

Esri News

for Business

Fall 2012

Big Data—What's the Big Deal?

By Victoria Kouyoumjian, Esri

The technology tides have shifted again, and as the notion of cloud computing is becoming mainstream across most industries, a new buzzword is emerging: *big data*. Never heard of it? Simply put, the term refers to the ever-growing mountain of data, generated from myriad sources, that organizations must effectively address.

For instance, according to a recent MeriTalk survey, 96 percent of federal IT professionals

expect their agencies' stored data to grow in the next two years by an average of 64 percent.

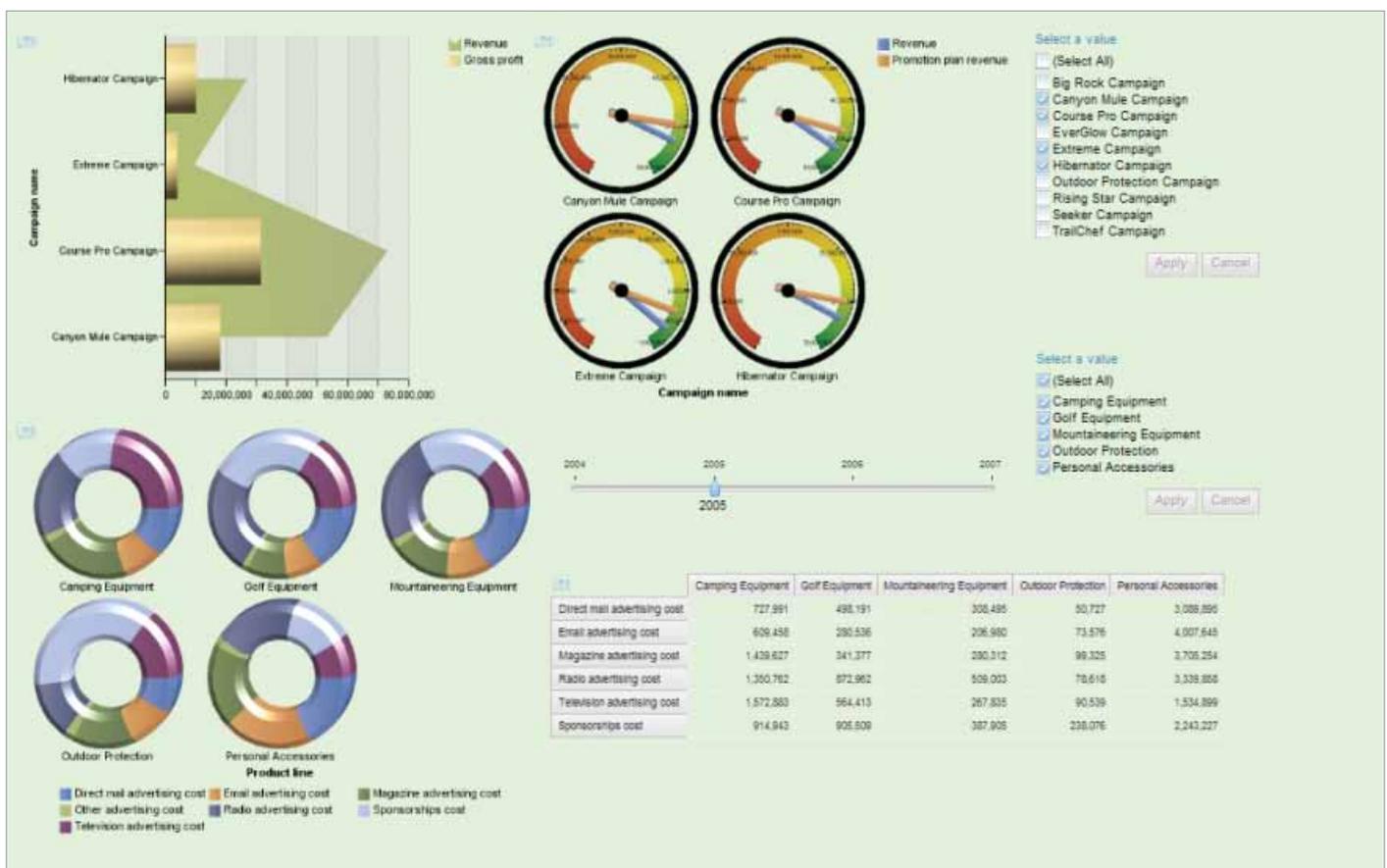
Big data is often described using the three Vs: velocity, volume, and variety. By example, consider a few of the real-world case studies gathered by IBM and provided by Mike Rhodin, senior vice president at IBM Software Solutions:

Utility companies record 350 billion meter readings per year (= volume); the financial service industry clocks 5,000,000 trade

events per second (= velocity); and, as we know, the types of data formats that can be generated easily range from structured traditional file formats to unstructured video, audio, imagery, e-mail, web logs, and pretty much anything [people] can think of (= variety).

As might be expected, the typical C-level individual is not overly concerned with the

continued on page 18



↑ Marketing Workspace Dashboard created by CloudTrigger.com, one of Esri's solution partners in the big data space.

Cover

- 1 Big Data—What's the Big Deal?

Case Study

- 3 Arby's Assesses Market Footprint with Esri Business Analyst
- 3 Business Sense
- 4 Seeing the Signs
- 6 A Retail Winner
- 7 USC Moore School of Business and EDENS Partner for MBA Class Project Using Esri's Business Analyst

Software

- 8 Enriching Enterprise Systems
- 10 Integrated ArcGIS Platform

Data

- 12 Blind Study Ranks Esri's Demographic Data Most Accurate

Special Topic

- 14 Expense or Essential Investment?
- 15 Esri Online

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Arby's Assesses Market Footprint with Esri Business Analyst

A Single-Platform Approach Improves Efficiency and Provides More Time to Focus on the Customer

Arby's Restaurant Group, Inc., the second-largest quick-service sandwich chain in the United States, uses geospatial technology and data from Esri to guide business decisions.

Arby's, based in Atlanta, Georgia, uses GIS to more accurately assess restaurants and trade areas for projects such as growing the chain and remodeling or relocating restaurants.

The restaurant chain uses Esri Business Analyst, which merges Esri's vast demographic and business data with detailed maps and allows organizations like Arby's to perform spatial analysis. Using the solution, Arby's can now update the locations of its restaurants and business development activity on designated market area (DMA) maps, which describe the activity taking place in individual markets.

Since Business Analyst can be easily deployed across the enterprise as a web-based solution, on desktops, and even from iPhones and iPads, Arby's can make these maps accessible to its staff. Development teams working in the field are able to quickly access the maps and easily discover the information they need through the Arby's intranet.

"Esri's Business Analyst has saved our GIS analyst countless hours."

Dave Conklin, Senior Vice President, Business Development, Arby's

This quick ability to synthesize data has made it possible for the teams to more easily and quickly monitor the business climate around each restaurant. This provides an opportunity for the organization to model different market scenarios to better serve existing customers and attract new ones.

Using one platform instead of several different solutions, as Arby's has done in the past, helps it better manage and analyze business data. With an enterprise system, Arby's can scale to meet the changing business landscape with tools that make it competitive in the marketplace.

"Esri's Business Analyst has saved our GIS analyst countless hours and has had a positive impact on the Business Development department," said Dave Conklin, senior vice president, Business Development, Arby's.

Learn more about how Esri helps commercial businesses at esri.com/business.



Business Sense

Simon Thompson
Global Director,
Commercial Solutions, Esri

Big Data—Boom or Bust?

Business data is growing at such a rate that many organizations can become overwhelmed by the big data problem. A recent analysis of data in business from market research firms McKinsey, IDC, and Department of Labor Statistics found that enterprises globally stored more than seven exabytes of new data on disk drives in 2010, while consumers stored more than six exabytes of new data on devices such as PCs and notebooks. One exabyte of data is the equivalent of more than 4,000 times the information stored in the US Library of Congress.

What does this mean? Your company is storing more data than that cable news show you watch, the media service you stream into your office, or all the words the national financial journal you read has ever printed—combined. Big data in business is really, really big.

Companies are trying to make sense of what they have—to get to the facts, connect the dots, and get some actionable business intelligence. Yet the very nature of big data makes it hard to understand. Organizations store almost everything, including financial transactions, social media messages, customer histories, demographic trends, and economic indicators. The whole sector is trying to get better answers and shorten the business cycle. However, for many companies, the answers just lead to more questions, business intelligence becomes just another data point, and the whole cycle starts again.

Location analysis and GIS offer a powerful way to connect people to place, transactions to actions, responses to trends, and customers to both where they do business and what kinds of business they do. Users of location analytics are converting big data into packets of insight, gaining understanding from intuition, and demystifying questions so they may be properly understood for the first time. From fraud detection to branch optimization and customer loyalty to product segmentation, location analytics is helping shift the advantage of big data in favor of business. The only question now is how many will seize the opportunity and put location analytics and GIS on the front line of the big data battlefield.

Seeing the Signs

The City of Glendale Finds an Innovative Solution with 3M to Manage Street Signs More Effectively

Got signs? The City of Glendale, in Los Angeles County, California, does. In fact, it had almost 2,000 more street name signs than it thought it did. While this surprise may not seem to be a big deal to some, for Glendale city staff, not knowing an accurate count of street signs could mean the difference between staying in budget and exceeding it by thousands of dollars.

“Each street sign costs at least \$150,” said David Lew, the parking and traffic supervisor at the City of Glendale. “If we need to replace them and end up miscounting by a couple thousand signs, we could be in a pretty big financial hole.”

