



Update and Modernization of Sales Tax Rate Lookup Tool for Public and Agency Users

Who we are!

George Alvarado, David Wright, Marty Parsons and Bob Bulgrien make up the DOR Information Services GIS Team!

GIS @ DOR...

Divisional Users: Information Systems, Property Tax, Special Programs, Research,

Number of Power Users: 20+

Types: Developers, Analysts, Cartographers and Data Viewers

Tools: ArcGIS Server, ArcInfo/ArcEditor/ArcView, ArcPad

Web GIS History...

- 1999** – Tax Rate Lookup – Created by the Research division based on the HTML Viewer on ArcIMS.
- 2001** – Forest Tax Haul Zone & Stumpage Value Area viewer is created by IS, Active-X Connector for ArcIMS.
- 2002** – Property Tax Utilities Apportionment Viewer is created by IS, Active-X Connector for ArcIMS.
- 2005** – Marshall GIS Updates/Upgrades for ArcIMS
- 2008** – All Viewers updated to hybrid ArcIMS/ArcGIS platform separating Geocoding from Map Viewing for release of Streamlined Sales Tax.

Existing Applications:

Sales Tax Lookup

Property Tax – Utilities Apportionment Viewer

Forest Tax – Haul Zone and Stumpage Value Area Viewer

Existing Platform:

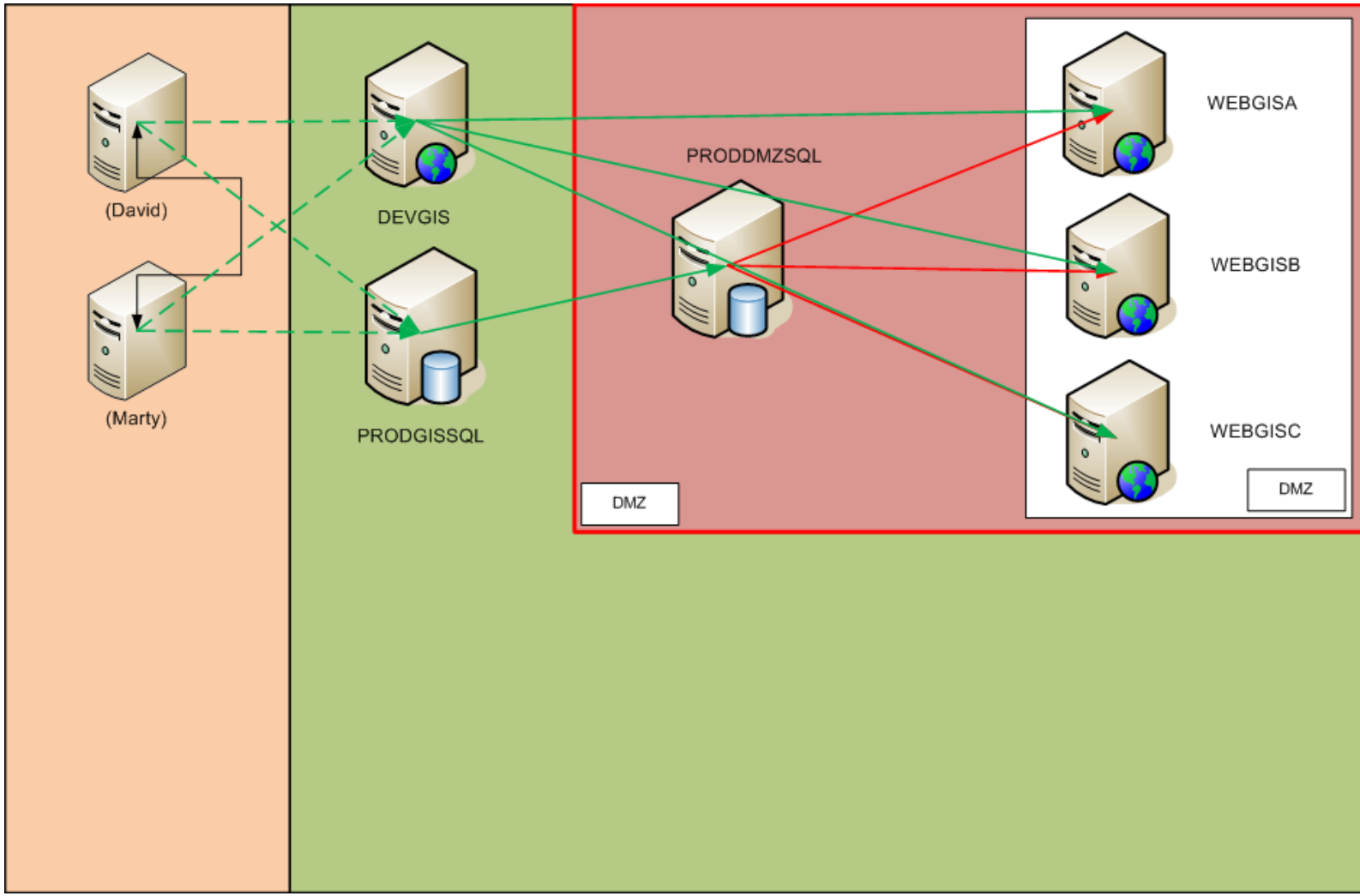
1 ArcIMS Server 9.2 Server – Map Creation and Display

2 ArcGIS Servers – GeoCode Searches

2 Web Application Servers – ASP.Net Server Application

Multiple SQL Servers – Tabular Search backend

GIS at the Agency – Current Conditions (cont)



GIS at the Agency – Current view of the State



A General View of the state just appears to be a blob of color, not much for context and often text that is not easily read.

Address Search **Map Search** Latitude/Longitude

1. Click and drag a box around the area you wish to display.
2. Select the **i** from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.

The screenshot shows a GIS web application interface. At the top, there are three search tabs: "Address Search", "Map Search" (which is selected), and "Latitude/Longitude". Below the search tabs are three numbered instructions. The main interface consists of a map area and a "Table of Contents" panel on the right. The map area includes a toolbar with icons for zooming, panning, and other map functions, and a "Map Size" dropdown menu set to "Small". The map itself shows the state of Washington with various counties labeled, major highways (interstates and state routes), and other geographical features. The "Table of Contents" panel on the right lists various map features with checkboxes and icons to toggle their visibility. The features listed are: "All Map Features" (checked), "Highways" (checked), "R.T.A." (unchecked), "C.E.Z." (unchecked), "P.T.B.A." (unchecked), "Streets" (unchecked), "MajorWater" (unchecked), "Parks" (unchecked), "Cities" (unchecked), and "Counties" (checked). Below the "Table of Contents" panel is a "Help" section with icons and text explaining the symbols used in the table of contents.

