Smart Community Delivers Real-Time Election Results

First Step on County's Journey to Deploy ArcGIS for Local Government Apps

GIS staff in the County of Fairfax, Virginia, are beginning to use ArcGIS for Local Government applications. They want to rapidly create applications that the public can use to access county data and services. For the midterm elections, they implemented their first one—the Election Results application (esriurl.com/results102).

"We were excited about delivering continuously updated results on election night," said Greg Thomas, GIS data administrator, County of Fairfax. "It's something the Office of Elections [staff] hadn't done before, and they were thrilled with the idea of providing results in map form."

Out-of-the-box capabilities drew the team to the Election Results application template, which they modified slightly with additions like a feedback button. Election results data was being published every 10 minutes.

"It is much easier to see the race results on the map instead of looking at a spreadsheet, which is all the county offered in the past," said Matthew Miller, spatial analyst, County of Fairfax.

The free ArcGIS for Local Government application template gave the GIS staff the best way to create the results viewer they wanted in a few weeks. "I didn't need to go to our staff and ask them to build something from scratch," said Miller. "It's out there—we just migrated our data to the ArcGIS for Local Government data model and it worked. It was quick and easy."

On election night, the app averaged 800 unique visitors per hour. The public could see precinct-level voting results for all contests on a precinct's ballot, bar charts showing voter turnout and which votes were cast, and social media links for sharing results.

"We ended up increasing our server capacity because it was getting so many hits," said Thomas.

To promote the app, the county used Twitter and Facebook in addition to mentioning it in a county newsletter. It is also on the Fairfax Geoportal (www .fairfaxcounty.gov/maps/geoportal.htm), which provides streamlined access to the county's interactive mapping applications.

For more information, contact Greg Thomas, GIS data administrator, County of Fairfax, at Gregory .Thomas@fairfaxcounty.gov.
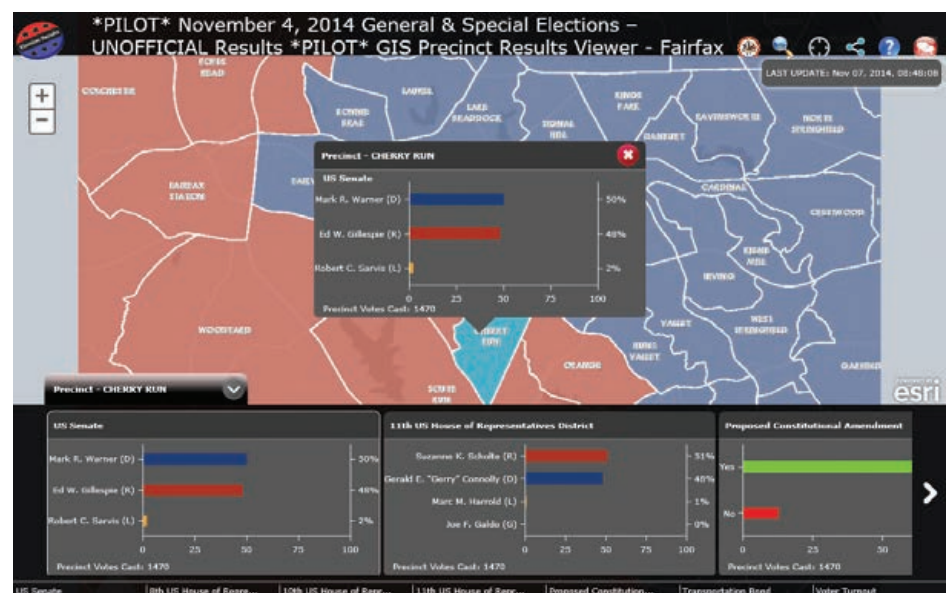
↑ The County of Fairfax, Virginia, used a free ArcGIS for Local Government application to deliver results on election night. Each precinct is shaded based on its winning party, and bar charts indicate race results within the precinct.

Contents

Apps for Sustainability

In October 2014, Esri and the International City/County Management Association (ICMA) hosted a whiteboard exercise at Esri headquarters in Redlands, California. At this one-day event, members of local governments gathered to give Esri and ICMA insight into the apps they need to make their communities more sustainable.

The information gathered from this event will help Esri develop the specific apps governments need most. Esri and ICMA will also share these needs with the public so developers can create solutions that better serve government sustainability efforts.

To get more information on this event and Esri and ICMA's #LocalGovTechnology Alliance, visit esriurl.com/ICMATechAlliance or contact Esri director of government marketing, Christopher Thomas, at cthomas@esri.com.

