



# Arc India News

Esri India Magazine

January - June 2014 Vol : 8 Issue : 1

Cover Story

**The Four  
Imperatives of  
Location Analytics**

Application Article

**Mapping the  
Market to  
Create Healthy Banks**

Technical Article

**Esri Location Analytics:  
Success Stories**

## Unlock the Power of Location



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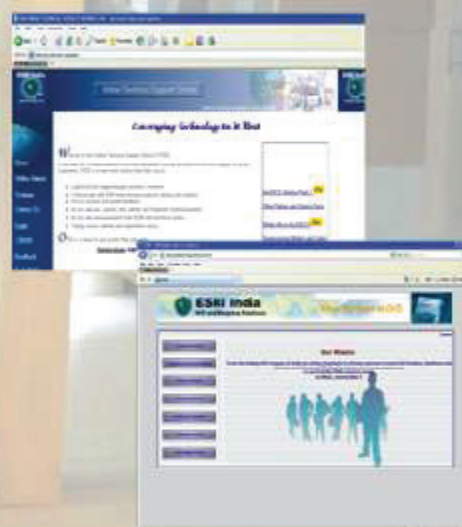
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**B**usiness Intelligence (BI) became an important tool to gain competitive advantage for the business leaders and a main-stream application for the IT managers, more than a decade ago. Business and IT leaders realized the importance of analyzing the data about their customers to discover trends about procurement, consumption and satisfaction; analysis of these trends helped in making better decisions. Every single department in any enterprise has to deal with location information; this could be the location of its customers, suppliers, partners, distribution channels etc. This information resides in a variety of business applications like Enterprise Resource Planning (ERP) systems, Customer Relationship Management (CRM) systems, and Supply Chain Management (SCM) systems and is usually available to the business decision makers in a tabular form and sometimes in forms like graphs, pie-charts, bar-charts etc. If the same information along with location data can be made available on a map, its impact and utilization for better decision-making can be much higher. This is where BI and GIS (Geographical Information System) come together in the form of Location Analytics.

While organizations have been able to implement BI solutions to address their need for data for decision-making, the adoption of GIS has been slow. One of the reasons for this was the challenges of integration of GIS with BI applications. Esri Location Analytics platform provides an answer to these challenges by way of its product – Esri Maps. This product provides direct integration of GIS capabilities with the leading BI and CRM platforms like IBM Cognos, MicroStrategy, Microsoft Dynamics and others. These capabilities are complemented with a full library of geographic content that makes Esri Maps simple to use and inexpensive. Instead of viewing the data in a tabular form, the users can quickly make maps of the data contained in the business systems.

Ventana Research, a company based in California published a report 'Business Trends in Location Analytics' in 2013. As per this report organizations use location analytics for business-to-business (B2B) and business-to-consumer (B2C) functions as well as in internal processes. 85% of the participants in this research said that using location analytics has improved the results of their activities and processes.

Esri Maps provides a location analytics solution for business analytics; this capability is also available through Esri's web mapping platform – ArcGIS Online thus enabling information sharing, communication and collaboration across the organization in a cost-effective and easy manner. Esri Maps is built over Esri's ArcGIS platform so all the powerful analytical capabilities are available to the users all across the organization through servers, desktop systems, mobile devices and public or private cloud.

Agendra Kumar

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## Remembering "The Father of GIS" - Dr. Roger F. Tomlinson (1933–2014)



It was Dr. Roger F. Tomlinson who first coined the term geographic information system (GIS). He created the first computerized geographic information system in the 1960s while working for the Canadian government — a geographic database still used today by

municipalities across Canada for land planning. Born in England, he settled in Canada after military service and attending university, where his work in geomorphology led to applying computerized methods for handling map information. Tomlinson has had a distinguished career as a pioneer in GIS and developed Tomlinson Associates Ltd., which provides geographic consulting services. For 12 years, he was chairman of the International Geographical Union GIS Commission. He was also president of the Canadian Association of Geographers and most recently was recipient of the prestigious Alexander Graham Bell Medal, awarded only once before by the National Geographic Society. Tomlinson was also the author of *Thinking About GIS: Geographic Information System Planning for Managers*, one of the most widely read books on the subject.

Esri president Jack Dangermond shares his thoughts "It is with great sadness that I relay the sudden passing of our dear friend and colleague, Dr. Roger Tomlinson, on February 9, 2014, at the age of 80.

Roger was above all else a geographer and was always proud to say that. He loved GIS, the field that he invented, and was so pleased to come to Esri and help us in thinking through difficult problems. He had a passion for staying current with the most recent technologies and always had insights that none of the rest of us had. He also loved attending the annual Esri User Conference and the opportunity to both see and acknowledge the great work of GIS professionals from around the world. He always said that giving out the Special Achievement in GIS (SAG) Awards was his favorite day of the year.

Roger both created and dignified our field with his strong yet graceful spirit and insight. He invariably knew what was important. His vision of first thinking about and then designing and building practical systems that created meaningful information products will be part of his legacy. With his passing, a beautiful and bright light has gone out in the world. Nevertheless, I know that his spirit and passion will live on in all of us.

He was my friend. I will miss him greatly. And his spirit will be missed by all of us." •

## Esri Launches Geotrigger Service for Mobile Developers

### Location-Based Messaging Added to iPhone and

## Android Apps with Minimal Battery Drain

Esri announced that its cloud-based Geotrigger Service is now available, making it easier for developers to add location awareness and messaging to their iPhone and Android apps. With the Geotrigger Software Development Kit (SDK), mobile apps can send custom messages when a user enters or leaves locations specified by the application developer.

"The Esri location platform currently offers many services for developers, from geocoding and geoenrichment to routing and maps," said Johan Herrlin, Esri senior business strategist. "Geotrigger boosts these existing services with location awareness and location-based alerts."

Esri's Geotrigger Service expands on the native geofencing features available within iOS and Android, including the ability to create complex polygon geofences and notify other servers or services when triggers are fired. Geotrigger Service also adds additional logic to reduce the battery drain when using location services on mobile devices. Geotrigger SDKs provide a consistent interface supporting faster development of apps for both iOS and Android.

Developers can add the following location-based functions to apps with Geotrigger Service:

- Notify citizens about road closures, emergencies, or public safety warnings based on their past or current location.
- Inform tourists about interesting places as they explore your city, theme park, and so forth.
- Engage customers with personalized content or deals the moment they enter a store—or a set amount of time later.
- Optimize customer service by notifying employees when a customer who just ordered something arrives at your store.

Esri's Geotrigger Service is the new and improved version of Geolqi's original technology. Esri acquired Geolqi in 2012, and its team formed Esri's R&D Center in Portland, Oregon. Since joining the company, the team has improved existing core location technology and added to the Esri suite of tools for developers on the newly launched developers.arcgis.com.

Current Geolqi customers are encouraged to migrate to Esri's Geotrigger Service to take advantage of the easier-to-use SDKs, improved tools, overall increased performance, and lower pricing. The original service will retire 18 months after the launch of Geotrigger Service. Migration tools will be provided to existing Geolqi customers.

"Geotrigger Service opens up a whole world of use cases, from stores wanting to engage customers to cities wanting to release an app to send civic alerts, local event information, or tourism info," said Amber Case, director of Esri's R&D Center in Portland. "Create an invisible button on a map, and when your phone gets within that button—that invisible region—something will happen. Your phone could even turn the lights on in your home as you pull into the driveway, and turn them off when you

leave. When you combine Geotrigger Service with the other capabilities of the Esri developer platform, such as geocoding, data visualization, and demographics, developers can create powerful solutions."

For more information on the Geotrigger service, visit [developers.arcgis.com/features/geotrigger-service](http://developers.arcgis.com/features/geotrigger-service) or [visitesri.com/events/developers/main](http://visitesri.com/events/developers/main) for additional information on Esri's comprehensive program for developers.

## Esri Supports OGC GeoPackage Encoding Standard

Esri announces the support of the new Open Geospatial Consortium (OGC) GeoPackage Encoding Standard. This new OGC specification defines GeoPackages for exchange and GeoPackage SQLite Extensions for direct use of vector geospatial features and/or tile matrix sets.

Esri actively participated in the development of this standard and was one of the very early adopters of the specification – supporting it even before it was approved by OGC membership as a final standard.

- Esri delivered draft GeoPackage support in the ArcGIS 10.2.1 for Desktop that shipped at the end of 2013.
- ArcGIS 10.2.2 for Desktop and Server provide support for the 1.0 vector specification recently adopted by OGC as a new standard.
- In summer 2014, ArcGIS 10.3 for Desktop will add platforms and deployment options based on 1.0 vector and tiled raster specification for OGC GeoPackage and ArcGIS Runtime 10.2.4 for Android and Java will also support GeoPackage.

"Esri continues to add support for many open and interoperable data sources," says Keith Ryden, Esri software development team member, who led Esri's work on GeoPackage and worked on the Open Geospatial Consortium, Inc. (OGC), standard. "Adding GeoPackage support was a natural progression to our previous support of OGC WMS, WMTS, WFS, WCS, and OGC KML. We are committed to making our users successful, and we had users interested in Esri's early support of GeoPackage, so we ended up supporting even the draft specification prior to its becoming an OGC standard. We will be interested to see how popular the use of GeoPackage becomes."

For more information on Esri support for OGC GeoPackage, visit [esriurl.com/geopackageblog](http://esriurl.com/geopackageblog).

## Explorer for ArcGIS Brings GIS to the Mac

Esri released Explorer for ArcGIS on the Mac, a native OS X application to discover, view, and share maps. The ready-to-use app joins Esri's family of mapping apps, including Collector for ArcGIS, Dashboard for ArcGIS, and Explorer for ArcGIS on iOS. It can be downloaded from the Mac App Store and Esri ArcGIS Marketplace.

With Explorer for ArcGIS, you can access maps, search for and visualize data, and brief stakeholders. In the new Mac version, you also have the ability to open and view multiple maps at once, dock and undock pop-up windows, and go full screen—taking advantage of Apple's Retina technology on MacBook and Thunderbolt displays.

Explorer for ArcGIS is one of many ready-to-use apps to access maps authored by you or others within your organization, and share them from Macs or iOS devices. The app is designed for anyone who needs to explore data in a geographic context and use maps to make more informed decisions. With an elegant and intuitive interface, it requires no GIS experience to operate.

Anyone using a Mac desktop or iOS device can download and try the sample maps included in the app. ArcGIS Online subscribers, trial users, and those with a Portal for ArcGIS account can simply download the app, sign in, and begin exploring their maps and data. An Android version of the Explorer for ArcGIS app will be available in a later release.

For more information on Explorer for ArcGIS, visit [esri.com/explorer](http://esri.com/explorer).



Explorer for ArcGIS is now available for Apple users who want to discover, use, and share maps from their Mac desktops.

## Letters to Editors

Dear Readers,

This section of Letters to Editors has been an important section of Arc India News and your comments/suggestions are valuable to us. We would like to have the opinion and feedback of all our readers with respect to the content being published and how it has been useful to them in day to day GIS advancement. You may also let us know what you expect to see in terms of application and technology in the magazine.

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Editorial Board

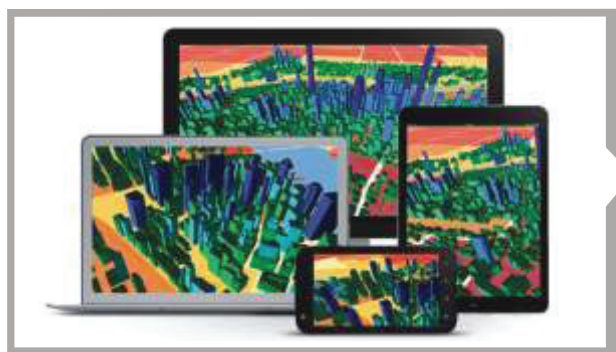
# What's Ahead in ArcGIS?

## More Ways to Understand Your World

Looking ahead to the rest of 2014, you will discover many new ways to be successful in your work using ArcGIS. Enhancements to the ArcGIS platform will follow these themes:

### Building on the Tools You Already Have

In addition to a long list of performance enhancements and new solution offerings to help you get up and running, we're adding a fast, modern experience to your Desktop applications. Side by side with ArcMap, you can use the new ArcGIS Pro. It's efficient, has an intuitive display, supports multiple layouts, and is a step toward the future of desktop GIS.



### 3D – A More Realistic View of Your World

Sure, you've been able to visualize data in 3D on your desktop for quite a while, but now you can use 3D everywhere. Whether you are serving your GIS out on the web, to phones, or to tablets, your users can have a 3D experience.

### Meet Requirements for Open Data

If you need to meet requirements to make your data open, Esri's new open data capabilities will make the whole process much faster and easier for you. You will be able to quickly create open data websites to serve your user community.



### Apps Are Where It's At!

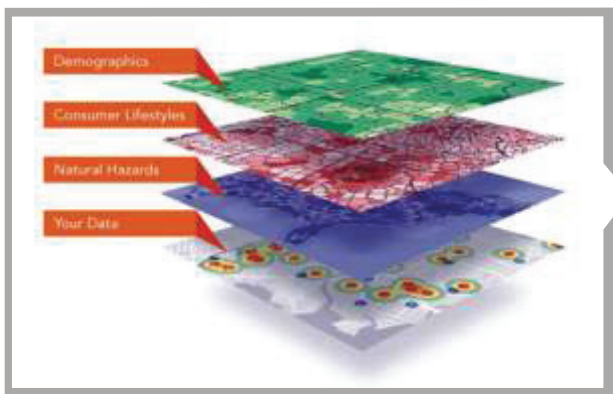
There's a good chance you're reading this text on a smartphone or tablet. To help you put GIS in front of your users in a way that fits with today's workflows and lifestyles, we are busily adding more apps and enhancing the ones you may already have. Watch for a new Explorer app that will offer a new way to discover, use, and share maps as well as brief stakeholders.

### Take Your Development to New Places

We are improving how developers work with maps across the ArcGIS platform and helping them push the boundary of code. The evolution of our SDKs, APIs, and other development tools continue to support developers who build apps for today's modern computing platforms. You can quickly add location to your applications by using the web API or native SDK of your choice then deploy your app across any device.







### Geographic Insight into Your Business

No matter where you are or what device or business system you're using, ArcGIS will help you develop an enterprise location strategy. With easy-to-use yet extremely powerful analytics at your fingertips, you can quickly discover vital information hidden in your tabular data about your customers, competition, assets, and communities that allows you to make more informed and effective decisions.

## Updated Esri Collector and Operations Dashboard Apps Speed Workflow

### New Improvements Include Disconnected Editing and Browser Support

Esri has released new versions of Collector for ArcGIS and Operations Dashboard for ArcGIS. The Collector app now includes the ability to download maps to your smartphone or tablet device to collect and edit data when working offline. Operations Dashboard has added support for browsers so you can view operations on your iPad, Android tablet or from your desktop. Both apps are available at no cost

own basemaps managed within their ArcGIS organization.

#### Operations Dashboard for ArcGIS

Operations Dashboard for ArcGIS provides a common operational picture for monitoring, tracking, and reporting events within your organization. The new version of Operations Dashboard now supports web browsers. That



means you can have the same real-time view of operations on your tablet that you see on your Windows desktop.

Data sources inside Operations Dashboard have also been improved in the 10.2.2 version of the app. You can now power operation views using dynamic map services as well as feature services, and other types of layers including real-time weather, traffic, and social media feeds.

Collector for ArcGIS can be downloaded

to ArcGIS Online subscribers and Portal for ArcGIS customers. Collector for ArcGIS

Collector for ArcGIS is a configurable field data collection app for iOS and Android devices. With the latest release, maps can be used anywhere regardless of network availability. You can take map areas offline and work with them in remote locations where network availability is either nonexistent or unreliable. Users can download Esri basemaps as well as their

from the Apple App Store and Google Play. Operations Dashboard is available through ArcGIS Online. Portal for ArcGIS users can access the Operations Dashboard app from the Customer Care portal.

Learn more about ArcGIS Online at [esri.com/ago](http://esri.com/ago).



# Unlock the Power of Location

## Put the Where in your Enterprise

**G**et a deeper understanding of your customer with Esri Location Analytics. 80% of transactional data has a location component. You can't see what this data is trying to tell you with charts and graphs. Esri Location Analytics provides you with a highly visual means to extract this missing analytic and ensure that you have the clearest possible view of your data.

