

NC OneMap Modernization

Data Management, Analytics, & Visualization

North Carolina

Initiated: August 2018

Completed: August 2019

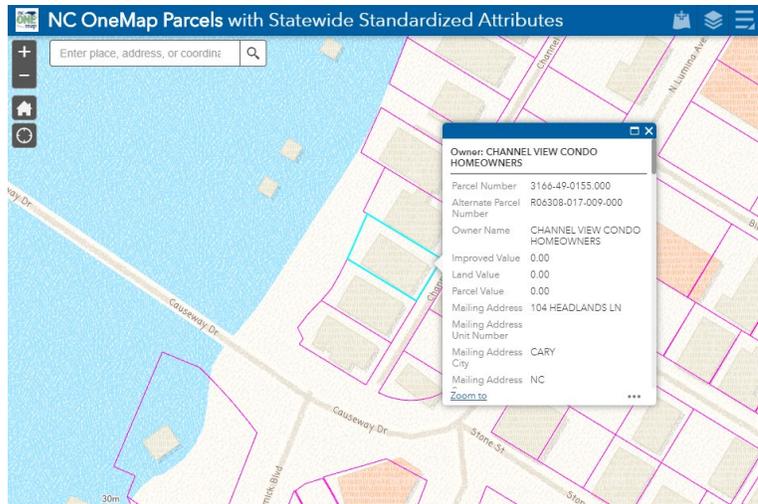
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Executive Summary

North Carolina has been a leader in Geographic Information Systems (GIS) data collection and dissemination for almost 20 years. Since its inception in 2003, NC OneMap has been an integral part of GIS data sharing in North Carolina. [NC OneMap](#) is the geospatial backbone, supporting North Carolina data users, both in the public and private sectors.

What started as a proof-of-concept project with federal partners has turned into a robust, modern infrastructure that North Carolina uses to leverage multiple categories of geospatial data for government, academic, and public use. NC OneMap houses 280 web services, web apps, maps, and other GIS resources



covering a total of 18 categories of geospatial information: Agriculture, Boundaries, Community Safety, Demographics, Earth Science, Economy, Education, Energy, Environment, Health, Imagery, Land Ownership, Location, Recreation, Structures, Transportation, Utilities, and Water.

State, local and federal government agencies, universities, K-12 schools, utilities, non-profit organizations and the general public all need a reliable statewide geospatial resource. NC OneMap provides that critical function that helps promote public safety, better government decisions, and economic vitality in our communities.

The NC OneMap architecture was completely redesigned and released in August 2019. While the original implementation was innovative when created in 2003, with the redesign it now embraces an Open Data philosophy to enable straightforward identification of relevant information, and the means to obtain it. The continued enhancement of NC OneMap supports the overall direction of the state's Geographic Information Coordinating Council (GICC) and our government's desire to make data created with public funds readily available.

The modernization of NC OneMap moved the architecture from an on-premises implementation of software vendor Esri's Geoportal Server to a hybrid deployment of cloud and on-premises. It leverages the Esri ArcGIS platform components of Enterprise, Online, and Hub.

This update has allowed state and local government agencies to quickly and easily share and access their data through NC OneMap. The new platform, along with guidelines and best practices for using it, have also made it easier to consolidate and uniformly present data layers from federated sources. Together these updates have improved the end-user experience, enabling those searching for data to find what they need faster, more accurately, and in one place.

Concept

North Carolina has been a leader in geospatial data sharing and coordination for nearly 20 years, due in large part to the spirit of collaboration that exists among our data owners. This is fostered by the [NC Geographic Information Coordinating Council \(GICC\)](#), which was established by executive order in 1991 and formalized in statute by the legislature in 2001 to better coordinate GIS efforts statewide. The GICC recognized the need for GIS data sharing and coordination among all facets of government, private entities, academia, and the public. The council has 11 subcommittees including local government, federal government, and private-sector members, covering topics ranging from general management and operations to metadata management.

