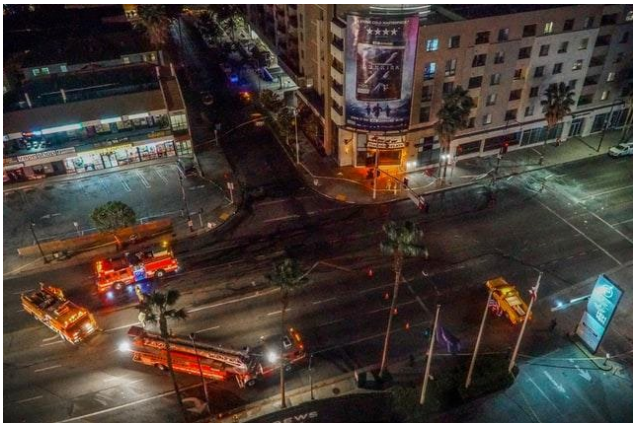# Addresses for the Nation - Pathways from Restricted Data to Open Data

Introduction

The Federal Geographic Data Committee and the National States Geographic Information Council recognize the need for a National Address Database (NAD). Accurate and up-to-date addresses and their locations are critical to transportation safety and are a vital part of Next Generation 9-1-1. They are also essential for a broad range of government services, including mail delivery, permitting, and school siting. In addition, the data can help enable critical applications including public health tracking and disease vector control, natural disaster response, transportation planning, construction/improvements notification, and provision of affordable housing.
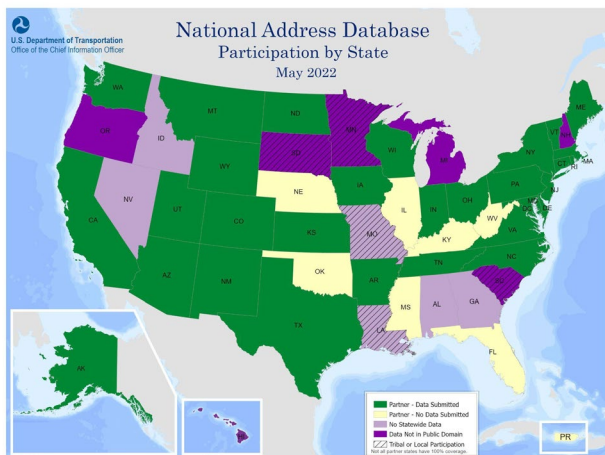
For years, there was a lack of a national database of address points in the public domain. In 2015, the United States Department of Transportation (DOT) began an effort to change this through the NAD initiative. The NAD is a unified collection of authoritative address points integrated from partners across the country. In most cases, the data is collected and maintained at the tribal or local governments, the data authorities, and aggregated to the state level before submission to the NAD. Participation in the NAD is completely voluntary and to date, there are NAD partners from tribal, state, and local government.

While participation is strong, not all states with address data have been able to become NAD partners. In some cases, there are policies in place that restrict data from being shared publicly. Overcoming

these restrictions is important – and possible. This paper describes how three states, Arizona, Kansas, and Kentucky, did just that.

Case Studies

Arizona

Arizona was one of the first states to contribute to the NAD. The decision to push authoritative address data to a national framework was determined through a series of circumstances and activities that brought to light the benefits and necessity of aggregating local data for both the state and the National Spatial Data Infrastructure (NSDI). This narrative is intended to serve as a use case example for information and knowledge exchange with the hope that the data and information provided supports the development of the NAD and the Address Theme for NSDI efforts leading to increased economic development, resiliency, broadband connectivity, digital equity, emergency preparedness, and response across the country.

Building Arizona's spatial data infrastructure has largely been a grassroots effort. The state's success in aggregating locally sourced authoritative data is largely due to the efforts of the Arizona Department of Transportation (ADOT) and the Arizona 911 Program Office to build a state supported data supply chain to meet state business requirements while minimizing the impacts and maximizing the benefits to local governments. The approach was multipronged and focused on education and outreach to local data authorities and their subsequent voluntary willingness to contribute and participate in the state data supply chain.

