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Point of view

Geospatially enhanced asset management:
Everything in its place

“Geospatially enabled asset management uses the power of location not only to properly value and utilize assets, but also as an organizing principle which helps to bring together all aspects of their management in one framework.”

Introduction

As Hurricane Irene bore down on the continental United States in 2011, the Immigration and Customs Enforcement Agency (ICE) intuitively knew where its assets were located. What the agency couldn't know was where the assets were in relation to the Hurricane's predicted path. Deloitte's1 geospatial approach analyzed ICE's critical asset locations in relation to the hurricane's predicted path and helped ICE develop new insights to plan more effectively for future storms and their aftermath.

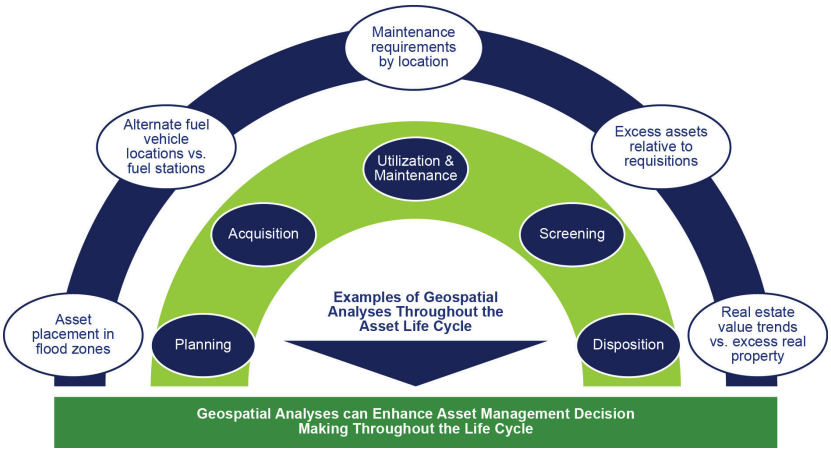
Asset management, at its core, requires cost-effectively putting the right assets in the hands of the right people at the right time and place. Pressure to maintain a high degree of asset accountability, while finding ways to reduce costs and maximize return on investment are challenging these organizations to find new and innovative ways to improve the management of their assets. Geospatially enabled asset management uses the power of location not only to properly value and utilize assets, but also as an organizing principle which helps to bring together all aspects of their management in one framework.

At each point in the life cycle, from acquisition to utilization to disposal, locational information is critical. After all, how can an asset be used where and when it is needed if its location is not known or accurate? But in addition to knowing where the asset is located, managers have to know where the asset is needed, as well as other environmental variables that affect the asset and its users. Geospatially enabled asset data can provide managers insight and analytic capabilities not available with traditional asset records, helping to more effectively, efficiently, and transparently manage their assets.

Asset Management and the Importance of Location

Tobler's First Law of Geography is "Everything is related to everything else, but near things are more related than distant things."2 This idea holds true for asset management in that key variables related to assets including people, work processes, transactions, accidents, etc. are all associated with specific geographic locations.

Traditionally, asset locations have been recorded and tracked using discrete records stored in a database. The database typically contains records with locational and descriptive data elements assigned to each asset such as an address. While traditional asset records provide information as to where specific assets are, they do not generally provide an understanding of where the assets are relative to each other, relative to their environments, and relative to mission needs.



Geospatial Analysis and the Asset Life Cycle

For example, an asset record that indicates a particular address and room tells management where an asset is located, but it does not tell them that the asset is located in a flood zone when a major storm is approaching, or that there are several alternate storage sites within 5 miles of the flood zone. It also does not tell them that transit routes to all but one of the alternate sites are likely to be inaccessible during a major flood. This example illustrates one way that focusing on geospatial data is a cost effective way of improving asset management, because it gives managers new ways to see the assets and their relationships to each other and their environment.

1As used in this document, "Deloitte" means Deloitte Financial Advisory Services LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/us/about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries.

2Tobler W., (1970) "A computer movie simulating urban growth in the Detroit region". Economic Geography, 46(2): 234-240.

“By analyzing the relationship between the assets and their environments in a variety of ways, management can view their assets in a context not previously available.”