Government Participants

City of Dubuque, IA

City of Fort Lauderdale, FL

City of Davenport, IA

City of Redlands, CA

Middleton Township, NJ

Town of Basalt, CO

City of Sacramento, CA

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Community Profiles Dashboard Informs Health Decisions

Arizona Department of Health Services Turns to Mapping for Improved Analysis

"What makes the new Community Profiles Dashboard revolutionary is the way you can access, sort, and analyze the information. You can zero in on key indicators related to your mission or concerns and drill down to the community level to determine where to focus your resources."

Will Humble, Director,
Arizona Department of Health Services

The Arizona Department of Health Services (ADHS) was set up to promote and protect the health of Arizona's children and adults. Its mission is to set the standard for personal and community health through direct care, science, public policy, and leadership. The ADHS carries out initiatives in diverse areas such as behavioral health; disease prevention and control; health promotion; community, environmental, and maternal and child health; emergency preparedness; the regulation of child care and assisted-living centers and nursing homes; and hospitals and emergency services.

One important area of focus for the ADHS is data monitoring and community profiling. Will Humble, director at ADHS, says, "If you are a community planner and you want to see where there are higher rates of diabetes, heart disease, and hypertension, you can compare data from the last four years to see how different areas have changed. This information can be very useful in how you plan for the future."

However, collecting health indicator data has been challenging in Arizona for a number of reasons. Arizona is not just the sixth largest state in the United States, it also was the second fastest-growing
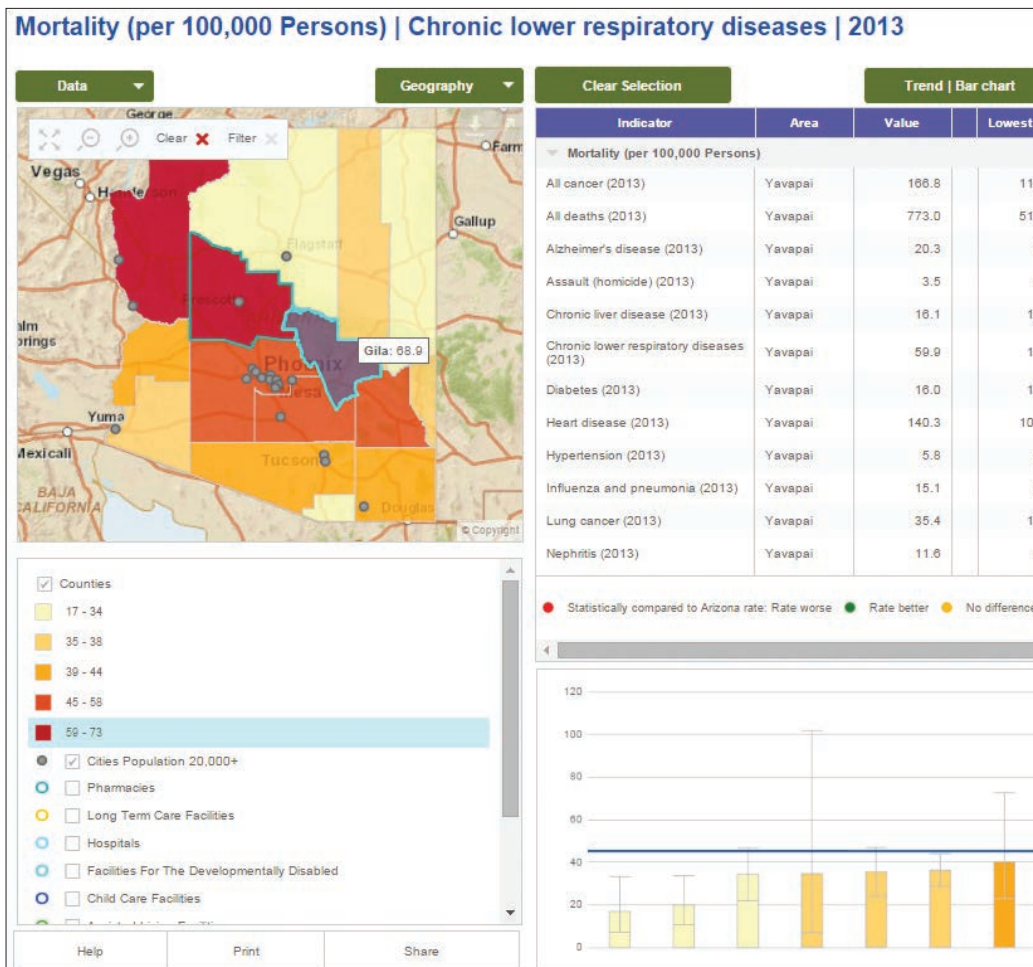
→ The Arizona Community Profiles Dashboard includes four years of data collected for a wide range of public health indicators such as mortality rates from chronic lower respiratory disease. Data can be viewed by county or primary care area.

state in the 1990s. In addition, its population is disproportionately spread across the 15 counties of Arizona, with Maricopa County, where the state capital Phoenix is situated, accounting for 60 percent of the population.

