



## **GIS FOR COMPREHENSIVE TAXATION SOLUTIONS**

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### **ABSTRACT**

Special Purpose Districts (SPD's) are created by state and local agencies for the purpose of funding special items such as Library Districts, Regional Transportation Districts, Crime Control Districts, etc. SPDs play vital role in implementing sales and use tax that is collected in addition to state tax and any other local taxes.

Frequent changes in municipal boundaries due to annexations make it difficult for retailers to determine local tax jurisdictions and manage tax issues. With tax jurisdictions constantly changing and new tax jurisdiction assignment requirements mandated by state and local lawmakers, the potential liability resulting from inaccurate tax assignment poses a significant problem.

The ESRI suite offers a range of flexible functionalities, which can be used to build a comprehensive solution to ensure that the most current information is available for tax jurisdiction assessment. This paper illustrates a solution that involves in creating a nationwide SPD product and periodic product maintenance to enhance the tax application performance.

### **INTRODUCTION**

Rapid developments in computer technology and information dissemination technologies, and the increasing accessibility to spatial information sources are all converging to provide a new impetus to "Geographical Information Systems". A comprehensive GIS solution provides a common platform for data development, data collation, data updates and data usage in taxation providing taxation agencies with quantitative and qualitative benefits.

The increased use of GIS for business decision-making processes has made it imperative for geospatial solution providers to be in sync with technological advances. These developments have created a need for an integrated work environment so that the complete life cycle can integrate into a common platform. After a detailed study of the various competing platforms the ESRI range of products was identified as meeting most of the requirements. This paper provides an insight of GIS taxation solution using ESRI range of products.

### **BACKGROUND**

Inadequate tax bases and competing demands for existing taxes make it hard for cities and counties to provide all the services their citizens' desire. In some states, when residents or landowners want new services or higher levels of existing services they can form a district to pay for them. Fire Districts, Irrigation Districts, Crime Control Districts, Hospital Districts etc. exist today because taxpayers are willing to pay for public services they want. Special Districts allow local citizens to obtain the services they want and more importantly at a price they are willing to pay.

Special Districts are units of local government established by the residents of an area or state and local development agencies to provide some service that are not provided by the county or city. 17 states have Special Purpose Districts wherein sales and use taxes are imposed.

Some Special Purpose Districts are located within cities. Many are located just outside city limits, in the unincorporated areas. In some states, suburban residents have often chosen to form Special Districts to provide needed services rather than form a city or annex their area to an existing city. Special Districts enjoy many of the same governing powers like other cities and counties. They can enter into contracts, employ workers, and acquire real property through purchase or eminent domain. They can also issue debt, impose taxes, levy assessments and charge fees for their services.

Group1 Software sources the SPD data from the taxing authority for each state. The taxing authorities have a constitutional responsibility to estimate available revenue for the state and are required to supervise the state's fiscal concerns and manage them. The state agencies may also collect taxes and fees owed to the state

Under state regulations appropriate local sales and use taxes are applicable on sale of all taxable items in addition to the state sales or use taxes. Cities, counties, transit authorities, and Special Purpose Districts may impose a local tax.

Local sales taxes are collected based on the location of place of business and in following order.

1. State
2. City
3. County
4. Special Purpose Districts &
5. Transit tax

### **BUSINESS NEED IN CREATING THE SPD'S**

Frequent changes in municipal boundaries due to annexations make it difficult for state agencies or retailers to determine local tax jurisdictions and manage tax issues. With tax jurisdictions constantly changing and new tax jurisdiction assignment requirements mandated by state and local lawmakers, the potential liability resulting from inaccurate tax assignment poses a significant problem. Most districts are updated on a quarterly basis and therefore users need a quarterly update to meet the requirements.

With the use of ESRI GIS technology, a comprehensive nationwide solution was built to ensure businesses utilize more accurate information for tax jurisdiction assessment. A solution that can standardize various information and append the special tax jurisdictions and municipal boundaries with customer address records would enhance the tax applications performance. Existing commercially available data sources were not adequate to allow automation of the assignment process and therefore a new enhanced boundary product needed to be created.

### **THE PROJECT PHASE**

The first step involved in creation of the Special Purpose Districts is identification of the boundary limits based on the information sourced from each subject state.

States typically publish all upcoming changes to the Special Purpose Districts at least 60 days prior to the effective date of the change. All changes go into effect at the beginning of a calendar quarter. Once the changes are identified, research and input collation is required to be sure that the boundaries reflecting the new changes are complete enough to update the database.

