EVERYTHING FAPPENS SOMEWHERE

Unlock new dimensions in your analyses with location intelligence

alteryx

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HIT THE GROUND RUNNING

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ULTIMATELY, IT IS NOT LOCATION DATA **OR SPATIAL ANALYTICS THAT DELIVERS** VALUE TO THE BUSINESS, BUT THE ABILITY TO EMBED THEM INTO DECISION MAKING, ACTIONS, AND EXPERIENCES.

- 'The Forrester Wave[™]: Location Intelligence Platforms, Q4 2018"



AMPLIFY YOUR X AND WHY

66% OF ENTERPRISES RANK LOCATION INTELLIGENCE AS EITHER CRITICAL OR VERY IMPORTANT TO REVENUE GROWTH STRATEGIES.

- "2019 Location Intelligence Market Study," Dresner Advisory Services

For centuries, philosophers, scientists, and analysts have noted how location affects vital aspects of life: Business, health, markets, social networks, retail trade, transportation, education, and housing are just a few examples. Everything happens somewhere, and location analytics can unlock depths of knowledge and provide insight in a new dimension ... literally!

WITH LOCATION ANALYTICS, YOU CAN:

- Transform your company's spatially-based data into information that can be analyzed to find hidden relationships not easily seen on a spreadsheet or chart
- Incorporate demographic, lifestyle and behavioral consumer data into your analyses to expand the depth and breadth of your analytics
- View distributions and spatial analytics over time, enabling you to rapidly spot high growth areas and population movements
- Deliver data visually so that it's easily shared and studied
- Solve problems, increase speed to insight, and provide knowledge integral to your organization's decision-making with location insights
- Make yourself indispensable as an analyst: Many corporations, industries, and public sector organizations currently include spatial analyses as an essential part of their data and business processes



WHY READ THIS E-BOOK?

BUSINESS ANALYSTS

new to location intelligence will find innovative methods of exploring their data and new ideas for analysis.

GEOGRAPHIC INFORMATION SYSTEMS (GIS) PROFESSIONALS

will discover how to import multiple spatial files at once, such as ESRI Shapefile .shp, MapInfo .tab, and Google Earth .kml files into Alteryx, which runs in virtual memory, processing spatial data efficiently and in many instances, with substantial time savings.



HIT THE GROUND RUNNING: FINDING + PREPPING SPATIAL DATA



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A wealth of spatial data is available online for use within location analytics. Here are just a few sources:

1. Federal government entities such as the U.S. Census Bureau provide a vast array of geographic boundaries and basic demographic data, downloadable at no cost through the Topologically Integrated Geographic Encoding and Referencing (TIGER) website.

2. Most cities in the U.S. also use an internal GIS to create, manage, and store their spatially-based infrastructure data. These datasets include parcels, water and wastewater lines, municipal buildings, zoning areas, floodplains, streets, railroads, and numerous other spatial data layers that comprise a city.

3. Municipal Government websites may provide data for download in an ESRI Shapefile .shp format. Navigate to the city's main website and enter "GIS" or "Shapefile" into the Search option. If the GIS department of a municipality provides their geographic data in a downloadable format, this technique often will direct you to the download page.

4. County Appraisal District GIS websites may also provide downloadable data; as with municipalities, the availability of spatial data for download can vary, and may not be offered through each county, city, or government entity website.

Once you've got the spatial data that will best enhance your analysis, it's essential to prep and blend the data prior to use. State-of-the-art data prep and blending tools on the Alteryx Platform can be efficiently applied to spatial datasets.



BEST PRACTICES: PREPPING SPATIAL DATA IN ALTERYX

REMOVE UNNECESSARY FIELDS WITH THE SELECT TOOL.

For example, if your analysis does not require the area of land and water for each Census block group, simply remove it from the workflow stream by unchecking the field.

APPLY THE AUTOFIELD TOOL EARLY IN THE WORKFLOW STREAM.

Autofield will optimize the incoming string fields, reducing the field width to the longest value, and modifying any fields to a numeric format if only numeric data are present. If your string fields are a default size of 254 characters, using Autofield will save space and processing time. (Autofield does not modify any spatial object fields.)

USE THE DATA CLEANSING TOOL TO CLEAN DATA, FAST.