The state's demography has a significant impact on the ADHS's role in terms of community profiling. This is because population density plays a large part in how the department is able to highlight significant trends. This presents a significant challenge for any organization that needs to show detailed analysis at anything below county level.

The initial trigger to resolve this issue was a 1988 law that directed the ADHS to use the data in the cancer registry to identify areas and populations that require further investigation. The state-collected cancer data was not complete enough to provide a look at rates on a relatively small geographic scale, limiting analysis to the county level.

Given the disparity in population numbers between the counties of Arizona, the initial analysis was not sufficiently detailed. So the ADHS created 126 Community Health Analysis Areas (CHAAs). Each CHAA was built from the 2000 US Census block groups and typically contains approximately 21,500 residents. These were then unified with existing Primary Care Areas (PCAs) to enable the ADHS to present data at a geographic scale smaller than the county level.

The next step was to find a way to present the cancer data in a visually meaningful way. The team hoped that this would put an end to the ad hoc requests for custom analysis it had been receiving. It would also mean data could be more easily shared with non-GIS professionals such as researchers and the public. The department leaders decided to use InstantAtlas visualization software from GeoWise, an Esri partner. Using interactive mapping software would help community planners ensure that spending meets local need.

The Community Profiles Dashboard has now been developed beyond using just the cancer data and includes four years' worth of data for a wide range of public health indicators. These are grouped into four areas: mortality, infant mortality, natality, and demographics. The dashboard allows users to drill down to individual PCAs and select indicators

that are then given a red, green, or amber rating, depending on whether the chosen indicator is higher than, lower than, or at the Arizona average.

"What makes the new Community Profiles Dashboard revolutionary is the way you can access, sort, and analyze the information," says Humble. "You can zero in on key indicators related to your mission or concerns and drill down to the community level to determine where to focus your resources. What's more, the site is user-friendly and will work on a desktop or mobile device, like an iPad."

Humble continues, "Knowing this information could help you make a more informed decision about where the new community park will be built or where to locate a new bike and walking path. To improve the overall health of our communities, access to these kinds of services is vital."

Other partner organizations have started to take notice. For example, Well Woman intends to use the information to help the organization make grant applications for work with particular cancers. Other department programs have also expressed an interest in the way the data is presented, with a view to adopting the same approach. Humble believes the momentum is gathering behind the Community Profiles Dashboard and says there are more developments on the way.

For more information, contact Julian Tyndale-Biscoe, InstantAtlas, at julian.tyndale-biscoe @geowise.co.uk.

WATER UTILITIES

- Backflow Inspection
- Capital Improvement Planning
- Capital Projects
- Change Request
- Combined Sewer Overflow
- Data Reviewer for Water Utilities
- Drinking Water Advisory
- Fire Hydrant Inspection
- Green Infrastructure
- Inlet Inspection
- Manhole Inspection
- Map Note
- Mobile Map
- Network Editing
- Pavement Project Coordination
- Proposed Water Design
- Public Information Center
- Sanitary Sewer Network Map
- Sewer Service Lookup
- Social Media Sentiment
- Stormwater Network Map
- Utility Isolation Trace
- Valve Exercise
- Water Conservation Dashboard
- Water Distribution Network Map
- Water Main Leak and Break Response
- Watering Violations

PLANNING AND DEVELOPMENT

- Code Violation for iOS
- Community Planning
- Land Use Public Comment
- Land Use Public Notification
- Park and Recreation Finder

LAND RECORDS

- Address Data Management
- Community Addressing
- Community Parcels
- Data Reviewer for Addresses
- Data Reviewer for Tax Parcels
- Deed Drafter
- Parcel Value for iOS
- Tax Map Book
- Tax Parcel Editing
- Tax Parcel Viewer
- Tax Reverted Property