The project phase can be broadly classified into two stages:

- 1) Initial product development and
- 2) Periodic product maintenance

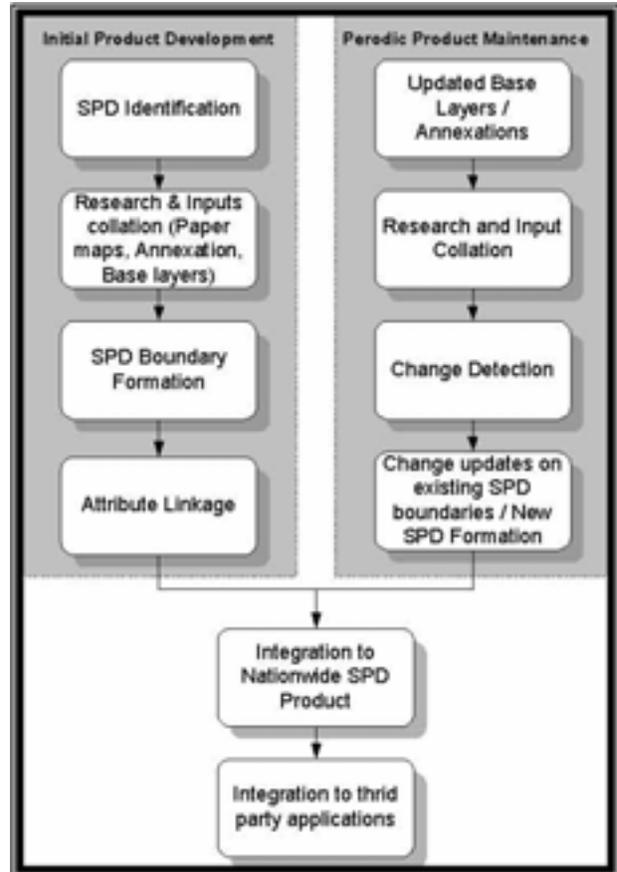
## 1. INITIAL PRODUCT DEVELOPMENT

Upon identifying the list of the Special Purpose Districts by the taxing agencies office, that forms part of the SPD product, research and Input collation was performed to list the various resources by which the boundary can be created.

The various forms of inputs used for SPD product development were paper maps containing the SPD boundary demarcations, documents containing annexation descriptions, Municipal boundaries (cities or towns), Minor Civil Divisions (MCD) consisting of Township boundaries (referred to as base Layers) and digital street network information for reference in the ESRI shape file format.

The initial SPD product development can be categorized according to the below listed base reference data using which the Special Purpose Districts can be formed

- SPDs with Countywide boundaries
- SPDs with Citywide Boundaries
- SPD's that are Municipal Development districts
- SPD's with other boundaries



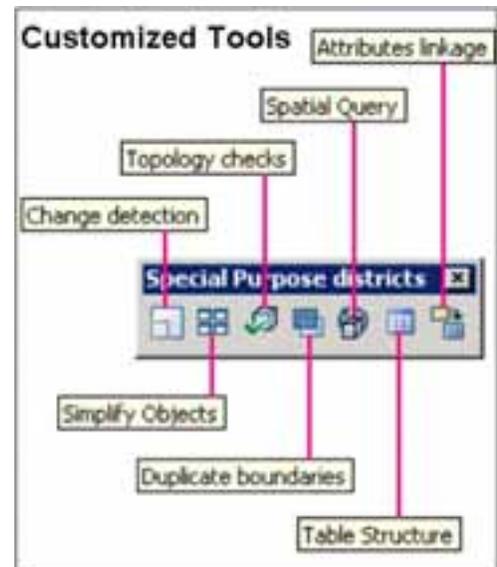
The size of the area served by a Special District can vary. A hospital district, for instance, can be as small as one square block, while some crime control districts encompass several counties. Residents of many unincorporated areas are served by numerous special districts, each with its own set of boundaries. In many cases, SPD boundaries do not match up with existing municipal or county boundaries, making the sourcing of the correct boundary definitions difficult to research and subsequently create in a shapefile format.

As part of input study and pre-processing activity all the source inputs were studied for suitability of using them for boundary formation. If the source for creating the SPD boundary was in paper format, the paper map was scanned.

The scanned image was then geo-referenced within ArcGIS environment. A Digital street network base layer with street attribute information was used as reference to ascertain the positional accuracy of the source geo-referenced.

The next step involved vectorizing the boundary in the ESRI environment. Custom applications were developed using Arc Objects, Map Objects, VC++ and java components to facilitate vectorization. Vectorized boundaries from the map can be a simple to complex shape polygon involving multi-polygon concepts.

The unique requirement of this project to meet the objective is to create the Special Purpose Districts with reference to the base layers (Municipal or MCD layers). All the SPD



boundaries were made compatible with the base layers in the preference order listed below.