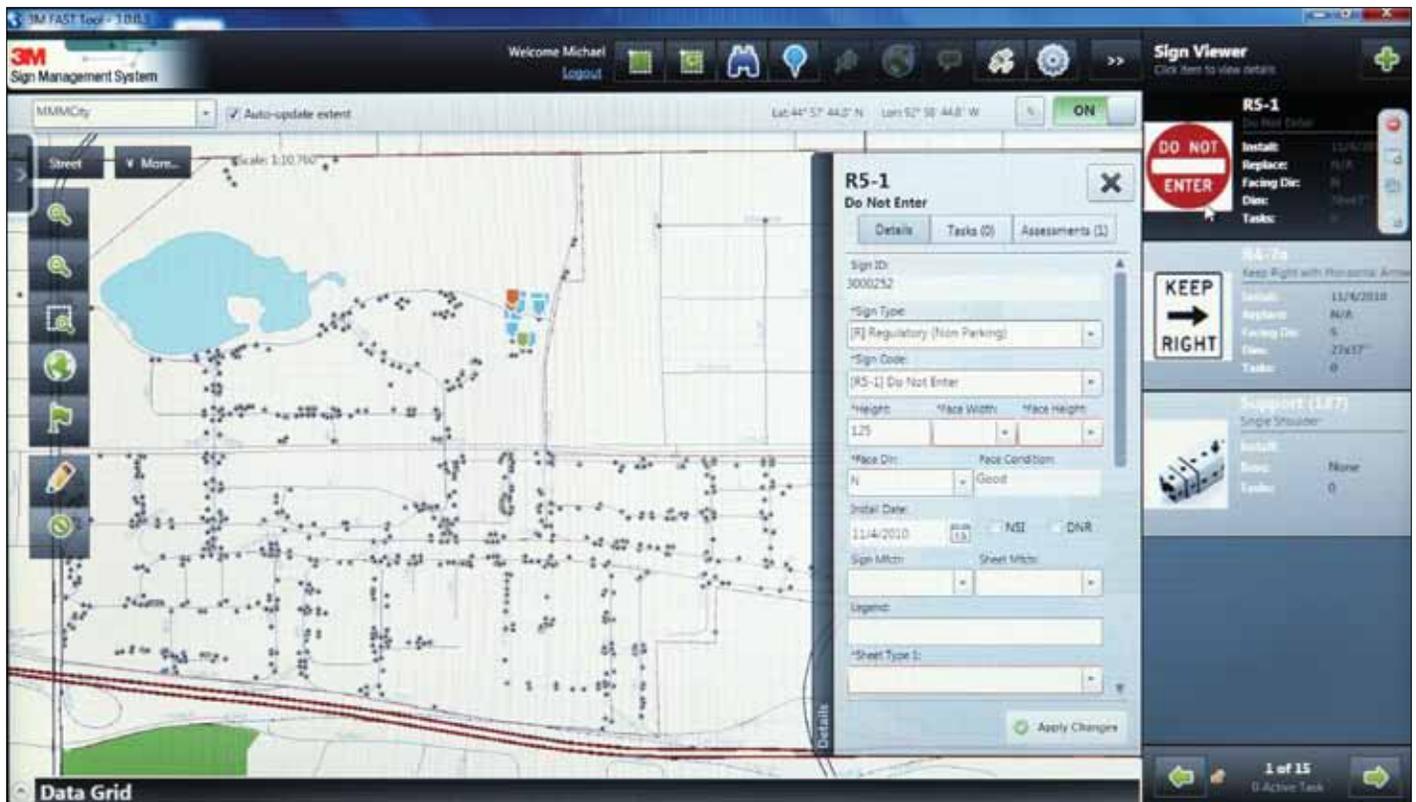
Glendale city staff attempted to inventory street signs manually for decades when time allowed by driving the city streets and recording where signs—including street name and road safety signs—were located. While this system seemed to work well, the introduction of new minimum retroreflectivity standards, as well as a timetable for city agencies to comply with these new regulations by the United States Department of Transportation, pushed the city to adopt a more comprehensive solution for road sign management. Glendale staff needed to get a better handle on its traffic sign inventory for replacement and maintenance purposes. The city found itself implementing 3M’s Sign Management System, a turnkey solution that inventories

signs, assesses retroreflectivity, and provides a service life prediction. At the core of 3M’s Sign Management System is an ArcGIS technology platform developed to help organize and maintain the inventory and synchronize sign information more easily for office and field-workers.

When Every Sign Matters

Headquartered in St. Paul, Minnesota, 3M is a \$30 billion company diversified into creating unique products that make people’s lives easier. From office products to electronic devices, roofing shingles to reflective tape, the company prides itself on its innovation and takes the business of inventing seriously. Finding a solution for inventorying street signs was tackled with the same visionary thinking that has made the company so successful.

The 3M Sign Management System is utilized by the sign and traffic department at the City of Glendale, where a staff of nine uses the system for maintenance so it can accurately budget for and plan sign replacement in the city. First, 3M inventoried all the traffic signs in Glendale including data capture, asset assessment, and data population of the sign management software solution. City staff was then trained on the system’s management tools to update and keep the inventory current.



↑ Incorporating ArcGIS with the solution means that information about the signs can be queried and displayed on a map. Here, the placement of all the Do Not Enter signs in the city are displayed on the map.

“Choosing one proven platform will save us and our clients time and money in the end.”

Sithya Khieu, Technical Development Manager, 3M

“We really had no idea how many signs we had,” said Lew. “We found out that our estimating was only off by almost 2,000 signs for street name signs alone out of 28,000 that the city maintains, which is pretty good. But when you are talking about being required to replace signs every 5 to 10 years, having accurate data in case of accidents or lawsuits related to signage, every sign is important.”

After performing hundreds of traffic engineering studies, 3M uses the knowledge gained to build in predictive modeling for sign management that assesses the sign type, installation data, and other attributes to estimate when the next replacement date for each sign is. This intelligence makes it easier for Lew’s staff members to manage the sign inventory. They can query the signs to find those that are deemed critical for maintenance or signs that possibly fall below the federal minimum requirements.

After nonperforming signs are identified, a work order can be created in the system and sent to a mobile device by a crew member out in the field. The mobile devices used contain GPS receivers, so as fieldworkers approach the sign, they can select the sign that appears on their screen, ensure that it is the correct sign that needs maintenance work, pull up and complete the work order, then sync the updated record with the sign management database. “This system works especially well in an emergency situation, such as replacing a sign that has been knocked down,” said Lew. “Within a couple of hours, the sign can be fixed and the work order processed.”

A Total Solution for Street Sign Management

One of the nice aspects of the system is the fact that the web interface that is used back in the office is the same interface that is seen on the mobile devices. The interface is very graphic in nature since it uses ArcGIS web map services, which provide an interactive map for workers to pan and zoom so they understand exactly where the signs are located in the city. This has made training of the staff very easy, especially important in California city agencies where fiscal troubles have meant moving staff to different departments or reducing the work force. “Once the staff is trained on one system or the other, it’s a done deal—we don’t have to retrain them,” said Lew. “This is a huge time and money saver for the city.”

The City of Glendale’s system is hosted by 3M, but agencies have the option to host the system on their own servers. “This is a nice option for smaller municipalities that may not have the budget of larger cities but still have the responsibility to maintain their street and road safety signs,” said Debra Gaborik-Snyder, business development and



↑ Work orders can be downloaded on a mobile device by a crew member out in the field, edited, then synced back up into the main system.

project manager for 3M’s Sign Management System business, part of the 3M Traffic Safety Systems division.

A cloud solution meant that 3M needed to find a level of service that had little or no interruption and systems that could all talk to each other in a common language. Led by technical development manager Sithya Khieu, 3M staff first looked at open source GIS technology, but after identifying and working with Esri partner GIS, Inc., based in Birmingham, Alabama, Khieu chose ArcGIS instead. “At the end of the day, we had many hodgepodge pieces—basically a whole cocktail of software—and we at first thought it looked like big savings,” said Khieu. “As we assessed system reliability, however, we found that using different types of software really created an issue for our customer interface. Choosing one proven platform will save us and our clients time and money in the end.”

To Serve and Protect

Having a system that manages all traffic signs is helping Glendale manage assets smartly, keep constituents safe, and protect the city against lawsuits and noncompliance penalties. As the city continues to grow and more streets are added to accommodate this growth, there is a system in place to maintain those new signs. And no longer will agency workers put up a new sign at an intersection and forget about it. All these signs will be appropriately tracked in a manageable way. “Signs have a definite life to them,” said Lew. “After a few years, they lose their reflectivity. We as a city have to take care of this problem so motorists can see the signs, especially at night.”

For more information, visit http://solutions.3m.com/wps/portal/3M/en_US/NA_roadway

A Retail Winner

University Students Use Esri's Business Analyst Online to Win Scholarship

How would you market a national retail chain to encourage more Hispanic families to shop there?

For three business administration majors, deriving the answer was simple: What would get their families to go there? What would they seek in the way of products and merchandise?

A marketing analysis that three California State University, Fullerton (CSUF), students conducted using Esri Business Analyst Online (BAO) helped them win a portion of a \$100,000 Sam's Club scholarship.

The competition was sponsored by DiversityInc, a consultancy and publisher of information on diversity management, along with scholarship funding by Sam's Club, a division of Wal-Mart Stores. The Hispanic Serving Institutions (HSI) Scholarship Competition asked university teams from around the United States to develop a marketing plan that would help Sam's Club build its relationship with the Latino community. One of five scholarship winners, the trio of Fullerton students used BAO to segment and identify key markets of Latino customers likely to shop at Sam's Club.

Mapping Their Way to a Winning Strategy

Staff from Esri made a presentation to the university's marketing department earlier in the year and asked if it was possible for the students to use the product for the contest. The students used BAO for one week for no charge. "This was a wonderful opportunity for them," said professor Christopher Anicich, lecturer in marketing, Mihaylo College of Business and Economics, who assembled the team from students in his Principles of Marketing class.

Susana Carmona, Shaun Vasquez, and Lizbeth Martinez, under the guidance of Anicich, used BAO to look more specifically at the demographic makeup of California as a market.

BAO is a web-based solution that provides access to extensive up-to-date demographic, consumer spending, and business data. This data can be found quickly by using customizable search criteria and different marketing scenarios explored through the interactive map.

BAO was used to develop a winning strategy to engage the Latino community in California. The students analyzed data about different markets and presented their findings through BAO solution-generated reports and maps. The CSUF team won the award in part because of the ability for the analysis to be easily replicated for use in other markets.