ELECTIONS

- Election Polling Places
- Election Results Viewer

FIRE SERVICE

- AED Inventory
- Fire Hydrant Inspection
- Fire Run Book
- Fire Safety Survey
- Fire Station Wall Map
- Pre-Incident Planning
- Special Event Planning
- Target Hazard Mapping

PUBLIC WORKS

- Bridge Inventory
- Campus Editing

EMERGENCY MANAGEMENT

- Common Operational Picture
- Damage Assessment
- Emergency Management Maps
- Flood Planning
- Incident Briefing Map
- Local Impact Map
- My Hazard Information
- Special Event Planning

LAW ENFORCEMENT

- Cell Phone Analysis
- Field Interview
- Pre-Incident Planning
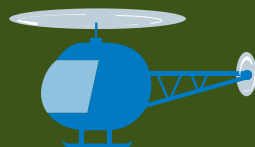- Public Safety Incident Maps
- Special Event Planning

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[GOV]ERNMENT

- Briefing Book
- Data Reviewer for Basemaps
- Executive Dashboard
- Local Government Basemaps
- Local Government Information Model
- Local Government Model Organization

Value Analysis Dashboard

FISH AND WILDLIFE
- Hunting License Locator
- Water Access Locator
- Wildlife Management Area

ECONOMIC DEVELOPMENT
- Enterprise Zones
- Live, Work, Locate

TRANSPORTATION
- Railroad Inspection
- Transportation 511

- Campus Place Finder
- Citizen Service Request
- My Government Services
- Road Network Management
- Plans and Drawings
- Public Parking
- Road Closures
- Road Maintenance Agreement
- Sidewalk Inventory
- Sign Inventory
- Signal Inventory
- Snow COP
- Streetlight Inventory

ENVIRONMENT AND NATURAL RESOURCES
- Park Locator
- Permit Inspection
- Permit Status
- State Trail Locator

EMERGENCY MANAGEMENT
- Common Operational Picture
- Damage Assessment
- Emergency Management Maps
- Flood Planning
- Incident Briefing Map
- Local Impact Map
- My Hazard Information
- Special Event Planning

[B]uilding [S]MART [COMM]UNITY

[s]martcommunities

ArcGIS for STATE GOVERNMENT

- Briefing Book
- Community Parcels
- Executive Dashboard
- Finder
- State Government Model Organization

HEALTH
- Birth Outcome Analysis
- Birth Outcome Briefing
- My Health Services
- Restaurant Inspections
- Restaurant Inspection Results
- Water Quality Inspection
- Water Quality Monitoring

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Utah Clears the Air

Utah, known for its natural diversity, is home to features ranging from arid deserts with sand dunes to thriving pine forests in mountain valleys. One of Utah's defining characteristics is the variety of its terrain. At the western base of the Wasatch Range is the Wasatch Front, a series of valleys and basins that is home to the most populous parts of the state. This area includes Salt Lake City and Provo as well as nearly 75 percent of the state's population.

Due in part to its unique terrain, Utah's low basins and valleys experience poor air quality on occasion during winter and summer. Research done by the Utah Department of Air Quality shows that more than 50 percent of the particulate matter in Utah's air comes from vehicle emissions. An average Utah driver travels 298 miles in approximately 60 trips per week, making traffic reduction one of the best ways to improve air quality. To compound the problem, Utah's population is consistently one of the fastest growing in the United States. With such population growth (and therefore exponentially more cars on the roads), there is obvious stress on the state's environment, in particular to Utah's air quality.

In 2008, Salt Lake City, in partnership with the Utah Department of Transportation (UDOT), organized the annual Clear the Air Challenge to reduce energy consumption; optimize mobility; and improve air quality, which ultimately improves the quality of life in Utah. In 2013, the Salt Lake Chamber assumed responsibility for the administration of the Clear the Air Challenge and started running the program in partnership with UDOT.

In 2014, the Salt Lake Chamber and UDOT made a strategic decision and chose the RideAmigos Transport Demand Management (TDM) software as a service platform to help them increase the impact of the challenge. RideAmigos gave the challenge's organizers the ability to monitor, manage, and set up various competitions and provide incentives and prizes to nudge people to make clever, more efficient, and environmentally friendly choices.

During the 2014 challenge, the partner organizations encouraged citizens to use the RideAmigos platform, available at cleartheairchallenge.org. The 6,800 people who used the platform during this time searched for real-time commute information; directions; and transportation options including biking, walking, and carpooling. Users were able to create open and closed networks for carpooling and ride sharing while tracking all their trips.

