Adapting to Changing ArcGIS for Server Technology - A City’s Vision

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About the City

- Virginia Beach Metropolitan Statistical Area (MSA) is the 38th largest in the United States, with a population of over 1.67 million.
- Virginia Beach is the most populous city in Virginia.
- Approximately 438,000 residents.
- City encompasses 307 square miles.
  - Land - 248 square miles
  - Water - 59 square miles
  - Beaches - 35 miles

Enterprise-Wide Geographic Information Systems (EGIS)

- Enterprise GIS Governance Model
  - EGIS Policy Board
  - Functional Teams
- CGIS and select departments - Support city’s geospatial data and needs
  - Key departments: Public Utilities, Public Works, Planning, Real Estate Assessor, etc.
- CGIS provides web mapping data/applications for the City
- Web Team – Supports public-facing applications
- Mobile Team – Supports mobile applications
GIS – Changing Architecture to Web Mapping

- Production
  - GeoMedia
  - ArcGIS Server 9.3.1, 10.2.2...

- Web Maps
  - Map Guide (Previously)
  - ArcGIS Server, ArcGIS Online… (Currently)

- Database Environments
  - Oracle – transactional DB – maintained by GIS production team
  - SQL Server – publication DB for web applications
Current and Future ArcGIS Products

• **ArcGIS Server**
  - 9.3.1, 10.2.2
  - ArcGIS Online for Organizations
  - Community Analyst

• **Future…**
  - Image Server, Geoevent processor, Business Analyst Online…
Web Mapping Applications

- **VBgov Maps** – Public facing
  - SharePoint, Google Maps, ArcGIS API for Javascript
- **City Map** – Intranet Enterprise
  - ArcGIS 9.3.1, ArcGIS 10.2.2, ArcGIS Viewer for Silverlight 3.2
- **Mobile Apps**
  - ArcGIS Online
  - SeeClickFix
  - Future - Xamarin and ArcGIS Runtime SDKs
Web Application Releases...

- **ComIT** (Applications Support) - IT
  - VBgov - Internet (Public Facing Application)
  - ArcGIS Server 9.3.1, SharePoint, Javascript, Google Map, VS 2010, C#

- **ArcGIS.com** - GIS
  - City Maps, Census 2010

- **CGIS** (Web Team) - GIS
  - City Map - Intranet (City Wide Applications)
  - ArcGIS Server 9.3.1, ArcGIS Viewer for Silverlight 2.4, Expression Blend, VS 2010, C#
City Map Tools
City Map Transformation… Applications

• Real Estate Assessor - Market Areas
• Public Safety – Shelters, Storm Surge…
• Public Utilities - Street Paving Status
• Public Utilities - Station Status…
• Other…
City Map Provides…

- All map layers are available for departments to view data.
- View maps with business data, document management systems.
- Ability to create prototypes and review within functional teams to create new applications.
- Customization is achieved through AddIns created in Visual Studio using C# and are distributed using ArcGIS Viewer for Silverlight to the respective interfaces.
- Ability to zoom at 1’ resolution is a requirement for Public Utilities.
City Map Data Source…

- All map data is served using a publication database
- All source data is consistent across all platforms
- Data updates are usually weekly and instant updates can be done as ad hoc requests or using data refresh tool in some cases using an Add-In
- All map services metadata can be accessed in pdf format
Layers to Map Service

Enterprise Geodatabase (SDE Oracle)

GeoMedia (Oracle)

FME, Python

SDE – SQL Server (Publication Geodatabase)

Personal Geodatabase

MXD

Map Services

Services Security

Apps
Security Model

Map Services

Security

Microsoft Active Directory

SQL Server Roles

Anonymous Services

Public Facing

Secured Services

Intranet
Report/Document Access
Prototyping to Operational...

- Public Utilities ad hoc maps such as Paving Status and Others...
- Real Estate Assessor’s Market Area Access
- Reports and Document Access
- Combination of City Data with Web Maps
- Access to Capital Improvement Program templates
- Developed AddIns as needed for different applications and are reused as needed
ArcGIS Online Initial Review...

- Determine the limitations of ESRI technology and find issues upfront (Geocoding etc.)
- Determine the service credit usage and thus plan for future guidelines and use (Use cases and service credits used etc.)
- Determine what type of applications we can help our teams to be able to implement, use and train (Document for training teams etc.)
- Determine the use of the technology for CGIS and train CGIS in supporting the teams (Documentation, training teams etc.)
- Determine the different aspect of use for desktop and/or mobile devices and their limitations
- In enabling data sharing with the public (Transparency - Shape files for distribution etc.)
- In organizational use of the technology such as secured access limitations etc.. (REA, Police, Fire, EMS etc..)
EO TEAM – 5 Use Cases
CD TEAM – 5 Use Cases
PS TEAM – 5 Use Cases

ArcGIS Online

Esri Maps for Office
Collector for ArcGIS
Operations Dashboard
Storytelling with Maps
ArcGIS Online/Web APIs/Desktop?

