

## How to implement Location Analytics



Creating a Location Analytics strategy starts with data. The massive amount of data that is collected by organizations these days is staggering. Transforming this volume of data into valuable information is a major challenge in many organizations. To gain insight into the metrics related to the performance of business processes, enterprises can interrogate their data by asking “who”, “what”, “when”, “how”, and “where”. Analyzing data according to these questions can provide essential information on answering the ultimate business question, “why”. Traditional Business Intelligence (BI) or Analytics fall short in analyzing the “where” factor of data.

The implementation of Location Analytics empowers the organization to interrogate their data with location as the driver of business process analysis. This type of implementation is achieved by querying and viewing your data through the lens of geographic analysis via an interactive map. Just as asking “when” produces a temporal pattern of activity, “where” produces a spatial pattern. A Location Analytics implementation produces this spatial pattern of key business process information.

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## What are the components for Implementing Location Analytics?

The implementation of a Location Analytics system consists of data and technical components. Like most enterprise-level systems data servers and platforms are utilized to produce informational outputs. The nature of the data in a Location Analytics implementation allows for the unique analytical capabilities associated with this spatial data.

### Data

The data components required for a Location Analytics implementation include data in the BI data repository as well as in GIS systems. These data are geographic or spatial in nature.

### BI Data

In the existing BI this type of information may be already stored within the Data Warehouse. Re-examining existing data through the base-level analysis of location will reveal the importance of the “where” factor in your performance metrics. Additionally, re-examining your business processes to leverage location information or key derivatives of location might lead to completely new workflows and decision-making capabilities. This type of examination yields data aggregated by location, allowing for deeper analysis of key outcomes that comprise the metrics contained in performance dashboards and reports. The organization and aggregation of your BI data by location improves the implementation of Location Analytics. For example, organizing sales data by county will not only promote viewing spatial patterns of sales performance, but will also facilitate deeper analysis with other location-aware datasets, such as customer demographics by county. Creating a simple metric of “Potential”, as a ratio of sales data and demographics, starts to show the power of Location Analytics.

Potential By County

| County Name    | State Name    | Number Physicians | Potential |
|----------------|---------------|-------------------|-----------|
| Accomack       | Virginia      | 0                 |           |
| Adams          | Pennsylvania  | 1                 | 12656     |
| Addison        | Vermont       | 1                 | 4065      |
| Albany         | New York      | 11                | 3872      |
| Albemarle      | Virginia      | 3                 | 3307      |
| Alexandria     | Virginia      | 5                 | 2321      |
| Allegany       | Maryland      | 4                 | 3357      |
| Allegany       | New York      | 3                 | 2333      |
| Allegheny      | Virginia      | 2                 | 1620      |
| Allegheny      | Pennsylvania  | 44                | 5191      |
| Amelia         | Virginia      | 0                 |           |
| Amherst        | Virginia      | 0                 |           |
| Androscoggin   | Maine         | 5                 | 2992      |
| Anne Arundel   | Maryland      | 19                | 2569      |
| Appomattox     | Virginia      | 0                 |           |
| Arlington      | Virginia      | 7                 | 2537      |
| Armstrong      | Pennsylvania  | 0                 |           |
| Aroostook      | Maine         | 5                 | 2510      |
| Atlantic       | New Jersey    | 1                 | 34437     |
| Augusta        | Virginia      | 4                 | 2107      |
| Baltimore      | Maryland      | 17                | 6490      |
| Baltimore City | Maryland      | 39                | 2203      |
| Barbour        | West Virginia | 1                 | 2420      |
| Bath           | Virginia      | 1                 | 644       |
| Beaver         | Pennsylvania  | 3                 | 11141     |
| Bedford        | Pennsylvania  | 1                 | 6243      |

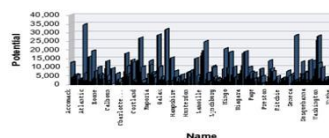


Figure 1  
Location-aware metric (Potential by County)

### GIS Data

Data that is in your organizations GIS is already organized by spatial characteristics. Spatial data consists of points, lines, and areas along with associated attributes in tabular format. Examples of this type of data include:

- Point of locations by Street Address (Retail Outlets, Customer Locations, etc.)
- Lines between point locations (Supply Chain Networks, Trip Routing, Connectivity, etc.)
- Areas representing Administrative boundaries (State, County, Sales Territories, Census, etc.)