Table of Contents	
<input checked="" type="checkbox"/>	All Map Features
<input checked="" type="checkbox"/>	Highways
<input type="checkbox"/>	R.T.A.
<input type="checkbox"/>	C.E.Z.
<input type="checkbox"/>	P.T.B.A.
<input type="checkbox"/>	Streets
<input type="checkbox"/>	MajorWater
<input type="checkbox"/>	Parks
<input type="checkbox"/>	Cities
<input checked="" type="checkbox"/>	Counties


Help:

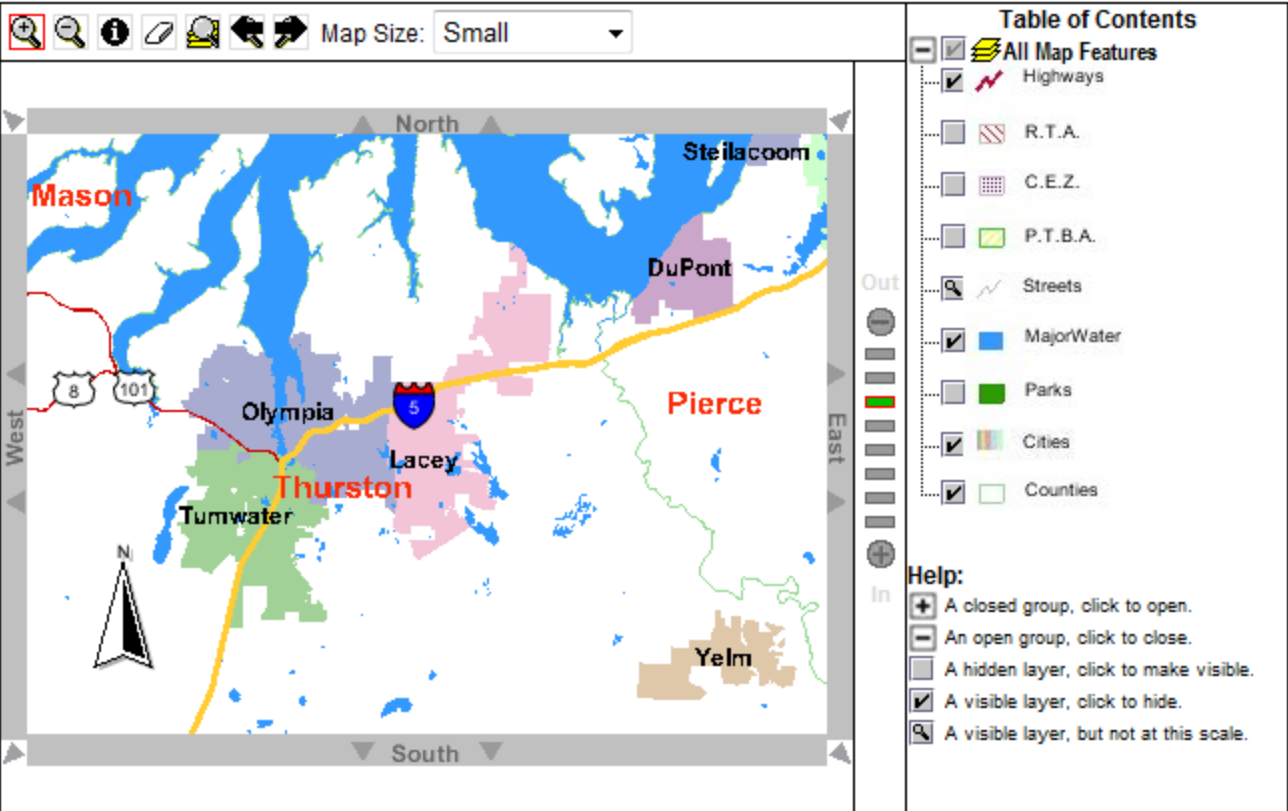
- A closed group, click to open.
- An open group, click to close.
- A hidden layer, click to make visible.
- A visible layer, click to hide.
- A visible layer, but not at this scale.

GIS at the Agency – Your local view

Closer views of the state still doesn't give much of a context, blobs of color for city boundaries, major waterways and major highways.

[Address Search](#) [Map Search](#) [Latitude/Longitude](#)





1. Click and drag a box around the area you wish to display.
2. Select the  from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.



The screenshot shows a GIS web application interface. At the top, there are three search tabs: "Address Search", "Map Search", and "Latitude/Longitude". Below the search tabs are three numbered instructions. The main interface consists of a toolbar with various icons (pan, zoom, info, etc.) and a "Map Size" dropdown set to "Small". The central map displays a geographical area with various colored regions and labels: Mason, Olympia, Thurston, Tumwater, Lacey, Pierce, DuPont, Steilacoom, and Yelm. A north arrow is visible on the map. To the right of the map is a "Table of Contents" panel with a list of layers and their visibility status. Below the table of contents is a "Help" section with icons and text explaining the symbols.

Table of Contents	
<input type="checkbox"/>	All Map Features
<input checked="" type="checkbox"/>	Highways
<input type="checkbox"/>	R.T.A.
<input type="checkbox"/>	C.E.Z.
<input type="checkbox"/>	P.T.B.A.
<input type="checkbox"/>	Streets
<input checked="" type="checkbox"/>	MajorWater
<input type="checkbox"/>	Parks
<input checked="" type="checkbox"/>	Cities
<input checked="" type="checkbox"/>	Counties

Help:

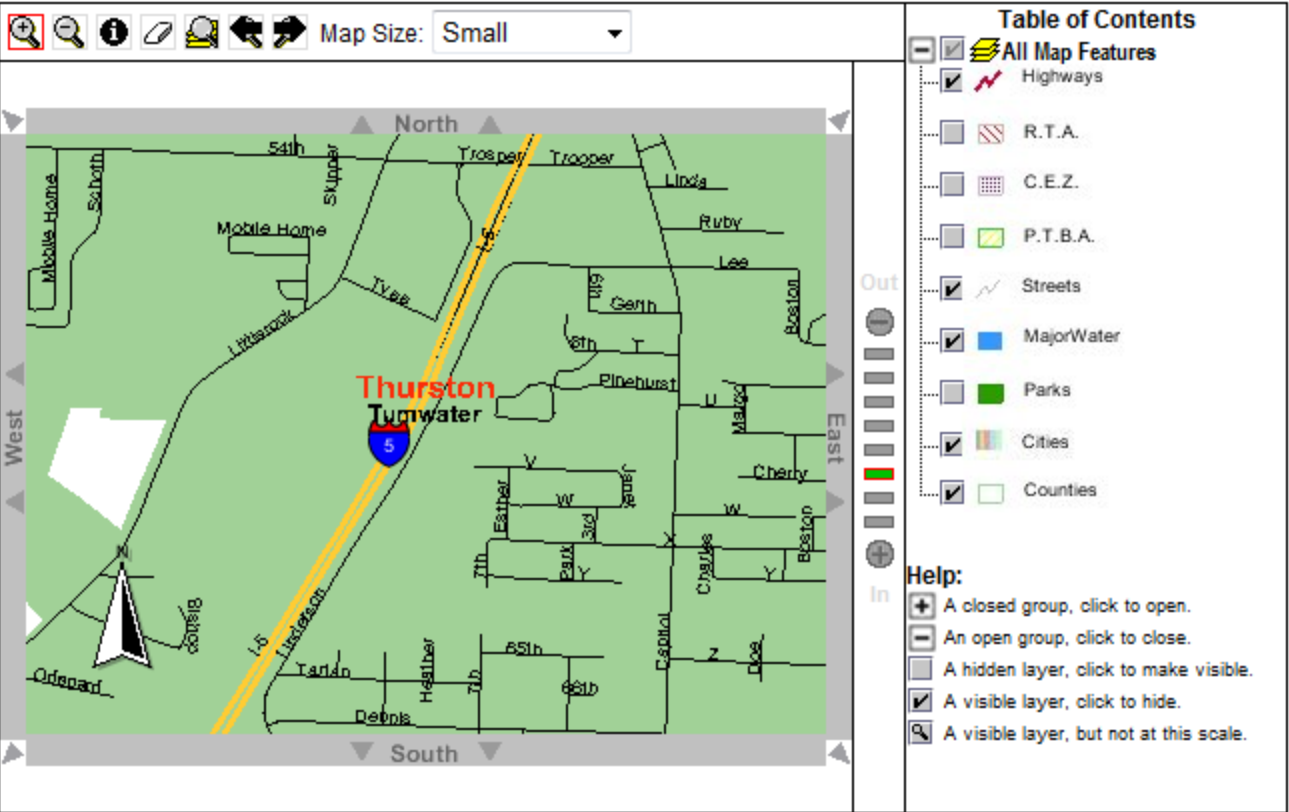
-  A closed group, click to open.
-  An open group, click to close.
-  A hidden layer, click to make visible.
- A visible layer, click to hide.
-  A visible layer, but not at this scale.

GIS at the Agency – Neighbourhood?

A General View of the state just appears to be a blob of color, not much for context and often text that is not easily read.

Address Search Map Search Latitude/Longitude

1. Click and drag a box around the area you wish to display.
2. Select the **i** from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.



The screenshot shows a GIS application interface. At the top, there are three search tabs: "Address Search", "Map Search", and "Latitude/Longitude". Below the tabs is a toolbar with icons for zooming, information, and navigation. A "Map Size" dropdown menu is set to "Small". The main map area displays a street grid with labels for "Thurston" and "Tugwater" in red. A yellow highway (Interstate 5) runs through the center. The map is surrounded by a grey border with "North", "South", "West", and "East" labels. To the right of the map is a "Table of Contents" panel with a list of map features and their visibility status. Below the table of contents is a "Help" section with instructions for using the legend symbols.

Table of Contents	
<input checked="" type="checkbox"/>	All Map Features
<input checked="" type="checkbox"/>	Highways
<input type="checkbox"/>	R.T.A.
<input type="checkbox"/>	C.E.Z.
<input type="checkbox"/>	P.T.B.A.
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<input checked="" type="checkbox"/>	MajorWater
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Help:

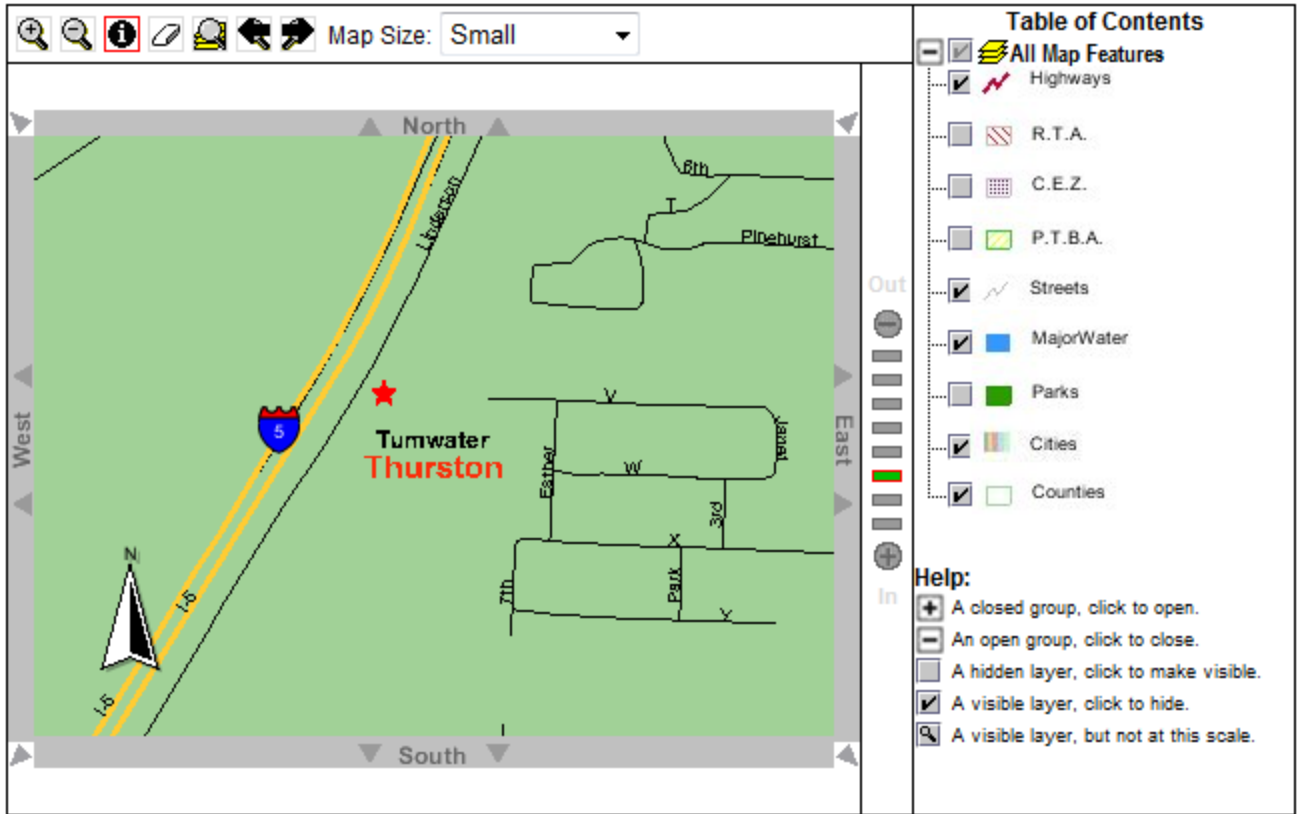
- A closed group, click to open.
- An open group, click to close.
- A hidden layer, click to make visible.
- A visible layer, click to hide.
- A visible layer, but not at this scale.