For their marketing plan, "We focused on marketing in California, but we believe the plan could be used for various regions," said Carmona of San Clemente. The senior, whose concentration is international business, added that the team also looked at the type of products sold and how the stores were promoted in areas with sizable Hispanic populations.

"We also talked to club employees about the store, its products, pricing, etc.," said Vasquez, a resident of Seal Beach. "One thing we believe is that few in the Hispanic community realize how easy it is to get a membership at Sam's Club. Informing the public would help the

"Accessing key consumer data and presenting it as actionable intelligence is something that any business professional—no matter the size of the organization—can do."

store become more inclusive."

"We worked very well together despite our different majors and backgrounds," added Vasquez, a senior who is studying finance and accounting. "Our collaboration was solid."

The team's hard work and ingenuity snagged \$20,000 in prize money as one of five winning teams in the competition. Their winnings amounted to \$15,000 in scholarship funding for the students and \$5,000 awarded to the university. The competition was open to teams of full-time sophomores and juniors from universities designated as Hispanic-serving institutions by the US Department of Education. Each team was tasked with developing a marketing plan around the theme Increasing Sam's Club's Market Penetration of the Latino Population.

An Event to Remember

The collaboration continued through the selection process and the contest's November awards dinner held in Washington, DC.

"In mid-October, I got an e-mail that our team was one of seven finalists," said Vasquez. "To narrow the field down to five, contest organizers wanted to conduct phone interviews." Four questions were posed: "What are the core beliefs and values of Sam's Club? How would we implement our plan, including a timeline of the rollout dates? What is our favorite attribute of Sam's Club? and What is our dream career? The following Monday, we heard that we were one of the winning teams."

Team members took a red-eye flight to Washington, DC, arriving at 6:00 a.m. Skipping any shut-eye, they headed straight for their hotel to change clothes and get ready for the diversity conference, as well as that night's awards dinner. The team met with executives from Sam's Club, then took part in the conference, using the opportunity to network with corporate attendees.

During the dinner, all the winning teams were to sit at one table, but the CSUF team was asked to sit with the Sam's Club executives at their table, said Vasquez.

The CSUF team stayed two extra days to take in the conference and to network. Team members also sent out thank-you e-mails to every individual they met from the warehouse company, said Carmona.

"It was nonstop," said Vasquez. "We wanted to suck up the whole experience. We knew that it was a once-in-a-lifetime opportunity."

The extra effort seemed to work: Carmona recently landed an

continued on page 18

USC Moore School of Business and EDENS Use Business Analyst for MBA Project

By George Daigh, GIS Project Manager, EDENS

Each year for the past five years, Dr. Michael Galbreth, a professor at the University of South Carolina's (USC) Moore School of Business, has issued his Management Science 873: Service Operations class a challenge—break into teams and use Esri Business Analyst GIS software to find retailers that will be a good fit for an EDENS property. Teams are assigned a shopping center and go to work researching the market and developing presentations using the tools in Business Analyst.

Galbreth's class is focused on managerial decision making that is supported by the careful analysis of data. He chose the GIS software for the class project because he wanted to give his students a more hands-on experience with GIS, a topic that is typically not covered in detail in business courses. "GIS helps me bring the service location topic alive. We talk about other site selection methods—regression analysis based on attributes of existing locations, for example—but students really connect with the map-based tools. They get excited about all the rich analysis that something like Business Analyst enables," says Galbreth.

The Moore School of Business and the Management Science Department have been supportive of Galbreth's use of GIS in the class. "I think that, potentially, GIS for business could grow into a full elective course at the Moore School, rather than its current place as a subset of an elective. GIS, and specifically the Esri training, is often cited as one of the most popular components of the service operations elective," says Galbreth. Abhinav Sharma, a student in the class, feels that GIS has the potential to be incorporated into other classes. "Any class that

works with demographic data and market analysis would benefit from the use of GIS," says Sharma. He also mentioned that marketing and quantitative methods in particular are two functional areas for which GIS seems to be a natural fit.

Sali Sumer, also a student who participated in Galbreth's class, says that having real-world examples made the project more relatable and allowed the participants to appreciate the value of GIS. "Use of a real-world example let us compare actual data to our own knowledge of a certain area and kept us more interested in the project. Additionally, applying it to areas we were familiar with made the project seem more relevant and instilled a level of passion versus a textbook example," says Sumer. She goes on to say, "This was one of my favorite classes of all IMBA classes I have taken, which is a sentiment commonly shared among my classmates. GIS is a valuable and user-friendly resource. I appreciate the exposure we were given to it and think that it has a ton of useful information. Knowledge of GIS and the information it contains will no doubt be useful for the majority of students as they enter the working world."

The University of South Carolina, Esri customer #7 out of over 100,000 organizations using Esri software, has been a longtime user of GIS. The GIS manager in the Geography Department, Mr. Lynn Shirley, has been part of all this growth since the mid-1980s. The Geography Department at the university formally distributes and supports Esri software on campus. Over the years, there have been several individual

faculty or students in the business school who have used the software, but Galbreth's integration of GIS into his class has raised the level of awareness of GIS applicability in business and real estate. With over 240 faculty, staff, and student users (outside of classroom use), the markets for GIS on campus continue to grow. Business applications have increased as the Business Analyst extension has become more widely available and data more robust. Shirley says, "Perhaps the most straightforward use of GIS from a holistic combination of data and spatial tools are those business applications [market area penetration, site assessment, location-allocation problems, etc.]. [GIS] has use throughout all spectrums of the curricula. I even include one lab on site selection in my freshman-level GIScience class."

Esri Business Analyst for Desktop software combines GIS analysis and visualization capabilities with an extensive data package so users can gain a better understanding and timely information about markets, customers,



↑ Using Business Analyst, students at USC's Moore School of Business are able to create maps that provide a complete picture of space at a retail location for potential lessors.

continued on page 19

Enriching Enterprise Systems

New Team at Esri Focused on Extending Geography Throughout the Organization

Esri writer Karen Richardson sat down with Chris Ovens, Esri's director of location analytics business, and James Killick, product management lead for location analytics, both members of the newly formed Esri Location Analytics team. The team focuses on building solutions that augment existing business systems with mapping visualization, spatial analytics and geographic information enrichment. Solutions currently developed by this team include Esri Maps for Office, Esri Maps for IBM Cognos, Esri Business Analyst, Esri Community Analyst, and ArcGIS for SharePoint.

Richardson: How would you define location analytics?

Ovens: A very popular business book was released in 2007 called *Competing on Analytics—The New Science of Winning*. The big idea in this book was that organizations could harness their data for competitive advantage. Arguably, this book contributed to the growth of the business analytics movement, where investment in IT systems has been pervasive—even through the recent economic downturn. By and large, however, the location or geographic perspective has been missing from these systems. Location analytics is the complementary addition



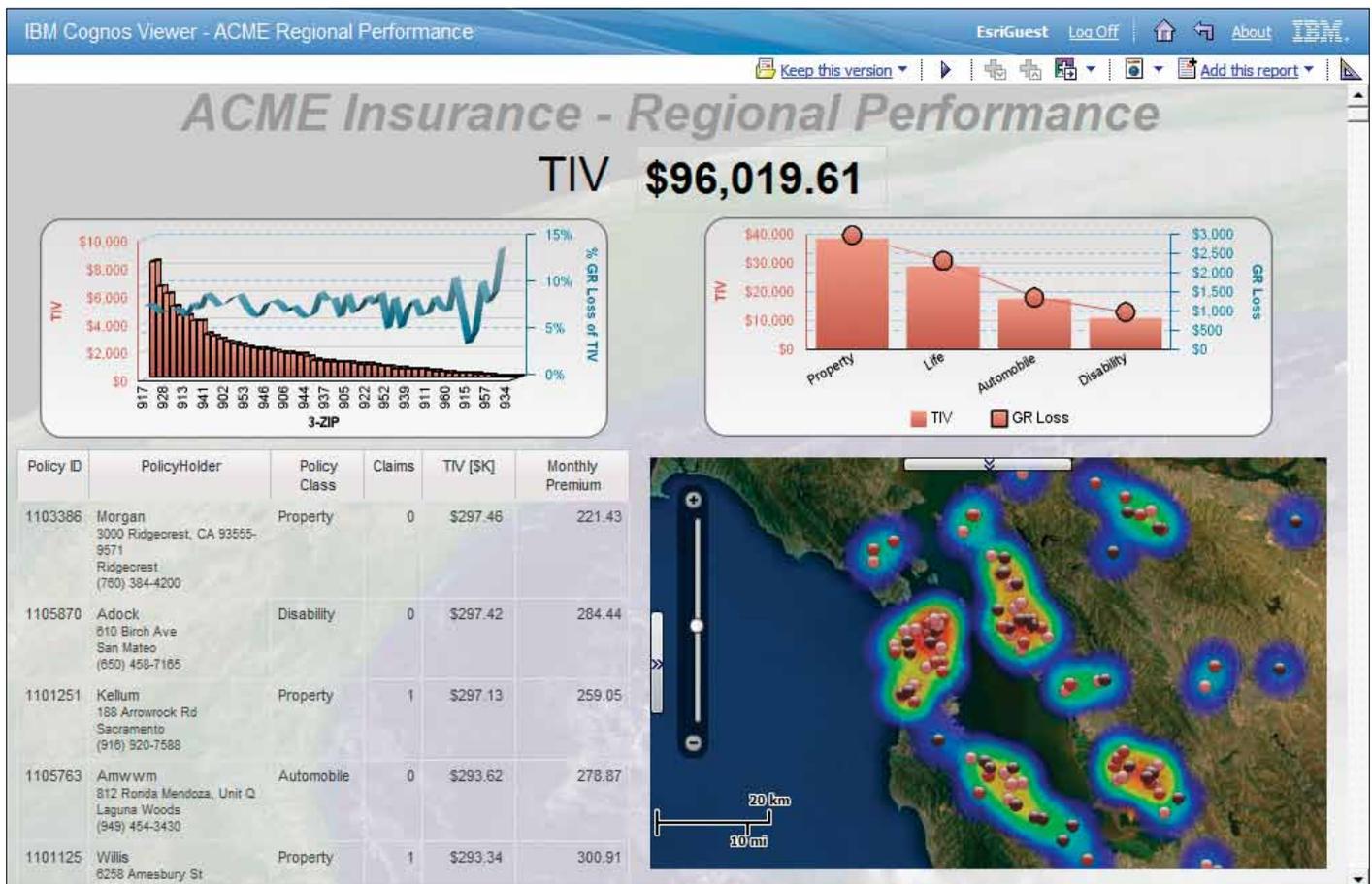
↑ Chris Ovens



↑ James Killick

of spatial capabilities—mapping visualization, spatial analytics, and information enrichment—to these important information systems.