Geospatial data duplication is a long-standing issue in the Geographic Information Systems (GIS) community. Collecting data that already exists can be very expensive and, for public entities, an unwise use of tax dollars. Gathering stakeholders with interests in the same data can save money and staff resources. Compounding the data duplication problem is that people or other organizations could not know about the collection effort. If data is not known, it is thought to not exist and, therefore, is created – and duplicated. One of the GICC’s first actions to address this issue was the creation of NC OneMap, which catalogs and manages the state’s geospatial assets. NC OneMap houses 280 web services, web apps, maps, and other GIS resources covering a total of 18 categories of geospatial information: Agriculture, Boundaries, Community Safety, Demographics, Earth Science, Economy, Education, Energy, Environment, Health, Imagery, Land Ownership, Location, Recreation, Structures, Transportation, Utilities, and Water. This data are used by state, local, and federal government entities as well as private-sector entities across the state.

NC OneMap provides a single place to discover data from local, state, and federal governments. Data is integrated from multiple communities and jurisdictions, allowing regional issues and problems to be addressed, while a statewide community of geospatial data stakeholders can solve policy and technical issues. The open, collaborative nature of this platform allows for better informed government decisions.

“NC OneMap is a special resource that is available to the GIS community in North Carolina. It provides a wealth of data through its modern interface and it serves as a confluence for our NCDOT partners in state and local government, as well as the broader GIS community. We are very fortunate to have a system such as this in place to serve the citizens of our state.”

John Farley, NCDIT GIS Manager for the NC Department of Transportation

North Carolina is moving towards an open data philosophy. NC OneMap provides an essential platform for the collection and dissemination of open GIS data. The North Carolina Center for Geographic Information and Analysis ([CGIA](#)), in the N.C. Department of Information Technology, is responsible for administrative oversight of NC OneMap and ensures the web application is available to all. Data and application accessibility for everyone are key characteristics. To that end, the data in NC OneMap needs to be:

- Redistributable without restriction (all data on NC OneMap is provided free of charge)
- Accessible 24/7

- Derived from large map scales or high-resolution sources
- The most current version of a data holding
- Reliably maintained by the data provider organization
- Documented using published standards

The NC OneMap architecture was completely redesigned and released in August 2019 to help meet these requirements. While the initial implementation of NC OneMap was innovative when created in 2003, over time it became a legacy application requiring significant time for maintenance and updates. While data sharing with other organizations was not cumbersome, more efficient and contemporary tools were available. The updated platform now embraces an open data philosophy to enable straightforward identification of relevant information, and the means to obtain it. The initiative, and its continued enhancement with the new release, supports the overall direction of the GICC and state government in making data created with public funds readily available.

The modernization of NC OneMap moved the architecture from an on-premises implementation of software vendor Esri's Geoportal Server, which served North Carolina well for many years, to a hybrid deployment of cloud and on-premises. It leverages the Esri ArcGIS platform components of Enterprise, Online, and Hub. Due to the limited resources allotted to NC OneMap, CGIA needed a solution that would allow it to quickly add content and easily maintain it.

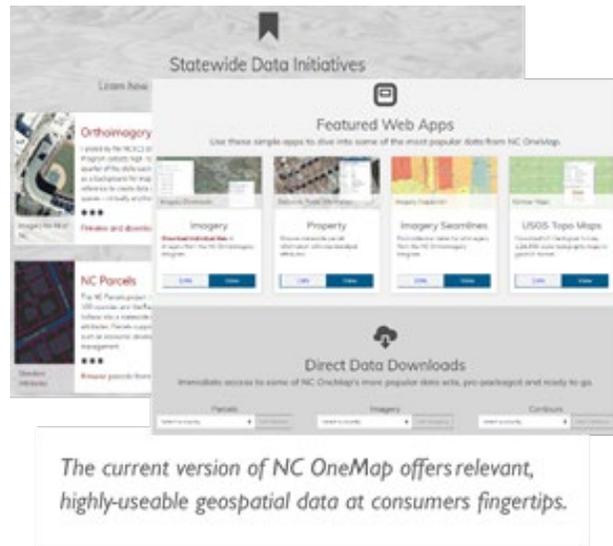
Several of CGIA's state partners, large and small, use ArcGIS Online, so transitioning to the new platform with that prebuilt infrastructure allowed for quick integration. The state departments of Transportation and Environmental Quality were already using ArcGIS Online in a production environment, which expedited the rollout of the NC OneMap update.