GIS at the Agency – Your House?

A Detailed View of the area just appears to be a blob of color, not much for context and often text that is not easily read.

Address Search Map Search Latitude/Longitude

1. Click and drag a box around the area you wish to display.
2. Select the **i** from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.



The screenshot shows a GIS application interface. At the top, there are three search tabs: "Address Search", "Map Search", and "Latitude/Longitude". Below these is a toolbar with icons for zooming, a location pin (highlighted with a red box), and other navigation tools. A "Map Size" dropdown is set to "Small". The main map area shows a green landscape with a road labeled "I-5" and a red star marking a location labeled "Tumwater Thurston". Other labels include "North", "South", "West", "East", "Linden", "8th", "Pinehurst", "Esther", "W", "7th", "Park", and "3rd". To the right of the map is a "Table of Contents" panel with a list of map layers: "All Map Features", "Highways", "R.T.A.", "C.E.Z.", "P.T.B.A.", "Streets", "MajorWater", "Parks", "Cities", and "Counties". Each layer has a checkbox and a corresponding symbol. Below the "Table of Contents" is a "Help" section with instructions on how to use the symbols: a plus sign for opening a closed group, a minus sign for closing an open group, a grey square for making a hidden layer visible, a checked square for hiding a visible layer, and a magnifying glass for a visible layer not at this scale.

- **Speed.** Users don't want to wait to see the map or if they have to wait they want to know that something is happening, they don't want to see the whole screen refresh and wonder if the app has crashed.
- **A current view of their world.** This will include contextual information such as major features like Parks, Schools, Shopping Areas and even Major Venues that are recognizable.
- **Ease of use.** The public is use to MapQuest, Google Maps and Bing. So if they need to rely on a toolbar to do what they need to then they are going to be bored and or unhappy with the experience.

What does it take to power a modern application?



- **Hardware:** Uptime is paramount for users that want data now, so this means redundant hardware that is powerful enough to support the volume of users your application will consume.
- **Software:** The ability to support the way users want to see a application work, this means quick response, visual cues that events are happening and most of all they want it how they want it.
- **Staff:** It is important to have staff that not only understand what the users are asking for but also understand what it takes to get there. These kind of employees also tend to know where things are going next and will help you keep up to date.
- **Time:** The conversion from one hardware/software architecture to a new platform doesn't happen overnight, it takes time to plan, ramp up and then implement. Elements such as Map-Caches and the supporting system to handle them take time to implement in a maintainable manner.

Expanded Applications:

Sales Tax Lookup

Property Tax – Utilities Apportionment Viewer

Forest Tax – Haul Zone and Stumpage Value Area Viewer

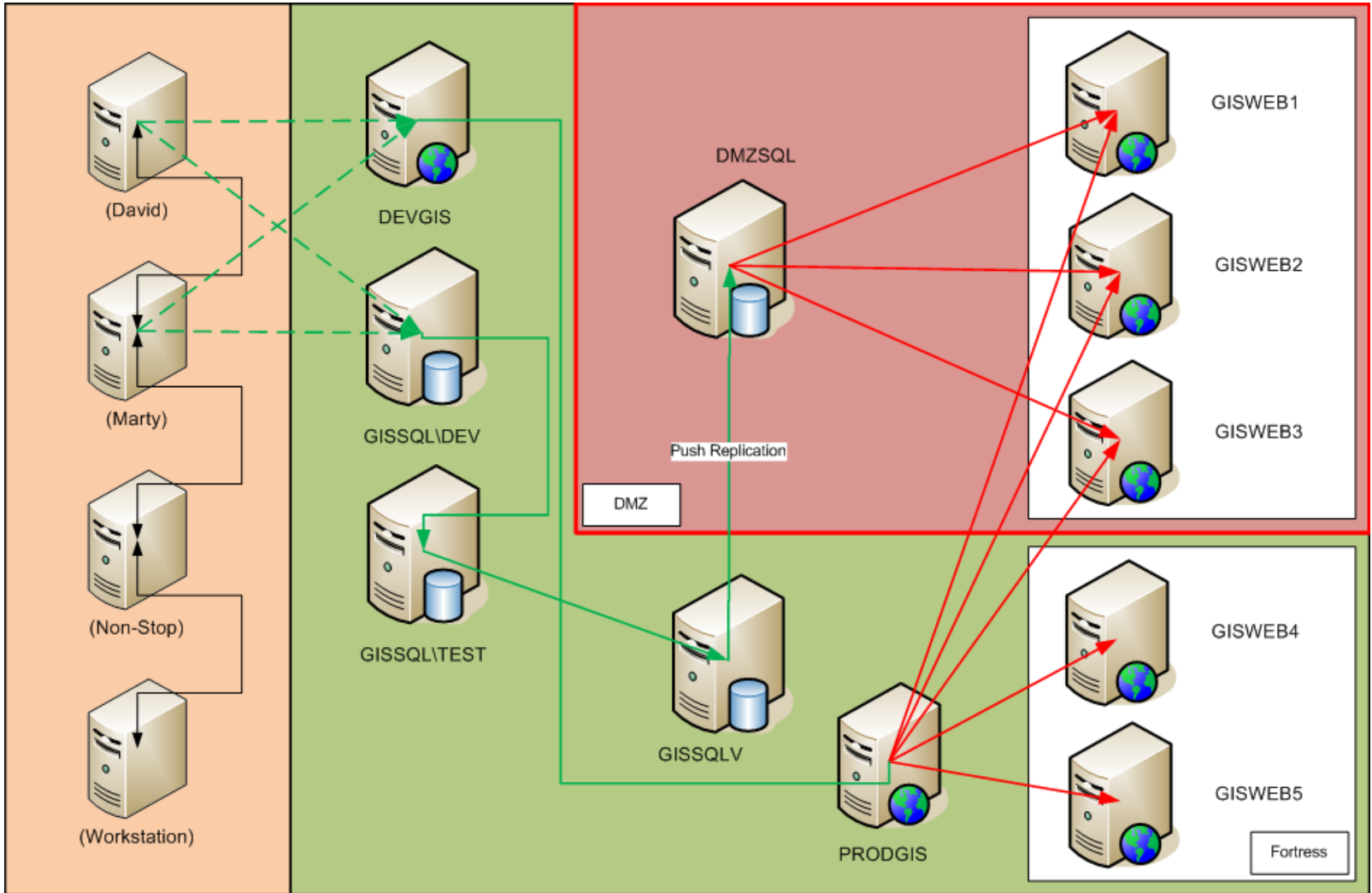
Enhanced Platform:

3 Redundant ArcGIS 9.3.1 Servers – Supporting Rest/JSAPI Access

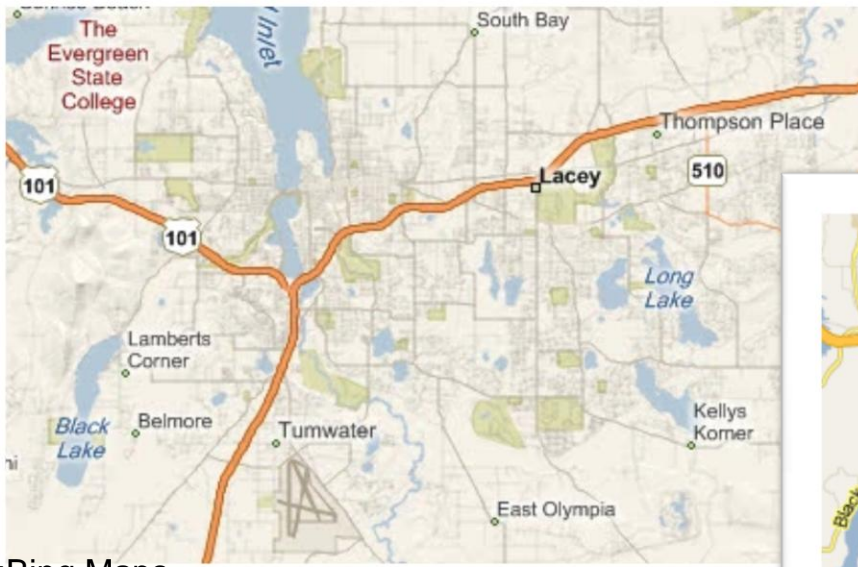
4+ Terabytes of network storage for cache creation and publication

Multiple Redundant SQL Servers – Tabular Search backend

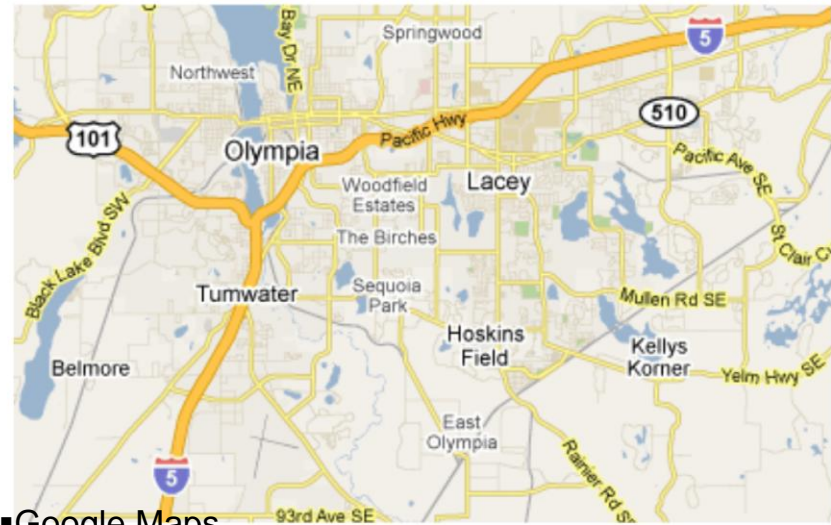
GIS at the Agency – Updated Conditions (cont)



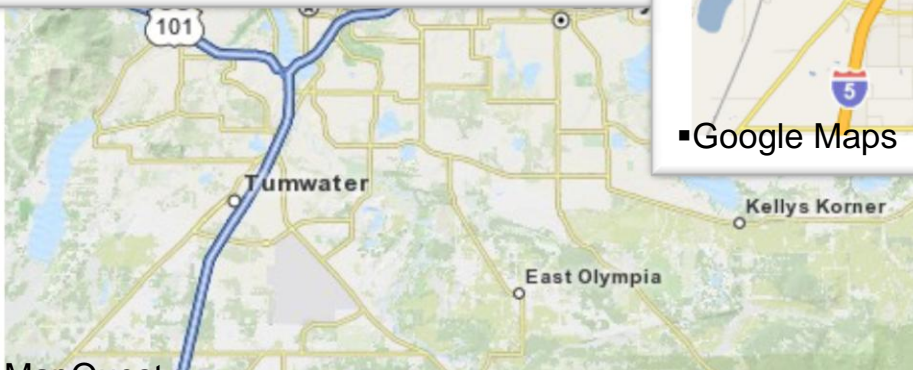
What does a modern application look like?