• ArcGIS Online
  - Simulate environments to test Service Credits usage
  - Limited functionality, Limited Printing
  - Feature limitation (1000 features…)

• Web APIs
  - Can be customized and rich functionality
  - Feature limitation (1000 features…), Limited Printing

• Desktop
  - Rich functionality, Full Printing
  - No feature limitation
Analytics/GeoEnrichment and Service Credits (Use as needed)
## Service Credits Usage Matrix (Cloud vs. Intranet)

<table>
<thead>
<tr>
<th>Services</th>
<th>Type</th>
<th>Quantity</th>
<th>Service Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature Services</td>
<td>Services</td>
<td>512</td>
<td>1475</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geocoding Services</td>
<td>Geocodes</td>
<td>50000</td>
<td>2000</td>
</tr>
<tr>
<td>GeoEnrichment</td>
<td>Requests + Views + Records</td>
<td>5000</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>Views</td>
<td>30000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Records</td>
<td>215000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requests + Views + Records + Attributes</td>
<td>300000 + 5 Attributes</td>
<td>15,350</td>
</tr>
<tr>
<td>Spatial Analysis</td>
<td>Features</td>
<td>100,000</td>
<td>100</td>
</tr>
<tr>
<td>Network Analysis</td>
<td>Simple Routes</td>
<td>8000</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td>Optimized Routes</td>
<td>8,000</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>Areas</td>
<td>500</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>Routes</td>
<td>5000</td>
<td>10000</td>
</tr>
<tr>
<td></td>
<td>Vehicles + Route Solves</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Route Solves</td>
<td>10,400</td>
<td>1</td>
</tr>
<tr>
<td>Data Storage</td>
<td>GB</td>
<td>100</td>
<td>1440</td>
</tr>
</tbody>
</table>
## Service Credits Review…

<table>
<thead>
<tr>
<th>Service</th>
<th>Credits per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map Tile Generation</td>
<td>1 credit per 1,000 tiles generated</td>
</tr>
<tr>
<td><strong>Feature Services Storage</strong></td>
<td>2.4 credits per 10 MB stored per month</td>
</tr>
<tr>
<td>Tile and Data Storage</td>
<td>1.2 credits per 1 GB stored per month</td>
</tr>
<tr>
<td><strong>Geocoding</strong></td>
<td>40 credits per 1,000 geocodes</td>
</tr>
<tr>
<td><strong>Simple Routes</strong></td>
<td>0.04 credits per simple route</td>
</tr>
<tr>
<td>Optimized Routes</td>
<td>0.5 credits per optimized route</td>
</tr>
<tr>
<td>Drive-Times (Service Areas)</td>
<td>0.5 credits per drive-time</td>
</tr>
<tr>
<td>Closest Facilities</td>
<td>0.5 credits per closest facilities route</td>
</tr>
<tr>
<td>Multi-Vehicle Routes (VRP)</td>
<td>2 credits per multi-vehicle route</td>
</tr>
<tr>
<td>Demographic and Lifestyle Maps</td>
<td>10 credits per 1,000 map requests</td>
</tr>
<tr>
<td><strong>Data Enrichment</strong></td>
<td>10 credits per 1,000 data variables (attributes)</td>
</tr>
<tr>
<td>Infographics</td>
<td>10 credits per 1,000 views</td>
</tr>
<tr>
<td>Reports</td>
<td>10 credits per report</td>
</tr>
<tr>
<td>Spatial Analysis</td>
<td>1 credit per 1,000 features</td>
</tr>
</tbody>
</table>
Service Credit Review...

- Tile caching in the Cloud consumed large amount of credits
- Feature services storage consumes credits monthly
- GeoEnrichment (Community Analyst...)

GeoEnrichment

Tiles
Operations Dashboards…

• Initial prototype of dashboards are being considered for Network Fleet Data
• Several other applications that can be of great use for management in different departments and emergency management are being considered
Changing landscape of GIS and IT...

- Business Intelligence has been making great strides recently.
- This will enhance the ability to integrate spatial systems with business systems within the City in an efficient manner.
- GIS provides robust spatial data and business systems provide data from various departments throughout the enterprise.
- The advantages are numerous as all business data doesn’t need to be present within the enterprise GIS.
Future…

- Migrating to ArcGIS 10.2.2…
- Working on establishing governance plans for ArcGIS Online, Community Analyst…
- Implement ArcGIS Online across the enterprise dependent on licensing
- Implement operations dashboards for management, native mobile applications
- Review Web APIs and consider changes if needed
- Integration of ArcGIS with Power BI for Office 365
Questions?

Thanks for attending the presentation

I hope some of the ideas presented are helpful

Your feedback is much appreciated and may offer some new insights for me to consider