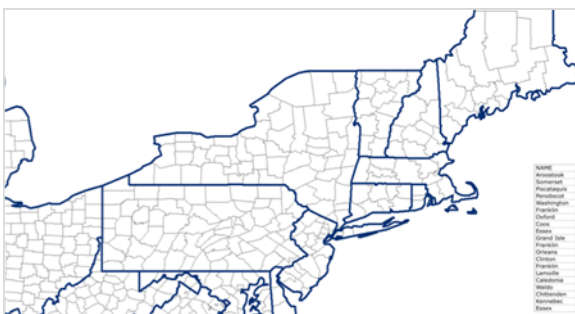


Figure 2  
GIS Data (County)

| Name           | STATE_NAME | STATE_FIPS | COUNTY_FIPS | FIPS  | POP2000 | HSPH00 | HSPH01 | HSPH02 | HSPH03 |
|----------------|------------|------------|-------------|-------|---------|--------|--------|--------|--------|
| Accomack       | VA         | 51         | 23          | 23001 | 12656   | 12.6   | 12656  | 12.6   | 12.6   |
| Adams          | PA         | 42         | 23          | 23001 | 12656   | 12.6   | 12656  | 12.6   | 12.6   |
| Addison        | VT         | 33         | 23          | 23001 | 4065    | 4.1    | 4065   | 4.1    | 4.1    |
| Albany         | NY         | 33         | 23          | 23001 | 3872    | 3.9    | 3872   | 3.9    | 3.9    |
| Albemarle      | VA         | 51         | 23          | 23001 | 3307    | 3.3    | 3307   | 3.3    | 3.3    |
| Alexandria     | VA         | 51         | 23          | 23001 | 2321    | 2.3    | 2321   | 2.3    | 2.3    |
| Allegany       | MD         | 24         | 23          | 23001 | 3357    | 3.4    | 3357   | 3.4    | 3.4    |
| Allegany       | NY         | 33         | 23          | 23001 | 2333    | 2.3    | 2333   | 2.3    | 2.3    |
| Allegheny      | VA         | 51         | 23          | 23001 | 1620    | 1.6    | 1620   | 1.6    | 1.6    |
| Allegheny      | PA         | 42         | 23          | 23001 | 5191    | 5.2    | 5191   | 5.2    | 5.2    |
| Amelia         | VA         | 51         | 23          | 23001 | 0       | 0      | 0      | 0      | 0      |
| Amherst        | VA         | 51         | 23          | 23001 | 0       | 0      | 0      | 0      | 0      |
| Androscoggin   | ME         | 23         | 23          | 23001 | 2992    | 3.0    | 2992   | 3.0    | 3.0    |
| Anne Arundel   | MD         | 24         | 23          | 23001 | 2569    | 2.6    | 2569   | 2.6    | 2.6    |
| Appomattox     | VA         | 51         | 23          | 23001 | 0       | 0      | 0      | 0      | 0      |
| Arlington      | VA         | 51         | 23          | 23001 | 2537    | 2.5    | 2537   | 2.5    | 2.5    |
| Armstrong      | PA         | 42         | 23          | 23001 | 0       | 0      | 0      | 0      | 0      |
| Aroostook      | ME         | 23         | 23          | 23001 | 2510    | 2.5    | 2510   | 2.5    | 2.5    |
| Atlantic       | NJ         | 34         | 23          | 23001 | 34437   | 34.4   | 34437  | 34.4   | 34.4   |
| Augusta        | VA         | 51         | 23          | 23001 | 2107    | 2.1    | 2107   | 2.1    | 2.1    |
| Baltimore      | MD         | 24         | 23          | 23001 | 6490    | 6.5    | 6490   | 6.5    | 6.5    |
| Baltimore City | MD         | 24         | 23          | 23001 | 2203    | 2.2    | 2203   | 2.2    | 2.2    |
| Barbour        | WV         | 20         | 23          | 23001 | 2420    | 2.4    | 2420   | 2.4    | 2.4    |
| Bath           | VA         | 51         | 23          | 23001 | 644     | 0.6    | 644    | 0.6    | 0.6    |
| Beaver         | PA         | 42         | 23          | 23001 | 11141   | 11.1   | 11141  | 11.1   | 11.1   |
| Bedford        | PA         | 42         | 23          | 23001 | 6243    | 6.2    | 6243   | 6.2    | 6.2    |

