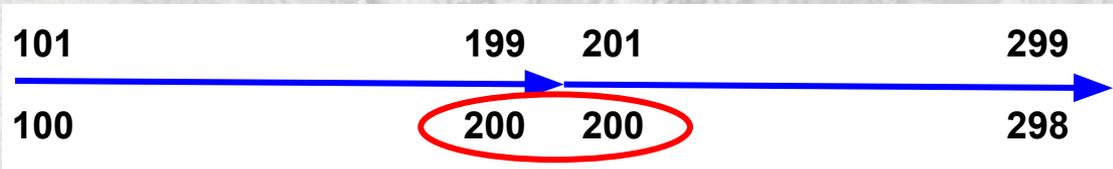
ALI Table



Utah NG911 Roadmap: Near-Term

Data Validation & Cleanup

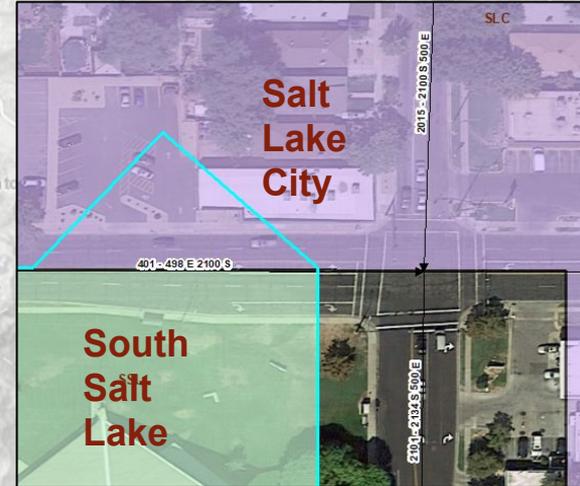
- **Address component cross-check: Centerlines vs. Address Points**
- **AGRC tools developed to automate checks, provide feedback to GIS data stewards**
- **Common Issues**
 - **Mismatched address components (predir, street name, postdir, street type)**
 - **Matching road centerline not found**
 - **Road segment address range overlaps**
 - **Road segment address range doesn't accommodate address point**
 - **Street name mismatches (primary vs. alias)**



Utah NG911 Roadmap: Mid-Term

Refine Data Cleanup & Build Out Infrastructure

- **Validate and cleanup emergency service boundaries**
 - Law
 - Fire
 - Emergency Medical Services (EMS)
- **Formalize official PSAP boundaries**
- **Determine authoritative GIS data providers and their area of responsibility**
- **Establish multi-user, near-live NG911 data editing platform**
 - Will ensure efficient data updates for call routing



APPROVED

Utah NG911 Roadmap: Long-Term

Operationalize NG911 Data Editing Platform

- Establish access and training for NG911 data editing platform
- Establish process to review and incorporate edits into statewide NG911 database
- Implement NG911 data editing platform



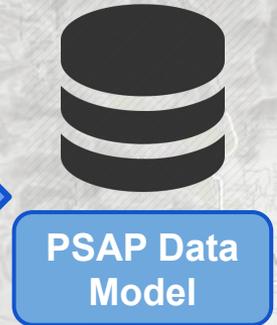
Ultimate Goal:

- Provision statewide NG911 database for local dispatch use

Challenges

- **Timely data updates (municipality → state database)**
- **Differences in GIS data for call routing vs. local dispatching**
- **PSAPs desire to customize data to meet local needs or preferences**
 - **Hinders ability to employ statewide database for local dispatch**
 - **Spelling out vs. abbreviating pre- or post-directions (900 N vs. 900 NORTH)**
 - **Leaving off "St" for some addresses (123 N Main vs. 123 N Main St)**
 - **Street name spelling differences (St George Blvd vs. Saint George Blvd)**

**NEXT
GENERATION
9-1-1**



Questions?



UTAH AGRC

LOCATION MATTERS

gis.  .gov

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