How a Geospatial Perspective can Enhance Asset Management

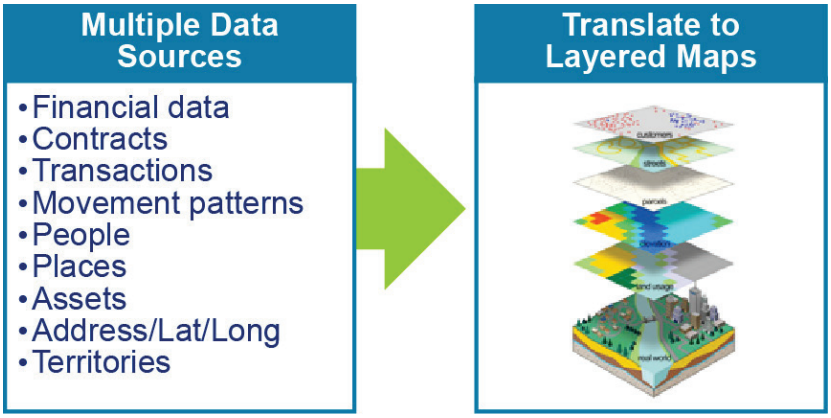
So where does geospatial data come from and how can it be used to enhance asset management? A geospatial perspective begins with accurate position coordinates (i.e. latitude and longitude) for physical objects. The object can be the asset itself, or something in its environment (e.g. road, flood zone, gas station, etc.). Coordinates can be derived from a number of locational criteria such as an address (called geocoding) or place name (called gazetteer). The most important value of recording these coordinates, however, comes not from the coordinates themselves, but from the development and analysis of useful geospatial models that tease out the geographic configuration of those objects.

In other words, by analyzing the relationship between the assets and their environments in a variety of ways, management can view their assets in a context not previously available.

When multiple layers of data that have been geocoded or tagged are overlaid on top of each other, the benefits of geospatial analysis increase. New relationships become visible and new queries and analytical capabilities become possible. The more accurate, varied, and current the geospatial data, the more opportunities there can be for visual and quantitative analytics.

- Where are the points of entry to a Federal facility, for example, in relation to the modes of transportation available for its users?
- Where are emergency response assets deployed and how long would it take to re-deploy them to a given crisis area?
- Where would new property leases minimize cost and maximize accessibility given changing demographics and commercial rental market trends?

These and other questions critical to the connection between assets and mission become quickly and clearly answerable using geospatial analysis. Having the answers to these kinds of questions helps improve decisions and planning by identifying relationships and trends.



Multiple data types can be layered on top of each other to view previously unseen relationships

All of this can help managers to better set strategic and tactical priorities regarding where and how assets are placed and used, and to communicate these priorities throughout the organization. Geospatial analytics can provide these benefits for any class of property, including assets that are fixed to the ground, such as buildings, infrastructure, or land, and assets that are highly mobile such as laptops, PDAs, or vehicles. In addition, it can provide these benefits throughout the assets' life cycle, particularly when assets are distributed over large geographic areas.

Examples of Geospatial Applications for Asset Management

Examples of Analytic Applications

Locating assets or events in space and in time

- Visual inventories through imagery or transactions
- Recognition of patterns
- Predictive analytics based on history and trends

Identifying where assets or events are spatially correlated

- Derivation of metrics based on factors related to value and utility
- Advance warning analytics related to situations affecting asset status or usability

Measuring the density of assets or other mission-relevant entities

- Evaluation of optimal asset placement or distribution
- Analysis of geographic factors in asset effectiveness

Examples of Applications Throughout the Asset Life Cycle

Acquisition

- Proposed facility space in relation to employee commute distances
- Greater insight into asset needs and suitability to demand locations

Utilization

- Fleet usage and card transactions outside of authorized range
- Optimal storage location vs. projected need locations

Screening

- Geographical proximity of excess/idle assets to new requisitions
- Proximity of underutilized assets to users to facilitate asset consolidation and pooling

Disposal

- Market values and trends by geographic area and asset class
- Proximity of assets to disposal sites or liquidators