### Deliver Better Outcomes

Esri Location Analytics makes it easy to geo-enable your business data with intuitive mapping and analytical tools. You will quickly discover new patterns and answers to any business challenge and effortlessly share your insights across the organization for greater collaboration.

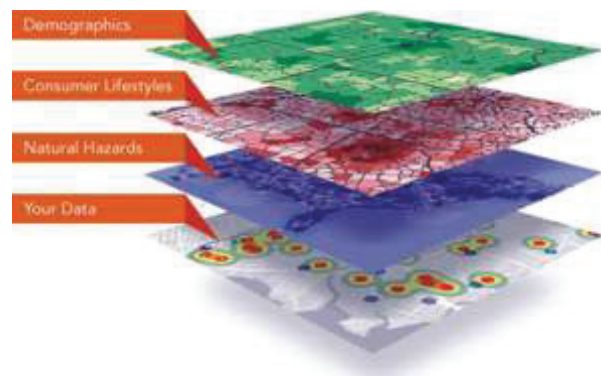
### Make New Discoveries

Graphs and charts are great, but you can extend your data with location at the helm. Visualize your data on a map to see new patterns. It's easier than you think to enable mapping throughout the enterprise.



### Reimagine the Possible

You can do much more than simple mapping. Combine your maps with up-to-date demographics, consumer spending, lifestyle, and business data. You can slice, dice, and recombine information to meet any opportunity and gain new insight.



### Get the Right Answer

There is a brave new world of analytics waiting for you to use in your everyday business life. Turn mountains of unstructured and structured data into powerful intelligence. From simple to scientific, you can ask new questions of your data and get the right answers using location as your new analytic.



### Open Up Understanding

Unleash location analytics to the entire organization. With Esri, the maps you create can be quickly and securely shared across any business system or device. That means you can make knowledge an easy-to-exchange organizational commodity.



## Solutions - A Perfect Match

**I**t doesn't matter what business system you have. We have the right location analytics fit for you. Whether through Esri offerings or partner solutions, you can add the power of location to your organization. From desktop to enterprise, from mobile to the cloud, Esri location analytics can work with any solution or system you have in place. You can easily inject mapping and location into your existing IT and enrich your view of the world. Take advantage of offerings for Microsoft Office, Microsoft SharePoint, IBM Cognos, SAP, Salesforce.com, or MicroStrategy.



Esri Location Analytics integrates geography with existing business systems and processes such as – Business Intelligence, Customer Relationship Management, Collaboration and Productivity, Focused applications.

## Business Intelligence

Esri Maps for IBM Cognos boosts your business intelligence (BI) to new levels. Easily integrate smart maps to your BI applications for more complete and actionable reports. By visualizing your intelligence data and applying location analytics, you add value to your decision-making process. Giving your organization what it needs to gain unprecedented business insight. Esri Maps for IBM Cognos bridges the gap between metric and location, seamlessly integrating into everyday workflows without the need for custom coding. Now you can enhance your reports with customized, interactive, intelligent maps. Easily take advantage of location analytics and geoenriched data to solve problems. Share your results intuitively using web maps for your dashboard.



Esri Maps for MicroStrategy lets you deploy dynamic maps and perform rich geoanalysis to solve any challenge. Easily integrate map-based query capabilities to filter data and spot trends and patterns. Make reports jump off the page by embedding rich maps and data visualization. You can better understand and influence performance when you use location to your business advantage.



Esri Maps for SAP BusinessObjects will help you separate your business from your competitors through the use of intuitive, interactive maps and location-based tools that fit perfectly into the work you do every day. Use Esri Maps to analyze Big Data and extract new insights from business and social data. Access and share your maps anytime, from anywhere.



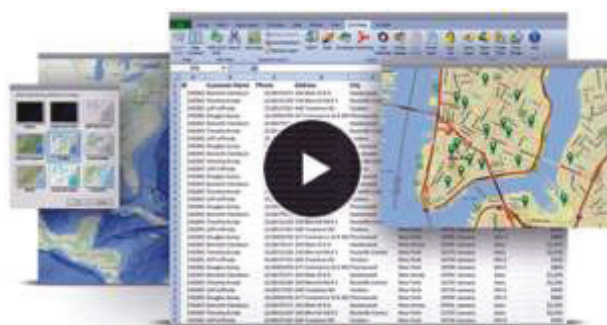
## Customer Relationship Management

Esri Maps for Dynamics CRM - Whether you're creating a customer retention campaign, finding ways to improve promotion targeting, or trying to better understand a sales territory, Esri Maps for Dynamics CRM gives you the ability to evaluate your customer data in new, exciting ways—using location. It gives you the secret ingredients to uncover hidden trends and patterns in your data and take your CRM to the next level. You can organize, automate, and streamline processes using location data and analytics. Designed for Dynamics CRM, you will be creating amazing maps and location-based infographics in seconds. You'll have intelligent maps and rich geo-analysis available whenever and wherever you need it. Start building a better customer relationship management experience.



## Collaboration and Productivity

Esri Maps for Office - Make dynamic maps of your spreadsheet data right in Excel. Create color-coded, point, clustered point, or heat maps. Add Esri's demographics and lifestyle data to enrich your own data to get even more context and details. Then share your maps through ArcGIS Online or copy them into your PowerPoint presentation or document.



Esri Maps for SharePoint - Map your organization's data in SharePoint lists or your data warehouse. Visualize key business measures in dynamic color-coded, point, clustered point, or heat maps. Enrich your data with Esri's demographic and lifestyle data and get deeper insights. Then share your

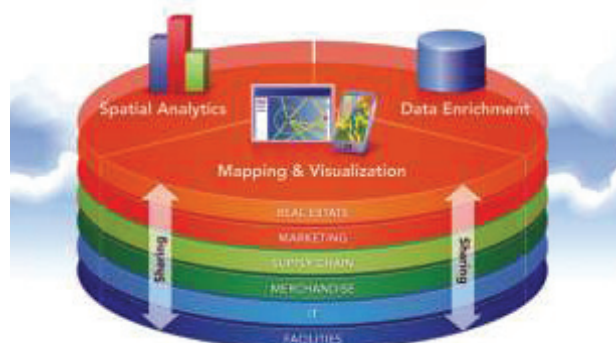




maps through ArcGIS Online with others so you can collaborate and make more informed decisions.

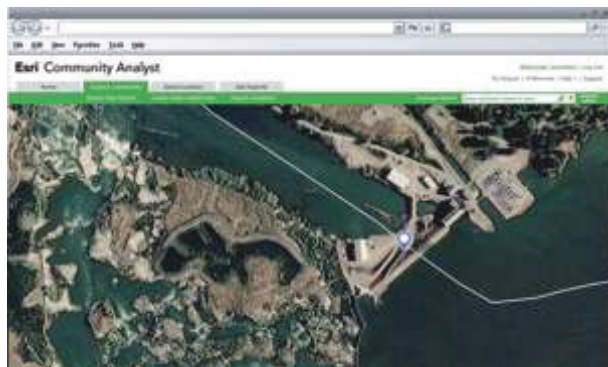
## Focused Applications

Esri Business Analyst is a complete system for analyzing data to reveal insights and patterns in your business. You can perform deep analysis of demographic and consumer data and combine it with your own data to gain greater understanding of your customers, competition, market, and trends. Business Analyst can be configured to share data, analyses, and insights throughout your entire organization.



Esri Community Analyst has done the tedious work for you. At any level of expertise, the power of data access, visualization, and reporting is available to you instantly.

The Web Application—With no installation needed, it is a cloud-based mapping solution that provides simple and easy-to-use GIS capabilities to every user •



## Esri Maps for Dynamics CRM

### Better Benefits, Thanks to Location

**K**ee your customers coming back by enhancing your customer relationship management (CRM). Esri Maps for Dynamics CRM gives you the secret ingredients to uncover hidden trends and patterns in your data and take your CRM to the next level. You can organize, automate, and streamline processes using location data and analytics. You'll have intelligent maps and rich geo-analysis available whenever and wherever you need it. Start building a better customer relationship management experience.

#### Get the Most Out of Your CRM

Whether you're creating a customer retention campaign, finding ways to improve promotion targeting, or trying to better understand a sales territory, Esri Maps for Dynamics CRM gives you the ability to evaluate your customer data in new, exciting ways—using location. Designed for Dynamics CRM, you will be creating amazing maps and location-based infographics in seconds.

#### See What's Missing

You can map practically any data to find patterns that would be missed otherwise. It's easier than you think. Start making new discoveries with data-driven smart maps.

#### Make Customer Revelations

Take your data to a new level of understanding by adding geoenrichment to the equation. Detailed demographics, consumer spending, and lifestyle data help you give a more complete picture.

#### Make Better Decisions

Intuitive, agile analytics allow you to ask more precise questions that yield better results. It's more than mere mapping. It's location analytics.

#### Do More with Your Data

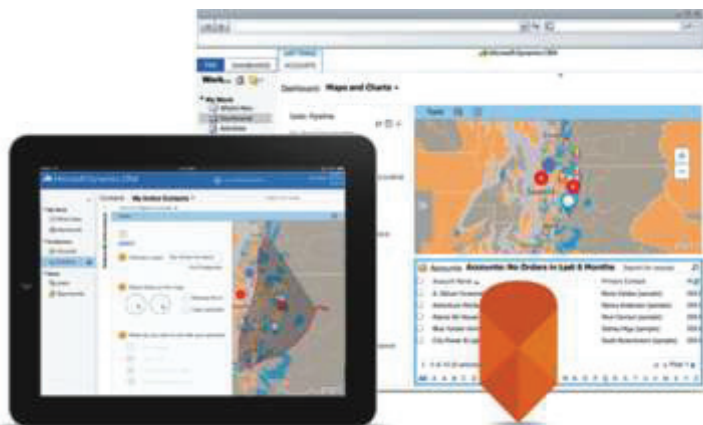
There's an easier way to sift through masses of data. Map analysis lets you create dynamic point clusters, heat maps, and other data visualizations to filter through the white noise and create true customer intelligence.

#### Ready to Deploy

Esri Maps for Dynamics CRM can be used with online and on-premises versions of Dynamics CRM. It's easily installed as a Dynamics solution package—no need for custom coding or GIS experience. Your maps reveal a geospatial view of your organization's data without leaving the Dynamics CRM environment.

#### Enterprise Access

Esri Maps for Dynamics CRM integrates Esri's ArcGIS platform directly into Microsoft's Dynamics CRM product. ArcGIS enables you to create, organize, and share geographic information and tools with anyone by using intelligent online maps and apps. The apps run anywhere and on any device •





# The Four Imperatives of Location Analytics

Location analytics combines geographic data on assets, infrastructure, transportation, and the environment with data on an organization's operations and customers to discover powerful answers to any business challenge and share those insights with the rest of the organization.



Location Analytics goes far beyond just "dots on a map." Without the right tools to interpret it, data can overwhelm a map.





Esri Location Analytics lets you build complete information and analyses for reaching new customers, markets, and levels of success by bringing the power of ArcGIS tools and methodologies to traditional business analytics systems, like business intelligence (BI), customer relationship management (CRM), enterprise resource planning (ERP), and enterprise asset management (EAM), as well as productivity tools like Microsoft Office and collaboration tools like Microsoft SharePoint.

Organizations create, manage, and analyze vast quantities of data in business systems they use every day. Information about location is pervasive in this data. Customers and constituents have a location. Assets, whether fixed or mobile, have locations, as do staff members and suppliers. With the ubiquitous use of mobile devices and social media, location data is becoming even more pervasive.

By ignoring the location data in your business systems, your organization misses the opportunity to make the most informed decisions and create the best business outcomes. Typically, business analysts, marketing directors, operations managers, and other decision makers lack easy access to spatial tools that visualize and analyze data in a geographic context. Esri Location Analytics provides a transparent connection to GIS that works with the business systems they use every day.

Many business users are completely unaware of the value that location analytics can add even if they do use some form of mapping in these business systems. The common misconception is that mapping is just adding data as "dots on a map."

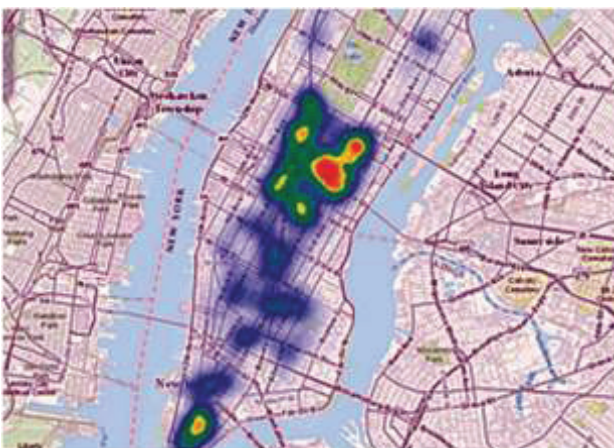
While putting data on a map will help uncover patterns that graphs and charts won't reveal, the value of location analytics can be much greater. The four imperatives of location analytics outlined in this article will help with those unfamiliar with GIS appreciate the full value of location analytics. For GIS professionals, these imperatives are a yardstick to measure the activities of your organization in terms of its level of sophistication and maturity in the use of location analytics.

#### Imperative #1—Go Beyond Basic Mapping

Putting your data on a map is simple and easy with many available mapping products. However, the business user dealing with a significant volume of data, say thousands,



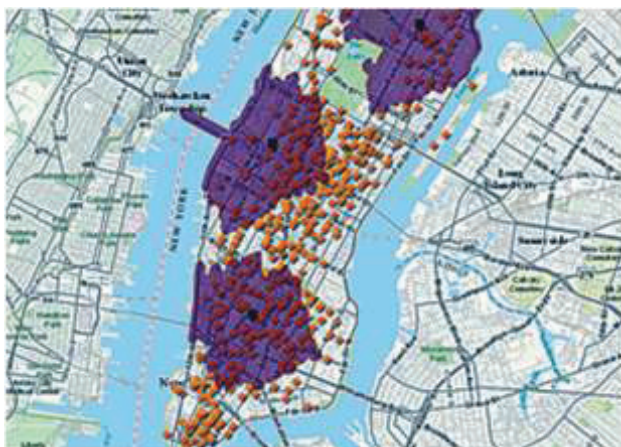
Heat maps make it easy to perceive data density.



Spatial queries let you analyze area that you define such as areas that are a 10-minute drive from a collection of Specific locations.

Clustering is one strategy for understanding your data by making data points in close proximity intelligible.





Nearest-neighbor analysis finds the closest entities of a specific type near a given location.

hundreds of thousands, or even millions of customers, will need the right tools to create value from location data because simply putting lots of data points on a map can quickly obscure it.

Fortunately, there are better ways to extract information about this data from the map. Not only does Esri Maps for Office make it as easy to make a map as it is to make a chart, it offers tools like automated clustering, heat mapping, data aggregation, and color coding. These strategies reveal more information from data, quickly surpassing the basic dots-on-a-map approach.

With automated clustering, the software automatically groups points that are in close proximity. Each group of points is represented by a symbol, typically a circle. The size of the circle is determined by the number of clustered points it references. A number in the center of the circle represents the number of points clustered. Automated clustering is activated based on how far the user is zoomed in to or out of the map. The circles representing the clusters break apart when the map is zoomed in and coalesce as the map is zoomed out. This is a great way to make viewing large quantities of data manageable.

Heat maps, an increasingly common technique, provide a surface that indicates how and where points are clustered. Point density is reflected by the colors used. An area of high density might be colored red, while an area of low density would be colored blue. Although good for showing the density of points, heat maps won't show what is statistically significant in the data.

Aggregating data based on regions and then mapping those regions can provide a much better picture of what's going on. Aggregation can be performed outside mapping software (in an Excel pivot table, for instance) or inside mapping software. For example, sales from individual stores aggregated by postal codes can be mapped by postal code areas, and those areas can be color coded by the mapping software. In addition to well-defined boundaries like post codes, aggregated data can be mapped by organizationally specific boundaries such as sales territories.

#### Imperative #2—Enrich Your View

When you're in the market to buy a house, you don't make your decision based entirely on the information the real estate agent gives you. Your decision is based on more than just the number of bedrooms or the price. Typically, you do some additional research. What is the neighborhood like? What

shops are in the area? How long would your commute to work be? All this information helps you make a better, more informed decision.