Killick: Location analytics is one of the next big waves for the business analytics space. Location as a part of business analytics has always been relevant—most commonly for things like site analysis and customer intelligence applications—but it's been overlooked for too long. With the mass adoption of smartphones and location-aware applications, the amount of location-based data is exploding, and people



↑ Esri Maps for IBM Cognos used to highlight an insurance company's regional performance.

are more and more accustomed to looking at the information through a map lens.

This adoption is making a big impact in the business arena. People are more comfortable with viewing data on a map, and when they see patterns, they want to understand them—that's location analytics. And this is a good thing, since location analytics gives you the ability to see your data in a whole new way that graphs, charts, and tabular data can't reveal. Simply being able to interact with your data through mapping enables you to find and understand patterns that weren't obvious in tables or charts. For example, where are your sales concentrated? Or where are geographic features like mountains, rivers, or freeways having an effect on your business or your organization? Where do you have gaps in coverage? Where should you be allocating more resources?

Simply mapping your data is not the whole story, although this act is a very useful and valuable exercise. It's when you start to leverage spatial analytics that things start to get even more interesting. One very simple yet immensely powerful form of spatial analytics is to tie the data in the map to your graphs and charts. As you drill down into the data, the charts and graphs update to reflect what you are seeing, or as you drill down into the charts and graphs, the map updates. For many people there are lots of aha moments when they suddenly figure out the answer to a question that has bugged them for a long time. Seeing data on a map for the first time really brings that data to life. It's interesting to see just how much people want to explore and understand what those patterns mean.

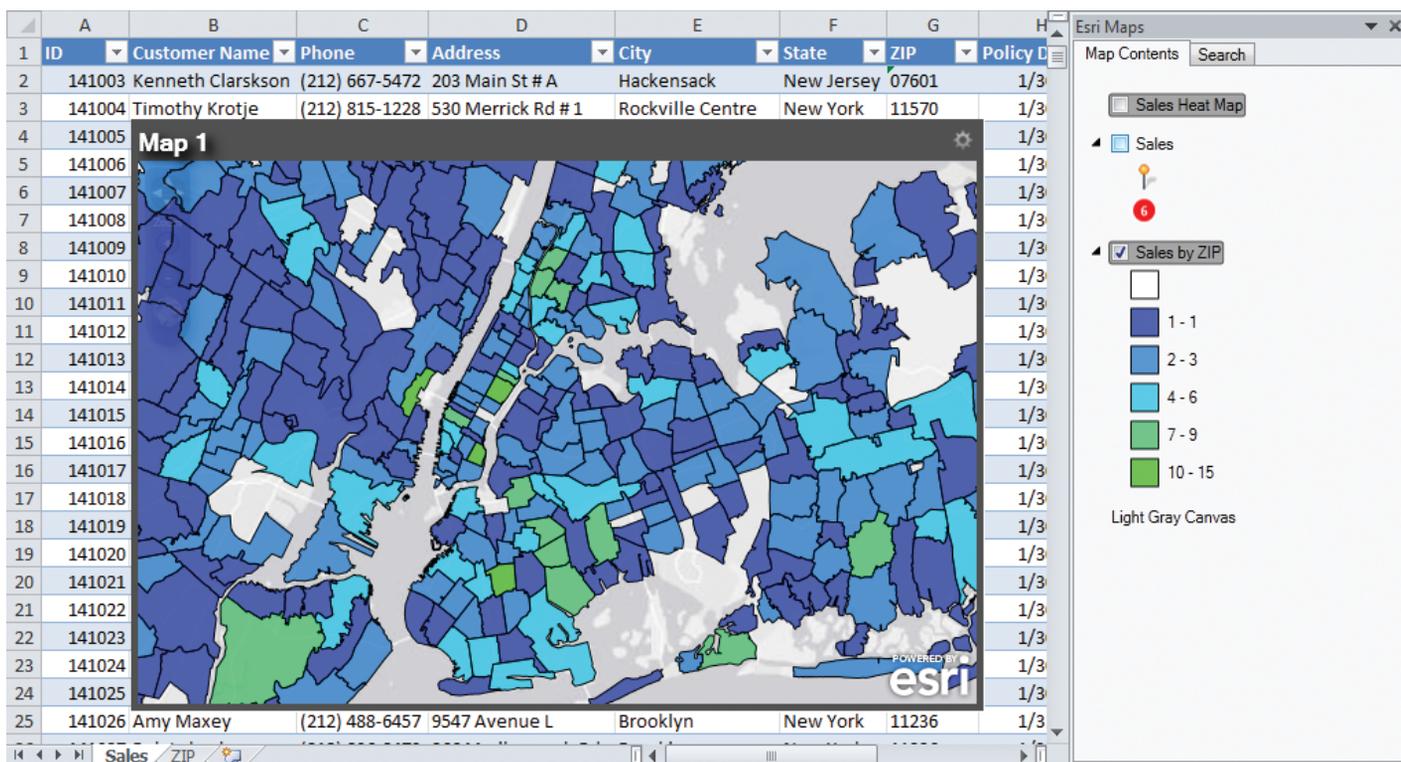
But it can go much, much further than this. Imagine you needed to ascertain the true trade area of a store because of competition or cannibalization. With location analytics, you can answer a question like, Where exactly do 80 percent of our revenues come from? Or perhaps find out which customers are within a specific drive time of a location. With location analytics, you can use your table, chart, and map data to do new analysis like model how much business you would generate at one location versus another, as well as quantify the effect it would have on your existing locations. Let's say you need to determine how many sites you need to open to cover 80 percent of the market and maximize revenues. Obviously you want to find the locations for those sites. Can you do that with traditional analytics? All this is possible with the kind of location analytics that Esri's platform provides.

So, location analytics is really about three key things: It's about dynamic, interactive mapping. It's about sophisticated spatial analytics. And it's about rich, complementary data that can be used to enhance the overall picture of your market. Used together, you can get better understanding and better knowledge, and you can make the best decisions.

Richardson: Esri is pulling many different products together. How would you see an enterprise making the best use of these technologies?

Ovens: The strength of the Esri Location Analytics portfolio is that an organization can use the right pieces that make the most sense for its business. If a company relies on business intelligence, we can improve

continued on page 16



↑ Viewing business information on a map provides the opportunity to quickly see where pockets of high sales—the ZIP Codes in green—exist.

Integrated ArcGIS Platform

Learn More about What's New in ArcGIS 10.1

ArcGIS 10.1 will change the way geographic information is managed by GIS professionals and accessed by their organizations. This complete GIS further integrates desktops, servers, and mobile and web applications and provides additional tools and infrastructure for extending the reach of existing GIS implementations. With ArcGIS 10.1, organizations can transition to next-generation GIS platforms without jeopardizing current GIS investments.

ArcGIS Online is now a fully integrated portal used by thousands of GIS users around the world to store and manage maps, data, and other geospatial information as well as access thousands of free maps, datasets, services, and tools. Esri continuously updates

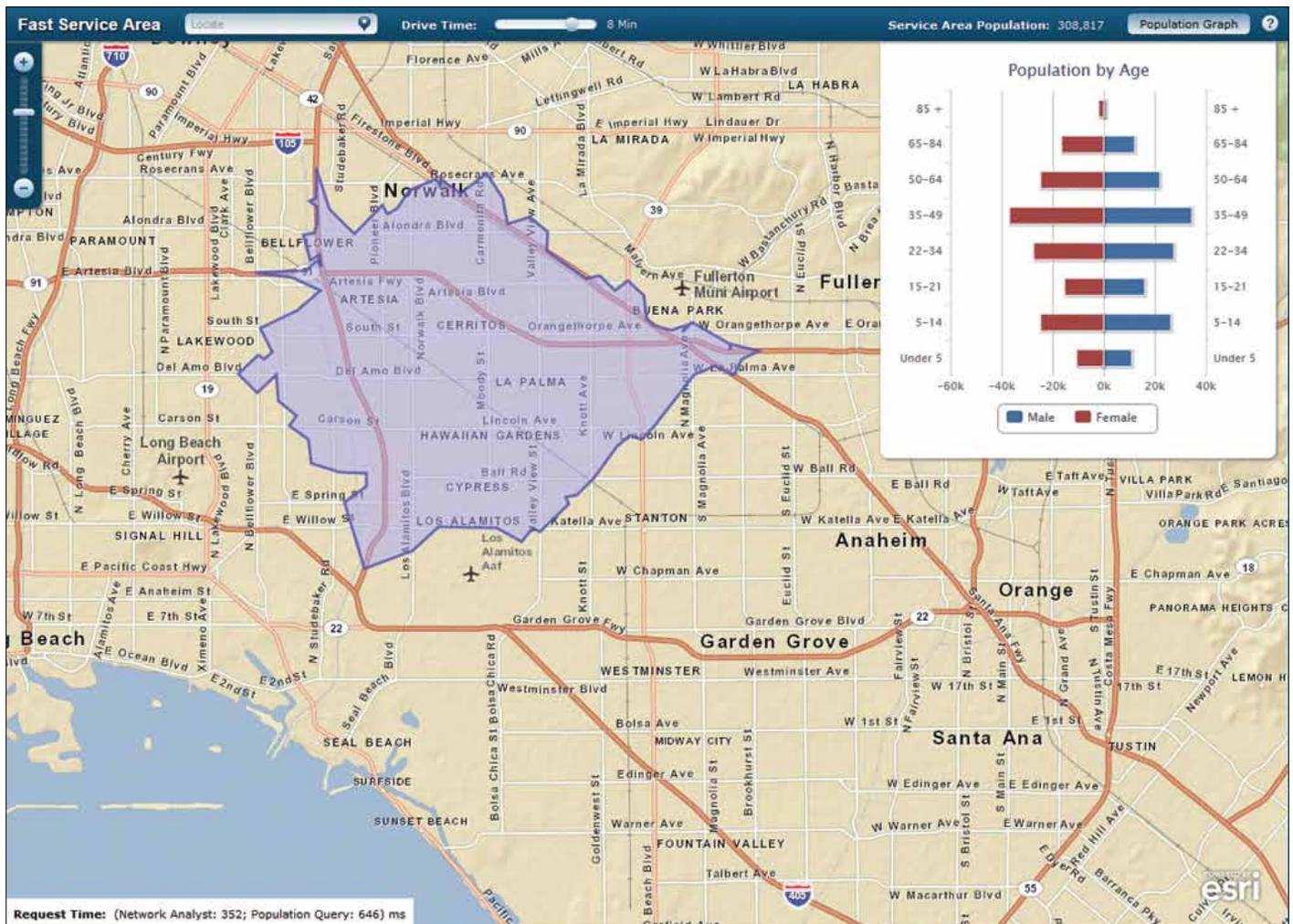
ArcGIS Online with new maps, imagery, and task services so users get the most current and accurate basemaps and GIS products available on the web.