The development of this approach was motivated primarily by two factors: the Federal Highway Administration (FHWA) reporting requirements associated with the All Road Network of Linear Referenced Data (ARNOLD) and Next Generation 911 (NG911). Through initial data evaluation, it was identified that the geospatial landscape in Arizona varied greatly. For example, smaller, rural government entities did not have the resources or infrastructure to develop the required geospatial data, while the larger communities had more mature systems that were not interoperable across county jurisdictional boundaries. Coordination and funding opportunities were essential components for a successful program.

Broadband grants provided funding for the development of data in rural areas where data did not exist. Smaller jurisdictions often did not have their own geographic information systems (GIS) to support the evolving E911 system requirements, and the funding was welcomed. Sharing the data with the state was part of the agreed upon support for development. The ADOT and 911 Program team spent more

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than a year reaching out to and meeting with local jurisdictions to understand their challenges and share potential solutions. These efforts established and built relationships that provided the opportunity for a shared understanding of the benefits provided through coordination and sharing data.

Arizona's ability to contribute the state aggregated data to the NAD hinged on several key factors. The state adopted the NENA data model schema for data submissions and provided tools for local partners to transform their data to the required standard. This allowed the state's submission to the NAD to have minimal attribution while meeting both state and national level needs. Additionally, through educational outreach, the ADOT and 911 teams were able to illustrate the value inherent in having more exposure to the data itself. Essentially, the more eyes on the data with a feedback mechanism, the better the data would become for all users.

Like other states, NG911 implementation has driven the state to continue to improve upon its approach to the data supply chain and aggregation of locally sourced data. Tools have evolved and currently, the state clearinghouse supports an automated workflow for data submissions in native formats for local entities. This lessens the maintenance burden and improves the feedback mechanism for local jurisdictions.

Arizona still experiences challenges with statewide aggregation and there are gaps in the data due to some local data providers that are not comfortable with sharing. An additional challenge is duplicative data sets developed independently to serve different purposes. Evaluating the best authoritative source is time consuming and at times unclear. The State Cartographer's Office, ADOT and the 911 Program Office continue to work to fill these gaps and improve the data. Even with consideration of the challenges and existing gaps, Arizona's ability to contribute to the NAD is a win for both the state and local communities. For example, more accurate and standardized address data has assisted in a more accurate count and assessment of addresses for the Census Local Update of Census Addresses (LUCA) Program. It has also enabled the creation of a statewide geocoder available for public use. Arizona supports the USDOT's efforts to compile the NAD and maintain its currency. Our intent is to continue to provide regular address updates to the NAD.

For more information about Arizona's efforts to provide open address data to the NAD, contact Deputy State Cartographer Jenna Leveille at jleveille@azland.gov.

Kansas

The State of Kansas GIS Initiative has endeavored to build and maintain a statewide address point data layer for many years. Our program went through a series of starts and stops funded by pots of short-term grant funding. While address points were identified as a strategic data layer, little progress was made. In 2013, our state GIS data clearinghouse began working with the Kansas 911 Coordinating Council (Council) to plan and implement Next Generation 911 services. Our initial efforts focused on NG911 GIS data standards and requirements; however, we quickly realized that the NG911 program provided an opportunity to develop and maintain several strategic data layers, including address points.

As with most states, Kansas certainly had its share of GIS haves and have-nots. The Kansas NG911 program catalyzed the development of foundational GIS data layers in jurisdictions where the data either did not exist or was significantly outdated. Kansas adopted a federated approach regarding data development, maintenance, and aggregation. Local jurisdictions are responsible for data maintenance, and the clearinghouse centrally manages data aggregation, quality assurance, and publication. Data development projects began in 2014 and continued through 2016 when the first statewide aggregated dataset was produced. Now in maintenance mode, local jurisdictions regularly submit data to the clearinghouse, where it is reviewed, aggregated, and published in various formats and as web services.