It's the same situation when you're making decisions about your organization. You're not going to be able to make the most informed decision if you're only looking at your own data. You need to enrich your view by learning more about the geographic areas in which your organization operates. What are the demographics and lifestyles of the people that live in each area? How are they expected to change? Where are competitive or complementary businesses? Is it useful to know more about the surrounding terrain? The acquisition of this information is called geoenrichment. It can add value to your data in two fundamental ways: map enrichment and data enrichment.

Map enrichment means adding new layers of information to the maps you create. These map layers could represent demographics or the locations of certain types of businesses. This data could be administrative boundaries acquired from a third party or real-time data like the path of a storm. Using these map layers with maps of your data can provide a more complete picture.

Data enrichment means adding new columns of information to your own database records so you can slice, dice, and analyze that data in new ways. Although your CRM data might reveal a lot about what products your customers buy and how often they buy them, it won't tell you much (if anything) about the lifestyles or the life stages of those customers. If you can add these dimensions to your data, you can better determine the optimal products and services for your customers and how best to reach them.

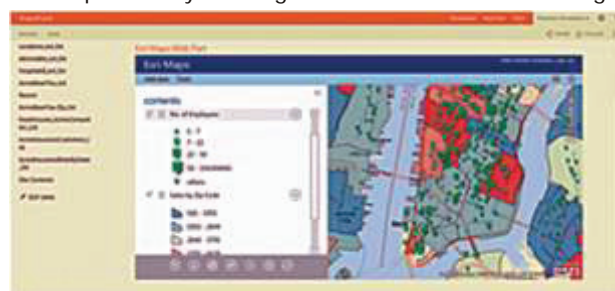
Geoenrichment lets you do real research based on location. This is a key component of Esri Location Analytics and the ArcGIS platform. Using geoenrichment, you can get to know your customers better and engage with them more effectively.

#### Imperative #3—Perform Map-Driven Analysis

Mapping your data can uncover many patterns and insights that graphs, charts, and tables simply won't reveal. However, the true value of a map is realized when you can interrogate it. Then it becomes a new analytical tool. Map-driven analysis can range from simply connecting maps to your data to more complex operations using spatial queries with geoenrichment.

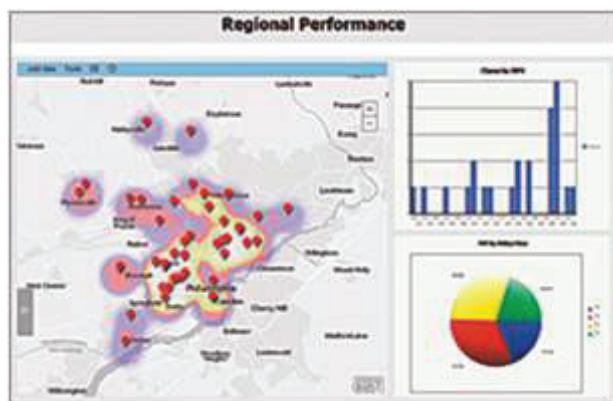
Connect your maps to your data so as you drill into your charts and graphs, the map updates to reflect the changes in unison or, conversely, as you drill into your map, graphs and charts update to reflect the current geographic area.

Use the map to perform spatial queries by selecting areas on the map either by drawing an area of interest or defining a



Share maps across business systems. Employee locations mapped in Excel are added to MicroStrategy for further analysis.





Not only does Esri Maps for Office make it as easy to make a map as it is to make a chart, it offers tools like automated clustering, heat mapping, data aggregation, and color coding.

specific region (for example, the area that encompasses a 10-minute drive from a specific location).

Use spatial queries with geo enrichment to understand the effects more fully. For example, by determining the path of an approaching hurricane and identifying the types of customers or facilities that may be affected, you can estimate vulnerable populations or forecast losses.

Determine statistical anomalies in your data by using hot spot analysis to identify statistical outliers to validate data quality.

Use spatial modeling to predict performance for existing or new locations. It can answer questions such as, What effect will opening a new facility in this location have on sales in existing stores?

#### Imperative #4—Collaborate with Maps

An enterprise operates more efficiently when everyone is on the same page. Never an easy thing to do, collaboration gets more difficult as a business gets larger. Organizational structures seem to get in the way. Use Esri Location Analytics to create and easily share maps. These maps can become the new information vehicle for breaking down barriers

across your organization. Here are four ways to share maps that maximize the value of collaborating with maps:

Share dynamic maps rather than static maps. A dynamic map can be focused on the area that's important to the topic under discussion.

Share maps across devices so anyone can use them on tablets, smartphones, or desktops and they are available everywhere. For example, a map created in your CRM and available on mobile devices could be valuable to the sales force in the field.

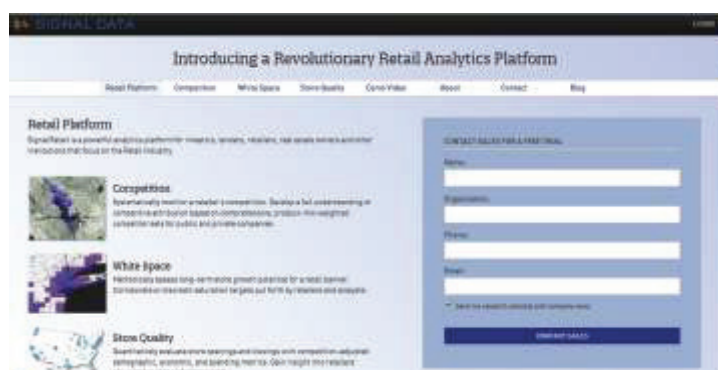
Share maps in presentations as dynamic rather than static maps. Maps created in your business systems can be used in your presentations to make data more comprehensible.

Share maps across business systems and use them as maps or map layers in other business systems. For example, a map of store locations generated in Excel can be used as a backdrop for maps of customers in your CRM.

Share maps securely by controlling who within the organization has access to maps and who can modify them.

#### Gain a Competitive Edge

Maximize the value of business data by following the four location analytics imperatives: go beyond basic mapping, enrich your view of the world, perform map-driven analysis, and collaborate with maps. Esri Location Analytics products and the ArcGIS platform will help you and your organization apply the four imperatives of location analytics •



## Gain New Insight into Your Business and Every Industry

Having the right analytics allows you to meet challenges of every stripe. No matter your field of endeavor, when you apply location information throughout the enterprise, you provide a complete data picture and analytics toolbox. That means making more informed decisions and seeing better results—using maps and high-powered geo analysis.

#### Location Analytics Improves Business

##### Retail

Reveal hidden profits by mapping demand, store performance, and product ranges. Location analytics brings together dynamic, interactive mapping; sophisticated spatial analytics; and rich, complementary data to enhance the overall picture of

your organization

Insurance

Access local hazard information at a global scale. Correlate



Dashboards make it easy for anyone in an organization to take advantage of the power of location information by providing easy-to-use intuitive apps and no-code solutions.

## Banking and Financial Services

Energy

## Transportation

Government

Health care

## Special Focus on Retail: The Top Five Reasons Why Location Analytics Is Essential for Retailers

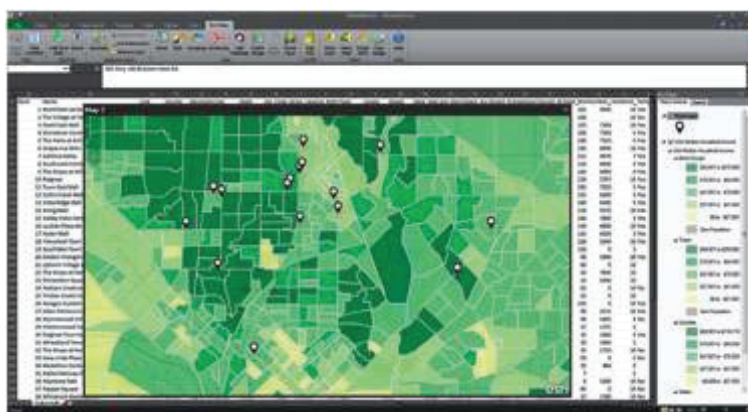
- Where customers live, what they buy, and why
- Store performance data, from a national to a local outlet level

1: Improve ROI - Reveal which areas of your business might benefit from increased investment by highlighting underperforming stores and markets. Understand how supply

2: Increase Sales - Make confident decisions about where to update product ranges and when to refurbish stores and open new ones. By viewing information about consumer spending patterns and market demand and the drivers behind them, you can better target and measure marketing activities. Store loyalty card information and point-of-sales data become geographic hot spots and performance feedback, ensuring you are responding to the market in time to profit on those decisions.

3: Control Costs - Layer business intelligence onto location-based data and drill down into supplier information, supply chain data, and customer service records to understand the why behind the what. Overlaying many different information sources allows you to reveal hidden sources and triggers of cost. The best news? Spatial analytics benchmarks can be set to alert you to potential future overruns and deviations.

#### 4: Boost Customer Satisfaction - Quickly identify the quality



of customer service and isolate the root cause of customer service issues—from stock availability and staffing to production, distribution, or delivery, location analytics enables you to identify patterns and deal with them. Model and test the viability and impact of service improvements to see if they truly fit your customers' needs to keep them shopping at your stores, not your competitor's.

5: Build Customer Loyalty - Use existing information to create, target, and enhance loyalty-building activities. Through point-of-sale information, online activity, customer complaint data, and more, you can create more comprehensive customer profiles to hone your loyalty-building activities to boost customer intimacy and engagement. Esri® Location Analytics can help you with ROI, sales, cost control, and customer satisfaction and loyalty—what are you waiting for? Contact us, and we'll show you how. ●



# Mapping the Market to Create Healthy Banks

Web portal gives better view of financial practices

By Karen Richardson, Esri Writer

**S**NL Financial's clients can quickly visualize their branch locations against the locations of competitors and see opportunities for growth through mergers and acquisitions. For the past two decades, SNL Financial has built a strong reputation for providing accurate and up-to-date financial data, news, and insights. Clients of the Charlottesville, Virginia-based company include leading investment banks, asset managers, banks and thrifts, and regulatory agencies. The company is frequently quoted by major media publications such as The Wall Street Journal, New York Times, and USA TODAY.

SNL collects, standardizes, and disseminates specialized business information for the banking, financial services, insurance, real estate, and energy industries through its SNL Interactive (SNLI) web portal. The portal includes SNLI Mapping, a mapping application delivered to the portal's subscribers. SNLI Mapping uses Esri's ArcGIS software to view and analyze information on a map.

## Mapping Business Worth

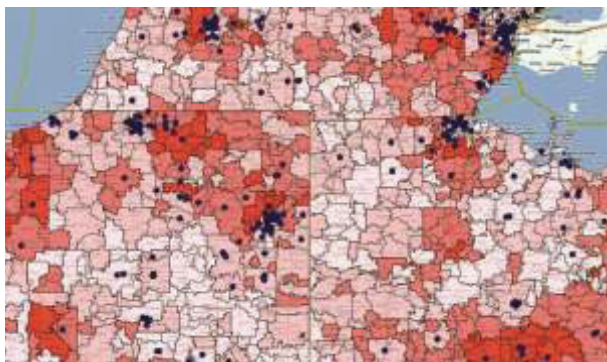
SNL started incorporating ArcGIS software and Esri data in its product to offer customers detailed GIS and analytic functionality. The analytic tools SNL's customers wanted were readily available in ArcGIS. With ArcGIS, clients can view various types of data, including street information and aerial images, and create new data, such as adding new market areas and incorporating demographic information and business data. SNLI Mapping incorporates these features, creating intuitive market analysis and visualization tools for subscribers. The website services allow subscribers to identify locations of assets, perform competitor searches, and generate indepth or ad hoc analyses as needed.

SNLI Mapping proved popular with subscribers, and SNL was delighted with the success of the online mapping service. "Clients find visualizing information on a map to be very useful," said Dan Sheets, project manager at SNL Financial. "Using this tool, the information they need really pops out at them."

Using SNLI Mapping, subscribers can better evaluate companies' mergers and acquisitions and make more informed decisions. They are performing their own market analyses and integrating demographic data with geographic information such as the location of major cities, interstate highways, and company buildings. Because it has high-quality mapping capabilities, many subscribers also use SNLI Mapping for making presentations. "Having all this information integrated makes it easy for them to understand market valuation and why a particular location or company may be more attractive than another," said Sheets.

## GIS Analytics Moves to Banking

Based on the success of SNLI Mapping, the company incorporated GIS visualization and analysis into Branch Analytics, a different web-based application that was created specifically to analyze bank markets. Branch Analytics allows customers to quickly perform in-depth market studies, integrating bank branch deposit and demographic data. SNL



Users can quickly see their branches plotted with hundreds of demographic variables that Esri provides, helping them better understand their markets and opportunities for growth.

expanded its use of Esri's ArcGIS software to create and deliver the geographic visualization and analysis. Users can quickly see their branches plotted with hundreds of demographic variables provided by Esri, helping them better understand their markets and opportunities for growth.

Clients for the application range from newly chartered banks to superregional institutions that cover large areas of the United States. They use SNLI daily to make important strategic decisions such as where to locate new branches, how to increase market share, and what products to offer to customers. Using Branch Analytics, they can access SNL's database filled with detailed profiles on more than 20,000 United States financial companies, including all publicly traded banks and thrifts, privately held institutions, and credit unions. Subscribers can quickly search for 150,000 branch locations and plot them on maps using the latitude and longitude of the bank location, which is derived from the reported branch address and validated by SNL's Branch Data Management team using a variety of sources. Esri provides its Updated Demographics and Business Summary data annually.

"SNL is the trusted information partner for all the top 50 depositories in the [United States] as well as hundreds of regional and community banks," said Elizabeth Rouse, product manager for branch and geographic intelligence at SNL Financial. "And 100 percent of investment banks with any substantive financial institution industry practice are SNL subscribers."

## Powerful GIS Analytics on the Web

Subscribers can use Branch Analytics to delve deep into the marketplace and find the best solution for maintaining a healthy balance sheet. Changes in market deposit concentration can be viewed using the service. This allows subscribers to model what-if scenarios such as what would happen if they opened new branches, offered different services, or closed underperforming sites. The application can model bank-specific activities, such as branch acquisitions, and change attributes on the fly. These attributes can include adjusting ownership for recently announced business transactions. Custom geographic markets can be created to

see the effects of these activities in the real world.

Banking professionals can create maps using SNL data and customize them for use in professional documents and presentations. This is easily accomplished by creating a report with Branch Analytics.

Maps can also be created after generating a report. Subscribers simply create a Branch Analytics report that, for example, looks at company market share in an area. The application automatically exports the analysis to a map. As

information is updated, or the analysis is customized, the map dynamically absorbs the changes to reflect the adjusted report.

"This has been a powerful tool for our customers," said Rouse. "Visualizing and modeling business practices help our customers make the best strategic decisions and better understand the markets they operate in."

For more information, visit [esri.com/finance](http://esri.com/finance).



SNL's clients can quickly visualize their branch locations against the competitors' locations to identify opportunities for growth through mergers and acquisitions.

## Esri Software Analyzes the Data to Determine Where to Open the Restaurants Famous for Custard and ButterBurgers

### Culver's Turns to GIS for Successful Franchising

**H**ave you ever wondered just what goes into figuring out where to locate a restaurant? Certainly there are hungry people everywhere, so why is one site better than another? That question is one that Dave O'Brien, real estate manager at Culver's, a successful Wisconsin-based quick-service restaurant chain, asks himself every day.

A growing franchising business, Culver's specializes in Frozen Custard, a premium ice cream, and the ButterBurger, a juicy hamburger so named because of its lightly toasted and buttered bun. Without a holding pan in sight, the restaurant cooks everything to order, including making the namesake

frozen custard, fresh on the premises throughout the day.

Though Culver's success stems a great deal from the delicious ButterBurgers and frozen custard, the company also works hard to help franchisees choose great locations for their restaurants. To do this, Culver's uses Esri's GIS software.

"We chose Esri because they have the best information available for what we need to know," says O'Brien. "Using ArcGIS Business Analyst, we are able to easily compare and contrast new sites by analyzing the demographics of our existing restaurants and then pinpointing new areas that are similar."