■ Bing Maps



■ Google Maps




■ MapQuest


GIS at the Agency – New view of the State

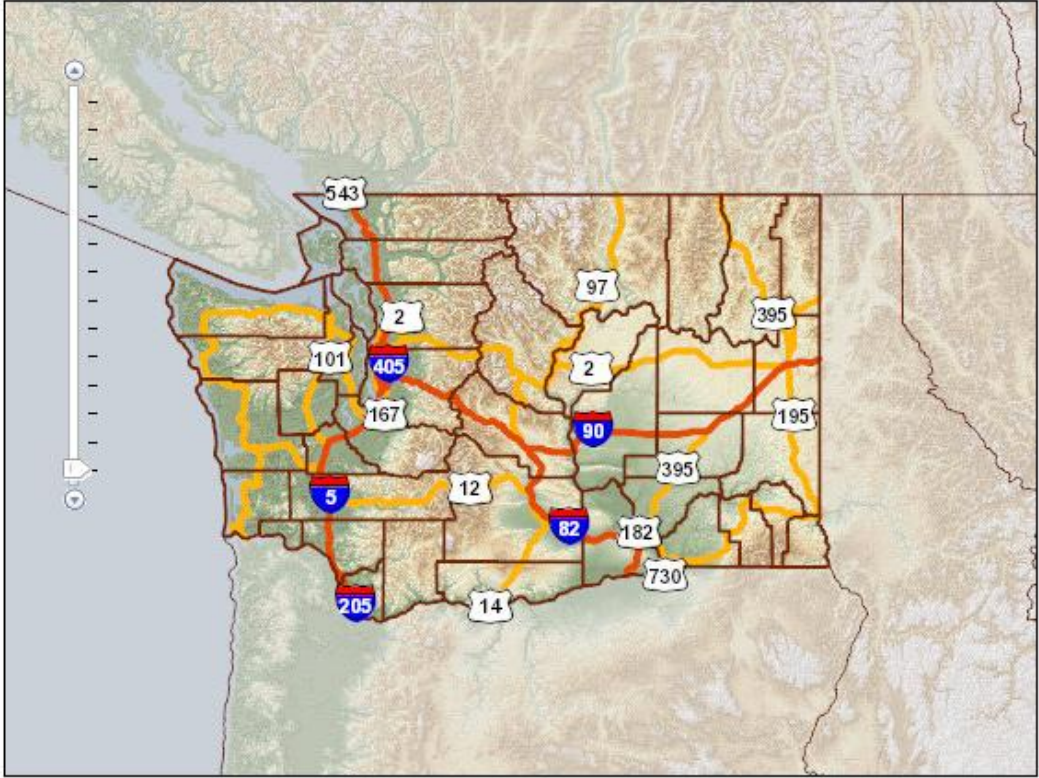
The full state view offers the user a bigger context of the area, they also see a more descriptive map of the state.

The use of a Shaded Relief offers the user a general idea of the topography of the state.

Address Search | Map Search | Latitude/Longitude

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 View Contents



Taxable amount: (Optional: To calculate sales and use tax only)

GIS at the Agency – Your new local view



The closer views still support topography but also allows us to display jurisdictions when other public map services can't show these.

Address Search | Map Search | Latitude/Longitude

1. Click and drag a box around the area you wish to display.
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Mason County
Pierce County
Thurston County

Taxable amount: (Optional: To calculate sales and use tax only)

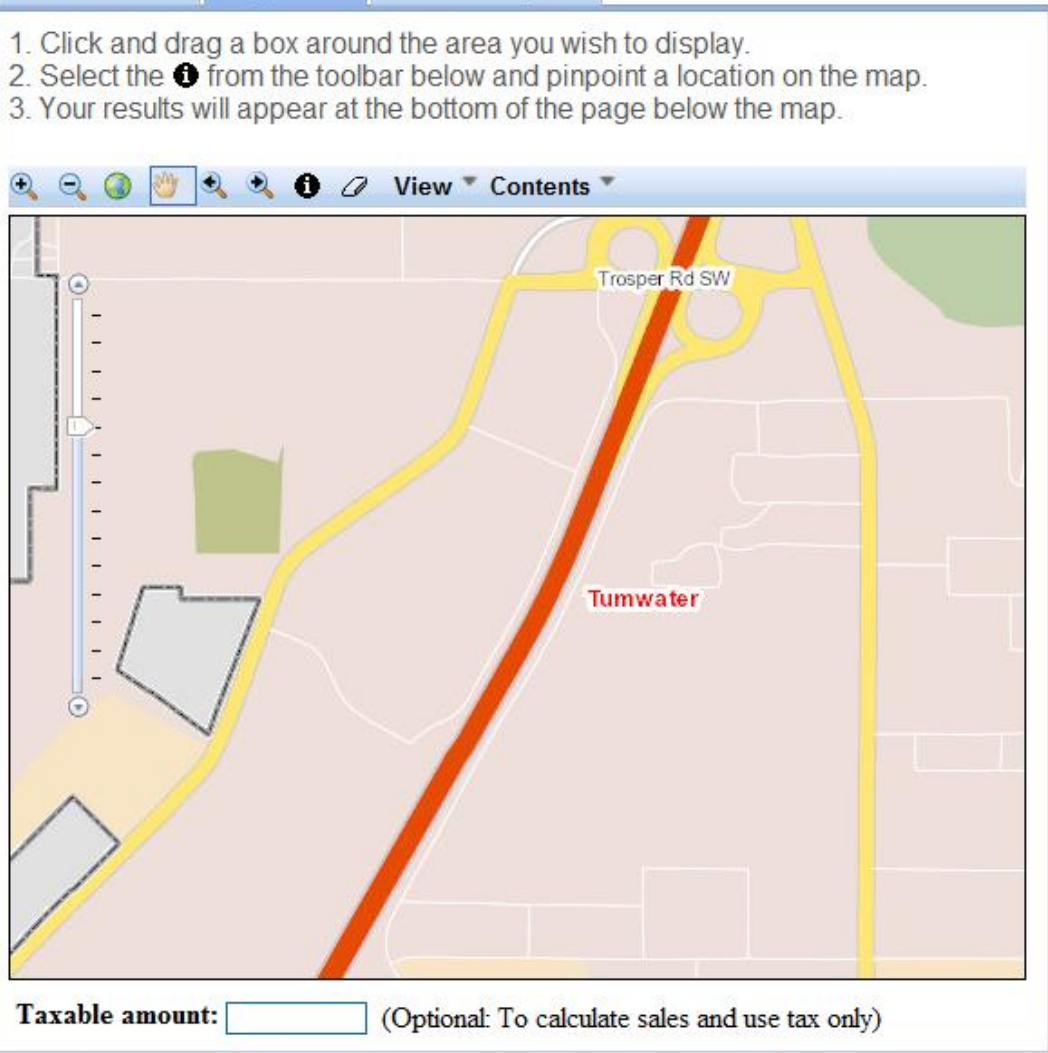
GIS at the Agency – Clearer Neighbourhoods

The closer context affords us city names, parks, schools, shopping areas and other major points of interest to the user to offer spatial awareness.

