Minnesota Geospatial Commons

Information Communications Technology Innovations
State of Minnesota
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Executive Summary

From transportation to environmental conservation, all manner of public, private, and non-profit organizations benefit from readily accessible geographic information. This information lets us analyze and interpret maps to help us understand relationships, patterns and trends. Since the turn of the century, society has witnessed this information leveraged on massive scales in web and mobile applications.

Users and stakeholders in Minnesota have long benefited from a relative abundance of geographic information.   Data was traditionally fostered through individual agreements and data sites. The sites were supported by different government agencies, leading to different data systems and different processes for analyzing and distributing information. This reduced opportunities for efficient collaboration or cross-organization analysis. Since the business of Minnesota government increasingly requires state agencies to collaborate – and not just among themselves – it was important to find a systematic way to gather and share this information with entities from other levels of government, academia, and the nonprofit, and private sector.

Stakeholders discussed the concept of creating a single place for all geospatial resources in Minnesota for more than a decade. Only recently did organizational cultures and technology catch up with the vision. Creating a way to put these resources in one place was a daunting task, but would become an important time-saving and cost-effective way to store and serve geographic resources. These information resources are expensive to acquire and tend to be large and complex, but lend themselves to widely diverse reuse when they are clearly documented, well-organized and made conveniently accessible.

A collaborative team composed of MN.IT Services staff supporting several state agencies came together to work on the project in 2012, culminating in an official launch of the Minnesota Geospatial Commons in March 2015, seeded with data from state, county, and regional government publishers.

The Minnesota Geospatial Commons provides a successful and scalable framework for documentation, organization and access of geospatial data. The site helps publishers efficiently share their information via a well-documented data store, while providing users the opportunity to access the data through an easy to use website that leverages intuitive search functions, subscription capabilities, and feedback loops.

Operated by the Minnesota Geospatial Information Office (MnGeo), a program of MN.IT Services, the Minnesota Geospatial Commons can be found at https://gisdata.mn.gov/.

Concept

Before this project, Minnesota had rich sources of geographic information, but they were scattered throughout many organizations and levels of government. A person looking for this information needed to know what entity produced it, make a request, then wait for that request to be processed – usually by manual means.

The concept for creating the Geospatial Commons was simple: create one place for publishers and users to easily share and access geospatial data. When a vision was articulated for the Commons in January of 2012, input from more than 500 survey responses was used to solidify the vision. Responders represented several sectors, including public sector (39%), education (24%), and private sector (22%). This helped project sponsors determine that the user audience represented a wide variety of stakeholders, not just state agencies or government staff.

Using the survey responses as a guide, the project was initiated with a workgroup made up of a dedicated project manager and technical staff that supported state agency publishers of geospatial information. All team members were also frequent users of data, making them ideally suited to collaborate on both business analysis and development roles. The team performed a high-level comparison of three platforms, using twelve evaluation criteria, in order to decide on the front-end solution, CKAN (also used for data.gov). Since each solution considered was open source software, the comparison included evaluating the health of the developer community. CKAN had more than 1,000 contributions on GitHub at the time, and has grown to more than 16,000 from 130 different developers.

In the fall of 2013, a pre-release version was completed and demonstrated for a stakeholder feedback session. That session encouraged additional work but validated CKAN as the chosen solution. From there, the team completed the first phase in June 2014, and a second final phase in March 2015.

The project team used an agile development approach with several internal releases and tests, including input from stakeholders in the statewide geospatial community after each release. In order to identify and prioritize the requirements, the team took an existing set of "user stories" that identified the types of tasks that were sought in a new solution for individual stakeholder groups. After mapping these user stories to the recommended functionality, the team divided tasks and pursued resolution using two-week "sprints." A shared code repository enabled team members to collaborate from their own workplace and agency, with centrally-provided development, test, and

production environments. While the agile approach was difficult to sustain for team members that weren't co-located or working full-time on the project, it did help control the scope of the project and drive success by focusing on the critical requirements of users and publishers.

By leveraging existing agency "data stores" called Geospatial Data Resource Sites (GDRS) nodes and open source software, the team was able to limit custom development to a "middle man" web application called the "GeoBroker." This application enables publishers to control the distribution of their resources, runs automated routines to validate metadata, and synchronizes the GDRS nodes with the public-facing web page of the Commons.

Focusing the custom development of the project ensured its long-term success by integrating with existing systems from agency partners and leveraging the open-source work of CKAN developers and data.gov. In this way, the project team demonstrated how the state can create a solution to a long-standing problem, despite mostly part-time staff and no official budget for hardware or software.

Over the last year, the Commons has transitioned from a project to a program overseen by MnGeo, which coordinates stakeholder communication through the Minnesota Geospatial Advisory Council. In order to grow the contents of the site, MnGeo publishes regular news articles and actively seeks partnerships with new publishing organizations.

Significance

Today, Minnesota citizens in need of geospatial resources about their state can go directly to one place for search and discovery: the Minnesota Geospatial Commons. The robust search function and ability to download resources in a multitude of formats greatly reduces the time the customer spends searching and acquiring the information they need.

The scope of the program is well defined via the expectations of publishers: data must be free and open, cover at least part of Minnesota, and be published in geospatial formats or in tabular formats that can be spatially enabled. Each resource must have sufficient documentation to allow a potential user to determine if they are fit for a particular use. Publishers must

be organizations, not individuals. These governing principles ensure that the Commons is different than many other open data platforms that may suffer from too little oversight or an overwhelming number of resources.