Founded in 1984 in Prairie du Sac, Wisconsin, Culver's is a growing franchise. The quick-service restaurant specializes in frozen custard and hamburgers called the ButterBurger.

profiling information.

The Segmentation Module consists of Esri's Community Tapestry data extension, which classifies U.S. neighborhoods into 65 segments based on their socioeconomic and demographic composition. Operating on the theory that people with similar tastes, lifestyles, and behaviors seek others with the same tastes-"like seeks like"-these behaviors can be measured and predicted.

The ArcGIS Analyst Segmentation Module has intuitive wizards that guide the analyst to answer questions about customers such as, Where are other neighborhoods that look like neighborhoods we are currently in that tend to have higher sales volumes? What do they buy? How can I reach them? and Where can I

O'Brien uses a combination of Esri's desktop and online software. ArcGIS Business Analyst, including the segmentation module, provides in-depth customer analytics, while Business Analyst Online is used for creating boardroom-quality maps and easy-to-understand reports. "We are a family company, and this is apparent in all our daily efforts," stresses O'Brien. "We want our franchise partners to succeed. Without them-the local owners and operators in their own communities and hometowns-we would not exist."

#### Selecting the Choice Sites

With nearly 400 restaurants that stretch from Wisconsin's heartland south into Texas and west to Wyoming, existing franchise partners and franchise candidates are continually looking at possible new sites. "The best way to determine a good site versus a bad site-besides understanding its access to customers, how to place signage, how good visibility is, and the location's prominence in a particular market-is almost certainly going to be comparable store analysis," says O'Brien.

Whether by existing franchise partners or new franchise

find more like them? Using these spatial analysis tools, Culver's is able to segment the demographics of a restaurant location and find new areas that have similar attributes.

To quickly share this information with corporate managers and new franchisees, the Culver's Real Estate and Franchise Development team uses Business Analyst Online. Business Analyst Online is a Web-based solution that applies GIS technology to extensive demographic, consumer spending, and business data to deliver on-demand analysis and presentation-ready reports and maps. Reports and maps are easy and convenient to use, with more than 50 templates readily available for the Culver's analysts to use for presentations to their board members and potential franchisees.

"We want to give our franchise partners the support they deserve," says O'Brien. "GIS technology gives them the ability to maximize their potential at Culver's."

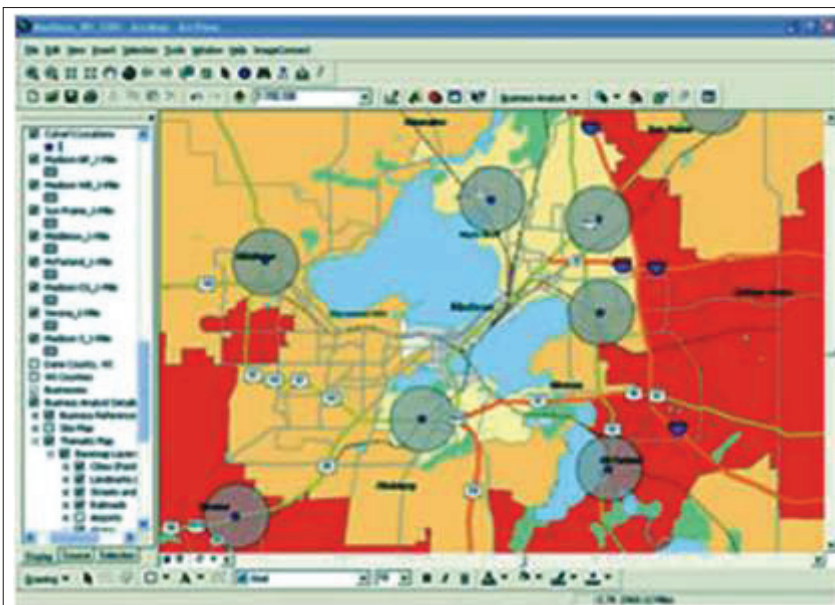
Today, GIS is seen as a strategic business solution that helps businesses continue to grow. Culver's plans to open 22 new restaurants this year, and almost 30 in 2009. Two have

candidates, new sites are always being scrutinized for potential. "Working with franchisees requires a lot of time; we're either on the phone discussing locations or viewing prospective sites in person," explains O'Brien. He goes on to add that ArcGIS Business Analyst helps everyone focus on trade areas that are more appealing before going out to visit prospective restaurant locations, helping to decrease the time it takes to narrow down choices.

Culver's analysts define areas being serviced by existing restaurants by creating locations on a map of their restaurants and using tools within ArcGIS Business Analyst to delineate market area boundaries around sets of customers. Next, Culver's uses the ArcGIS Business Analyst Segmentation Module to mine valuable customer



Even with an extensive menu, every food item at Culver's is made fresh To order throughout the day.



ArcGIS Business Analyst allows Culver's to define areas being serviced by existing restaurants. The software extension does this by creating locations on a map of the restaurants and defining market area boundaries around sets of customers, in this case one-mile rings.

already opened in Phoenix, Arizona, a new market for the company. "GIS is a tool to help us make even better decisions as we continue to expand," says O'Brien. "GIS doesn't replace anything we have now, including people. Instead, the software has become a necessary tool that complements our existing business process."

For more information contact,  
Dave O'Brien, real estate manager,  
Culver Franchising System, Inc.,  
at 608-644-2639 or  
Email daveobrien@culvers.com.

#### The Culver's Culture

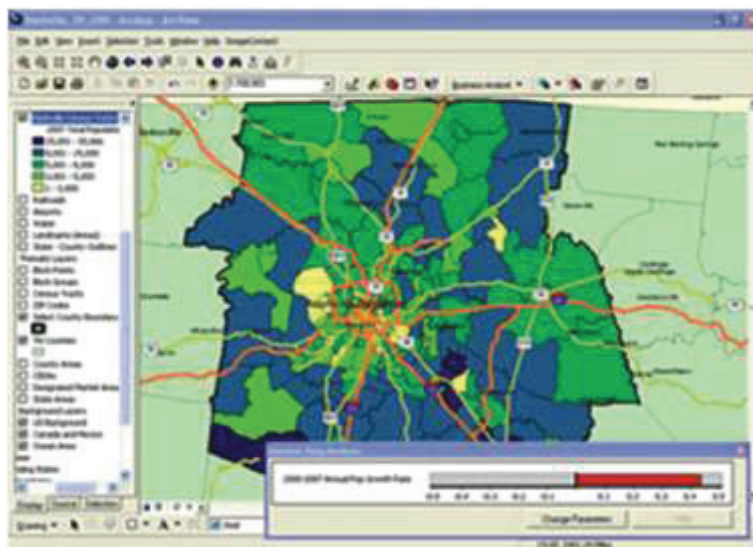
The first Culver's restaurant opened in 1984. Founders Craig Culver and his wife, Lea, oversee more than 388 restaurants in 17 states through

Culver Franchising System, Inc. Culver's attributes the success of its franchise restaurants to the owner/operator concept. Franchise partners operate their restaurants full-time. Before they can open the door to a new restaurant, each franchisee must complete an intense 16-week training program where they learn, hands on, the business of operating a restaurant.

Culver's guests order from a cashier or drive-through, but the restaurant goes a step further by bussing tables and bringing around fresh coffee refills. Culver's has won many accolades including recognition as one of 25 high-performing franchises in the country by the Wall Street Journal. Culver's was rated the best burger chain in the country according to the 2007 annual survey of diners conducted by Restaurants & Institutions magazine.

Author: Karen Richardson, Esri Writer

Source: [www.esri.com/news/arcwatch](http://www.esri.com/news/arcwatch)



## Esri Location Analytics: Success Stories

### Better Business Analytics by Understanding Location

With a presence in 33 countries, more than 475,000 employees, and a turnover of Euro 107 billion, Carrefour Group is a world leader in distribution and retail through more than 15000 companies- operated or franchised stores. It currently runs four main grocery store formats: hypermarkets, supermarkets, hard -discount stores, and convenience stores.

What did they do?

With Esri partner Galigeo's assistance,





Carrefour implemented a worldwide platform for geomarketing using the Esri® ArcGIS® platform together with Galileo's Location Intelligence software. The combined solution joins key business data with spatial location to improve store performance driven by better marketing decisions. The application is used by staff throughout the world, covering every store operated by the group. Staff uses the solution to guide expansion and development strategy; optimize direct marketing actions, including distribution of weekly circulars; monitor store performance; and better understand the sales territory

Do I need this?

ArcGIS, when combined with solutions such as Galileo's, assists people with different geospatial analysis, ranging from the store manager who needs reports to operate the store to the expert in charge of site selection. By representing and displaying business intelligence on maps, businesses can identify hidden trends and customer relationships and behavior as well as enable a deeper marketing analysis and improve business outcomes •

<http://www.esri.com/library/casestudies/carrefour-group.pdf>

## Localized Knowledge for Better Retail Experiences



What did they do?

Location analytics enables TSCG local associates to combine their research experience, knowledge, and instincts with analytics to create critical insight into decision making. Esri® Business Analyst™ and Business Analyst OnlineSM products deliver up-to-date market analysis supplemented with demographic, business, traf- c, and competition information. Esri Location Analytics provides the ability to collaborate and share information anywhere on any device, including phones and tablets, using intuitive reports and map templates that consistently

**W**hen The Shopping Center Group (TSCG) began almost 30 years ago in Atlanta, Georgia, the founders decided to focus exclusively on retail real estate. Today, TSCG operates 22 offices from New York down to Florida and over to Mississippi. Throughout its history, the company has remained true to its core mission—"Only retail, everything retail"—and is now the largest privately held retail-only real estate platform in the country

promote the company's brand and mission.

Do I need this? In retail real estate, there is a significant amount of information available; it's the ability to deliver the right information and value that matters. Esri Location Analytics provides the data analysis, sharing, discovery, and collaboration that real estate companies need to differentiate excellent opportunities from average ones •

[Http://www.esri.com/library/casestudies/the-shopping-center-group.pdf](http://www.esri.com/library/casestudies/the-shopping-center-group.pdf)

## Keeping a Successful Franchise Growing

**G**reat Harvest Bread Company, headquartered in Dillon, Montana, is known for its whole-grain breads and baked goods. More than 220 bakeries in 43 states are run by franchisees dedicated to the company's mission of providing delicious and nutrient-rich food products to local communities.

What did they do?

To ensure their franchisers are both happy and successful, Great Harvest staff take special care to find locations with viable territories that support long-term business success. A combination of esri Location Analytics including Business Analyst software and Tapestry segmentation data, allows the company and franchisees to quickly perform detailed market analysis that identifies market gaps and profitable potential locations to open



bakeries. Profiling and ranking customer and franchise territories allow Great harvest staff to better understand their existing customers behaviors to serve them better. Using cloud-based software subscriptions to ArcGIS online and Business Analyst Online enables staff to quickly analyse

prospective locations anywhere and supplement desktop analyses with the most current data. This information is then shared throughout the organisation using intuitive story maps and visualisations.

Do I need this ?

Esri Location Analytics enables franchisers to understand how

and where they can grow their business and help franchisees thrive. Whether large or small, understanding and analyzing location based data allows companies to build enduring profitable relationships with their franchisees and customers •

<http://www.esri.com/library/casestudies/great-harvest-bread-company.pdf>

## Mitigating the Risks of Expansion



**P**etco™ is a leading national pet specialty retailer, with more than 1,200 Petco and Unleashed by Petco store locations nationwide.

What did they do?

Petco staff members began using an Esri geographic information system (GIS)-based site selection solution to mitigate the risks associated with expanding its network of stores. As the number of stores has grown, so have the risks of selecting inappropriate or marginal locations or new stores that have the potential to cannibalize the sales of existing stores. Petco sought to improve its ability to assess both the sales potential for new locations and any risks. Investing in the Esri solution provided scientific analysis that gave leaders more confidence in their decisions.

Do I need this?

Opening a new store often requires a long-term property rental contract and significant construction-related capital expenditures.

Minimize costly mistakes and improve the performance of sites with accurate site selection using Esri GIS technology •

Source: <http://www.esri.com/library/casestudies/petco.pdf>

## Strategic Growth Fueled by Innovative Market Insight

**F**ounded in 1992 in Dover, New Hampshire, Planet Fitness is the fastest-growing gym franchise in the United States. Nationally, Planet Fitness has opened more than 600 locations, including 100 in 2012 alone. With this rapid growth, the company was added to Inc. magazine's Top 500 list. Franchise Planet Fitness of Maryland has mirrored this tremendous success by opening 20 locations already in the first quarter of 2013. What did they do? In partnership with MacKenzie Retail and Datastory Consulting, Planet Fitness of Maryland staff use the Esri geographic information system (GIS) platform to analyze the location and makeup of the current membership. Gym members' addresses are color-coded based on club affiliation, and the patterns that emerge give insight into when and where to grow to meet demand and market opportunity. Using this information, Planet Fitness of Maryland can serve its existing members better and find the right locations based on projected membership. Do I need this? The process of finding good real estate can be daunting, and mistakes are costly. It takes a lot of interaction,



collaboration, and communication to match the best locations with the most appropriate clients. Using GIS, information—seeing what real estate is available in proximity to existing locations and competition, along with market potential—can be easily understood and analyzed. This helps maximize long-term value while minimizing development costs and risks. GIS not only helps streamline and improve the site selection process, it also enables the entire real estate team to make better decisions, faster •

Source: <http://www.esri.com/library/casestudies/planet-fitness.pdf>



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## Esri India at India Geospatial Forum 2014: ArcGIS as a Platform

The 16th edition of India Geospatial Forum (IGF) 2014 started on a high note with this event marking a major milestone for Geospatial Media, the organizers, with this being their 100th conference. Scheduled from 5-7th February 2014 at Hyderabad International Convention Centre, Hyderabad, the key focus of the conference was around convergence i.e. how the overall GIS ecosystem is converging and getting integrated with other enabling technologies thereby empowering industries to make better decisions based on smart and intelligent geographic information. Reflecting this focus, the conference was aptly themed as "Converging Geospatial Trade & Practices". The conference and exhibition was well attended by 1400+ delegates represented by 325+ organizations from 16 countries.

The conference was inaugurated by Dr. V.K. Dadhwal, Director, National Remote Sensing Centre (NRSC) who emphasized how diverse industries were benefitting from the GIS technology evolution.

The Plenary Session opened the IGF 2014 with thought provoking deliberations from the various IT leaders and experts. Agendra Kumar, President, Esri India as a plenary speaker in "Convergence: Fostering Innovations in Applications" session shared Esri's technology vision on Location Analytics and how it adds a new dimension to various applications by bringing together geographic information existing in silos and integrating it together for better decision making. He emphasized on leveraging the location as a platform to integrate, connect and geo-enable an enterprise.

Esri India had the location platform offerings demonstrated at its exhibition booth as well. The demonstration showcased Esri's complete ArcGIS platform offering and how it is transforming the way people think, see, and use their data making it practical to apply geographic thinking everywhere across organization enabling better collaboration and sharing. Some of the key demonstrations included geo-enabling Business Intelligence (BI) enterprise data (IBM Cognos), 3D Visualization and analytics, Geo-event processor enabling real-time GIS, and ArcGIS Online, Desktop and Server offerings and showcasing various GIS applications as well.

In addition to the plenary sessions, IGF hosted a number of symposiums and special sessions on geospatial technology segments such as Mining, Energy, Water, Forestry and Land

Records, as well as seminars on technology developments and innovations. Seema Joshi, Head – Pre Sales, Esri India speaking at Symposium on Forest Management shared how ArcGIS platform can deliver real value to Forestry applications enabling cross-department collaboration, data sharing, and creating and sharing applications which are accessible on variety of device platforms like mobile, tablets and desktops.

A day long special session on National GIS (NGIS) was organized on 7th February 2014 in collaboration with National Spatial Data Infrastructure (NSDI). Dr. Maj Gen R Siva Kumar, CEO, NSDI gave a brief overview of India's NGIS mission while highlighting the issues of data sharing, metadata, duplication of data etc. Vatsal Dave, Vice President, Esri India, as one of the keynote speakers talked about the importance of NGIS service applications as a critical success factor for its mainstream adoption and success. He emphasized on how technology platform vision needs to go beyond just providing an underlying technology for data sharing and dissemination to being an enabler for creating and delivering services and applications that can be shared and extended to the actual users and stakeholders. Technology is ready today to quickly create services served through simple apps and applications helping in everything from decision making to providing citizen services.