The distribution of Kansas NG911 data layers, including address points, is governed by an MOU between the Council and each jurisdiction. According to the MOU, NG911 GIS data layers can be freely shared among Kansas state and local governments; however, the decision to share data beyond the approved users lies with each jurisdiction. The Kansas GIS data clearinghouse has developed automated procedures to centrally manage and facilitate data requests. To date, 81 of Kansas' 105 counties have agreed to share their data with the NAD. While this is a significant accomplishment, our goal is to publish the entire statewide dataset into the public domain and regularly share updates with the NAD.

While NG911 was the initial driver in the development of statewide address points, the utilization of the data goes well beyond this use case. Address points are used to power authoritative geocoding services utilized across state and local government and incorporated into numerous web applications. Public domain distribution of authoritative data improves efficiency, reduces duplication of effort, and drives innovation.

For more information about Kansas' efforts to provide open address data to the NAD, contact Geographic Information Officer Ken Nelson at nelson@ku.edu.

Kentucky

The Commonwealth of Kentucky began maintaining and contributing framework layers to The National Map in the early 2000's, however, none of our contributions included address point data. Strategically, everyone in the GIS community was aware of the need for this data, but getting the local governments to share address points for an aggregation effort seemed impossible. Year after year, both address points and parcel data were listed as the highest priority layers in strategic planning documents. Repeatedly, executive branch agencies documented how access to this resource would benefit their business processes. Unfortunately, no progress was made during this timeframe.

In 2011, the Division of Geographic Information worked to open lines of communications with the Commercial Mobile Radio Service (CMRS) Board, which had recently been administratively attached to the Kentucky Office of Homeland Security. For the first time, our team got a county-by-county view of the data being created and maintained at the local level. Sadly, much of the data was found to be incomplete, outdated, and erroneous.

We were very excited when we learned that a consultant for the CMRS Board was aggregating the data into a statewide layer. Unfortunately, the excitement was short-lived in that there was no desire to share the data, and none of the cleaned-up data was being provided back to the Public Safety Answering Points (PSAPs) for their operations. When pressed about this during a CMRS Board meeting, one board member clearly stated, "This isn't a map sharing program and each PSAP only cares about their area." The mindset of the Board and CMRS leadership was just not conducive to moving the effort forward.

Fast forward to 2016 when a new administration revived Kentucky's stalled 9-1-1 effort by appointing new leadership and bolstering their wherewithal via updated statutes and regulations. The entity was rebranded as the "Kentucky 911 Services Board," and following a reorganization of the Board, an administrator was hired that was truly dedicated to getting Kentucky's Next Generation 911 efforts back on track. For once, things seemed to be headed in the right direction.

Shortly thereafter, we were engaged by the new Executive Director of the Kentucky Office of Homeland Security and the 911 Services Board Administrator. We strongly advocated for the aggregation of local level address point data and encouraged the Board to hire a consultant that could lead them through the upcoming NG911 effort. One by one, over the next several months, the pieces began to fall in place as recommendations were acted upon.

In 2019, the stars seemed to align as federal NG911 grant funding became available, empowering legislation was passed, and administrative regulations were updated to achieve the goals set by the 911 Services Board. A lengthy procurement process netted two vendors: one for PSAP GIS data aggregation, and another to build a statewide NG911 Supplemental Data Portal. Finally, after years of advocating, a dedicated GIS specialist was hired specifically to advance Kentucky's NG911 effort. We could now see the light at the end of the tunnel.

Throughout 2020 and 2021, the 911 Services Board Administrator announced time and time again during Board and other outreach meetings that Kentucky's address point data would be aggregated and shared with everyone via the Commonwealth's GIS data clearinghouse. Our hopeful interpretation of this statement is that it would truly be shared with everyone, not just users in the Executive Branch.

As a NSGIC member, I was aware of the National Address Database (NAD), had noted Kentucky's ranking on DOT's "map of shame," and was determined to improve our stature in that regard. I realized that even though we were close to having a seamless statewide layer of address points, our score on the Geospatial Maturity Assessment (GMA) would suffer because we were not currently sharing this crucial dataset with the NAD.