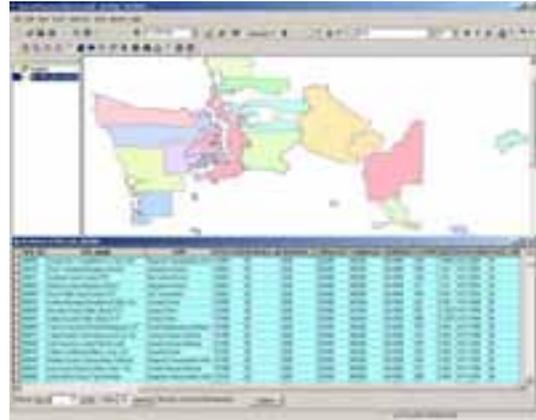
- County boundaries.
- Township boundaries.
- City boundaries.
- Major Streets.

The digital boundaries were validated against the source for any anomalies such as shape mismatch against source, completeness, topological correctness etc. before proceeding to next level activities.

Upon vectorizing the boundaries, the digital vector product was processed to attach attributes such as SPD name, SPD ID, type effective date, rate etc.

Data integration is the key activity wherein all the boundaries are integrated into single product. Potential issues such as overlapping boundaries resulting either from incorrect boundary definition or incorrect positional placement could result in returning more than one SPD name for a particular address when queried from customers.

All such cases are reviewed using customized processes to ensure boundaries from the same SPD type do not result in overlapping areas.



Using ArcGIS in-built functionalities it becomes a relatively easy step to track and identify the overlapping polygons using different criteria. Applications are also developed for automated verification of specifications requirements.

## 2. PERIODIC PRODUCT MAINTENANCE

Due to constant changes in the base layers, it is imperative to have the SPD data product updated and maintained such that most current and accurate information is available for the tax jurisdiction assessment.

In order to achieve this requirement a periodic update (monthly/quarterly/annual), process is defined and followed so as to keep the product most current. This maintenance schedule is based on a series of highly synchronized steps involving various activities. The maintenance update period for SPDs is defined at a monthly and quarterly basis.

Monthly updates: The changes in the base layers (county, municipalities, MCD's) are sourced from our data supplier (Tele Atlas) on a monthly basis.

Change detection analysis is performed between the current base layers and the previous version using customized utilities in ArcGIS environment. The resulting output provides a list of all such locations where the boundary changes have occurred. Based on the change detection analysis report the effected SPD boundaries are altered to match with the current base layer.

Quarterly updates: On a quarterly basis, Annexation and De-annexations to the SPD product are made available by each states' Comptrollers office. This list usually contains the details of the new SPD boundaries formed and imposes local sales and use tax.

Special Purpose District (SPD) Sales and Use Tax		
The following special purpose districts (SPDs) have imposed a Local Sales and Use Tax:		
SPD Name	Local Code	Local Rate
Palmsview Crime Control And Prevention District	5108528	005000
The boundaries for the Palmsview Crime Control and Prevention District are the same as the boundaries for the City of Palmsview. The City of Palmsview will be 8.14%.		

Using the new annexations, which are usually in descriptive form, new Special Purpose Districts are formed. These newly created boundaries are then integrated into the existing SPD product prior to the effective date from which these boundaries would be effective to impose taxes.

### **DATA USAGE PHASE AND TAXATION BENEFITS**

Typically each state taxing authority has several responsibilities. They are responsible for locating new businesses to the correct tax jurisdiction and also collect the sales and use tax and disperse to the correct jurisdiction – a concept called “Fair Share”. In states that have moved to destination based sourcing, the taxes are sourced to the primary point of use – the purchaser’s home address. Therefore it is important that the correct special tax jurisdiction is assigned initially as that sets the rates for the collection of the tax. The collected taxes must then be tracked and managed such that each municipality gets their fair share of the taxes collected and each Special Purpose District entity also gets its collected tax properly remitted. The state also can use the Special Purpose District data for audit purposes to be sure that the local businesses are collecting and remitting the correct amount of tax.

### **FURTHER DIRECTIONS**

We have completed a very successful Special Purpose Districts program creating a unique Nationwide SPD dataset. The objective of the Nationwide SPD dataset is to provide our national customers a product that properly assigns special tax jurisdictions to simplify the tax process and minimize audit issues. This product is updated monthly in some states and quarterly in all states, providing the most complete and current product available in the market today.

### **ACKNOWLEDGEMENTS**

Authors take this opportunity to thank RMSI team and Group1 Software in particular for sponsoring this project, which has been derived from their actual business need. The Nationwide SPD project has been a wonderful experience working and authors would like also to extend thanks to Group1 technical team for their support throughout the project for it’s successful accomplishments.

### **REFERENCES**

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