Some of the other speakers in the special session on NGIS were Dr. P S Acharya, Scientist G, Department of Science and Technology, Ministry of Science and Technology, Vinod Bothale, Group Director, NRSC, Dr. S Subba Rao, Surveyor General, Survey of India and Dr. Vandana Sharma, Deputy Director General, National Informatics Centre.





## Esri India Participates @ GeoIntelligence India 2014



The eighth edition of GeoIntelligence India was held on 12-13 June at JW Marriott, Aerocity, New Delhi. The conference witnessed a gathering of 500 + delegates from across industries coming together to engage in high-level discussions on issues pertaining to geospatial intelligence in matters of defence and national security. The visionary addresses, thematic sessions, networking opportunities and state-of-the-art exhibition proved to be a robust platform to further our objective of raising the profile of geospatial intelligence and presented beneficial takeaways for our delegates.

Esri was the Platinum Sponsors at the GeoIntelligenceIndia 2014. There was full-fledged team representing Defence vertical both from Esri and Esri India at the Conference and Exhibition to discuss and interact with the officers from all the three Armed Forces demonstrating the latest trends in the Esri GIS technology in the Defence domain.

Delivering the inaugural address, Gen Bikram Singh, Chief of Army Staff, Indian Army, said that defence industry needs to come up with innovative and economical solutions which cater to the complexity of today's warfare and raised the issue of interoperability among the three forces. His views were supported by Lt Gen (Dr) Prakash Menon (Retd), who spoke about the need of interoperability among the defence armed forces and CAPFs in the country. AG Apte, Chairman, NTRO, raised an interesting point when he said that 'geoint itself can become a platform for data fusion and analysis.' Building the need for effective cyber defence capabilities.

The Plenary session opened with the theme: Surveillance in Digital Battelfield chaired by Lt. Gen Anil Bhalla, DG DIA &



DCIDS. This session talked about empowering the armed forces with advanced geospatial intelligence. The frontline soldier and commander have specific information needs but without overwhelming technology load and information overload".

The second Plenary Session focused on 'Converting Geographic Coordinates to Navigation Coordinates' and was chaired by VAdm SK Jha, Chief Hydrographer, NHO. Speaking on the occasion behalf of Esri, John Day, Director, Global-Defence, said "National security is a complex endeavour. The solution has to be unity of action and providing a common enterprise platform. He also shared his vision of empowering users by increasing collaboration, agility and responsiveness. Day explained the need for seamless, online foundation data for all environments. "GIS is an integrating framework for all missions," he added.

Border Security has been a priority for any nation. Addressing the session Brett Dixon, Business Manager, Esri, spoke how the applications of GIS has been significant in border security operations. "Actionable Intelligence should be provided to those who need it," said Dixon. "The need for simple, effective and timely solutions is crucial," he added. Craig gave a brief demo on border security applications along with the talk. Disaster Management has been the hot subject as always, the specific track on the subject during the conference talked about the recent Uttarakhand which India witnessed about a year ago is still fresh in people's minds. The session focused on why disaster preparedness is important for the country. It is not that we do not have basic information for disaster reduction like technical studies, geographical data, etc. This information does exist, but is not readily available to local authorities and other stakeholders. Speaking on the occasion Richard Sundaram, Industry Head – Defence and Emergency management gave the industry perspective how Esri GIS technology can be useful and effective for disaster management.

Esri displayed its latest technology on defence solutions by participating at the state-of-art exhibitions during the GeoIntelligenceIndia. The delegates showed great interest by visiting our booth and trying to understand the niche behind the latest ArcGIS technology that can be used for various defence solutions be it Battle Management System, Military Operations, etc •

## Department of Mining Engineering, Indian School of Mines, Dhanbad



### Introduction

Situated in the heart of the country's prime coking coal belt, 260 kms from Kolkata with a campus spread over 88 hectares the fully residential ISM has all the facilities of world class academic institute. What started as an institution to impart mining education has graduated into a full-fledged technical institution of international acclaim offering a host of programmes like B.Tech., M.Tech., M.Sc. Tech. and MBA. In addition the School offers M. Phil. and full as well as part time Ph.D. programmes, while also awarding D.Sc. as the highest degree of academic achievement. The serene campus comprises academic buildings, student hostels and 100% residential facilities for faculty and staff apart from other infrastructure facilities for a cosmopolitan community. The School has links with reputed universities and institutes across the globe and has an alumni base all over the world. The School today is making foray into the newer areas of academic endeavours in tune with the changing times.

The Department of Mining Engineering was established in 1926 with the founding of the School in that year by the Viceroy of India, Lord Irwin. Over the Past 88 years, it has developed and grown to become the largest Department of its kind in the country with excellent facilities for teaching and research and widespread activities in both coal and non-coal/metalliferous mining sectors. Its high reputation attracts students from all parts of India as well as from abroad.

The Department has been recognized as a QIP Centre for the faculty members of other Mining Engineering Departments of the country to pursue higher studies. The Department has been accorded the status of "Centre of Advanced Studies" in Mining Engineering by the University Grant Commission, in recognition of its high standards of teaching, research and services to the mining industry. The students passing out from this Department have traditionally occupied top positions in the government departments as well as in the mining industry, both in India and abroad.

### Postgraduate Programmes

Admission to the 2-year M. Tech. programmes, is made on the basis of GATE Score/ ISM Entrance Examination and satisfactory performance in an interview, held generally in June – July every year. Candidates sponsored by Govt./Semi-Govt./Public Sector Undertakings, are also admitted to the M. Tech. programmes. Such sponsored candidates are not required to produce GATE Score and are not eligible for scholarship. Candidates seeking admission to M. Tech. programmes without GATE Score, have to qualify in a written test conducted by the School followed by a personal interview; such students are not eligible for any scholarship. The Department offers various 2- year M. Tech Programmes on different subjects of mining and M. Tech Geomatics is one of them. M. Tech Programme in Geomatics

In view of importance of the subject vis-à-vis the needs of qualified surveyors in mining and allied industry, a new M. Tech Programme in Geomatics with special emphasis on Mine Surveying has been introduced for the first time in the country in the Department of Mining Engineering at Indian School of Mines, Dhanbad. The students for this programme are selected on the basis of GATE scores and personal interview of the candidates having basic qualification of B.Tech/B.E./4-year B.Sc. (Engineering) in Mining /Environmental/ Civil/ Geomatics/ Geo Informatics/ Geo Sciences/Remote Sensing/Computer Science/IT or M.Sc. in M. Sc. Tech (Applied Geology/Applied Geophysics/with 60% marks in Mathematics at Graduate level/ M. Sc. in Geospatial Sciences /GIS/Geo-information. The Course covers both traditional as well as advanced surveying and attaches special emphasis on Mine Surveying. This is a two years full time course with four semesters out of which the first two semesters are devoted to class work with practical including summer training and the other two semesters are earmarked for thesis work. The Course is also approved by DGMS. M. Tech (Geomatics) degree holder of this institute will be granted Mine Surveyor



Certificate of Competency subject to having one year of experience

Main area of coverage in the course

- Mine Surveying
- Digitization of old map
- Remote Sensing & GIS tools and Techniques
- Preparation of Computer Aided Plans & Section including GIS based maps
- Preparation of Mine Information Systems using GIS
- Application of information Technology in Mine Surveying
- Photogrammetry and Remote Sensing

Research, Training, and Consultancy

The department has so far undertaken more than 100 consultancy projects in the various area of Mine Surveying, Land information, Mine Safety, Disaster Management and solved the real life problems of Mining Industry. The department has contributed towards the capacity building Training and R&D projects GIS based Land Information System including digitization of mine plans (surface & Underground), Digitization and Mapping, Application of GIS & Remote Sensing in Mine Safety & Disaster Management and Application of advanced GIS & surveying techniques for preparation of digital mine plans, quick updation of Mine

plans & sections, 3D visualization of mine (Underground & opencast) , check surveying and correlation of underground mines Geomatics Infrastructure The Department has an excellent infrastructure for Geomatics Lab and Mine Survey. The students of this course are provided with hands on training in the use of modern state-of-the-art survey instruments and softwares being used in the Mining Sector. The Geomatics Facility includes most of the geospatial softwares such as ARC GIS, and relevant Remote Sensing softwares and relevant modern survey instruments as required in the Geomatics domain Like Plotter and Scanner and DGPS and other GPS for extracting and processing the information from mine plans and to update them with the latest information.

For More Details

Dr. Dheeraj Kumar | M.Tech, Ph.D. (IIT KGP) Member of ISRM, SAIMM, MGMI Associate Professor In-Charge, Mine Surveying & Geomatics Section & Course Coordinator, M.Tech (Geomatics) Department of Mining Engineering Indian School of Mines Dhanbad, Jharkhand - 826004

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**Email:** dheeraj@dkumar.org; dheeraj76@gmail.com

## Get more Information From Imagery and Data

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# EXELIS

## Visual Information Solutions



For More Details Contact :

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**Tel:** +91 (124) 4002702 **Email:** exelis@esriindia.com

## Tips and Tricks

### Building your Storymap with the Shortlist appTemplate

A colorful and fun way to present points of interest. The Shortlist app lets you organize points of interest into tabs that make it fun for users to explore what's in an area. Users can click on the places either in the tabs or on the map to find out about them. The tabs automatically update as users navigate around the map to show them what's interesting in their current map extent. Each tab of places in a Shortlist is defined by a point layer in the web map the app displays. These layers can be based on spreadsheet data or shapefiles. Download the app, configure it by editing one of the files, and then put it on any web server or website you have access to.

#### Step by Step Instructions

The technical part of making a Shortlist is easy. The hard part is deciding what places you want to show, writing useful and engaging descriptive text about them, and getting nice pictures. Although, that's the fun part too. In the steps below you will assemble the places you want to feature in your Shortlist as point layers in a web map. Each point layer in your web map contains the places for one tab in your Shortlist.

For each place, the point layers contain descriptive text and a URL to a picture (such as a JPG or PNG). The picture files can be stored anywhere on the web as long as they are accessible directly via a URL. The recommended image size and shape for best appearance and performance is 245 pixels wide x 184 pixels tall. Shortlists look best when all the images are the same size and shape. You can upload your places as CSV files, which you can create in any text editor, or export from Excel or ArcMap, or as shapefiles.

You'll then install the template on a publicly accessible website or web server and then configure the template to point at the web map you created. Follow the steps below to create your Shortlist. If you need more help, tips, and complete documentation, see the README PDF file that comes with the template download.

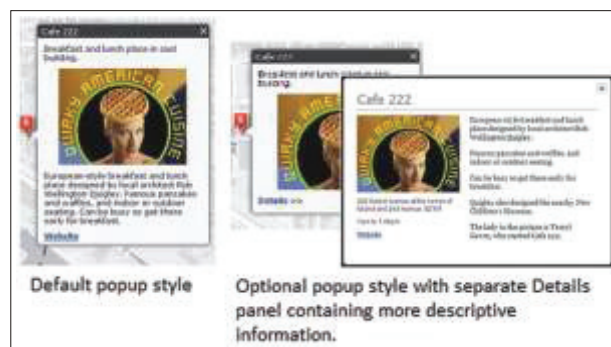
#### Step 1

Download the Shortlist template ([http://links.esri.com/storymaps/shortlist\\_template\\_zip](http://links.esri.com/storymaps/shortlist_template_zip)) and extract it anywhere on your computer. If you want to test your Shortlist on your computer before deploying it, you can use a local testing server such as Internet Information Services on Windows, in which case you can extract the template into your wwwroot folder.

#### Step 2

In the \Samples folder in the download, use one of the sample files as a template for assembling each of your Shortlist point layers. There are two sets of sample files depending on whether you want to use the default Shortlist popup style, which only displays a few attributes, or allow users to launch the optional Details panel from the popups, which displays more attributes. To use Excel to assemble a CSV file, choose one of the three Excel files depending on how you want to specify the location of your points (you can choose to specify lat/long coordinates, a street address in a single field, or a street address in four fields). If you have ArcMap, you can edit the Points feature class to create your points and export that

layer's attribute table to a CSV file. There's also a Points shapefile you can edit to create your point layers. You can have a maximum of 99 places in each of your point layers.



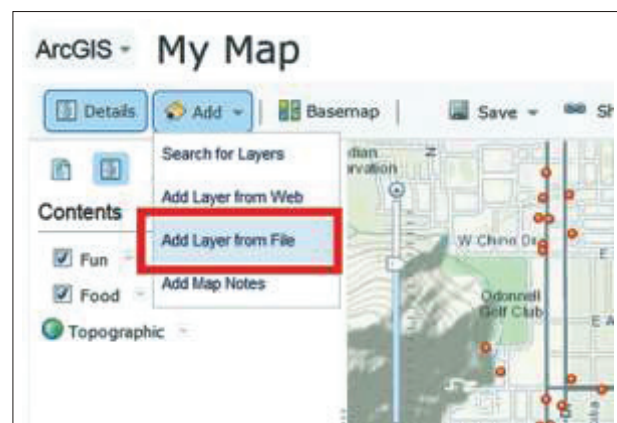
#### Step 3

Log in to ArcGIS Online using a free public account or an organizational account, and create a new web map. Choose the basemap you want to use.



#### Step 4

Upload the CSV or shapefiles for your Shortlist point layers into your map. (To upload a shapefile into a web map, zip it into one file). The names of the layers and the order they are listed in your map are used by the tabs in your Shortlist. Don't make the layer names too long or they won't fit in the tabs (you can tweak the code later to make the tabs wider if you want). You don't need to symbolize these layers or configure popups for them because the Shortlist template does that automatically.



#### Step 5

Optionally, your Shortlist map can contain additional supporting point, line or polygon layers, such as trolley

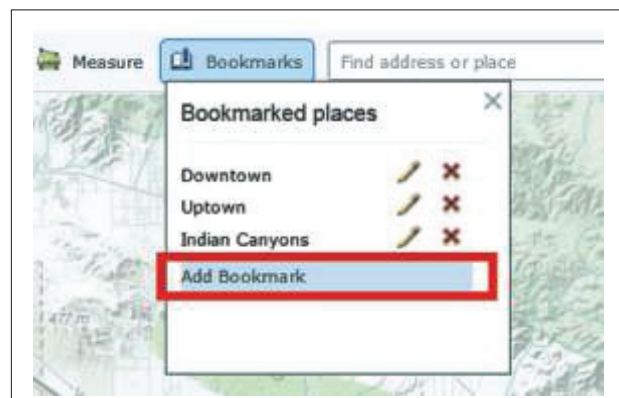


stations, transit lines, or neighborhood boundaries. If you want users to be able to click the features in these supporting layers to get information about them, create the layers using the CSV files or shapefiles in the \Samples folder as templates, and upload them into your web map. You don't need to configure popups for these layers because the template handles that, but symbolize them in your web map the way you want them to look in your Shortlist.



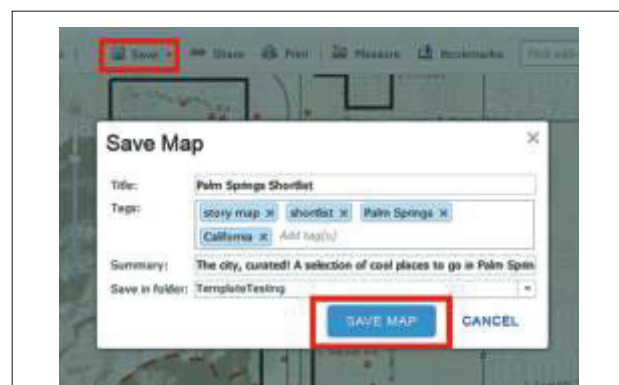
#### Step 6

Optionally, add bookmarks into your web map. These appear in a menu on the right side of your Shortlist that people can use to zoom to particular areas on your map. Don't use too many bookmarks, and don't add them for areas where there are few or none of your places, because then the Shortlist tabs look empty. If you choose not to specify any bookmarks, the menu is automatically hidden.