In total, participants saved more than $750,000 in gas and increased the total number of calories burned by 15,933,401 when they biked or walked instead of driving. In addition to helping participants save money and burn more calories, the RideAmigos interface helped make transportation smarter and more effective and had the added positive externalities of reduced traffic and less congestion, with a total of 2,199,978 miles logged on alternative transport modes, eliminating 651 tons of CO_2 emissions.

Additionally, through the ArcGIS Online geocoding services, RideAmigos delivered accurate location search results that were in close geographic proximity to users to ensure they would find the resources that were relevant to them. ArcGIS Online also provided unique data analysis and tools to illustrate commuting behavior and traffic patterns. ArcGIS Network Analyst services delivered clear driving directions.

By supporting and incentivizing alternative transportation, Utah Department of Transportation and the Salt Lake Chamber spurred a variety of social, economic, health, and environmental benefits throughout the region that has turned Utah's investment in transportation management into one of the most successful programs in America.

For more information, contact Prachi Vakharia at Prachi@RideAmigos.com.

Information courtesy RideAmigos, OpenStreetMap, Esri

Start-Ups You Should Know
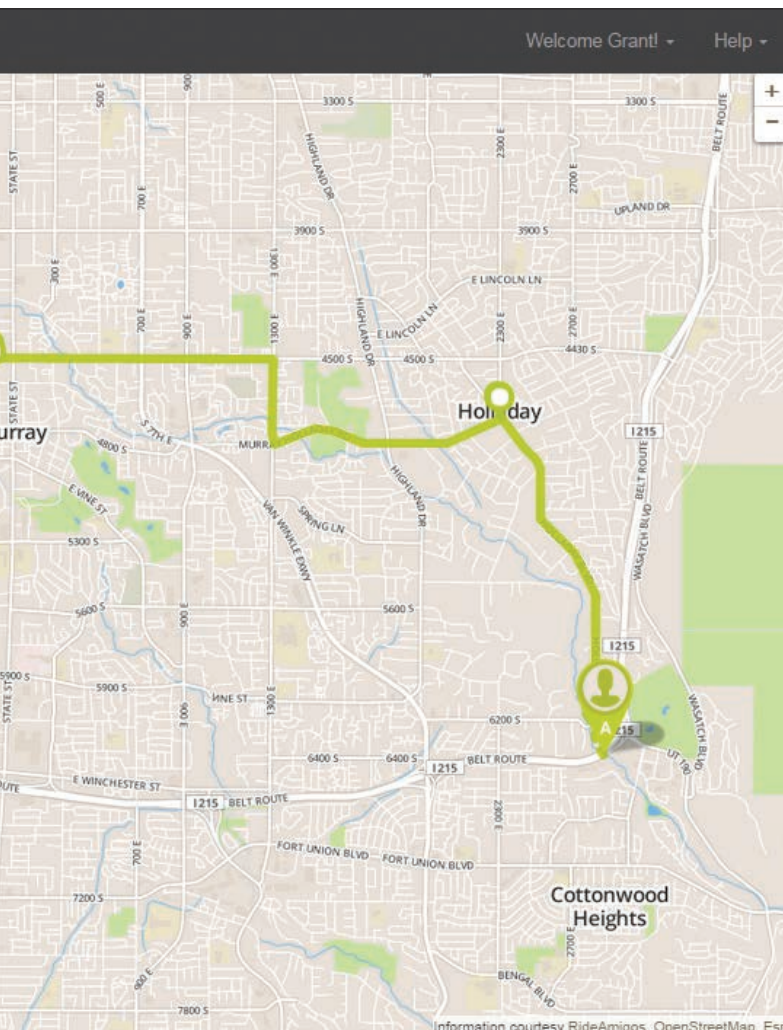
In addition to RideAmigos, Esri is working with other start-up companies to provide you with innovative, sustainable, and smart solutions for government. The growing list of companies includes the following:

Visit esri.com/start-ups to learn more.

Tapestry Segmentation Helps Agencies Identify and Reach Residents

New Segments Highlight Demographic and Lifestyle Changes

As the US population evolves, state and local government departments must meet the needs of an increasingly diverse and aging population. Changing household types, lower income, and reduced home values are among other changes that have also profoundly influenced how governments provide services. Savvy departments are well aware of these changes. To better serve residents in their jurisdictions, departments can use segmentation data to learn who their residents are, what they buy, how to reach them, and where to find more like them.