Remove any leading or trailing whitespace in your text fields, as well as impute null numeric values to zero and replace null string values with blanks.

RENAME YOUR SPATIAL OBJECTS TO PROVIDE CLARITY.

Within the Join, Spatial Match or any tool with an embedded Select function you can easily rename a polygon to something more descriptive like "Trade Area Polygon" or points to "Customer Points." This will help in quickly discerning your spatial objects as they are added to the location analytics process.





OPEN UP A WORLD OF OPPORTUNITIES

LOCATION INTELLIGENCE

is the practice of collecting and managing customer location data, enriching it with other data sources, and analyzing for contextual insights for the purposes of informing optimized actions, decisions, and customer experiences.

—Forrester definition





SEVEN WAYS TO APPLY LOCATION INTELLIGENCE

Applying location analytics to your data transforms rows of spreadsheet records into a visual treasure map of spatial relationships and connections. Key insights practically reveal themselves. There are many remarkable ways to uncover location intelligence now that you have obtained, cleaned, and prepped your spatial data. Let's explore our top seven.

PIN: PUT POINTS ON A MAP

Everything happens somewhere, so it all starts with a location. In spatial analytics terms, "location" refers to a point referenced onto the Earth's surface. A large amount of locational data can be stored in a point format, such as stores or customers.

The first step in location analytics is geocoding, or simply creating that point on a map for the location of a standardized address. A latitude and longitude are assigned to the address, effectively "geo-coding" or adding the latitude and longitude "codes" to the location on the Earth's surface.

LATITUDE: A measure in degrees proceeding North or South from the Equator.

LONGITUDE: A measure in degrees proceeding East or West from the Prime Meridian at o degrees, which extends through the location of the Royal Observatory in Greenwich, England.

Once you geocode a location, you can create a spatial object point, which can not only be shown on a map, but also used for spatial processes such as calculating the distance between points, finding the nearest point, spatially matching point layers to polygon layers, and more.

GEOCODING IN ACTION

CHALLENGE:

A major retailer regularly receives a spreadsheet of customer names and addresses. They need to display customer residential locations on a map along with their store locations.

SOLUTION:

Using a geocoding engine, such as the TomTom Geocoder in Alteryx, the addresses of the customers and stores are assigned latitude and longitude coordinates. These geocodes are then associated to create a spatial object point field, which can be displayed on a map layer.

RESULTS:

The spatial point objects can also be correlated to understand the relationships between the customers and stores, such as:

- How far away are my customers from the stores?
- How many minutes are my customers driving during peak traffic to each store?
- What is the average drive distance for my customers?
- Where are most of my customers clustered, in order to designate trade areas?
- What are the nearest three stores to each customer?
- Are there areas where customers are driving a long distance? Could I place a new store there to serve them more efficiently?

ALTER YOUR X AND Y: GEOCODING IN ALTERYX

If your dataset already contains latitude and longitude fields, you can use the Create Points Tool to automatically generate the spatial point using these fields. Best practice tip—run your data through the Geocoder in Alteryx to ensure the top matches.





RELATE: CONNECT POINTS TO FORM SHAPES

All lines and polygons are made up of a series of points (i.e. a series of latitude and longitude geocoded coordinates). You can use lines and shapes to:

- Create a custom polygon trade area or region
- Digitize a proposed travel route line
- Generate a set of points to show locations, such as gas wells, nonprofit organizations, or public libraries

Many datasets are available in ESRI Shapefile .shp, MapInfo .tab, Google Earth .kml and other spatial formats pre-digitized and ready for use.

DIGITIZATION: The process of creating points, polylines, and polygons by manually clicking on a reference map and producing the point(s).

CREATING RELATIONSHIPS IN ACTION

CHALLENGE:

An analyst receives an updated spreadsheet of oil well locations and needs to add them to an existing spatial layer of well sites, with points marking the exact oil rig positions.

SOLUTION:

Within the Map Input Tool, the analyst zooms in to the detailed base map area for the recent locations. Activating Point Mode, the analyst clicks directly on the map in the precise spot where the new rig is sited and creates the spatial point object.

RESULTS:

The manually located point objects are added to the existing map layer, allowing the analyst to quickly distribute updated and current information throughout the organization.