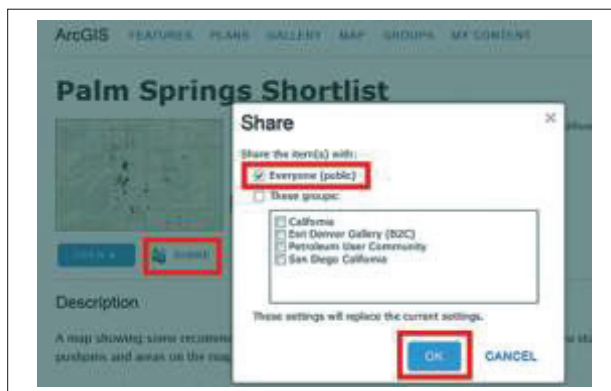
#### Step 7

In your web map, zoom and pan to the area you want users to see when they first open your Shortlist, and save your map. The title you save your map as is used as the title of your Shortlist, and the summary is used as the subtitle of your Shortlist.



#### Step 8

Make your web map public. The Shortlist template expects that the web map you use is publicly accessible.

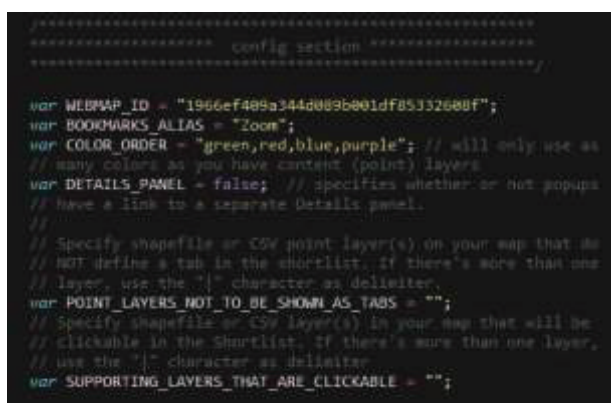


#### Step 9

Copy the contents of the Shortlist template download (minus the \Samples folder, which isn't needed) onto a publicly accessible website or web server. This can be a web server that you or your organization maintains, or it can be a folder on a shared or hosted web server that you use for your website. In an enterprise situation, you can have a system administrator load the files onto a server. The location of the template's index.html file on your website or web server defines the URL that is used to access your Shortlist.

#### Step 10

Configure the Shortlist template to use your web map by editing the index.html file. You can open this file in the editor of your choice. In the Config section of the file, edit the WEBMAP\_ID variable to be the ID of your web map. You can copy this ID from the URL used to access your web map. If you've chosen to use the separate Details panel for your popups, set the DETAILS\_PANEL variable to true. Optionally, you can also edit the BOOKMARKS\_ALIAS variable to change the name of the Zoom menu and edit the COLOR\_ORDER variable to control which of the four Shortlist point symbol



colors are used by each tab. In Step 5 above if you added any supporting layers that you want your users to be able to click to get more information, specify the names of those layers in the SUPPORTING\_LAYERS\_THAT\_ARE\_CLICKABLE variable. Save the index.html file.

Congratulations, your Shortlist is now operational.

## Server Object Extension for Data Extraction

This code helps user to extract the code from the defined layer based on the extent/map area provided by the user. Same code can even be hosted as web service

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Collections.Specialized;
using System.Runtime.InteropServices;
using ESRI.ArcGIS.esriSystem;
using ESRI.ArcGIS.Server;
using ESRI.ArcGIS.Geometry;
using ESRI.ArcGIS.Geodatabase;
using ESRI.ArcGIS.Carto;
using ESRI.ArcGIS.SOESupport;

namespace MPFD
{
    public class MPFD : IServerObjectExtension, IObjectConstruct, IRESTRequestHandler
    {
        private string soe_name;
        private IPropertySet configProps;
        private IServerObjectHelper serverObjectHelper;
        private IServerLogger logger;
        private IRESTRequestHandler reqHandler;
        public IMapServerDataAccess dataAccess;
        public IFeatureClass m_fcToQuery;
        public string mapName;
        public IMapServer3 mapServer;
        public string layerIndices;
        public string layerName;
        private string[] m_mapLayerNameToQuery = new string[] {
            "Ward", "ULB", "Panchayat", "Village", "Block",
            "Tehsil", "District"
        };
        public MPFD()
        {
            soe_name = this.GetType().Name;
            logger = new ServerLogger();
            reqHandler = new SoeRestImpl(soe_name,
                CreateRestSchema()) as IRESTRequestHandler;
        }
        #region IServerObjectExtension Members
        public void Init(IServerObjectHelper pSOH)
        {
            serverObjectHelper = pSOH;
        }
        #endregion
        #region IObjectConstruct Members
        public void Construct(IPropertySet props)
        {
            configProps = props;
            try
            {
```

```
mapServer = (IMapServer3)serverObjectHelper.ServerObject;
mapName = mapServer.DefaultMapName;
IMapLayerInfo layerInfo;
IMapLayerInfos layerInfos =
    mapServer.GetServerInfo(mapName).MapLayerInfos;
// Find the index position of the map layer to query.
int c = layerInfos.Count;

layerIndices = String.Empty;

for (inti = 0; i < c; i++)
{
    layerInfo = layerInfos.get_Element(i);
    for (int k = 0; k < m_mapLayerNameToQuery.Count(); k++)
    {
        if (layerInfo.Name == m_mapLayerNameToQuery[k])
        {
            layerIndices = layerIndices + i + ",";
            layerName = layerName + m_mapLayerNameToQuery[k] +
                ",";
        }
    }
}
layerIndices = layerIndices.Substring(0, layerIndices.Length - 1);
layerName = layerName.Substring(0, layerName.Length - 1);
}
catch
{
    logger.LogMessage(ServerLogger.msgType.error,
        "Construct", 8000, "SOE custom error: Could not get the
        feature layer.");
}
}
#endregion
#region IRESTRequestHandler Members
public string GetSchema()
{
    return reqHandler.GetSchema();
}

public byte[] HandleRESTRequest(string Capabilities,
    string resourceName, string operationName,
    string operationInput, string outputFormat,
    string requestProperties, out string responseProperties)
{
    return reqHandler.HandleRESTRequest(Capabilities,
        resourceName, operationName, operationInput,
        outputFormat, requestProperties, out responseProperties);
}
}
#endregion

private RestResource CreateRestSchema()
```



```

    {
        RestResource rootRes = new RestResource(soe_name, false,
        RootResHandler);
        RestOperation SpatialQueryPoint =
        new RestOperation("QueryPoint",
        newstring[] { "Input_Geometry" },
        newstring[] { "json" },
        RestOperation SpatialQueryPointBuffer =
        new RestOperation("PointBuffer",
        newstring[] { "Input_Geometry", "Buffer_Distance" },
        newstring[] { "json" },
        PointBuffer);
        rootRes.operations.Add(SpatialQueryPoint);
        rootRes.operations.Add(SpatialQueryPointBuffer);
        return rootRes;
    }

    Privatebyte[] RootResHandler(NameValueCollection boundVariables,
    string outputFormat, string requestProperties,
    out string responseProperties)
    {
        responseProperties = null;
        JsonObject result = new JsonObject();
        result.AddString("SPCGIS", "SOE");
        return Encoding.UTF8.GetBytes(result.ToJson());
    }

    Privatebyte[] QueryPoint(NameValueCollection boundVariables,
    JsonObject operationInput, string outputFormat,
    string requestProperties, out string responseProperties)
    {
        JsonObject result = new JsonObject();
        responseProperties = null;
        JsonObject jsonPoint;
        if (!operationInput.TryGetValue("Input_Geometry",
        out jsonPoint))
            throw new ArgumentNullException("Input_Geometry");
        IPoint location = Conversion.ToGeometry(jsonPoint,
        esriGeometryType.esriGeometryPoint) as IPoint;
        if (location == null)
            throw new ArgumentException("Invalid location",
            "Input_Geometry");
        var layerindex = layerindices.Split(',');
        string aa = "";
        //Querying
        for (inti = 0; i < layerindices.Split(',').Count(); i++)
        {
            ISpatialFilter spatialFilter = new SpatialFilterClass();
            dataAccess = (IMapServerDataAccess)mapServer;
            m_fcToQuery = (IFeatureClass)dataAccess.GetDataSource(
            mapName, int.Parse(layerindex[i]));
            spatialFilter.Geometry = location; // give your geometry
            spatialFilter.GeometryField =
            m_fcToQuery.ShapeFieldName;
            spatialFilter.SpatialRel =
            esriSpatialRelEnum.esriSpatialRelIntersects;
            IFeatureCursor featureCursor =
            m_fcToQuery.Search(spatialFilter, false);
            IFeature pFeature = featureCursor.NextFeature();
            if (pFeature != null)

```

```

        {
            while (pFeature != null)
            {
                for (int k = 0; k < pFeature.Fields.FieldCount; k++)
                {
                    if (pFeature.Fields.get_Field(k).Name.ToString() != "Shape")
                    {
                        aa = aa + pFeature.Fields.get_Field(k).Name.ToString() + ":"
                        + pFeature.get_Value(k).ToString() + ",";
                    }
                }
                aa = aa + ",";
                pFeature = featureCursor.NextFeature();
            }
        }
        result.AddString("Results", aa);

        return Encoding.UTF8.GetBytes(result.ToJson());
    }

    Privatebyte[]
    PointBuffer(NameValueCollection boundVariables,
    JsonObject operationInput, string outputFormat,
    string requestProperties, out string responseProperties)
    {
        JsonObject result = new JsonObject();
        responseProperties = null;
        JsonObject jsonPoint;
        if (!operationInput.TryGetValue("Input_Geometry",
        out jsonPoint))
            throw new ArgumentNullException("Input_Geometry");
        double? distance;
        if (!operationInput.TryGetAsDouble("Buffer_Distance", out
        distance) || !distance.HasValue)
            throw new ArgumentException("Invalid distance",
            "Buffer_Distance");
        IPoint location = Conversion.ToGeometry(jsonPoint,
        esriGeometryType.esriGeometryPoint) as IPoint;
        if (location == null)
            throw new ArgumentException("Invalid location",
            "Input_Geometry");
        var layerindex = layerindices.Split(',');
        string aa = "";
        ITopologicalOperator topologicalOperator =
        (ESRI.ArcGIS.Geometry.ITopologicalOperator)location;
        for (inti = 0; i < layerindices.Split(',').Count(); i++)
        {
            ISpatialFilter spatialFilter = new SpatialFilterClass();
            dataAccess = (IMapServerDataAccess)mapServer;
            m_fcToQuery =
            (IFeatureClass)dataAccess.GetDataSource(mapName,
            int.Parse(layerindex[i]));
            spatialFilter.Geometry =
            topologicalOperator.Buffer(distance.Value);
            // give your geometry
            spatialFilter.GeometryField =
            m_fcToQuery.ShapeFieldName;

```

```
SpatialFilter.SpatialRel =
esriSpatialRelEnum.esriSpatialRelIntersects;
IFeatureCursor featureCursor =
m_fcToQuery.Search(spatialFilter, false);

IFeature pFeature = featureCursor.NextFeature();

if (pFeature != null)
{
while (pFeature != null)
{
for (int k = 0; k < pFeature.Fields.FieldCount; k++)
{
if (pFeature.Fields.get_Field(k).Name.ToString() != "Shape")
```