For more than 40 years, segmentation has been used to assist organizations with applications such as customer profiling and prospecting, site selection, direct mail campaigns and analysis, and territory analysis. Segmentation is based on the principle that people will seek others with tastes and lifestyles that are similar to their own—"like seeks like." For example, young singles would probably not gravitate toward suburban neighborhoods of seniors or married couples with children. As the lifestages of people change—singles marry, have children, become empty nesters, and retire—they move on to other neighborhoods where the residents share these lifestages.

A successful market segmentation system must be able to accurately distinguish groups among consumer behaviors. To supplement the demographic view of people in an area by age, income, employment, housing, or family type, segmentation data can provide an added dimension about their lifestyles and lifestages. Where can governments find this valuable segmentation information?

With more than 75 years of combined experience in building segmentation systems, Esri's data development team used its proven segmentation methodologies to create Tapestry Segmentation. The next generation of Tapestry reveals the diversity of the US population and can identify seniors, immigrants, people of different income levels, singles, college students, and those who are serving in the military. Tapestry's 67 segments accurately describe all the residential neighborhoods in the United States. The system combines the who of lifestyle demography with the where of local neighborhood geography. Users have a consistent view of the entire American landscape, seeing where important changes are taking place and where the population has stayed the same.

State and local governments must learn how to identify, locate, and communicate with population segments that are a growing influence in the United States, such as residents in racially and ethnically diverse areas and also different types of seniors.

As the baby boomers age and move into retirement, seniors are changing the US population. Tapestry Segmentation has identified six very different segments of seniors. Most of their lifestyles are dictated by age, income, and population density. Among these segments, seniors in Silver and Gold and Golden Years neighborhoods are active and affluent. Residents in Senior Escapes neighborhoods are also active but somewhat limited by their ailments. Seniors in Social Security Set neighborhoods live on low, fixed incomes in rented high-rise apartments.

Ethnic diversity is a commonality among other segments, although they differ according to age, location, affluence, family types, and housing. Tapestry captures many subtleties of these consumers. Barrios Urbanos, Valley Growers, and Fresh Ambitions are some of the new Hispanic segments of Tapestry. Residents in these three segments are young and married, have children, and may live in multigenerational households. Other differences occur in their education levels, shopping
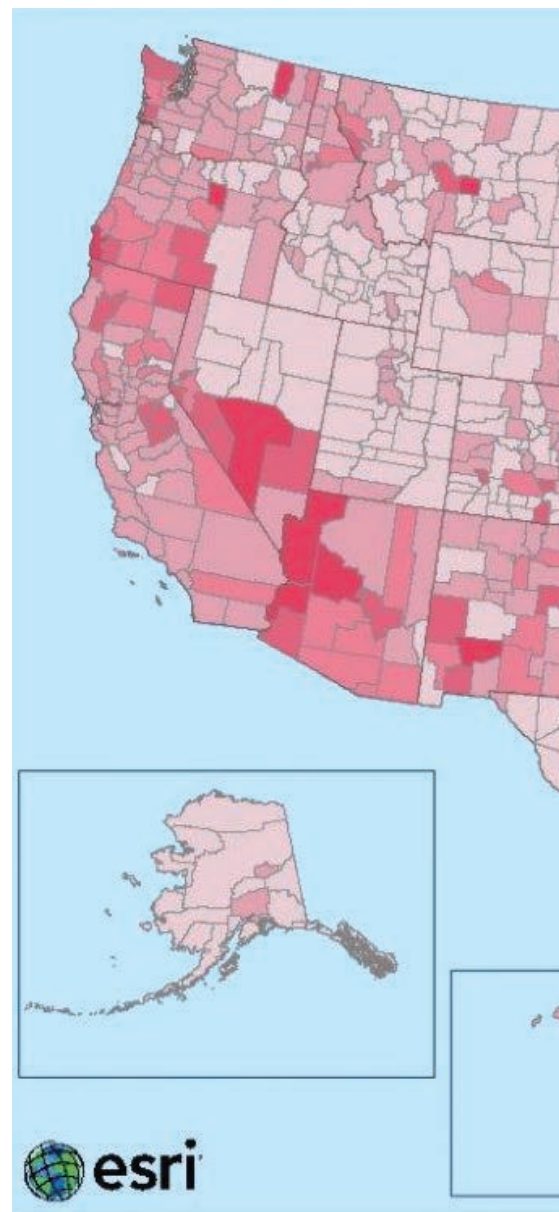
habits, product choices, and entertainment preferences.