The updated NC OneMap is a secure collaboration space for CGIA's numerous partners to share open data. Using ArcGIS Online, invitations are sent by CGIA to their partner data providers to join the open data group. Once the owner accepts the invitation and shares their data items with the group, it is automatically discoverable as public open data in the NC OneMap Hub application.

Data content standards are in place for the most widely used foundational data sets as well as best practices and policies to ensure they are effectively managed. To ease the transition to the new platform, CGIA provided an update to the [NC OneMap Guidelines, Recommendations, and Best Practices](#).

Data custodians are required to follow a standardized taxonomy system for tagging their resources. For

example, all open data will have the NC OneMap tag, other tags associated with International Organization for Standardization (ISO) topic categories, and any other tags the data owner decides to include. These custodians realize the level of expectation when sharing their data – it must be accessible, relevant, and timely. The updated architecture ensures the data are successfully stored, managed, and integrated. Data are secure from outside threats and, while it contains no PII (Personally Identifiable Information) that is not already part of the public record, complies with privacy rules.



These standards, along with the easily navigable application front-end and new keyword search features, enable NC OneMap to provide relevant, highly useable geospatial data at consumers' fingertips.

Significance

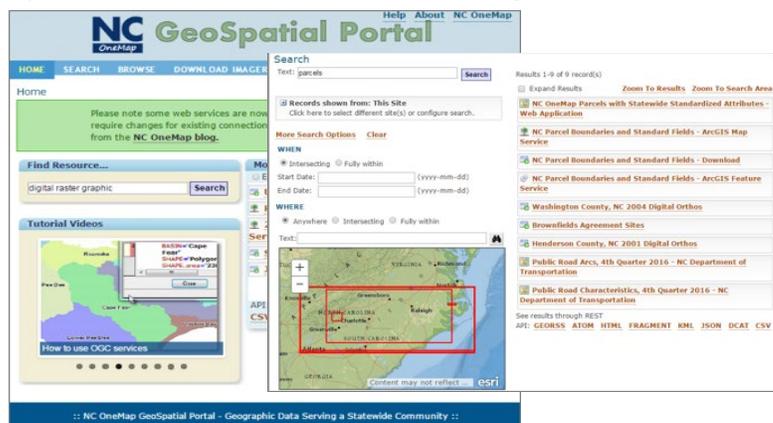
NC OneMap provides, free of charge, access to reliable statewide geospatial data that can be used for anything from mapping out new highways to building a tax mapping application. A portal that serves as a single point of access to hundreds of layers of data is an invaluable resource for government decisionmakers and private entities. Maintaining this resource continues to be an organized effort with numerous partners throughout North Carolina, involving agencies in all levels of government, the private sector, and academia.

NC OneMap's success is due in large part to the willingness and ability of the state's data partners to share and understand that their data are important to others outside of their own organization. **NC**

OneMap is managed and maintained by two full-time employees with a budget of approximately \$250,000.

This team works tirelessly to ensure that the state's GIS data is housed and shared on this platform, but it could not exist without the partnership and shared vision of the GIS community who own the data.

By using the prebuilt tools afforded North Carolina through its Enterprise Agreement with Esri, state and local