```
{
aa = aa + pFeature.Fields.get_Field(k).Name.ToString() + ":"
+ pFeature.get_Value(k).ToString() + ",";
}
}
aa = aa + ",";
pFeature = featureCursor.NextFeature();
}
}
result.AddString("Results", aa);
return Encoding.UTF8.GetBytes(result.ToJson());
} }
```

(contnd. from page No. 29)

## How to Create a List of Favorites from Your ArcGIS Online Items

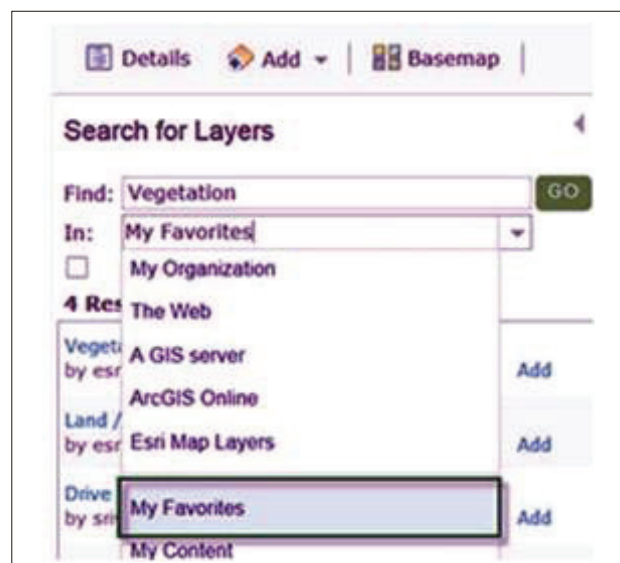
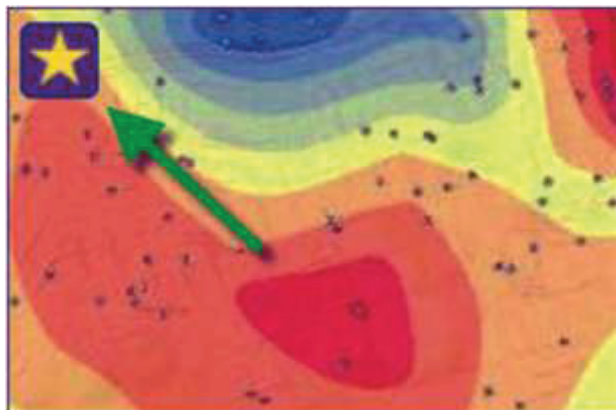
To make it easier and faster to access your frequently used ArcGIS Online items, we introduced "My Favorites" in the last release of ArcGIS Online.

You can mark an item as a favorite and create a list of all your favorites. This helps you to quickly find and access frequently used maps, layers, and other items.

Here is how you set it up:

- Search for items or go to your My Content list. For each item, go to the details page, hover over the thumbnail, and click on the star icon that appears in the upper left corner of the item thumbnail.
- To make items in the Gallery your favorite, you don't need to go to the item details page. Just hover over the thumbnail and click on the star icon.

You can view the list of favorites you created in the My Favorites section of the Gallery. You can also Search for Layers in the map viewer and your Favorites will show up in the results, so you can quickly add any of your favorite items to your map.



To remove a favorite item from your list, hover over the thumbnail and click on the star.



# Signal Data Brings Powerful Esri Location Analytics to Customers

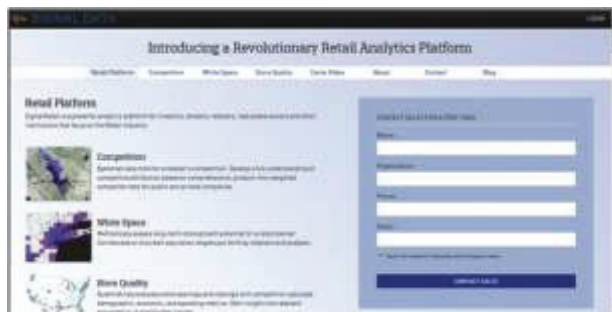
## Retail Organizations Can Make Better Business Decisions Using Rich Data and Analysis Tools

**R**edlands, California—Esri announces that Signal Data Corporation has incorporated Esri Location Analytics into its business intelligence platform, Signal Retail. Signal Data is a venture-backed financial technology company located in New York, New York, that helps investors and retailers analyze the quality of retailers' and restaurants' store locations and track competitive activity. With Esri Location Analytics incorporated into Signal Data, organizations that focus on the retail industry, including institutional investors, lenders, retailers, and commercial real estate owners, now have the ability to make better investment decisions.

"We implemented the Esri platform to help us solve the pain points our institutional investor and retailer clients face," said Steve Blose, cofounder and chief executive officer of Signal Data. "Now, we can give our customers competition-adjusted location analysis—that missing component in their workflow. Our software enables clients to uncover the root causes of store locations' profitability by analyzing the locations based on competition, economic activity, and demographics."

Signal Retail offers clients an integrated competitive intelligence and site selection software platform that combines Signal Data's proprietary location data and competitive analytics with Esri's location analytics tools. The Signal Retail platform includes rich business data and analytical tools that allow investors to graph, map, and analyze retail and restaurant store-based performance and keep track of the competition by knowing where every single retail outlet is located.

Signal Retail comes preloaded with retailers' locations, new



and closed stores identified, stores categorized by retail sector, and retailers benchmarked versus peers. Previously, retailers and investors would have to track this data on an ad hoc basis, which was extremely difficult and costly, if not impossible.

Now users can log on to the cloud-based system and view data about each location. They are able to see, for example, if stores that opened recently—as opposed to five years ago—are the same quality investment by analyzing competitive relationships and view Signal's proprietary, competition-adjusted demographic, economic, and spending metrics based on local markets.

"Understanding customer behavior inside stores is now as important as the external characteristics and demographics," said Simon Thompson, director of commercial industry, Esri. "Information is power. Signal Data has filled a gaping hole in the industry, and with this information, clients can create healthier investments, which leads to healthier businesses and communities."

"For more information on how Esri helps businesses operate better, visit [esri.com/business](http://esri.com/business).

## Esri Location Analytics Steers Growth at Bank of Clarke County

### Hyperlocal Community Bank Uses Market Data to Get to Know Its Customers

**R**edlands, California—Esri announced that Bank of Clarke County, a full-service community bank with 12 branches throughout Northern Virginia, has adopted Esri's Location Analytics platform to drive better performance and customer insight. Esri partner Datastory Consulting created several interactive analyses for bank directors to better visualize and understand the market potential and help them align the organization's growth strategy with opportunity while reducing risk.

"Esri Location Analytics is helping our managers understand how to apply 130 years of bank experience as we grow into a new marketplace, instead of letting the new marketplace take over us," said Serena Bowen, business analyst, Bank of Clarke County. Using the Esri location platform, including ArcGIS Online and Esri Business Analyst Online, Datastory's team detailed market assessments that considered area demographics, consumer expenditures, and customer lifestyle information combined with hyperlocal data about new residential and commercial developments and transit patterns.

"Delivering this information to the bank over a cloud-based infrastructure means that IT resources are not affected," said Matt Felton, president of Datastory Consulting.

These analyses were provided to the bank as interactive maps and dashboards so bank directors and management staff can explore and assess the bank's site selection and marketing decisions. With this newfound market awareness, Bank of Clarke County is making knowledge-based decisions driven by local data about how to successfully attract new customers while continuing to serve existing ones.

"Datastory helped make sense of big data and convert it into pockets of insight that are tailored to the specific needs of the bank's personnel," said Simon Thompson, director of commercial industry at Esri. "This is deepening the bank's understanding of opportunities and shaping market strategies throughout the organization."

For more information on how Esri helps the financial services industry better serve its customers, visit [esri.com/banks](http://esri.com/banks).

## DID YOU KNOW?

### Fundamentals of Surfaces

A 3D surface model is a digital representation of features, either real or hypothetical, in three-dimensional space. Some simple examples of 3D surfaces are a landscape, an urban corridor, gas deposits under the earth, and a network of well depths to determine water table depth. These are all examples of real features, but surfaces could be derived or imaginary. An example of a derived surface is the contaminant levels of a particular bacteria in each well. Those contaminants could be mapped as a 3D surface too. Imaginary examples of 3D surfaces are often the types found in video games or computer simulation environments.

A 3D surface is usually derived, or calculated, using specially designed algorithms that sample point, line, or polygon data and convert it into a digital 3D surface. ArcGIS can create and store four types of surface models: raster, triangulated irregular network (TIN), terrain datasets, and LAS datasets.

These surface models can be created from a variety of data sources. The two main methods of creating surface models are interpolation and triangulation. There are several interpolation methods to create raster surfaces, such as Inverse Distance Weighted, Spline, Kriging, and Natural Neighbor. You can build triangulated surfaces by creating a TIN, terrain dataset, or LAS dataset. You can also convert between these surface models.

Raster, TIN, terrain, and LAS datasets are all types of a functional surface. A functional surface is a continuous field of values that may vary over an infinite number of points. For example, points in an area on the earth's surface may vary in elevation, proximity to a feature, or concentration of a particular chemical. Any of these values may be represented on the z-axis in a three-dimensional x,y,z coordinate system, so they are often called z-values.

Surface models allow you to store surface information in a GIS. Because a surface contains an infinite number of points, it is impossible to measure and record the z-value at every point. A surface model approximates a surface by taking a sample of the values at different points on the surface and

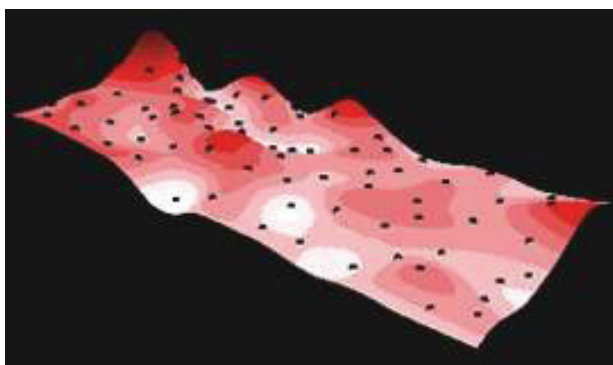
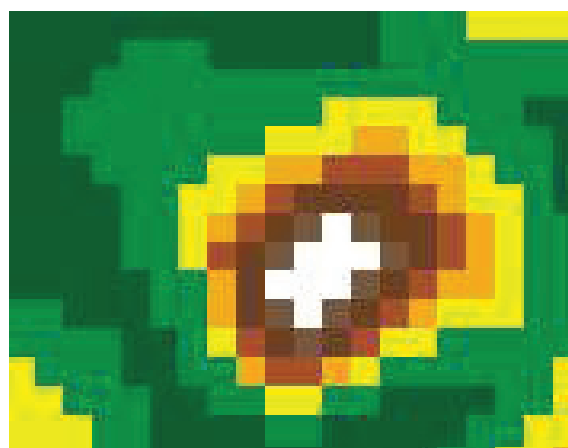
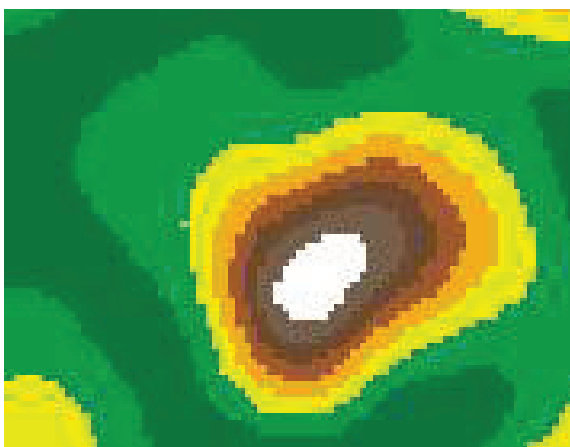
interpolating the values between these points.

The illustration below shows a surface model of chemical concentration across an area. Points show where the concentration was sampled.

#### Raster

GIS data can generally be categorized into two major types: raster and vector. Vector data is defined by points, lines, and polygons and their associated relationships that comprise geospatial data. Real-world features and surfaces can be represented as vector data stored in a GIS. Raster data is a rectangular matrix of cells, represented in rows and columns. Each cell represents a defined square area on the earth's surface and holds a value that is static across the entire cell. A surface can be represented as raster data, where each cell in the data represents some value of real-world information. It could be elevation data, contamination concentrations, water table levels, and so on.

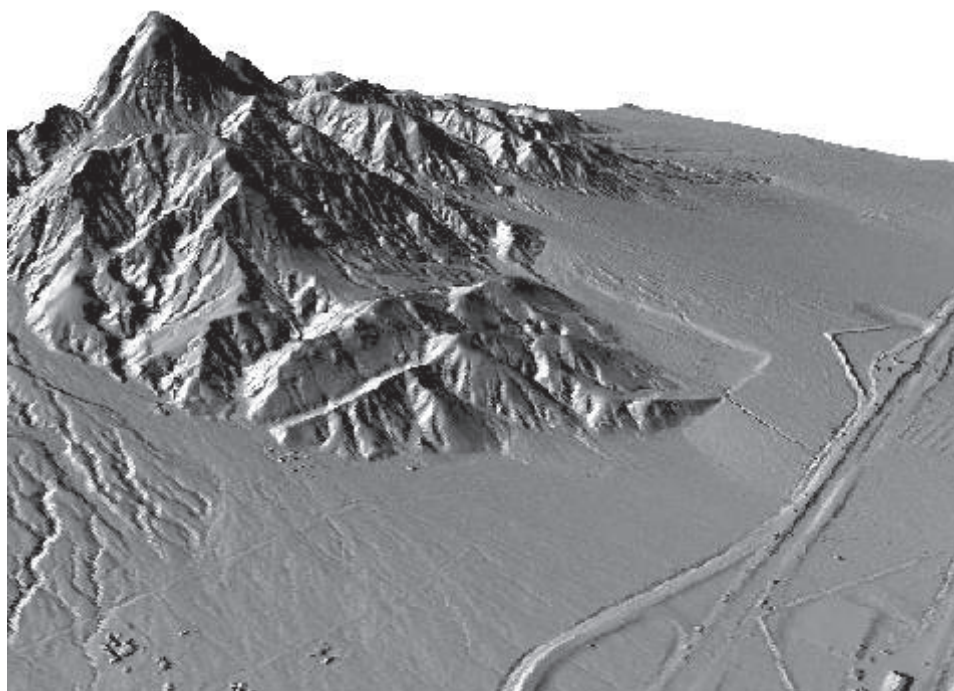
Raster data can be further subdivided into categories, such as thematic, pictures, or continuous data. Surfaces represented as raster data are a form of continuous data. Continuous data is also referred to as field, non-discrete, or surface data. A continuous surface represents phenomena in which each location on the surface is a measure of the concentration level or its relationship from a



fixed point in space or from an emitting source.

Elevation models are one such example of raster surface models. The fixed point may be a spot height derived from photogrammetric methods, but interpolation between heights help form the digital elevation model (DEM). Since raster surfaces are usually stored in grid format with uniformly spaced cells, the smaller the cells, the greater the locational precision of the grid. The example below compares a higher-precision grid (left) to a lower-precision grid (right).





are a digital means to represent surface morphology. TINs are a form of vector-based digital geographic data and are constructed by triangulating a set of vertices (points). The vertices are connected with a series of edges to form a network of triangles. There are different methods of interpolation to form these triangles, such as Delaunay triangulation or distance ordering. The resultant triangulation satisfies the Delaunay triangle criterion, which ensures that no vertex lies within the interior of any of the circumcircles of the triangles in the network. If the Delaunay criterion is satisfied everywhere on the

The locational precision of individual features—for example, the summit of a mountain—is directly related to the size of the grid cells. In the example above, a very coarse elevation surface data is depicted as a surface model in a two-dimensional, planar view. Raster surfaces can be generated and modeled with other image sources for 3D perspective views as well, such as this high-resolution DEM with hillshade (below).

A raster surface is a continuous field of values that may vary over an infinite number of points. For example, points in an area may vary in elevation, proximity to a feature, or concentration of a particular chemical. Any of these values may be represented on the z-axis in a three-dimensional x,y,z coordinate system to produce a continuous 3D surface.

Raster surface data represents a surface as a grid of equally sized cells that contain the attribute values for representing the z-value and the x,y location coordinates.

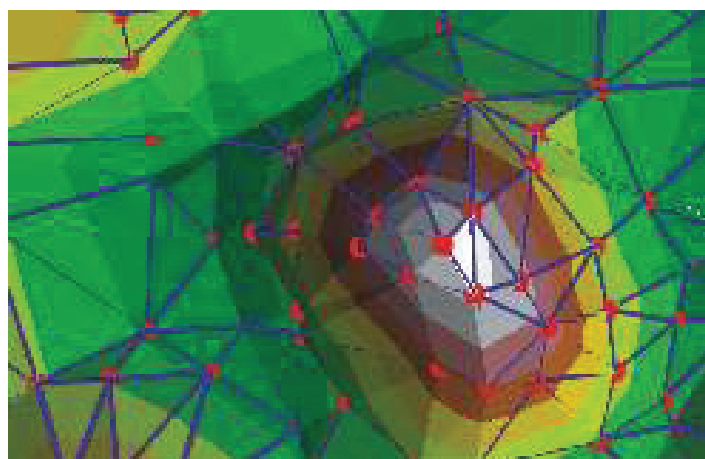
#### TIN

TINs have been used by the GIS community for many years and

TIN, the minimum interior angle of all triangles is maximized. The result is that long, thin triangles are avoided as much as possible.

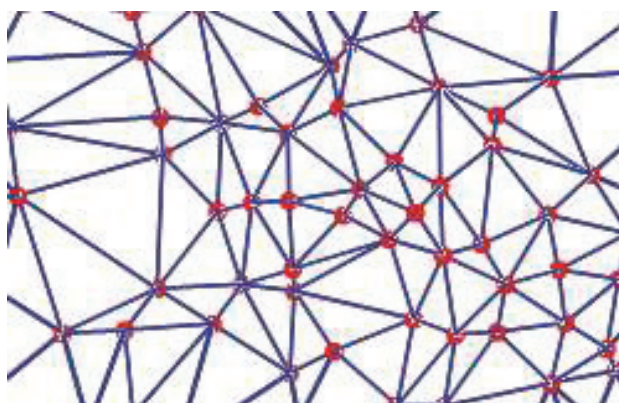
The edges of TINs form contiguous, non-overlapping triangular facets and can be used to capture the position of linear features that play an important role in a surface, such as ridgelines or stream courses. The graphics below show the nodes and edges of a TIN (left) and the nodes, edges, and faces of a TIN (right).

Because nodes can be placed irregularly over a surface, TINs



can have a higher resolution in areas where a surface is highly variable or where more detail is desired and a lower resolution in areas that are less variable.

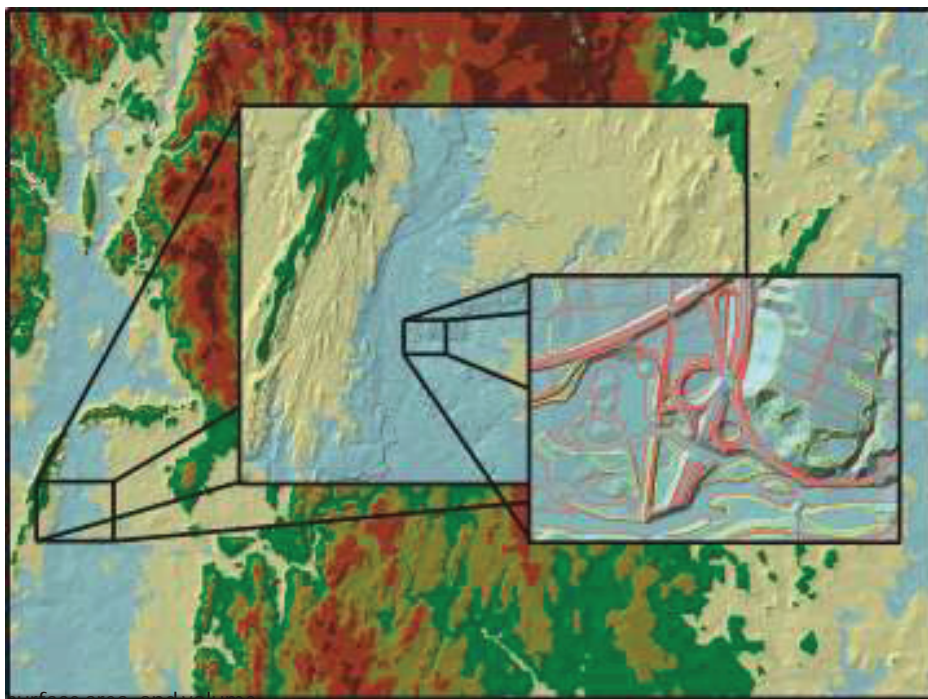
The input features used to create a TIN remain in the same position as the nodes or edges in the TIN. This allows a TIN to preserve all the precision of the input data while



simultaneously modeling the values between known points. You can include precisely located features on a surface—such as mountain peaks, roads, and streams—by using them as input features to the TIN nodes.

TIN models are less widely available than raster surface models and tend to be more time consuming to build and process. The cost of obtaining good source data can be high, and processing TINs tends to be less efficient than processing raster data because of the complex data structure.

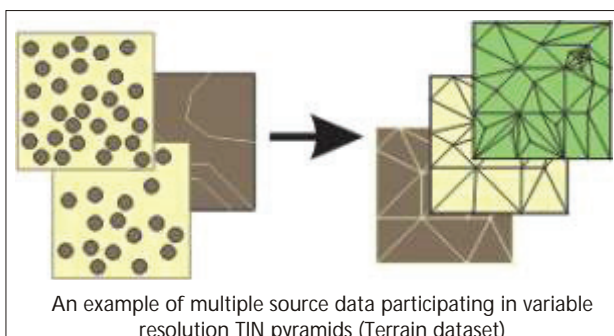
TINs are typically used for high-precision modeling of smaller areas, such as in engineering applications, where they are useful because they allow calculations of planimetric area,



surface area, and volume.

#### Terrain dataset

Remotely sensed elevation data, such as lidar and sonar point measurements, number in the hundreds of thousands to hundreds of millions. Managing and modeling this type of data is cumbersome for most hardware and software



An example of multiple source data participating in variable resolution TIN pyramids (Terrain dataset)

available today. The terrain dataset allows a series of rules and conditions to be generated that index source data into an ordered set of TIN pyramids that is generated on the fly.

Terrain datasets are an efficient way to manage large point-based data in a geodatabase and produce high-quality, accurate surfaces on the fly. Lidar, sonar, and elevation measurements can number from several hundred thousand to many billions of points. Organizing, cataloging, and generating 3D products from these types of data is difficult at best and prohibitive in many cases. Terrain datasets allow you to overcome these data management hurdles, edit your source data, and produce highly accurate TINs at varying resolutions.