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## Technical Components

The technical components necessary for implementing a Location Analytics include:

- Business Intelligence (BI) platform
- GIS platform and Geospatial Web Server
- Interactive Map viewer application that connects to the existing BI and GIS systems respectively

### BI Platform

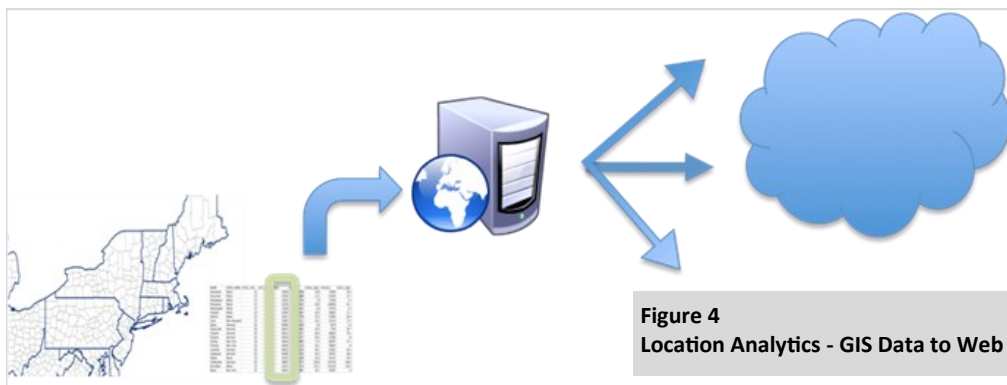
The BI platform provides the robust reporting application environment for implementing Location Analytics. The above examination of data by location allows for the creation of BI reports that are aggregated by geography. A simple report composed of tabular and chart data produces the start to the rich information provided with Location Analysis. Each location aggregate will have a standard unique identifier (Ex. State Abbreviation, County FIPS Code, etc.). This identifier is the primary means to join the location-based BI data to other components in the Location Analytics implementation. For data at the County level the standard unique indicator is FIPS which then maps to a polygon showing the county boundaries.

| FIPS  | COUNTY NAME | STATE NAME | DEMOGRAPHIC | DEMOGRAPHIC2 | SALES  | POTENTIAL   |
|-------|-------------|------------|-------------|--------------|--------|-------------|
| 10005 | Sussex      | Delaware   | 198469      | 41.1         | 617.86 | 321.2200175 |
| 51001 | Accomack    | Virginia   | 38805       | 39.4         | 617.1  | 62.88283909 |
| 51131 | Northampton | Virginia   | 13729       | 42.4         | 596.49 | 23.01631209 |
| 24039 | Somerset    | Maryland   | 26413       | 36.5         | 585.3  | 45.12728515 |
| 24047 | Worcester   | Maryland   | 51186       | 43           | 483.78 | 105.8042912 |
| 36103 | Suffolk     | New York   | 1492400     | 36.5         | 415.27 | 3593.806439 |
| 24019 | Dorchester  | Maryland   | 32924       | 40.7         | 393.24 | 83.72495168 |
| 24045 | Wicomico    | Maryland   | 98185       | 35.8         | 389.43 | 252.1249005 |

**Figure 3**  
BI Report (County – FIPS)

### GIS Platform and Geospatial Web Server

This GIS platform and Geospatial Web Server allow for the visual geographic representation of the BI data. The GIS platforms works with the points, lines, and areas representing the spatial data involved in your business process, such as administrative boundaries (State, County, Zip Code), sales territories, retail outlets, distribution channels, customer demographics, etc. This data contains the geographic map elements as well as the associated attribute tables for each element. For each spatial data component, note the unique identifier associated with that element (ex. County FIPS). This unique identifier will serve to join the spatial GIS data to the BI data described above. Publishing the GIS data via a Geospatial Web Server will facilitate the use of this spatial data in the Location Analytics implementation.