ALTER YOUR X AND Y: CREATING RELATIONSHIPS IN ALTERYX

The Map Input Tool provides a base map layer that enables you to interactively explore the reference map and create points. The tool allows you to choose a Point, Line, or Polygon mode.

• IN POINT MODE, clicking on various areas of the map will produce multiple points not connected to each other. This is useful for individual locations, such as a set of stores.

• IN LINE MODE, the first click will set the initial point, and subsequent clicks will create connected points in order, until the last click.

• WITHIN POLYGON MODE, if the last click is on the initial point, a closed polygon is generated. Now you have a custom trade area, catchment, or specialized region you created on the fly!

The created point, polyline, or polygon can then be exported in the same spatial formats listed above: .shp, .tab, and .kml, as well as the Alteryx. yxdb (Alteryx Database) format. Alteryx .yxdb formats hold spatial objects (points, polylines, and polygons) in a separate field, the same as the other formats. In addition, Alteryx .yxdb formats can contain multiple spatial objects in one file.

With the exported datasets, now you can add detailed tabular data to the points, polylines, or polygons, such as store number, sales metrics, and other data stored internally about each location. You can use the spatial datasets in any Alteryx workflow, enabling you to perform spatial and demographic analytics using your own custom spatial features.



MEASURE: FIND THE DISTANCE **BETWEEN POINTS**

Finding the relationship between your customers and stores, hospitals and patients, or distribution centers to each other in terms of distance is integral to understanding their spatial correlation. It also gives you the ability to provide deeper insights into questions like how much time it takes for your patients to drive to a hospital, or how many customers reside within a 10-minute drivetime area.

DEFINING "DISTANCE"

Direct or straight-line distance (also called "as the crow flies") is measured in terms of the distance from one point to another along a straight path following the curvature of the Earth. In Euclidean geometry, this is the shortest distance between points. This measure doesn't consider roads, mountains, lakes, or any other geographic feature; it simply calculates the miles, kilometers or other distance units directly between two points.

Drivetime distance considers mountains, lakes, and other geographic boundaries, since drivetime analytics are based upon the time it takes to drive along a street network from one point to another. These analytics have two components: Drivetime in minutes, and drive distance in miles, kilometers, or other units.

DRIVETIME + DISTANCE IN ACTION

CHALLENGE:

A healthcare analyst wants to find out how many minutes it takes for an average patient to drive to a hospital. With trusted TomTom data, Alteryx quickly calculates drivetime minutes and drive distance from a set of points to another. For example, a patient may be two miles away from a hospital based on straight line distance, but must drive five miles due to a river between the residence and hospital, as well as needing to cross a major highway. This could equal an additional 15 minutes of driving time, which is likely unacceptable for hospital patients.

SOLUTION:

Once average drivetime is calculated, you may consider siting a new hospital branch location in an area populated with patients that are driving more than 20 minutes to the current hospital location. To accomplish this, you could create trade areas around each hospital with a 20-minute drivetime and immediately view the groups of patients within each area by overlaying the customer points onto the drivetime polygons.

RESULTS:

Now you can see if most of your customers reside within a 20-minute drivetime area, or if you should continue to analyze the data for a new branch site.

DISTANCE CAN BE ANALYZED WITH THE FOLLOWING CATEGORIES:

- Direct (straight-line) distance
- Drivetime distance
- Finding the nearest location(s)

Often with drivetime analytics, a specified time to travel is set, such as 10 minutes. Using this option, a drivetime polygon can be created, which shows the area covered by travel from one center point (origin) within a specified amount of time. For a 10-minute drivetime trade area, the polygon boundary created shows where one could travel in 10 minutes from the origin point, using all streets in the underlying network.

With Alteryx, the street network is provided by TomTom data and updated quarterly so you have fresh data. This is essential in analyzing high-growth areas where population is increasing rapidly and the road infrastructure is expanding.

FIND NEAREST LOCATION ANALYSIS IN ACTION

CHALLENGE:

As a distribution center analyst, your job is to calculate the nearest stores so that incoming inventory can be distributed evenly, lowering the cost of transportation and reducing idle inventory.

SOLUTION:

Using the Find Nearest Tool in Alteryx, you can calculate the 10 nearest stores from the distribution center, as well as analyze each store's distance relationship to other stores.