Young people in High Rise Renters, City Commons, and Las Casas neighborhoods earn modest incomes, rent apartments in multiunit buildings, usually have lots of children, and stay connected with the folks in their countries of origin.
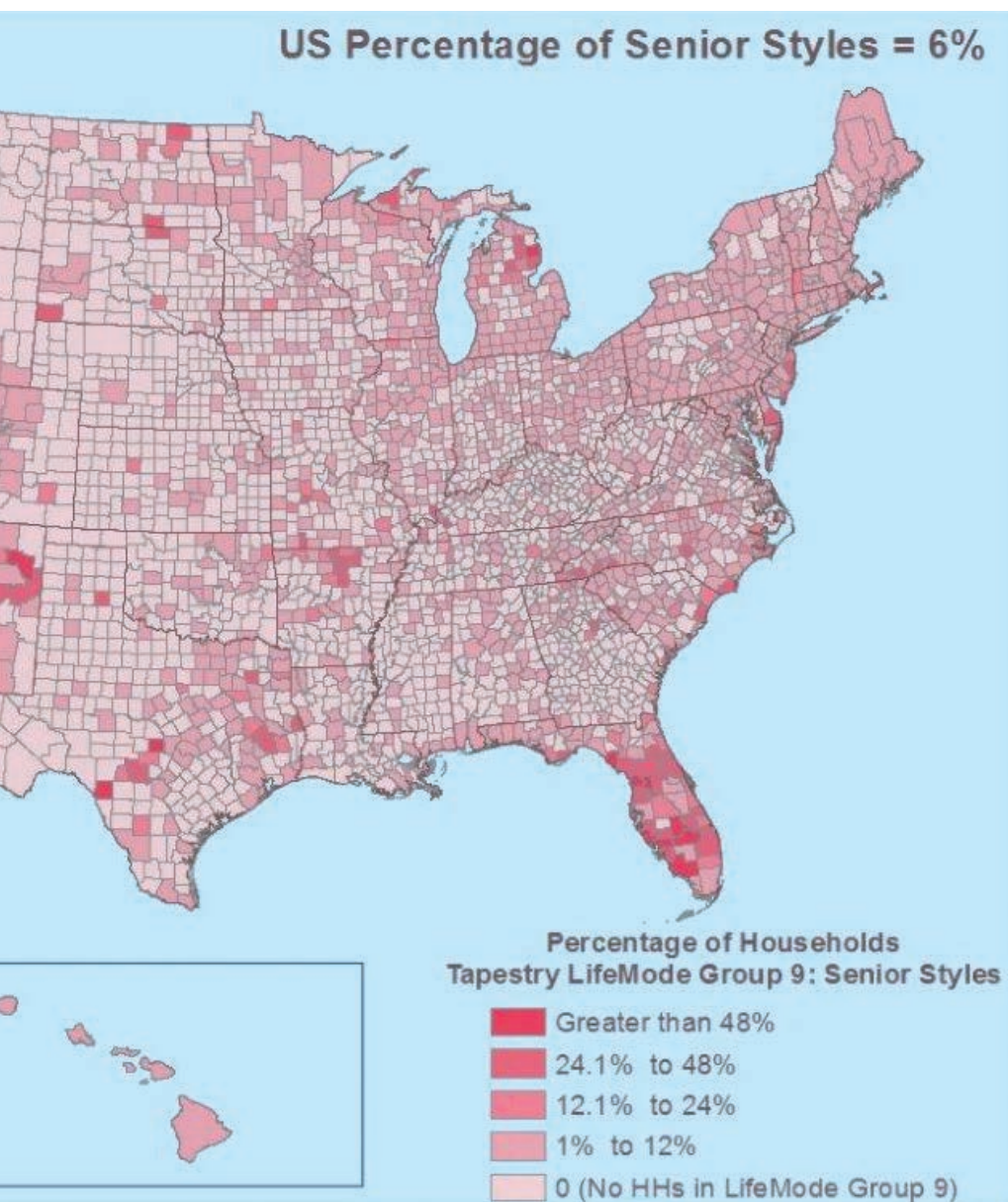
Another emerging trend is the increase of single households. Although an obvious commonality among people of these segments is their single status, differences occur in their ages, employment, incomes, interests, and locations in areas of varying population density. Residents of Laptops and Lattes, Trendsetters,

Metro Renters, and Old and Newcomers neighborhoods are some of the singles segments of Tapestry.