ArcGIS Online for organizations, a new subscription for ArcGIS Online, is a customizable, web-based system designed for managing an organization's geospatial content using cloud tools and infrastructure. It allows administrative control over data creation and access while making geographic information easily available both inside and outside the organization, enabling collaborative efforts.

At 10.1, ArcGIS for Server has a new, simplified, and high-availability architecture referred to as a site. An ArcGIS 10.1 for Server site

includes a web server, web gateway, and GIS server for processing requests. With the web gateway, the site can be accessed through one common URL even though it may be composed of multiple machines. Running natively on 64-bit Windows and Linux operating systems, ArcGIS for Server provides users with high-performance web editing, map caching, on-the-fly analyses, and imagery exploitation capabilities.

Users have additional choices for deployment. ArcGIS for Server is fully certified on VMware and VCE's Vblock platform and can be deployed on Amazon Elastic Compute Cloud (EC2) on both Windows and Linux. Multiple GIS servers can be configured for the site and



↑ Esri continuously updates ArcGIS Online with new maps, imagery, and task services so users get the most current and accurate basemaps and GIS products available on the web.

organized into groups called clusters. Each cluster can be configured to run a dedicated subset of services. For example, a cluster of servers with more processing power can be exclusively committed to running computationally intensive processes such as geoprocessing.

Once ArcGIS for Server is installed, services are immediately available through HTTP, eliminating the need for an existing web server and allowing users to get up and running quickly. The ArcGIS for Server site can also be integrated with an organization's web server using ArcGIS Web Adaptor. GIS servers can communicate with each other so workflows—such as asynchronous geoprocessing or map caching—can be distributed across

servers to be more easily accomplished. Multiple GIS servers can be administered with minimum disruption to the site.

The new ArcGIS 10.1 for Server architecture is cloud-friendly. ArcGIS Server Cloud Builder for Amazon Web Services, a new Windows-only desktop application, lets administrators build and maintain ArcGIS for Server sites on Amazon EC2, create templates (e.g., custom sites), back up sites, or delete sites without logging in to the Amazon-hosted machine. GIS servers can still be administered via Amazon Web Services Management Console for more fine-grained control over the site.

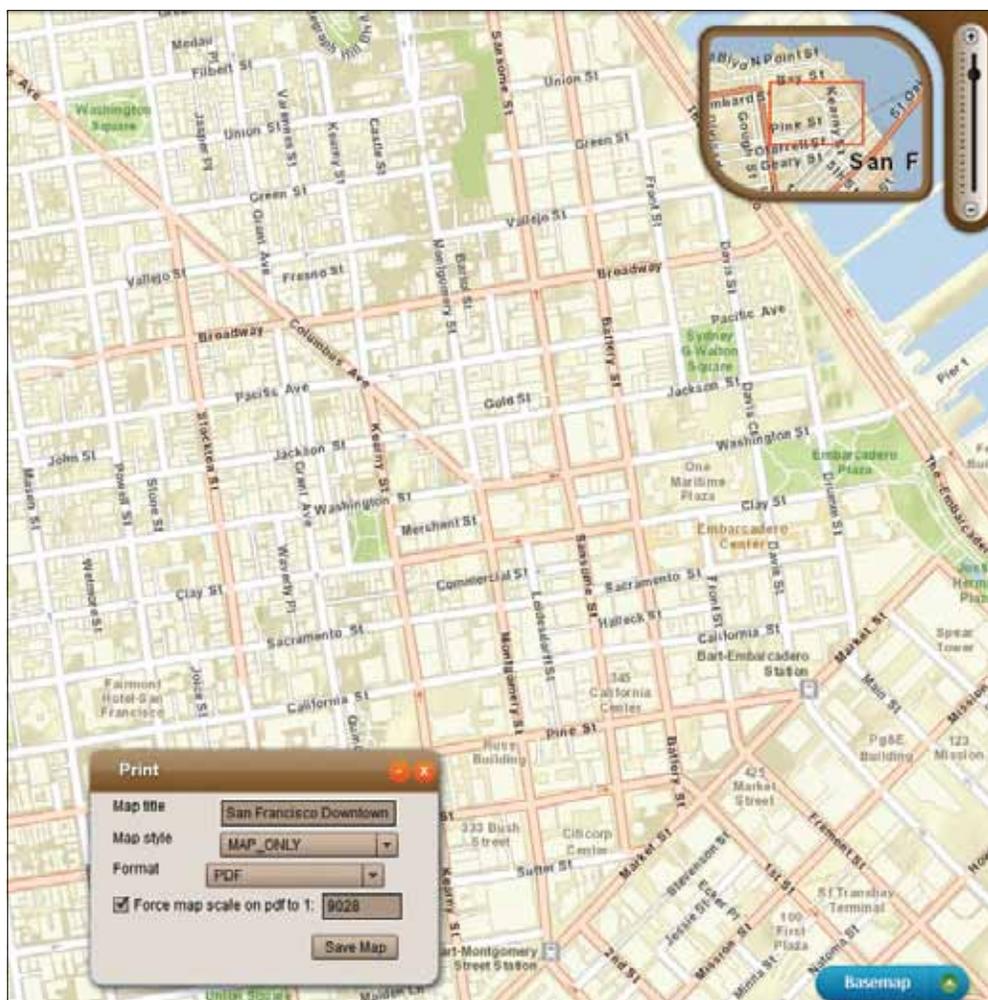
ArcGIS for Server includes new services, including a print service that allows users to

produce high-quality, large-format PDF maps directly from web maps. Along with the ability to generate sophisticated GIS and mapping services with Standard and Advanced editions, all editions of ArcGIS for Server will provide simple mapping capabilities from a spatially enabled database.

GIS professionals will find this release of ArcGIS for Desktop to be the most empowering GIS authoring environment to date. Any GIS resource—including maps, imagery, geodata, and tools—can be delivered as a web service on both ArcGIS for Server and ArcGIS Online. Desktop users can easily package maps and layers and make that content available to staff, stakeholders, partners, or the public via online groups while maintaining complete control and ownership of this content.

At 10.1, developers gain even greater access to the ArcGIS system via improved APIs and software development kits (SDKs) for web and mobile applications, configurable viewers, and the new ArcGIS Runtime. With ArcGIS Runtime, developers can create and deploy focused, fast, stand-alone GIS applications for desktop users. The runtime is a small, lightweight deployment designed for both desktop and cloud development that does not require installation and can be run directly from a CD. In terms of its capabilities, ArcGIS Runtime fits between ArcGIS Engine and ArcGIS Web Mapping APIs.

Mobile developers can also create custom business applications using ArcGIS Runtime SDKs for iOS, Android, and Windows Phone devices. These applications can use the powerful mapping and geocoding capabilities available from ArcGIS for Server and ArcGIS Online. Applications can be deployed to the enterprise or the public via the App Store and Marketplace. A free ArcGIS application, available for download on all major mobile platforms, lets users explore map content, collect and edit GIS features, and use sophisticated geoprocessing tasks.



↑ ArcGIS for Server includes new services, including a print service that allows users to produce high-quality, large-format PDF maps directly from web maps.

Blind Study Ranks Esri's Demographic Data Most Accurate

Many people assume that all demographic data is the same when, actually, demographic estimates and forecasts vary significantly from vendor to vendor. Using inaccurate demographic data could skew conclusions drawn from analyses and have dramatic consequences for business. Data inaccuracies may occur by either over- or underestimating populations or households. What are the implications?

Developers could underestimate the population and miss valuable opportunities or overestimate numbers and invest in an unprofitable area. Retailers that open a new store based on inaccurate data risk losing their startup dollars, sales revenue, and market share. Inaccurate data can also result in flawed expansion plans. Does data accuracy matter? Indeed, it does—in terms of investments, sales, market share, and competitive advantage.

How Do Data Providers Verify Accuracy?

The release of each decennial census enables data vendors to evaluate the accuracy of their annual demographic estimates. These estimates

are benchmarked against census results. Vendors could also compare their estimates to those of other providers to determine the accuracy of their own demographic data.

In 2011, Esri took advantage of this once-a-decade opportunity and commissioned an independent study to obtain an unbiased answer to the question of its data accuracy. Esri's motivation for the study was twofold: (1) to test the accuracy of Esri's demographic data to identify areas where methodologies could be improved and (2) to ensure that Esri is providing the industry's most accurate data.

Research Team

The eminent research team of Matthew Cropper, GISP, of Cropper GIS; Jerome N. McKibben, PhD, McKibben Demographic Research; David A. Swanson, PhD, University of California, Riverside; and Jeff Tayman, PhD, University of California, San Diego, conducted the study. Cropper has a broad background in GIS and demographic analysis. McKibben, Swanson, and Tayman are noted authorities on small-area forecasts and measures of forecast accuracy. They have written extensively and presented papers frequently on these subjects.