RESULTS:

Now you can rank stores' proximity to the distribution center by straight-line distance as well as drive distance in miles and drivetime in minutes. Based on this information, you can make improved decisions on idle inventory to be moved from one store to another based on capacity.



LAYER: **DISCOVER RELATION-**SHIPS IN DATASETS

Discovering how various datasets relate to each other gives you a major advantage in understanding your data. Just as layers of maps can be overlaid and aligned with each other, allowing you to view how the individual layers interact, you can overlay points, polylines, and polygons to align them within the same geographic references on the Earth's surface.

The Spatial Match Tool in Alteryx provides multiple overlay match options between two spatial datasets, such as Intersect, Contains, Within, Touches and even the advanced DE-9IM Relation process.

"EVERYTHING IS RELATED TO EVERYTHING ELSE, BUT NEAR THINGS ARE MORE RELATED THAN DISTANT THINGS."

- Tobler's First Law of Geography

SPATIAL RELATIONSHIPS IN ACTION

CUSTOMER POINTS WITH DRIVETIME POLYGONS:

Perhaps you have geocoded the address locations for clients of a nonprofit organization. You also have 30-minute drivetime boundary areas generated for each food pantry in the metroplex. At this organization, volunteers are allowed to drive up to 30 minutes one way to pick up clients and transport them to the food pantries for a weekly visit. Therefore, you need to visualize which clients are within the 30-minute drivetime area and which are not. Using Spatial Match, you can overlay the client points onto the drivetime area polygons. Then, by selecting the Within option, those within volunteer driving distance as well as those who may need additional transportation assistance are immediately shown.

POLYLINES WITH PARCEL POLYGONS:

A light rail is proposed to extend through various tracts of land across the state. Using a parcel boundary dataset that contains land use information, you can spatially match the proposed light rail route onto the parcel polygons. The resulting matched output provides a list of tracts with existing land use designations, which can inform the planning committee's decision.

POLYGONS WITH POLYGONS:

You would like to obtain a list of the census block groups within a city boundary. Using two separate polygon layers, one for block groups within the state and one for the city boundary, the Spatial Match Tool can efficiently determine in one process which block groups are not only within the city boundary, but also all block groups that intersect the city limits boundary.







ENHANCE: APPLY DEMOGRAPHIC + SEGMENTATION DATA

A treasure trove of demographic data within geographic boundaries can be used to enhance your spatial datasets and analytics. Alteryx empowers analysts to leverage industry data sources like Experian to provide highly accurate and recent demographic, segmentation, and other variables for seamless use within workflows.

The many datasets provided by Experian include:

- Current and projected five-year demographics (updated quarterly)
- MOSAIC Household Lifestyle Segmentation with 71 segments
- Consumer expenditure
- Psychographic, lifestyle and behavioral variables
- Simmons Survey Data
- Census Data, including the American Community Survey (ACS) Data
- And much more

GEOGRAPHIC BOUNDARIES IN ACTION

CHALLENGE:

In marketing analytics, the demographic composition of a DMA is very important for determining the mix of advertising that will be used to reach specific audiences. For example, a beverage distributor would like to know where populations aged 25-35 reside that have a specific income range, and an above average annual spend on beer per block group.

SOLUTION:

You can explore the Experian data to create categories based on demographic, segmentation, and consumer expenditures of the population per DMA that best fit the target audience, or determine which block groups are best to target based on variables you already know. Using these and other factors, you can create a more insightful view of where these prospect populations are located.

RESULTS:

The marketing team utilizes the selected block groups to determine focus areas for advertising spend, adjusting media types for the defined customer. In addition, instead of mailing promotional materials to all zip codes in a city, the beverage distributor can use location analytics to focus on exact target demographics for effective mailouts to certain prioritized zip codes, saving postal costs.





Demographic data are available in many geographic boundaries, from Census block groups and tracts to Designated Market Areas (DMA) as well as zip codes. Many of these boundaries are useful when viewing demographic characteristics, and the data can be accessed immediately using the Allocate Tools in Alteryx.

In addition, appending demographic and segmentation data to your customer, patient, or client locations can provide excellent insight into who they are and the areas where they reside. You can also append the demographic data within your custom trade areas, allowing comparisons of existing store markets to each other, and to prospect market areas.