Since the creation of the Geospatial Commons, 17 agencies have published their information in the new site and several have shut down their original data discovery sites. This focuses the state's geospatial efforts into one space instead of many, reducing data acquisition time for users and empowering them to focus on value-added projects. Support for the Commons has been expressed from a broad community, including educational institutions and independent developers. For MnGeo, the Geospatial Commons provides a focal point for collaboration not only with state agencies, but with local governments, as well. As of April 2016, six local government organizations are publishers on the Geospatial Commons. Many more have contacted MnGeo expressing a desire to participate in the program.

As a result of these efforts, this project meets the priorities of MN.IT Services: Improving Services through Collaboration, Shared Technology Services, and Delivering Digital Services. It also meets several NASCIO priorities: Consolidation/Optimization, Legacy Modernization, and Budget and Cost Control.

Impact

The goal of the Geospatial Commons project was to produce a coordinated, next-generation site that allowed organizations to publish metadata and data; and empower users to find, view and use data, web services and applications. This goal was achieved when the site officially launched in March 2015. The site provides increased transparency and access to state agencies' geospatial data, services, and applications in a single location. The Geospatial Commons replaced several individual agency data delivery sites with a single shared site, reducing duplication of effort and redundant delivery mechanisms.

In July 2015, the first non-state government entities added their data sets into the Geospatial Commons. Very quickly, it has become the single site for all things geospatial in the state, which has improved communication and created efficiencies regarding geospatial data, services, applications, information and news in Minnesota. This helps MnGeo meet its mandate for coordinated geospatial data in state agencies and the broader geospatial community.

The release and growth of the site aids the broader geospatial community in Minnesota in many ways. Now, instead of having to understand which state agency publishes a certain dataset in order to know which site to visit, users can navigate to the Commons as a "first stop." From independent developers coding apps to students conducting research projects, this can significantly reduce the time needed to discover useful data.

As counties begin to publish their resources to the Geospatial Commons, the time saved in hunting for data by contacting prospective data stewards will increase exponentially. For example, if seven different state agencies independently seek out one data set from each of the 87 counties in Minnesota, it is estimated that it will take about four hours per county to obtain a license, have an attorney review and then obtain the data. This adds up to 2,436 hours of search and retrieval time, equivalent to an investment of more than one full-time employee.

When any agency or organization is looking for similar data from multiple Minnesota sources, they will only need to visit the Geospatial Commons. Recently, the Census Bureau was looking for specific geospatial information from 22 counties. Fifteen of those counties have requested their information be made accessible through the Geospatial Commons. As they save time for Census Bureau staff not having to contact each county individually, they also save the time of 15 sets of county staff workers who don't need to fill these additional data orders.

If the 15 counties have their data served in the open environment of the Geospatial Commons, a reduction of 448 hours to assemble that one data set will be experienced; a savings of nearly 20 percent. By leveraging an open API, the Commons is also "harvestable" itself, and is expected to be harvested by data.gov within months.

One of our most powerful measures of success is the amount of resources available on the site, and the steady growth that has occurred since our soft launch in July 2014. At that time, the Commons had seven publishers and less than 50 resources. A visualization of the growth since then is available on the site's statistics page. As of April 2016, 17 publishers were participating, with 535 total resources published:

Organization	Published Resources
Metropolitan Council	142
Natural Resources Department	140
Geospatial Information Office	75
Dakota County	51
Agriculture Department	29
Minnesota Geological Survey	26
Pollution Control Agency	18
MetroGIS	17
Transportation Department	11
Health Department	5
Board of Water and Soil Resources (BWSR)	4
University of Minnesota, Twin Cities	4
Itasca County	4
Education Department	3
Lake County	3
Revenue Department	2
Minnesota Valley Transit Authority	1

Two publishing partners described the impact and benefit of the Commons on September 30, 2015:

> *"We are excited to be one of the first counties publishing data on the Commons, now that it is available to counties and cities. Last year, Dakota County changed its GIS data distribution policy to make all Dakota County GIS data free and open. After that change, we began making more data available for download on the County website. However, the Commons provides a much more effective way for people to discover and download Dakota County GIS data, since it provides a single site to find available data for any county or city in the State. Once we were set up, updating and adding layers is a very simple process. Now, we will simply direct people to the Commons, and avoid having to maintain our own website and data repository." –* **Randy Knippel, GIS Manager, Dakota County**

> *"The value of the Minnesota Geospatial Commons as a one stop shop for data is becoming evident as additional agencies contribute information. This website is a shining example of interagency cooperation and transparent, responsive government. We at the Council are proud to be part of this collaborative resource. We expect having an efficient way to search and access vast amounts of data will be a catalyst for innovation and lead to the development of GIS products benefiting countless agencies and users throughout Minnesota,"* **– Mark Kotz, GIS Manager, Metropolitan Council.**

The use of geospatial information grows in importance nearly every day. By having one place in Minnesota to add and access this data, everyone benefits from this rich data – and saves time and money in the process. By incorporating local government publishing partners as well as state agencies, the Commons has transformed the operations of both users and publishers of geospatial information in Minnesota.