Highways and Arterial roads are labeled and appear in a more graphic way.

Address Search | Map Search | Latitude/Longitude

1. Click and drag a box around the area you wish to display.
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Trosper Rd SW


Tumwater

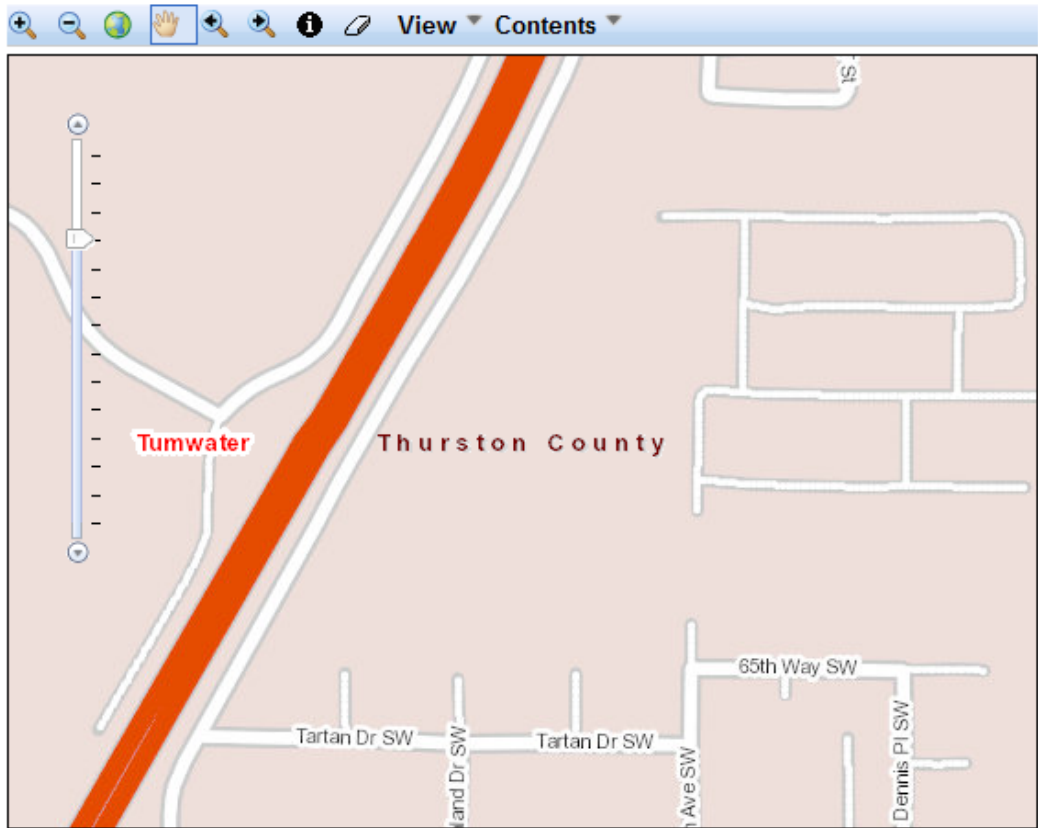
Taxable amount: (Optional: To calculate sales and use tax only)

GIS at the Agency – Your House?

More detail is afforded the user, with collector roads being labeled .

Address Search | Map Search | Latitude/Longitude

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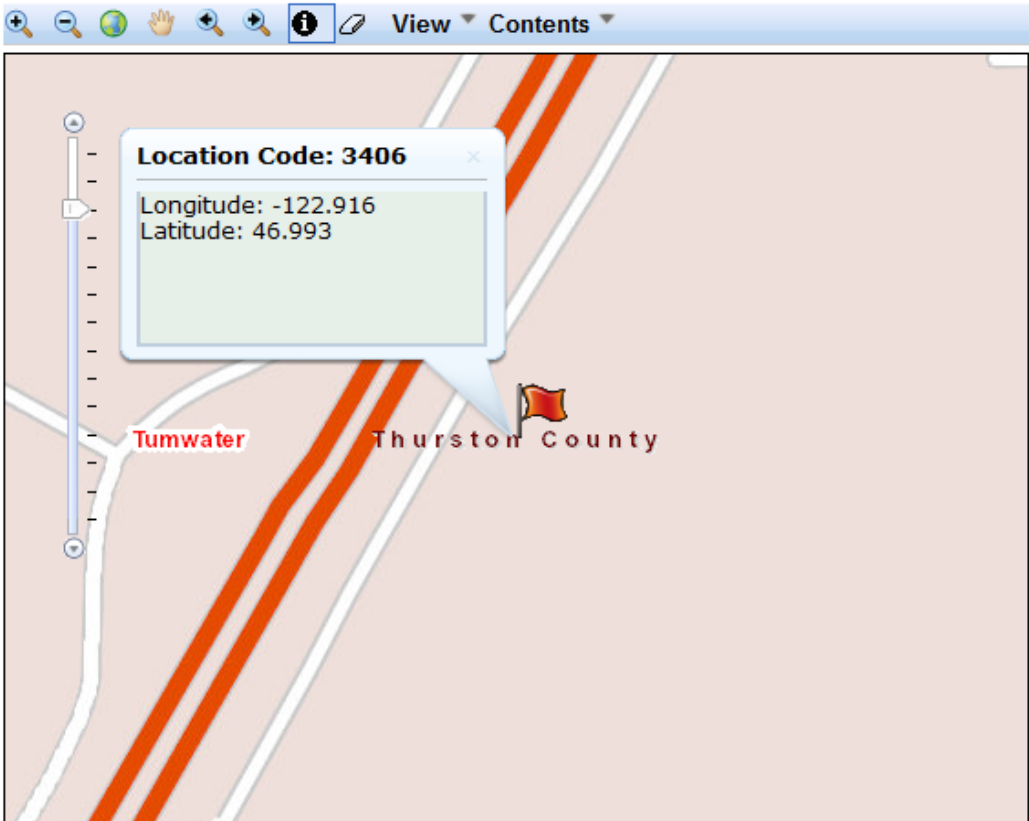
Taxable amount: (Optional: To calculate sales and use tax only)

GIS at the Agency – Look my house!