**Figure 4**  
Location Analytics - GIS Data to Web

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# Galigeo

## About Galigeo

Galigeo provides innovative Location Analytics software solutions to solve complex location-dependent business problems. Galigeo software connects directly to enterprise applications, maps large-scale datasets and applies spatial processing to enhance data visualization, reporting and predictive analytics.

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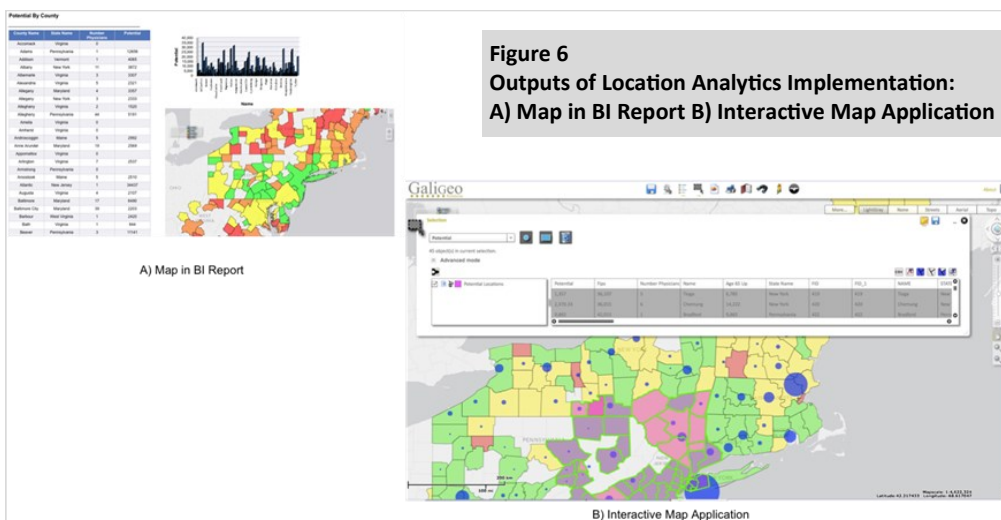
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## Interactive Map Viewer Application

With the data from the Data Warehouse organized by location through BI platform reports, and the GIS spatial data published via a Geospatial Web Server, the last piece of the Location Analytics implementation involves the interactive map viewer application. This is a new and unique way to visualize, interact, and interrogate your BI data. Configuration of the map viewer application will include steps for linking the location-aware data in your BI with the spatial data in your GIS. The organization of your BI data by location, as described above, will ensure ease of configuration for the map viewer application.

**Figure 5**  
Location Analytics Configuration - Join  
BI data to GIS data

With your map viewer application now established as the connector between your BI and GIS platforms, you are now able to analyze your business process metrics by location. From the seamless connection of your BI and GIS data through this interactive mapping application, your analytical capabilities are enhanced. Dynamic maps can be included into your existing BI reports bringing forward value-added information for improved decision-making. New location-based analytical workflows can be established by interrogating the spatial representations, relationships and patterns on your BI data in an interactive manner. The map viewer application extends the reporting capabilities of your BI with an interactive analytical environment based on location. These capabilities include the ability to create new analysis based on previously mapped metrics, as well as, advanced geo-processing routines, such as service area analysis and spatial queries on BI data. These enhanced analytical capabilities will facilitate greater understanding of your business.



**Figure 6**  
Outputs of Location Analytics Implementation:  
A) Map in BI Report B) Interactive Map Application

## Conclusion

The implementation of Location Analytics enhances the capabilities to transform a company's massive amounts of data into valuable decision-making information. As part of this implementation, the development of location-aware analytical workflows through the interrogation of your data, driven by the "where" factor, enhances your overall ability to make better-informed decisions. The steps of this implementation provide a roadmap for thinking about how location can be utilized to provide a deeper level of analysis for your organization.

## Galigeo, a new generation of Location Analytics Solutions

Galigeo is the new generation of Location Analytics applications integrating predictive analytics, performance management, and marketing management solutions to solve complex location-dependent business problems. To learn more about Galigeo, visit [www.galigeo.com](http://www.galigeo.com)