Examples of Applications by Asset Management Facet

People

- Targeting training needs based on pattern analysis of error by location
- Usage hours per operator vs. accident report locations

Processes

- Detection of changes such as migration or increased error rate
- Work planning and maintenance scheduling in relation to asset location and condition

Systems

- Combining data from multiple systems together in a geographic context for analysis
- Providing data and analysis to data warehouses and dashboards

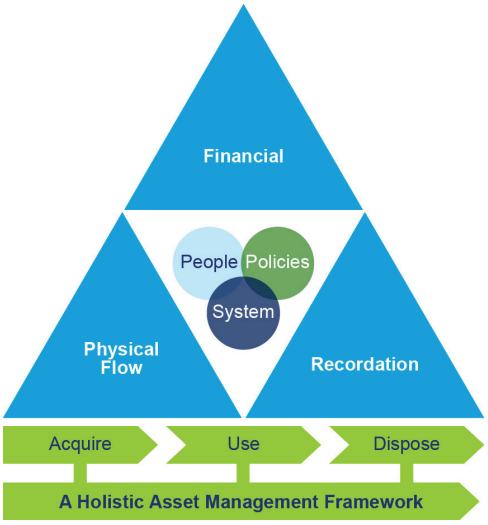
“Deloitte’s approach to asset management is based on a framework designed to address asset accountability, auditability and cost efficiency. “

Deloitte's Approach to Geospatially Enhanced Asset Management

Deloitte's approach to asset management is based on a framework designed to address asset accountability, auditability and cost efficiency. It is a holistic framework that considers people, processes, and systems as well as the physical, financial, and system record aspects of assets. Implementation of this integrated framework can help organizations manage their assets throughout their useful lives, from acquisition through disposal.

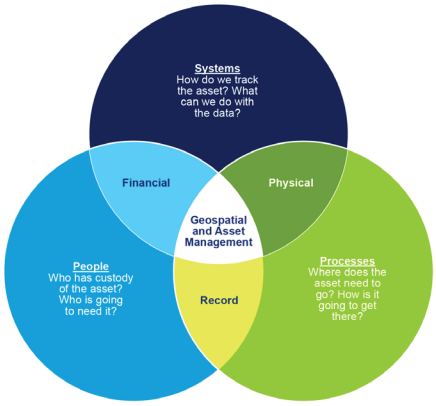
Managing assets in this way can help organizations meet a number of objectives related to asset management:

- Cost reduction
- Better budgeting and acquisition planning
- Improved accountability and compliance oversight
- Enhanced audit readiness
- Improved public trust
- Increased return on asset investments



A Holistic Asset Management Framework

Integrating geospatial analytics into such a framework is a natural extension of this approach in that it further supports each of the goals identified above. Deloitte's approach to this integration is based on three areas of focus:



Geospatial Integration into the Asset Management Framework

- Data collection and geocoding
- Tool development and analytics
- Report design based on management and operational needs

This approach is further realized by integrating asset management systems with geospatial technology through standardized interfaces, ETL tools and the use of Web Services architecture. For example, the Web Services approach facilitates bringing multiple kinds of data collected through geocoding and geotagging together with the asset attributes, allowing for the rich and varied analyses described above. A Web Services architecture relies on standard communication protocols between business applications both from within an organization (asset management, purchasing, maintenance, etc.) and outside of the organization (local zoning, superfund sites, census data, etc.). These technical approaches can improve flexibility and usability across the organization, which is critical because as budget environments continue to tighten, management must extend beyond their traditional organizational stove pipes to use and view data in ways that cross organizational boundaries. Web Services protocols can help facilitate these cross functional capabilities and allow other business applications to take advantage of them to produce reports that are useful across the organization. This creates a "loosely coupled" integration, which makes the resulting systems easier to develop, implement, and support, breaking down long standing operational silos.

“Deloitte has an extensive and ever-growing track record in the fields of asset management and geospatial analytics.”