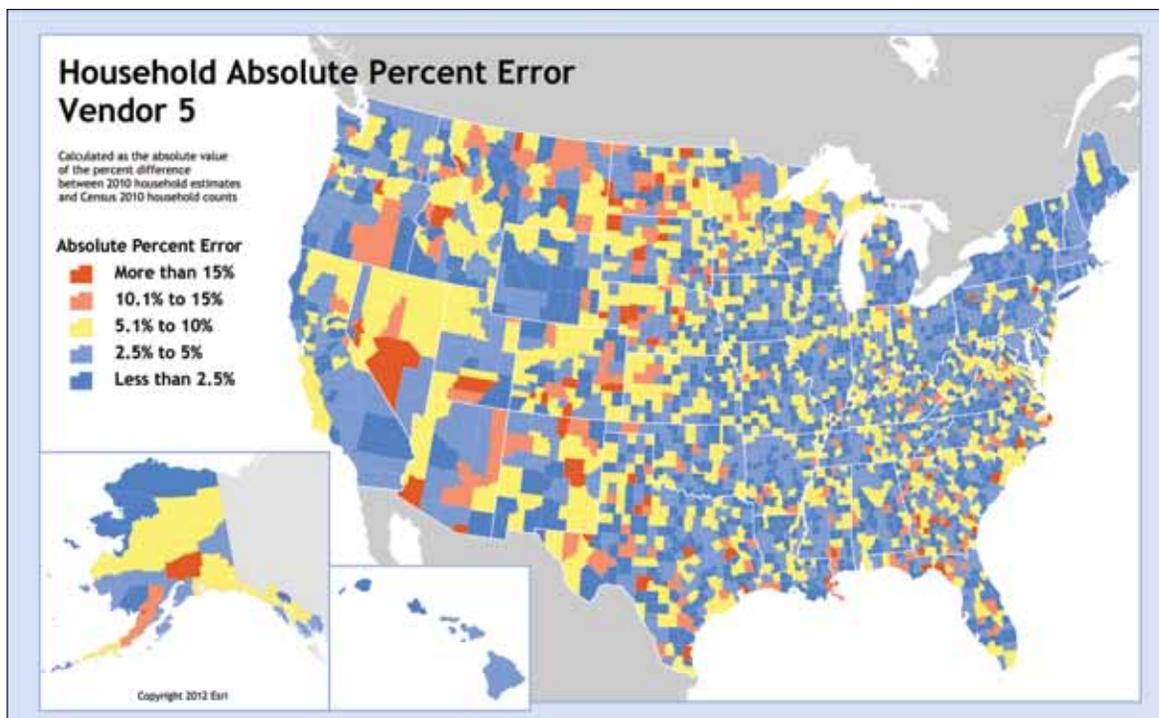
How the Study Was Conducted

Data was provided to the research team without identifying individual vendors or their update methodologies, enabling a completely blind study.

The researchers compared the Total Population and Total Households variables from Esri and four other major data vendors. The team conducted the study for the entire United States at the state,

Geography	Vendor 1	Esri	Vendor 3	Vendor 4	Vendor 5
Total US	315.9	247.7	276.7	295.7	304.7
State	21.4	12.6	17.9	19.3	29.7
County	49.2	39.8	52.1	46.5	55.7
Census Tract	263.3	242.5	252.3	266.4	255.5
Block Group	138.7	105.8	113.3	123.9	119.7

↑ The chart illustrates precision scores for each data vendor by geography. The lowest score indicates the most precise data—the highest accuracy.



← Inaccuracies in household data can have dramatic consequences for business. Companies that under- or overestimate consumers in an area could either miss expansion opportunities or lose dollars and market share by investing in an unprofitable area. This map of the United States by county was produced with data from vendor 5.

county, census tract, and block group geographies. All the vendors, including Esri, had created their forecasts using 2000 Census geography. To analyze the accuracy of vendor forecasts without modifying their data or compromising the original results, the researchers assigned 2010 Census counts to 2000 Census geography.

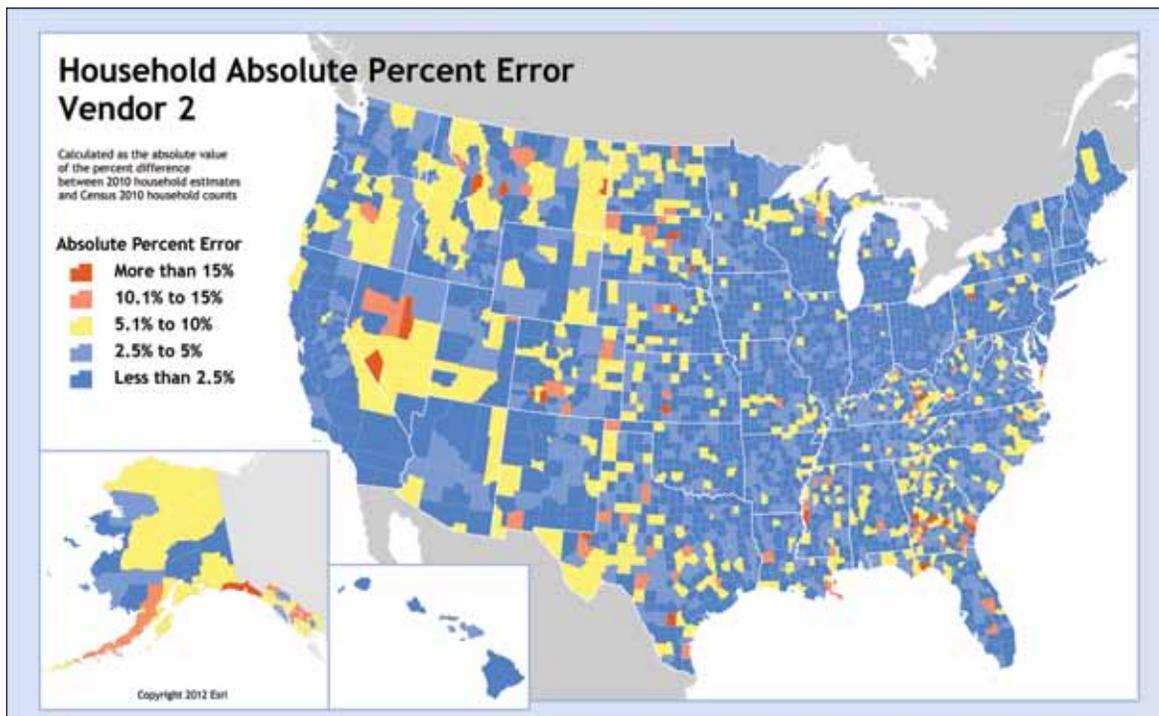
The research team investigated and evaluated a range of direct and supporting measures to assess vendor accuracy and reported the results as a scorecard. The scorecard was then used to measure forecast accuracy across three dimensions of accuracy—precision, bias, and allocation—to obtain a total (unweighted) score. The lowest score denoted the highest accuracy.

Precision measures the percentage difference between a forecast and a census count and is particularly accurate at measuring small-area forecasts. Therefore, because precision is the best single measurement of accuracy, it is discussed in the excerpted study report.

Esri Ranked First for Precision

The results are in—Esri ranked first for precision among the five vendors at each geography level. Esri's estimates were closest to the Census 2010 estimates, and Esri data was also identified as the most accurate overall.

The researchers noted in their study summary, "After reviewing the results for all quartiles at all levels of geography, it is concluded that Esri had the lowest precision error total for both population and households. The results also show that at smaller levels of geography, which are more difficult to forecast, Esri tends to perform even better, particularly for households."



← Household data from vendor 2 (Esri) was used to produce this map of the United States by county. Many areas across the country show very low error percentages.

What Does This Accomplishment Mean to Data Users?

The study proves that Esri's update methodologies produce the industry's most accurate demographic data. Users can be confident that Esri's Updated Demographics data will provide them with the best possible analysis results.

Esri's Data Development Team

With more than a century of combined experience, Esri's data development team is composed of geographers, demographers, statisticians, economists, and programmers. The team has compiled a distinguished record of producing innovations to Esri's demographic update methodology to continually improve the accuracy of the data.

How to Access Esri's Updated Demographics Data

Esri's Updated Demographics data is available as a database in a variety of formats including, but not limited to, shapefile, file geodatabase, and Microsoft Excel. Updated Demographics data is also available in Esri Business Analyst Online, Community Analyst, Esri Business Analyst for Desktop, Esri Business Analyst for Server, the Business Analyst Online APIs, and the Community Analyst APIs.

To learn more about Esri's Updated Demographics data, visit esri.com/demographicdata.

Expense or Essential Investment?

Looking at the Value of GIS Training

By Suzanne Boden, Esri Training Services

Given what seems like a constant stream of conflicting economic news, it's not surprising that some organizations have a hunkered-down, wait-it-out mentality. Scrutinizing purchase requests and paring budgets to essential spending is the fiscally responsible way to operate these days. However, it begs the question: What is "essential" spending?

Howard Community College in Columbia, Maryland, offers customized training for business and work force development. It cites research and benefits to make the case that training is essential spending and posit that by investing in training, organizations will see returns in a variety of areas.

Employee Performance—Improvements in productivity, morale, motivation, and problem-solving skills accrue from training.

Employee Retention—Employees that feel valued and productive are less likely to leave. Hiring and training new employees is expensive and time-consuming.

Cost Savings—Trained employees make fewer mistakes. This results in

less duplication of effort. Trained employees can do more work in less time than untrained employees and require less supervision.

Increased Profits—The less time managers spend answering employee questions about how to complete tasks, the more time managers have to focus on customer management, new revenue opportunities, and more efficient ways to do business—items that increase profits. Increased customer satisfaction resulting from higher-quality work produced by trained employees also helps retain existing customers and win new ones.