Using the Spatial Match Tool, you can overlay your geocoded customer points spatially onto the geographic boundaries you choose, matching the points and polygons together within the same geographic references on the Earth's surface. Then, each of the Experian variables can be accessed for the geographic boundaries you select, allowing you to create customized demographic, segmentation and consumer profiles for your clients, patients, and customers.

DEMOGRAPHICS IN ACTION

CHALLENGE:

A retailer wants to know what customer demographics and segments constitute their best and most profitable as well as worst customer types.

SOLUTION:

Using internally-defined criteria of "best" and "worst" customer, their analyst spatially matches geocoded customer points to each block group in the U.S. Their internal datasets are instantly enriched with Experian MOSAIC segments per block group along with other variables selected that provide insight into the customer type.

RESULTS:

With these results, the analyst can determine the count of customers per block group, along with the top MOSAIC segments for both the "best" and "worst" customer categories. In areas where the "best" customer count is high, the analyst can note the main segments and begin to create a customer profile that unlocks details for the block groups containing the "best" customer type: Age range, education level, housing type, lifestyle segments, consumer expenditure, etc.



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MAP: Share insights VISUALLY

They say a picture is worth a thousand words, so a map must be worth a million! Maps are essential for conveying extensive amounts of information, all in one image. A well-designed map will be able to deliver that information in a concise, easy-to-read, understandable, and attractive format.

Using the Report Map Tool in Alteryx, various spatial data layers can be added in Point, Polyline and Polygon formats simultaneously. For instance, a point layer of financial donors can be added as a map layer, along with a polygon layer of development outreach areas.

Alteryx provides extensive map layers via TomTom data; these include streets, highways, lakes, rivers, parks, and many other geographic features. It is also possible to modify the base map layers, customizing the map to your preferred color symbology.

Thematic layers, such as those that are popular in population or income maps to show distinction between defined locations, can be easily created. Custom ranges, equal records, equal ranges, and other options like ramped or preset unique value coloring are available for smoothed or individual themes. Map legend fonts, icons, and other elements can be adjusted to get the exact look you need.

MAPS IN ACTION

CHALLENGE:

In a spreadsheet table, you may see a list of residential addresses within 100-year floodplains and 500-year floodplains in a city. Unless you know the city street map very well, it may be hard to visualize from a spreadsheet exactly where each house is located relative to each other and within the overall city boundaries.

SOLUTION:

If you show the locations on a map, you can easily see the distribution of the houses and provide this information to planning committees.

RESULTS:

The municipal committee now can use the map to augment their residential Planning and Development specifications, as well as protect Environmentally Sensitive Areas (ESAs).

EXPAND YOUR OUTPUTS

Maps in Alteryx can be generated in PDF, HTML, PowerPoint, Word, Excel, RTF and other formats. In addition, it is possible to save the map directly from the Browse Tool as a JPEG, PNG or BMP image format.

"I AM TOLD THERE ARE PEOPLE WHO DO NOT CARE FOR MAPS, AND I FIND IT HARD TO BELIEVE."

- Robert Louis Stevenson, "The Art of Writing on Treasure Island"



ACT: SELECT IDEAL SITES

Site selection, or the process of performing spatial and demographic analytics to determine the optimal site for a new location, is widely used for not only retail stores, but also for hospitals, malls, government agencies, bank branches, schools, libraries, nonprofit organizations, and more. It is an intricate process, a balance between art and science.

True site selection involves many factors, including population growth, economic measures, urbanicity, evaluation of competitors, retail synergy, existing locations, real estate markets, statistical models and so on. However, the core of the analytic process is spatial analytics using demographic and lifestyle segmentation data, such as the Experian Demographic Data in Alteryx.

THE METHODS EXPLORED IN THIS E-BOOK ALL PLAY **A PART IN THE SITE SELECTION PROCESS:** Geocoding, distance and drivetime analytics, finding the nearest locations and competitors, appending demographic data within custom or predefined geographic boundaries, and of course, presenting your discoveries and proposed locations on a map.

Many corporations use Alteryx as an integral part of their site selection process, allowing GIS analysts to perform detailed and proprietary location analytics rapidly and with high accuracy. The Reporting Tools enable maps and demographic results to be produced in batch processes, distributing to a database or via email to recipients. Workflows can be packaged and shared with other Alteryx users, facilitating an enterprise-wide analytic environment.