Representative Examples of Our Experience

Deloitte has an extensive and ever-growing track record in the fields of asset management and geospatial analytics. Experience with federal and commercial clients in a variety of industries has resulted in a strong and well-rounded foundation on which to continue to build. Past successes with clients have led to strong relationships, in part due to Deloitte's dedication to providing transparency, confidence, and accountability throughout the asset management process.

Immigration and Customs Enforcement Agency (ICE)

After enhancing ICE asset records with geospatial information, Deloitte was able to perform a number of analyses on the data, providing ICE with a better understanding of the locations, distributions, and concentrations of its assets. Some examples of these analyses and their benefits are:

- **Improved Inventory Efficiency:** Through analysis of geospatial data in relation to Property Custodians and field offices, Deloitte identified specific locations that are not meeting inventory procedural requirements. This work allowed ICE to target locations for remedial training and was directly linked to statistical inventory improvements the following year.
- **Communication and Training:** By comparing the locations of past targeted assistance visits with a map illustrating the density of ICE assets around the country, Deloitte identified high concentrations of valuable assets that had not been targeted for training visits in the past.
- **Enhanced Fleet Management:** Deloitte performed a proximity analysis of which vehicles were within a specified range of fuel stations that sold alternative fuel. In addition, the team used geospatial data to identify ways to reduce ICE's carbon footprint through vehicle realignment and the use of alternative fuels. Sites with increased fleet acquisition or disposal activity have been identified and analyzed in order to help forecast potential changes to the fleet in the coming years.
- **Emergency Planning:** An analysis of assets in the path on Hurricane Irene, along with replacement and emergency supplies nearest to the likely affected areas was performed. The analysis allowed managers to better plan for a possible emergency and improve response time.

Major U.S. City

A major U.S. city receives tens of thousands of applications for permits each year to perform work on many of the City's linear assets within rights-of-way including streets, water, and electrical utilities. Deloitte helped the City transform a complicated, paper-based business process to one that effectively utilizes geospatially enhanced asset data and map-based visualization and reporting to streamline this essential municipal service. The old paper and fax system led to inefficient management of the assets within the rights-of-way resulting in backlogs, infrastructure project conflicts, business conflicts and delays, rework costs, and sub-optimal compliance revenue. City officials often didn't know, for example, if two projects were scheduled for the same place at the same time on the same assets (e.g., section of road). They also had difficulty tracking and issuing compliance violations associated with each permit (e.g., a back hoe left on sight too long). As a result, roads were unnecessarily re-cut and resurfaced, traffic barricades and detours were left up too long, and the City's compliance revenue was lower than it should have been.

The system developed by Deloitte allows City administrators to review and approve permit applications, track asset conditions, and track permit compliance by way of a Web-based application which displays all streets, zoning and permit activity online using maps. The system also enables them to develop insight into trends and patterns in street-cutting activity that may not have been readily apparent with the paper process. City officials estimate that over 90% of all permit applications come in online, and that the number of employee hours required to approve a single permit application has decreased by 75%.

Conclusion

Deloitte firmly believes that any asset management solution can reach a higher potential when it is integrated with underlying data. Making crucial decisions without seeing the full picture is an outdated model, and managers need to adapt to new ways of serving their organizations. The combination of a holistic asset management approach with geospatial visibility is not only key to establishing relationships between multiple assets, but also to providing better asset intelligence with an individual asset's unique geographic location and that location's environment.

Deloitte's functional familiarity with the wide range of asset requirements, its knowledge of asset management procedures and policies, and its significant experience implementing geospatial solutions make Deloitte uniquely qualified to help our clients get the most out of their assets.

About Deloitte

Deloitte is one of the largest professional services organizations in the world. Deloitte applies its experience in leading complex, multi-functional teams to foster a seamless integration of people, processes, and technology in the creation and execution of geospatial solutions that take into account existing asset management systems, processes and people.

Contacts

Matthew Gentile, Principal
Geospatial Analytics
Deloitte & Touche LLP
1919 N. Lynn St., Arlington, VA 22209
magentile@deloitte.com
571-882-6880

Craig Reineck, Senior Manager
Asset Management Services
Deloitte & Touche LLP
1919 N. Lynn St., Arlington, VA 22209
creineck@deloitte.com
202-286-2632

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