Income disparity covers segments with median household incomes that range from more than $200,000 down to less than $17,000. Top Tier, the wealthiest segment of Tapestry, has a median household income of $162,900, more than three times that of the US median. At the other end of the spectrum is Social Security Set, neighborhoods of seniors where the median household income is $16,300.

This type of information can be invaluable to agencies so they know which services to provide, where to locate the services, and the types of media and messaging that will reach each group of residents most effectively.

Esri Demographics data includes Tapestry Segmentation and is available in ArcGIS Online, Esri Business Analyst, and Esri Community Analyst, and through the location analytics products. Visit esri.com/tapestry for more information.

US Percentage of Senior Styles = 6%

Percentage of Households
Tapestry LifeMode Group 9: Senior Styles

- Greater than 48%
- 24.1% to 48%
- 12.1% to 24%
- 1% to 12%
- 0 (No HHs in LifeMode Group 9)

← This map of the United States by county shows locations of Tapestry's *Senior Styles* neighborhoods. The Villages, in Sumter County, Florida, one of the fastest growing areas in the United States, boasts the highest number of *Senior Styles* residents: 82.5% or 42,280 of 51,249 total county households.

The Future of the City

Geocentric Cities Will Be Better Equipped to Act and Respond in Real Time

By Jack Dangermond, Esri President

Over the past five decades, information technology has increasingly impacted local government by improving basic record keeping and automating selected workflow processes within focused applications areas. Shared enterprise-wide systems have largely been based on datacentric DBMS approaches by which information products (reports or views) were generated from integrated systems. Applications were largely in the areas of financial management; personal record keeping; and citizen services, like permitting and notification.

In the late 1990s, due largely to faster computing and services-oriented architecture, enterprise systems began to emerge that could dynamically combine data from multiple databases and support applications that pulled from distributed (departmental) systems, bypassing the need to do database normalization and integration. This distributed, federated architecture was dramatically expanded with the maturing and acceptance of web standards as a backbone for enterprise architecture.

A New Pattern

Today, the patterns of data mashups that dynamically join distributed data have been implemented and are helping to unify and integrate information from many sources.

Replacement of the traditional database design is focused on ensuring that there are common keys amid the distributed data, thus allowing for seamless integration. Leveraging these integrated datasets is a whole new suite of analytics that can perform tabular and statistical data manipulations as well as advanced visualizations.

Common to most data is some form of georeferencing to a place or area, for example, x,y coordinates, an address, a place-name, or a geographic area such as ZIP code or statistical area. The role of a modern GIS is to help associate geographic locations with tabular databases and provide tools that interrelate all this data, for example, associating a table of data about points (such as crime incidents) with a table of areas (such as police districts). Even more importantly, GIS provides many tools to analyze and visualize this data, turning it into actionable information that cities can use to improve services and quality of life.

The Future City

Future cities will be smart. From air quality to energy usage, from traffic to consumer spending, everything will be measured in real time and in fine detail through deployment of a sophisticated array of sensors. Faced with mountains of real-time data that they need to make sense of and act upon, cities will increasingly turn to GIS to help organize, analyze, and share this information.

In addition, cities' operational transaction databases will be exposed as web services. These services will be used to support a whole new world of online applications for cities, including operational workflows, analytics, and decision support. This means that the behavior of government will be closer to being in real time and more responsive to real-time information. Things like field surveys will be replaced with a massive network of stationary and mobile devices that measure and track everything that moves or changes. Crowdsourcing will be integrated and normalized as a particular source of information. This method will enable citizen reporting as well as employee surveillance and reporting of human observations and interpretations.

The services enabling operational data will mean that data can be easily connected and dynamically integrated. Processes that involve tasking and resource allocation will become more automated. For example, repairs, response to emergencies, and the deployment of police and other critical resources will become more responsive and rational.

Citizen interfaces to government services will increasingly be done on the web. The so-called e-gov revolution will mean consolidation and integration using web services that simplify all transactions with government. Citizen visits to city hall will become virtual.

GIS-based smart 2D and 3D maps will become the new user interface for communicating, integrating, analyzing, and understanding everything in and about the city. All databases will be geoenabled, exposed as web maps and web scenes, and available everywhere on any device. They will provide reports, tell stories, reference locational activities, provide a rational basis for analysis of complex situations, support place-based planning and decision making, and enable understanding.

Efforts such as the work in open-space planning and community action by the Trust for Public Land promise to provide a new scoring measure for open space and public access. This type of GIS-based scoring system will evolve into a framework for scoring everything in a city, providing an integrated, transparent, and comprehensive science-based framework that is the key to the city of the future.

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