Armed with GMA scores for address points from 2019 and 2021 and the DOT NAD status map, I reached out to the 911 Services Board Administrator. He and the Board's consultant immediately understood the value of being a NAD partner. The Administrator's intent all along had been to contribute the aggregated address point dataset to Kentucky's GIS clearinghouse, where resources are shared in the public domain. The arguments for engaging in a collaboration with DOT are very compelling, and from our perspective, it is a cost-avoidance measure. Interestingly, this same sentiment was echoed by some PSAPs that attended a public meeting in April 2022. They are growing tired of fielding calls from companies in search of authoritative address points data and see the NAD as a great option.

In March of 2022, we began work with the Commonwealth's 911 GIS data integrator (GeoComm) and the 911 Services Board GIS specialist to establish an update routine for all NG911 data layers, including address points. As per administrative regulation, all PSAPs must now submit layer updates each quarter (failure to comply with this administrative regulation can impact the PSAP's funding). Address points will be provided to the 911 Services Board upon completion of the integrator's QA/QC review and aggregation process. The data will then be staged for loading into Kentucky's enterprise geodatabases and provided to DOT for inclusion in the NAD.

A presentation regarding the NAD was conducted during the June 21, 2022, meeting of the Kentucky 911 Services Board. The overview underscored the importance of current and accurate address points as it

relates to NG911, but also noted how the data can be leveraged more broadly by public and private sector entities. The aim is to provide quarterly submissions, and the hope is that we'll be contributing data for all 120 counties by early 2023. Kentucky is very excited to be a part of this partnership.

Much of the credit for reaching this milestone must be attributed to the Kentucky 911 Services Board Administrator, Mike Sunseri. His leadership, and the continuity he's provided through two administrations, has been key to Kentucky's success. Our advocacy efforts over the years seemed to fall on deaf ears at times, but Mike took note of our recommendations and learned from the mistakes made by his peers across the nation. He embraced the vision we held for many years and used all of the tools at his disposal to make it happen.

For more information about Kentucky's efforts to provide open address data to the NAD, contact Geographic Information Officer Kent Anness at kent.anness@ky.gov.

Conclusion

Realization of the NSDI requires the public sharing of best available authoritative data. In most cases the data begins at a local or state level. The Geospatial Data Act (GDA) provides guidance for theme leads toward recognizing the importance of including partners and stakeholders as we strive for national authoritative data sets. As stated in the GDA, "*the National Spatial Data Infrastructure shall ensure that geospatial data from multiple sources (including the covered agencies, State, local, and tribal governments, the private sector, and institutions of higher education) is available and easily integrated to enhance the understanding of the physical and cultural world.*"

The intent of this white paper is to provide real world examples illustrating paths to public data sharing and to encourage states that have not yet had the opportunity to participate in the NAD to do so. Identifying the benefits gained by those states who have contributed is intended to support data contributors and communities as a whole. The examples of the multiple uses of address data provided below exemplify the importance of this foundational dataset for the nation.

- **Broadband** - As access to the Internet becomes a cornerstone in our lives, address information is a key element in determining served and underserved populations, and where broadband services are needed or need improvement.
- **Commercial Mapping and Navigation** - Private sector companies leverage address data as a key component of their service to support activities like package delivery and enabling consumers in finding and navigating from one place to another in support of day-to-day activities.

- **Emergency Management | Damage Assessment | NG911** - Address data serves as one of the foundational data layers in support of routing calls and providing emergency response for Next Generation 9-1-1.
- **Elections** - Addresses are a key component of getting voters the right ballot and assigned to the correct voting precinct and polling place.
- **Healthcare Response and Service Delivery** - Address locations were extremely important during the recent pandemic in determining where to best provide test and vaccination services.

If you would like to learn more about the National Address Database, please visit https://www.transportation.gov/gis/national-address-database or contact the United States Department of Transportation at nad@dot.gov.