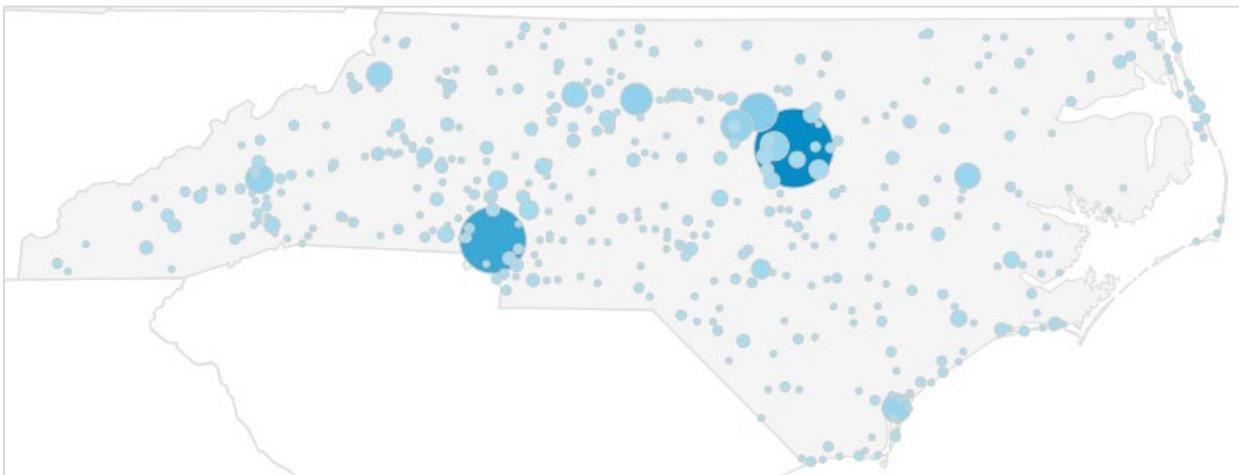


The second version of NC OneMap, replaced in August 2019, added the ability to search for data using keywords.

government agencies have been able to quickly and easily share and access their data through NC OneMap. The platform refresh also makes it possible for consumers to access data from a single point while maintaining federated ownership across agencies.

The new application front-end provides a simple, visually appealing way to search for and discover geospatial data. Data can easily be previewed on a map and in a table. The modernization of the application has saved time and, therefore, money, not only for organizations sharing their data, but more importantly for the organizations and individuals consuming the data.

Data is discoverable much quicker than on the previous platform. We know that consumers are much more likely to use the information if it can be found quickly. If information is not easily discoverable, they will find another source for it, create it themselves (potential duplication), or go without it.



Spatial distribution of NC OneMap website traffic from August 2019 through April 2020. Larger and darker circles indicate more volume.

The GICC and CGIA will continue to innovate, introducing new data and easy-to-use maps and tools to analyze and interpret the information housed in NC OneMap.

Impact

Citizens rely more and more on access to geospatial information in their daily lives and in examining real issues in cities, counties, and across the state. The private sector constantly looks for more efficient ways to locate and access geospatial data to meet business needs. In both instances, there is an ever-increasing expectation that the data customers look for is

"As a major provider of geospatial services in North Carolina, our specialists rely on NC OneMap resources to deliver timely solutions for decision makers in government and commercial organizations statewide."

Mr. Zsolt Nagy, AECOM Technical Services of North Carolina, Inc.

current and readily available for consumption. The modernization of NC OneMap has made this information easily discoverable.

While there are many categories of information available, foundational data such as aerial imagery, cadastral land ownership, transportation, and governmental boundaries provide usefulness across disciplines. Decision-makers and GIS professionals at all levels of government and from private-sector organizations in fields such as transportation and environmental consulting, infrastructure utility, land surveying, forestry, and engineering can find what they need quickly and easily.

Below are tangible examples of the impact NC OneMap has in North Carolina.

Local Government

Person County North Carolina's government was the target of a recent ransomware incident which disabled most digital assets, including the county's public-facing tax mapping application. The tax mapping application is used by citizens, business owners, developers, and local government staff to locate land ownership information, which facilitates real estate transactions, residential and commercial development, and is a critical component of the building permit process. Using NC OneMap, county staff were able to quickly locate vital GIS information such as land parcels, watersheds, roads, and floodplains and rebuild a replacement tax application until full service could be restored. The NC OneMap hub was critical in providing timely and accurate information and helped local government staff easily provide a continuity of communication and functionality during the cyber incident.

Federal Government

Federal agencies in NC represent many types of users of geospatial data. These agencies have both broad planning responsibilities and responsibilities at the local scale requiring natural resource data, emergency management, demographics, environmental, and other site-specific data. Nearly all this data is housed and freely available within NC OneMap. Federal workers often have projects in states other than where they reside, so having a one-stop location for data is extremely helpful in gathering necessary geospatial data for project needs. The NC OneMap data sets all adhere to strict federal guidelines for metadata and distribution formats so incorporating the data into national or local applications is extremely easy. NC OneMap has been instrumental in providing consistent, easily accessible data to a wide variety of applications and federal agencies.