SITE SELECTION IN ACTION

CHALLENGE:

A retail corporation is in a high growth phase and aims to open 100 new stores this year, and they need to understand where the best locations would be.

SOLUTION:

Their Market Planning Manager uses Alteryx to import various data sources, including existing store locations, performance metrics, competitor data, other retailer stores, customer addresses, and other datasets in various formats, such as Excel, ESRI Shapefile, and database connections.

Using the state-of-the-art geocoding tools in Alteryx, the manager creates the spatial points for each locational dataset and performs distance analytics, along with creating customized trade areas for each existing store. Lifestyle segmentation and demographic variables enrich the large amounts of data, providing deeper insight into the geographic areas that surround stores and in which customers reside.

RESULTS:

Without using any code, the Market Planning Manager takes these results, builds statistical models, and highlights new geographic areas that contain demographic compositions similar to their best customer and store type. Optimal prospect locations are prioritized and easily communicated by providing reports and maps to the executive team. By targeting previously untapped potential customers and providing direction for attaining the growth goal, new stores and markets are in the pipeline!

"THE COMBINATION OF LOCATION AND INTERACTIVE MAPS AS A MEANS OF DISPLAYING AND EXPLORING INSIGHTS CONTINUES TO GROW IN IMPORTANCE TO ANSWER **INCREASINGLY COMPLEX BUSINESS QUESTIONS."**

- "Forecast Snapshot: Location Intelligence Software, Worldwide, 2019," Gartner







YOU ARE HERE.

Whether you're a business analyst new to location intelligence and looking to upscale your analyses, or a seasoned GIS professional who wants to leverage the efficiency inherent in a platform that processes multiple spatial file types in virtual memory, it's easier than ever to step into the world of location intelligence and unlock new dimensions in your analyses with the power and ease of a self-service analytics platform like Alteryx.



CONNECT YOUR LOCATION INTELLIGENCE DOTS

Unlock the hidden treasure trove of spatial data information and kick your insight-building skills up a notch with your Spatial Analytics Starter Kit.

SPATIAL ANALYTICS STARTER KIT | DOWNLOAD NOW





ABOUT THE AUTHOR

DEANNA SANCHEZ, ALTERYX

ACE, began using Alteryx in 2005, and specializes in Spatial and Demographic Analytics in Alteryx, along with Analytic Apps. She has a degree in Geography with concentrations in GIS and Medical Geography, and excels in threedimensional GIS visualizations. Her background includes 20 years of spatial analytics, ranging from epidemiological research to municipal enterprise GIS to real estate and corporate retail site selection. As a Senior Consultant, she utilizes Alteryx for almost every aspect of performing analytics for healthcare, finance, real estate, oil and gas, manufacturing and marketing industries, as well as advanced site selection.

In addition to consulting, Deanna is an Alteryx trainer, and has provided Beginner to Advanced level instruction to over 350 students across the country. An experienced presenter, she has shown projects at the International Medical Geography Symposium in Montreal, the National Retail Federation (NRF) Big Show in NYC, and various Geography-related conferences, as well as multiple times at Alteryx Inspire. Deanna has been on the leadership team of the **Dallas** Alteryx User Group for 5 years, with over **280 members,** and leads the Alteryx For Good volunteer team in Dallas. She recently launched the DFW Women of Analytics Group and the Fort Worth Alteryx User Group. She feels greatly honored to have received the Alteryx For Good Champion Award in 2017, and believes that any amount of volunteering, large and small, creates expanding ripples of good throughout your community.

DEANNA SANCHEZ

ALTERYX USER **SINCE 2005**



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The Thrill of Solving

ABOUT ALTERYX

Revolutionizing business through data science and analytics, Alteryx offers an endto-end analytics platform that empowers data analysts and scientists alike to break data barriers, deliver insights, and experience the thrill of getting to the answer faster. Organizations all over the world rely on Alteryx daily to deliver actionable insights.

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ABOUT TEKNION

Teknion, an Alteryx Premier Partner, is a diverse team of data professionals, helping clients to unlock the hidden truths buried in their data. We believe our clients are best served when we deliver solutions that embrace Self-Service and Automation as a core paradigm; creating better data, better insights, better results.

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