Finally at our closest scale we see all roads labeled but we also find all landmarks are labeled as well.

Address Search | Map Search | Latitude/Longitude

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2. Select the  from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.



Location Code: 3406
Longitude: -122.916
Latitude: 46.993

Tumwater Thurston County

Taxable amount: (Optional: To calculate sales and use tax only)

GIS at the Agency – Look my house in a aerial...





The View Aerial Option affords the user the view of the most recent imagery available hosted by ArcGIS Online.

By utilizing the JS-API the use of ArcGIS Online supporting services is easy to implement.

Address Search Map Search Latitude/Longitude

1. Click and drag a box around the area you wish to display.
2. Select the  from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.

 View Contents



Location Code: 3406
Longitude: -122.916
Latitude: 46.993

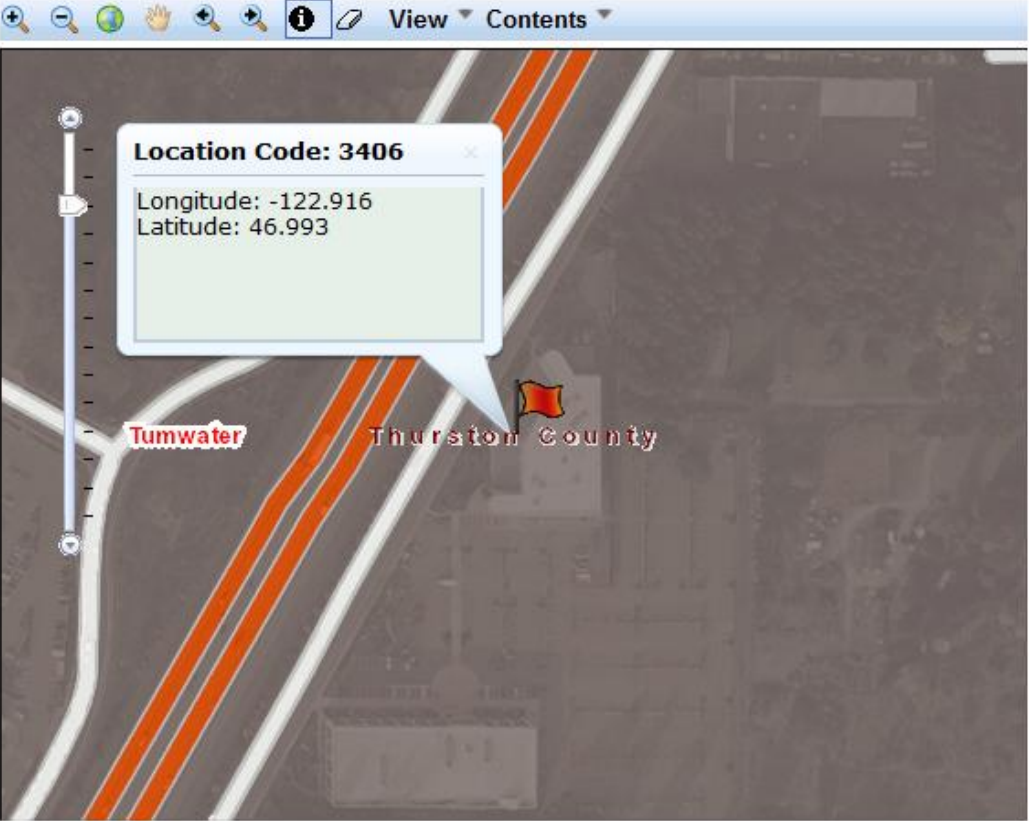
Taxable amount: (Optional: To calculate sales and use tax only)

GIS at the Agency – Look my house in a hybrid...

The Hybrid option affords the user the ability to see the photograph in a manner where they can adjust the transparency of the map on top of the image to see streets and landmarks labeled.

Address Search | Map Search | Latitude/Longitude

1. Click and drag a box around the area you wish to display.
2. Select the **i** from the toolbar below and pinpoint a location on the map.
3. Your results will appear at the bottom of the page below the map.



Location Code: 3406
Longitude: -122.916
Latitude: 46.993

Tumwater Thurston County

Taxable amount: (Optional: To calculate sales and use tax only)

- **Performance:** The users now see principally a tiled service that makes for faster navigation and allows for much more pleasing cartography that allows for better display of data.
- **Usability:** The users now are able to principally navigate as they are accustomed to with Bing/Google/MapQuest/ArcGIS Online.
- **Size:** The users now also have a larger screen without the clutter of the 'Table of Contents' that allowed us to make the map overall larger and allowed for the elimination of the Map Size selector which required a lot of custom JS to handle resizing frames.
- **Functionality:** The users now have the ability to look at the same data as they usually would but also with a photographic context with the aerial overlay. This will allow them to better locate what they seek.
- **Maintainability:** The agency now has a single codebase built on a single spatial architecture that allows us to more easily grow and expand without the concerns or impacts of both ArcIMS and ArcGIS Server.

What did we gain?....



- **Maintainability:** The agency now has a single codebase built on a single spatial architecture that allows us to more easily grow and expand without the concerns or impacts of both ArcIMS and ArcGIS Server.
- **Performance:** The agency now is using a thinner API that offers a smaller footprint to support and download on the users pc.
- **Support:** The core JS files needed to operate the application are housed on ESRI's server cluster, so if there are issues we are able to contact there support team versus having to support these services also.

What did we lose?.... (conclusions)



- **Ease of Publishing:** ArcGIS Server using a tiled cache requires more time to updated the services and the current tools do not allow for easy full configuration and publication of services.
- **Time:** It takes a number of weeks to build a full cache for the state at the appropriate scales and with the right configurations.
- **Space:** There are large space needs to build and host a cache, plus you also would want to have a staging location for said caches to allow for ease of publication. DOR has allocated 4TB, 2TB per array to support building/staging and then publication.

Thank you...



David Wright

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