In many ways, the benefits of GIS mirror those of training. Improved productivity, operational efficiencies, problem solving, and business decision making are important reasons organizations invest in GIS technology. It's not a stretch, then, to say that investing in training is essential to realize the full benefits of GIS. The staff who create, manage, and use the GIS data, maps, and applications are contributing to the success of the organization as a whole. To realize the greatest returns

3D Visualization Techniques Using ArcGIS 10 by Esri

Virtual Campus 

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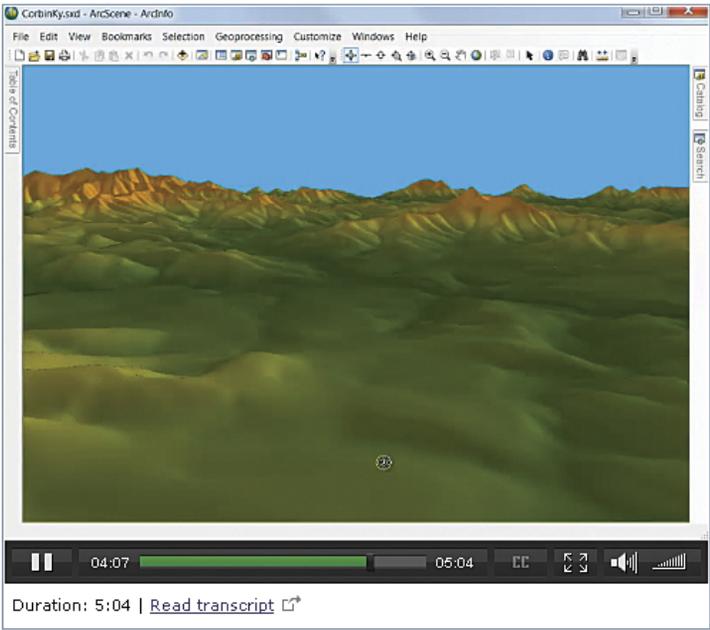
Introduction

- Data used for 3D visualization
 - Z-values
 - Raster data
 - Triangulated irregular networks (TINs)
 - Terrain datasets
 - Multipatch features
 - 3D features
- 3D navigation basics
- Identify data types
- Techniques for defining base heights
 - Base heights
 - Set base heights for raster and feature data (ArcScene)
 - Set roles for 3D layers (ArcGlobe)
- Techniques for enhancing 3D views
 - Enhancing 3D scenes within ArcScene**
 - Vertical exaggeration
 - Illumination
 - Set vertical exaggeration (ArcScene)
 - Set illumination and background color (ArcScene)
- Generating 3D objects from 2D features
 - Extrusion
 - Extrude buildings and wells (ArcScene)
 - Extrude parcel values (ArcScene)
 - Extrude buildings (ArcGlobe)

Review

Enhancing 3D scenes within ArcScene

In the following video, you will see how to enhance 3D scenes within ArcScene.



Duration: 5:04 | [Read transcript](#)

[Read transcript](#)

↑ ArcGIS 10 web courses feature demos, graphic slide shows, and interactive activities designed to reinforce key concepts; are shorter (about three hours); and incorporate adult learning principles that emphasize problem solving and applying the software to complete realistic workflows.

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from a GIS investment, staff must understand capabilities (and constraints), efficient workflows, and best practices to achieve the desired results.

As the end of the year approaches, most organizations are well into 2013 budget planning. Next year's economic forecast is uncertain, but cost consciousness will remain. There are two Esri training solutions that can help organizations get the most value while maximizing the benefits from training investment: the Virtual Campus Annual User License and the Esri Training Pass.

Virtual Campus Annual User License

A Virtual Campus Annual User License provides one year of organization-wide access to the full catalog of Esri-authored web courses at a reduced price. Web courses are a convenient way to learn a variety of topics related to GIS, ArcGIS, and technologies such as Python scripting. Because courses are available 24/7, employees can take training during downtime or when they need to prepare for new projects.

While valuable to help GIS staff keep their skills up-to-date, web courses can also be a useful training option for knowledge and administrative workers who have no GIS experience. In just a few hours, these workers can expand their skill sets and be empowered to contribute more to the organization's bottom line.

Mark Nowak, GIS manager at the City of Dover, Delaware, is taking advantage of the city's annual user license to help non-GIS staff develop new skills. "One office assistant was able to pull occupied and vacant mobile home data for a recycling initiative from a program originally created for permitting," Nowak said. "I was surprised with how much she had learned. When I asked her to perform a task, she was able to do it without asking for help."

Esri Training Pass

The Esri Training Pass is the newest way to purchase training from Esri. As with a Virtual Campus Annual User License, it is purchased once and then used to train as many as needed. With a Training Pass, purchase the number of training days needed and redeem them throughout the term for any combination of instructor-led training, client coaching services, and Virtual Campus Annual User Licenses.

For managers, one of the beauties of the Training Pass is that it eliminates the hassle of dealing with individual purchase approvals throughout the year. With training days in place, managers can provide access to training as it is needed—to support staff development plans, prepare key staff for upcoming projects, bring new employees on board, and respond agilely to those executive mandates for new GIS products or applications that crop up from time to time.

So there's reason for optimism as the new year approaches. By demonstrating that training bolsters the bottom line, even the most cost-conscious executive can be persuaded that GIS training is an essential investment, one that will reap dividends throughout the fiscal year and beyond.

Enriching Enterprise Systems continued from page 9

those systems; if Microsoft SharePoint is the mission-critical solution, Esri Location Analytics makes it better. As we all know, Microsoft Office is pervasive in business. Esri Maps for Office delivers far more than an Excel mapping plug-in. It provides a complete mapping system including collaboration.

The point is that there is no one-size-fits-all solution for business, and the breadth of the Esri Location Analytics portfolio allows flexible deployment of spatial capabilities, enhancing the mission-critical enterprise information systems, whatever these may be.

Killick: Enterprises can use location analytics across their organizations in new ways and get the most from their investments in enterprise IT and GIS. Certainly, companies are going to use location analytics to expand on their traditional use of GIS, like in a real estate planning department of a retailer that needs to make better decisions about where to open or close a store.

But we expect to see the finance department tie into the GIS system and spatial data using location analytics from spreadsheets. GIS analysts are going to create useful data and map layers that let non-GIS professionals, knowledge workers, and anyone in the organization start to use location and geography to make better business decisions. With location analytics, anyone can start to understand the overall performance of their organization, and those people who need to find places that should be doing better or where there's opportunity for growth

can start to answer those questions for themselves using the tools they are most familiar with, like Microsoft Office or a BI dashboard. Marketing departments can use it for customer intelligence, analyzing who the best customers are by finding out information about them. There're many questions that can be answered. How do we reach our best customers? When we geotarget them, what message would resonate best? Or, where are the highest concentrations of people who look and behave like my best customers? Using a nonsiloed approach across an organization means businesses can start to make consistent decisions based on consistent data.

Richardson: The users of location analytics are different from traditional GIS users. How is this influencing your thinking?

Ovens: The most important thing to keep in mind is that we are taking the most intuitive and useful GIS capabilities and content to the users of other information systems and packaging them up in new ways. The key is to ensure ease of adoptability for these users. These users are already doing a job, answering key business questions and making sense of data. We're just enhancing their ability and capacity to get better answers and address new questions. Minimizing training and user ramp-up time is a crucial design criterion for the Esri Location Analytics suite of products, so all our products adopt the workflow and user experience they are already familiar with. In fact, there's often nothing "new" to learn.



↑ Add complementary mapping and spatial analytics to your mission-critical business systems.

Killick: You are right—typical location analytics users are not GIS users or analysts. They don't work in GIS departments. They are business-people. They are knowledge workers. Many of them have never even heard the term GIS or know what it stands for. Typical users will spend much of their day using standard business productivity tools—Excel, Word, or PowerPoint. Some of them may spend most of their day using business intelligence tools and running reports. This is the group that is going to drive the uptake of location analytics.

There will also be a subset of customers who use very sophisticated tools and want to expand them. These are the professional analysts—they'll spend most of their day creating financial models in SAS or SPSS or perhaps authoring BI reports for the rest of their organizations. Our products are also designed to appeal to this group—that's why we don't have a one-size-fits-all approach. Our audience needs to create impactful, insightful reports and presentations for senior management; adding mapping and geographic analysis dramatically expands what they are doing now. Many of the users will be accustomed to using simple mapping tools and consumer technology, so Esri's location analytics is ideal for this segment.

Understanding the different types of users is affecting our thinking in a number of ways. The most important point we have to keep in mind is to bring location analytics to the end users rather than force them to leave their familiar environments and learn about something called GIS. Successful adoption of location analytics has to be nondisruptive to people's workflows and workdays.

Secondly, people don't have the time or desire to learn software; they just want it to work. They expect their business applications to be as easy and intuitive as their best consumer applications on their iPad or smartphone. When people use location analytics, they expect to understand it immediately and use it. That's what we are giving them.

While we are focused on the everyday business users and knowledge workers who spend their days working in Excel or with BI, we also have to cater to the professional analysts. These users need power and flexibility to perform ad hoc queries or create sophisticated models. We have to give these users what they need too, but at the same time keep it extremely intuitive and, hopefully, fun.

Richardson: Do you expect Esri maps for other products to come out of the development center?

Ovens: Yes, we will continue to expand our Esri Location Analytics portfolio of products. We'll add new enterprise systems to the list and cultivate our partner community to create enabling technologies on top of them. We believe there's a lot of opportunity to take these programs and add to them, creating new business solutions and market coverage that our customers are demanding of us. A lot of our partners really have a deep understanding of the business process, and they'll be creating a whole expanded set of applications on top of what Esri does.

Killick: We're currently working on map enabling the whole Office experience. This is called Esri Maps for Office, which is much, much more than a simple add-in. It will give users access to a complete mapping system that they'll be able to use across their organization, enterprise-wide. This product not only enables them to create dynamic maps of data directly from within Excel but also allows them to add interactive maps of data in PowerPoint presentations. And like the best of today's software, it allows users to easily store and share their maps, work, and analysis in the cloud

“Successful adoption of location analytics has to be nondisruptive to people's workflows and workdays.”

so they can easily embed them in web and mobile applications without any programming.

Earlier this year, we released Esri Maps for IBM Cognos. We're currently exploring providing similar functionality for other BI platforms to fill the gaps where we don't have a solution from Esri partners. For example, APOS has a similar product to Esri Maps for IBM Cognos that connects to SAP and BusinessObjects. We are going to focus on other BI and ERP [enterprise resource planning] platforms and help Esri's partner community grow.