Rendering very large TINs is generally difficult, partially due to limitations by hardware such as video cards. However, terrains are beneficial in that you render the areas that you need to visualize at an optimized resolution. Thus, if you have a small-scale area in ArcGlobe or ArcMap, fewer nodes will be utilized by the terrain to generate the TIN rendered on your screen. However, if you zoom in to an area at large scale, a full resolution (utilizing all the nodes for that area) will be used to generate a TIN on the fly. The obvious advantage is that only a small portion of the study area is being rendered with large

numbers of nodes, or a subsampled collection of nodes is used to generate a lower-resolution TIN on the fly.

An example of this is shown in the following graphic:

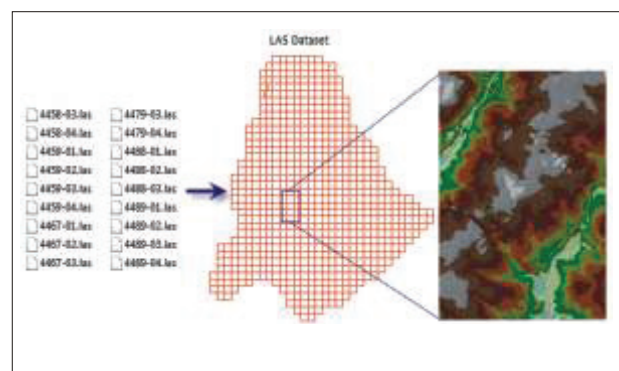
Terrains reside in feature datasets in personal, file, or geodatabases. The other feature classes in the feature dataset can participate in the terrain or actually be embedded in the terrain, which means that the source data could be moved offline after the creation of the terrain dataset. The graphic below illustrates how multiple types of feature classes can participate to generate TIN pyramids:

Terrain datasets are unique in that they can either embed or reference the source data. Through the indexing of each point measurement, a set of TIN pyramids is generated, each set with successively fewer participating nodes (source points). This allows ArcMap and ArcGlobe to generate a TIN on the fly at whatever resolution is needed for the scale of the viewer. Small-scale displays of data require fewer points, and thus, a lower-resolution TIN is rendered. As the viewer zooms in, a smaller area of the dataset is required but at higher resolution. The density of points increases, but performance is not hindered because a high-resolution surface is rendered only for the displayed area.

#### LAS dataset

A LAS dataset stores reference to one or more LAS files on disk, as well as to additional surface features. A LAS file is an industry standard binary format for storing airborne lidar data. The LAS dataset allows you to examine LAS files, in their native format, quickly and easily, providing detailed statistics and area coverage of the lidar data contained in the LAS files.

A LAS dataset can also store reference to feature classes containing surface constraints. Surface constraints are breaklines, water polygons, area boundaries, or any other type of surface feature that is to be enforced in the LAS dataset. A LAS file contains lidar point cloud data •





# ArcGIS FAQs

## 3D Navigation Using ArcGIS 3D Analyst

Navigation can sometimes be confusing for users who are used to 2D navigation, or other 3D applications. Learn more about some of the more common difficulties when navigating in ArcGlobe and ArcScene.

Why can't I navigate over the top, or North Pole, of my 3D view?

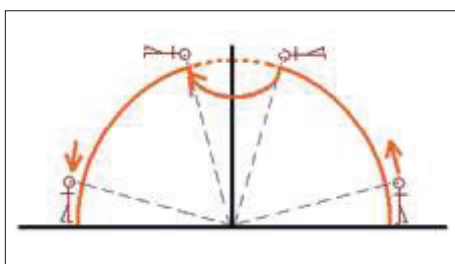
Symptom

When navigating using the standard Navigate tool in ArcGlobe or ArcScene, the application doesn't let me roll over the top (or North Pole) of my 3D view.

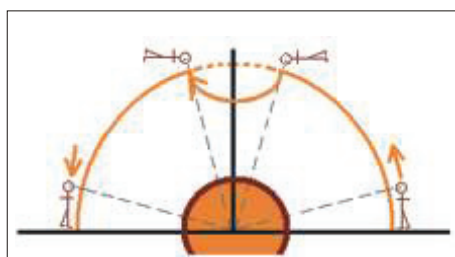
Reason

The application requires that the implied up direction for the camera is one of the following:

- Away from the ground (for Surface mode in ArcGlobe and ArcScene)



- Toward the north (for Global mode in ArcGlobe)



This behavior ensures that the Navigate tool operates in the most understandable manner and is also enforced for navigating underneath your data (or the South Pole).

Note:

- You can use any of the flying tools (Walk, Fly, or Orbital Fly) to navigate over or under your 3D view.
- The 3D Pan tool in ArcGlobe can be used to switch easily into Surface Navigation mode and allow you to pan across the North and South Poles.
- See the related "Why do I spin around when I fly straight down?" item in this list.

Why do I spin around when I fly straight down?

Symptom

When attempting to fly straight down in my 3D view, I can enter into a spin.

Reason

When flying, the application requires that the implied up direction for the camera is away from the ground. This is done to ensure that the flying tools operate in the most understandable manner.

When flying down, a directional movement to the left or right

will lead to a roll in the camera to maintain the ground as down in relation to the user. The more pronounced the turn to the left or right, the faster the spin.

Note:

- To avoid spins when approaching your data from above, use the right-button drag functionality of the Navigate tool or the Zoom To Target tool.
- Also see the "Why can't I navigate over the top, or North Pole, of my 3D view?" item in this list.

Why does zooming in stop before reaching the surface?

Symptom

When I zoom in (using the Zoom In/Zoom Out tool, the mouse wheel, or a right-click drag), the camera stops moving part of the way through the 3D view.

Reason

The observer (camera) has reached the target point.

This behavior can be seen when changing from a flying tool to the standard Navigate tool. When flying, you are directing the target location while the observer is chasing it. This means that there is a particular distance between the target and observer points at all times. When you stop flying and zoom in toward the target, the observer has to stop when it reaches the target.

Note:

- Use the Target tool to reset the target location on the surface or some other 3D point.
- In the Navigate tool, pressing the Ctrl key and clicking also allows you to reset the target location.

Why does the terrain move as I navigate around my view?

Symptom

As I navigate around my 3D view, the terrain pops up and down, especially in regions where there are peaks and valleys.

Reason

To handle large volumes of data, ArcGlobe varies the level of detail it uses for generating the elevation surface. When you are a long way from the ground, you cannot discern every detail in the surface, which reduces the need to use the full resolution of the elevation data. Performance can be enhanced by generalizing the surface to a level appropriate to its distance from the viewing position. As you navigate closer to the surface, more detail is used from the elevation layers until the maximum resolution is reached.

This optimization can become noticeable in mountainous regions, where peaks appear to become taller and valleys wider as the resolution of the terrain increases. Creating animation files is often when the effect is first noticed.

Note:

- You can reduce this effect by increasing the level of detail setting for your elevation layers. This setting is accessed via the Level of Detail tab on the Customize>ArcGlobe (or ArcScene) Options dialog box.
- Increasing the elevation level of detail can result in a drop in performance, particularly if you have a lot of elevation data. Decreasing the value again after creating animation Files is a good practice.

## Selecting Graphics Cards for ArcGIS 3D Analyst

The performance of the ArcGIS 3D Analyst extension is dependent on the type of graphics card that is used. The 3D Analyst requires OpenGL-compatible graphics cards, as OpenGL technology is used for 3D display in the ArcGlobe and ArcScene applications. In the past five years, there has been tremendous growth in the availability of OpenGL graphics cards due to the increased use of OpenGL in consumer games. While Esri cannot possibly test all these graphics cards, direction on what to look for in a graphics card is provided below.

### Which graphics card should I buy?

A good OpenGL-compliant graphics card with at least 64 MB of texture memory is recommended. Most desktop systems come equipped with power graphics cards, but in general, if you are going to use a system for 3D visualization, you will want to make sure it is a workstation class graphics card. Workstation class graphics cards are discrete (as opposed to integrated with the system's motherboard) graphics card available for desktop and mobile (laptop) systems. The major graphics card manufacturers (NVIDIA and AMD [ATI]) categorize their graphics card solutions into desktop, workstation, and mobile. Experience has shown that the workstation class graphics cards have better performance and support for professional 3D applications, including the 3D Analyst.

### What is OpenGL?

OpenGL is an industry standard with a cross-platform, 3D graphics application programming interface (API). Cards supporting this API offload computation-intensive tasks from the CPU and perform the operations using specialized hardware.

### Is there a particular version of OpenGL the card should support?

Yes, the card should support OpenGL 2.0 or higher. Look for cards and their drivers that are designed and optimized for OpenGL to achieve the best performance. As more and more consumer games use OpenGL, there are more resources with which to compare various cards' performance. When looking at comparisons, focus on OpenGL technology rather than other display technologies, such as DirectX.

### What is texture memory and texture mapping, and are they important?

Texture memory on the graphics card is used to store 3D textures, such as imagery or facades. Texture mapping handles imagery in hardware. Images, such as those from satellites, orthophotos, scanned maps, and raster-based symbols, can be rendered in real time when texture mapping is supported in hardware on the card. Texture memory controls the total amount of imagery that can be used at one time. If you intend to use imagery or raster-based symbols in your 3D GIS applications, you should consider a card that supports this feature. The card should have at least 16 MB of RAM that can be dedicated to the task. This means the total memory of the card needs to be more than 16 MB. Texture memory is particularly important for ArcGlobe, and 32 MB of texture memory is recommended as a minimum.

### What is geometry setup?

Geometry setup reduces load on the CPU and graphics pipeline by accepting geometry data directly rather than requiring preprocessing by the CPU into a card-specific format. Requiring less use of the CPU and the graphics pipeline improves performance. This option should be used if available.

### My graphics card has geometry acceleration as an option. What is this, and is it important for the 3D Analyst?

Geometry acceleration accepts geometry primitives, for example, triangles; projects them into 3D camera space; clips, illuminates, and projects again to 2D screen space; and rasterizes the result. Using this feature is advised, as it significantly improves performance for 3D Analyst applications.

### My graphics card has z buffer resolution as an option. What is this, and is it important for the 3D Analyst?

Z buffer resolution controls how accurately the card can perform hidden surface removal. The minimum to consider is 16 bit, with the highest and most accurate resolution being 32 bit. A 24-bit z buffer is recommended for the 3D Analyst, but higher and lower values will also work.

### What about output resolution, colors, and refresh rate?

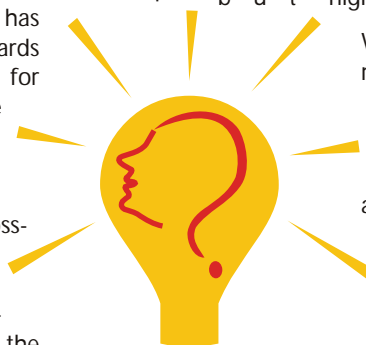
These control the size and quality of the resulting display on your monitor—the higher, the better. Be aware that configuring a card to maximize one of its capabilities may diminish its capabilities in other areas. For example, just because a card supports a 24-bit color mode and 1,280 x 1,024 output resolution doesn't mean you can have them simultaneously. Also, depending on the card, increasing one of these parameters may impact

memory that is available for other things such as textures.

### What if my graphics card meets the recommendations but it still doesn't work well?

Even if your graphics card is new, sometimes display issues can occur, such as textures not appearing on building multipatches. A good method of practice is to check periodically for updated drivers available for you to download. The steps for updating the graphics card driver will vary depending on whether you work from a desktop or a laptop. If the graphics card is on a desktop computer, you can generally go to the original equipment manufacturer's website to find an update. The two most common manufacturers include NVIDIA and AMD (ATI). If the graphics card is on a laptop, most often you will need to go to the computer manufacturer's website, such as Dell or Toshiba, to update the driver. Some newer-generation graphics cards allow you to update directly from the card's website, but generally, you'll have to get the update from the computer manufacturer.

If updating to the most recent driver version doesn't resolve the issue, consider updating to an Esri-certified version of the driver. Esri-certified drivers are available on both the NVIDIA and AMD website, listed below. However, please note that certified drivers may not be updated as regularly as the current version ●





## 1. Role: Software Engineer / Senior Software Engineer

**Experience**  
2 - 5 years

**Qualification**

B.SC/ BE /  
B. Tech /  
MCA / M.Sc /  
M.Tech

**Requirement**

1

**Location**

Mumbai

### Skill Set

- GIS Development Experience in ESRI Enterprise
- GIS programming in Java
- Expertise in OOAD
- Knowledge on ArcGIS
- Ability to read and generate UML documentation
- Experience in working with XML
- Experience in working with an IDE similar to Eclipse, Netbeans etc.
- Knowledge of Spring framework or similar application development framework
- Demonstrated experience in SOA and Web Services.

### Desired Skill

- Knowledge and experience with CMMi environment preferred
- Knowledge of GIS technologies
- Java based portlet development

## 2. Role: Software Engineer / Senior Software Engineer / Technical Analyst

**Experience**  
1 - 7 years

**Qualification**

B.SC/ BE /  
B. Tech /  
MCA /  
M.Sc /  
M.Tech

**Requirement**

9

**Location**

Bangalore /  
Gurgaon /  
Singapore

### Skill Set

- Should have experience in VB.Net, C#.Net and ASP.Net technologies
- Should have experience in SQL Server, Oracle 10g and PL/SQL
- Should have experience in JavaScript, AJAX
- Should have experience in Crystal Reports
- Should have knowledge in ArcSDE
- Should have knowledge in ArcGIS Server
- Should have knowledge in SDLC process
- Should interface with client for Requirement Analysis and technical queries

### Desired Skill

- Knowledge and experience with CMMi environment preferred
- Knowledge of GIS technologies

e-mail your resume to [careers@esriindia.com](mailto:careers@esriindia.com) or send it through post to:

Head, Human Resource,  
ESRI India

Plot No. 223-224, 3rd Floor, Udyog Vihar, Phase -1, Gurgaon, Haryana 122002 INDIA.

Kindly mention the position applied for and your current location in the subject line.

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Theme: GIS Creating our Future

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GIS Users around the world have one great advantage over users of other Information Technologies: They have something to show for it!

Esri India invites authors to submit abstracts for papers presentation and posters for Map Galleria at Esri India user conference. The abstract submission should be original research and implementation contributions on Esri technology on themes outlined in Technical Sessions / User Presentations. All submitted papers shall be evaluated for quality, originality and relevance by the technical paper committee. The acceptance of the papers will be based on the review results.

If authors would like to submit papers / posters on a new theme not included, they can write to us at [UC2014@esriindia.com](mailto:UC2014@esriindia.com).

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