We're also engineering the Esri Location Analytics platform so ISVs [information service vendors] can take full advantage of it in their own systems and products. By leveraging Esri's cloud offerings, companies will be able to quickly embed Esri Location Analytics in their own applications. And, of course, the platform can also be installed behind a firewall if security policies demand it.

In addition to the above, we will continue to provide a location analytics product for SharePoint called Esri Maps for SharePoint as well as expand with vertically focused products like Esri Business Analyst and Esri Community Analyst.

Richardson: What macro trend do you think is most influencing the adoption of location analytics?

Ovens: Unlike 20 years ago, the world now understands the notion and power of a digital map. This is driving not only acceptance of location analytics solutions but also actually driving demand. Line-of-business executives and even CEOs want to see their information on a map. It is no longer simply a nice thing to have; it is essential.

The acceptance of the cloud as a platform for both capabilities and content will continue to drive the adoptability and pervasiveness of location analytics.

Killick: The consumerization of web mapping has been a huge influence. This started in the late '90s with the introduction of MapQuest and was taken to the next level with Google Maps and the Google Maps API. More recently, though, it has been most influenced by the mass adoption of smartphones and tablets and the location applications that have come along with that. It moved from being about maps to doing business with maps. People are starting to expect maps. People are generally very, very excited just to see their own data on a map. However, as I've tried to communicate above, location analytics is about much more than just mapping. Yes, it's about dynamic mapping and visualization of your data. But it's also about spatial analytics for interrogating data in a whole new way, and it's about data enrichment, for getting the context of the people, places, and companies in the areas where businesses operate.

For more information, visit esri.com/locationanalytics.

Big Data—What’s the Big Deal? continued from page 1

definition of big data. What is really interesting is finding ways to take advantage of big data to drive better business outcomes, according to Gartner. So how does one extract value out of data that is terabytes large (or larger), at scale, on both a geographic and a practical level? How does one store all this data? And how does one achieve results that are meaningful to the organization and its customers? These are a few of the challenges of big data.

The good news is that there are a growing number of technologies that allow individuals to store and conduct analyses on the three Vs of big data. For example, MapReduce is the original set of distributed computing ideas now embodied today as Apache Hadoop. Other big-data-related technologies include Apache Cassandra, Hive, NoSQL, and MongoDB, just to name a few. Also emerging are applications or methodologies used to perform data mining and analyses on big data via pleasing dashboards and an intuitive user experience (UX).

A residual effect of the growth of these offerings is the increased demand for workers with blended skill sets to fill the role of a data scientist—half research scientist, half data analyst.

Enter serious business analytics.

To put the potential for big data into perspective, in 2011, GigaOm shared a few interesting examples of real-world situations where big data problems were solved:

- A New York University PhD student conducted a comprehensive analysis of several terabytes’ worth of Wikileaks data to determine key trends around US and coalition troop activity in Afghanistan.
- A global nonprofit analyzed 80 million documents to confirm validity of the Guatemalan genocide of the 1990s.
- A California genomics company consumed over 100 million gene samples to predict markers for coronary artery disease.

It’s unsurprising and quite a natural progression that the discussion of big data arrives on the heels of cloud computing. The cloud allows organizations and agencies to store a tremendous amount of data

Mining location data from information and making sense of it are perhaps two of the biggest challenges faced with big data.

in a highly reliable system in a distributed environment. The cloud provides the ability to scale dynamically, leverage existing algorithms for analyses, and take advantage of robust data center hardware, cost-effectively, without building from the ground up.

Esri has been testing Amazon Web Services’ (AWS) Elastic MapReduce product and deploying prototypes on the AWS cloud as well as exploring and providing MongoDB examples to plug in NoSQL data sources to ArcGIS. More visible is Esri’s geospatial analysis of Tweets generated from Twitter and collected through big data partner Gnip. There are examples of social media monitoring via public information maps, where Tweets are captured and displayed across relevant geographies. Other Esri partners currently in the big data space are Microsoft, IBM, TerraEchos, and CloudTrigger.

Every organization sees its data as core assets that drive business and decision making. Mining location data from these assets and making sense of it are perhaps two of the biggest challenges faced with big data. Typically, this information is randomly collected and then locked away. Access is limited, or the data is archived and forgotten. A more democratic platform, such as ArcGIS Online, can be used to greatly increase the speed of understanding and sharing of location data assets. As a result, individual users are empowered with the information they need to make the most effective and innovative decisions, affecting the future of government and society, science and business.

That is the big deal about big data.

A Retail Winner continued from page 6

interview with Sam’s Club executives.

BAO: Tools for Future Executives

The experience of competing and meeting business leaders at the diversity conference “opened doors for me and taught me that an education is important, but having the skills to talk to people in a competitive environment is also important,” said Carmona. “I enjoyed the work and seeing what we could accomplish.”

Added Martinez, “This experience showed me how I could come up with ideas, be creative, and do well. It actually encouraged me to study marketing, and I’m considering careers in retail, marketing, and marketing research.”

“I realized that I could really do this,” said Vasquez, who is interning at a financial investment company. “I gained confidence in what I could do—what I could accomplish.”

“I’m very proud of what our team was able to accomplish and hope that we can work with Sam’s Club on other projects that will provide

real-world experience for our students,” said Anicich. “It turned out to be an amazing experience for all of us.”

“As these students have exemplified, accessing key consumer data and presenting it as actionable intelligence is something that any business professional—no matter the size of the organization—can do,” said Simon Thompson, global director of commercial solutions at Esri.

Learn more about Business Analyst Online and try it free for 14 days at esri.com/BAO.

USC Moore School of Business and EDENS use Business Analyst for MBA Project continued from page 7

and competition. Organizations use Business Analyst for Desktop to improve decisions about consolidations or expansions, determine the effect of changes in consumer behavior on existing business models, and explore opportunities driven by economic factors and changes in marketplace.

David Beitz, GIS director at EDENS, says that retail real estate benefits greatly from the advanced data and tools accessible from GIS: "Business is the fastest-growing sector in GIS, and retail real estate in particular is well suited to benefit from the analysis and presentation functions of GIS. There is an entire new classification of work being done here that I call retail geographics. It's part site selection, part market research, and part demographics, mixed with the emerging location intelligence field. Retail geographics is all about using GIS to help retailers and shopping center operators pull together all the information needed to make better location decisions."

EDENS is headquartered in Columbia, South Carolina, near USC's main campus and has been using Esri's Business Analyst GIS software for more than 13 years to help lease and develop shopping centers. Beitz says the partnership helps both organizations. "Leasing is critical to our business, and to have

these MBA students approach the leasing process from an analytical perspective using GIS is very interesting. We get to see how the students approach the problem; how they research the market and the universe of potential retailers; and finally, how they present their cases. The students then get feedback from EDENS's leasing representatives on how various retailers have responded to the locations and sometimes which retailers they are in talks with now."

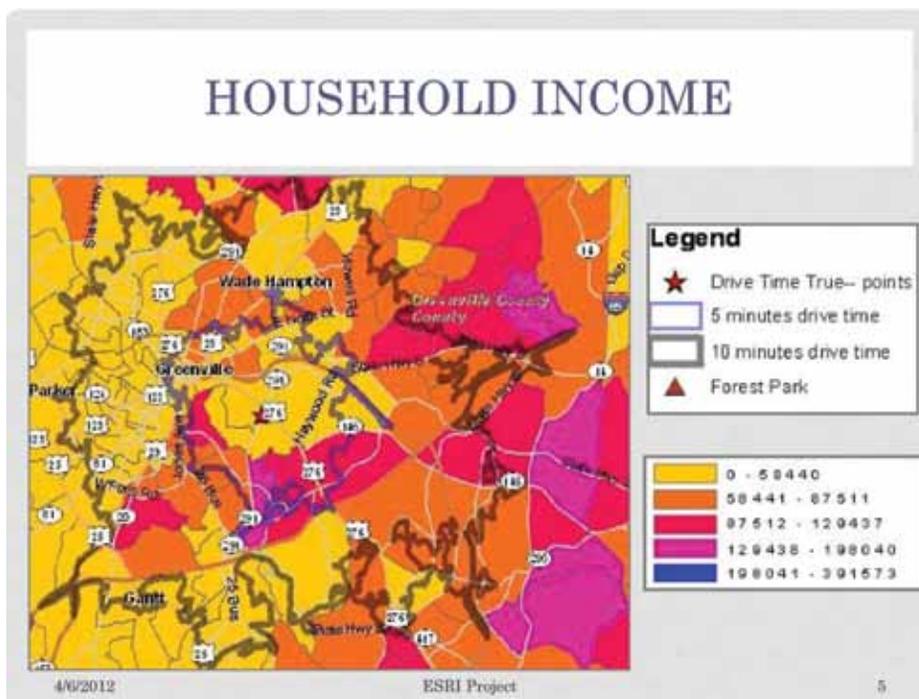
Galbreth agrees. "The EDENS partnership provides the link to the real world that is so important in all business classes. EDENS provides a context in which each student team can hone their GIS skills. In addition, EDENS experts attend the final student presentations. Their feedback and the discussions during the presentations are always some of the highlights of the course. Students love the opportunity to hear from experts that are using these tools every day. There have been so many good presentations over the years. My favorites are the ones where the EDENS folks reveal after the presentation that the business proposed by the students is exactly the one that EDENS has determined as the ideal target. Other times, the students have presented an out-of-the-box idea that was

very well justified by careful GIS analysis. I like to think that the EDENS experts have gotten some fresh ideas from a lot of these proposals."

About the Author

George Daigh was the GIS project manager for EDENS. He has performed GIS analysis, market research, and marketing work in the retail real estate industry for more than five years. Having experience with demographic analysis, site selection, and location marketing, he integrated retail geographics into the daily operations of leasing, development, and acquisitions at EDENS.

George Daigh is now with Beitz & Daigh Geographics, Inc., and can be reached at gdaigh@beitzanddaigh.com.



← Students are able to understand market potential based on household income and drive time by integrating and viewing this data on a map created in Business Analyst.



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