Streamlining Zip-Plus-4's for Sales Tax with GIS

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About AGRC

• AGRC Responsibilities
  - Facilitate effective GIS-related efforts in Utah
  - Provide stewardship, maintenance, and access for Utah’s State Geographic Information Database (SGID)
  - Where ever possible, encourage enterprise GIS solutions
AGRC Products & Services

• State Geographic Information Database (SGID)
• GIS Technology Transfer (Training)
• GIS Solution Services
  – GIS database development
  – GIS applications
  – Digital Cartography
  – Spatial Analysis
• Internet Mapping Services (including ArcIMS)
About the Utah State Tax Commission

• Mission: collect revenue for the state and local governments and to equitably administer tax and assigned motor vehicle laws.

• Project Partners
  - Division of Sales Tax
    • Business Need
  - Technology Management Group
    • Internal IT Group
  - Division of Property Tax
    • Municipal Boundaries GIS Data Steward
Streamlined Sales Tax

• SST
  - The point of delivery is where a purchaser takes possession of tangible personal property or makes first use of a service, whichever comes first.
  - The sales tax rate to charge will be determined by the point of delivery.
    • The purchaser’s nine-digit ZIP code determines the location of a transaction when goods or services are delivered.
    • If a nine-digit ZIP code is located within two or more jurisdictions, the seller should collect and report tax at the jurisdiction with the lowest rate.
Mobile Telecommunications Sourcing Act

• MTSA
  - Providers of telecommunication services are required to report the locations of where services are delivered on their sales and use tax returns.
  - U.S. Code § 4-4-120 (Mobile Telecommunications Sourcing Act) and Utah Code § 59-12-207 specify that the nine-digit zip code of the customer’s “place of primary use” shall determine the delivery location for taxing purposes.
Problem Statement

• Must know location of 9 digit zipcodes (zip+4) for implementation of SST & MTSA taxes

• Must assign correct taxing jurisdiction for each zip+4
Analysis Resources:

• USPS AIS Zip+4 Product (subscription)
• GIS data
  - 5 Digit Zip Code Polygons
  - Post Office Location Points
  - Address Locator Service
    • Statewide street centerline feature class with address and zone attributes
  - Municipal Taxing Jurisdiction Polygons (cities, counties, transit special sales tax districts)
• ArcGIS ArcView 9.0+ License
  - Model Builder, Python
  - Visual Basic for Applications
What is a Zip+4?

- 9 digit routing code used for sorting mail
- Typical Zip+4 represents 10-15 households (one side of a residential block)
- But, can be PO Box location, General Delivery, Building, Floor, Business, Etc.
- USPS Address Information System (AIS) database stores tabular description of the range of delivery locations for each zip+4
  - Zip+4 Type
  - (If applicable) Street Name, StreetType, PreDir, SuffDir
  - RangeStart, RangeEnd
  - No explicit geography !!
  - 553,000 records for Utah (pop 2.5 million)
How to find a Zip+4?

• PO Box & GD Zip+4’s
  – Build Point Feature Class of Postal Office Facilities
    • AIS City State Product
    • Locate: Post Offices, Branches, Community Post Offices
    • Method: Geocode & Manual Placement
  – Join & Assign point location of postal facility using AIS CityStateID as key field (VBA script)
  – Result: One point feature for each PO Box & GD Zip+4
  – Overlay Analysis (Identity) to assign Tax Area IDs from Municipal Tax Area Polygons to Zip+4 Point Features
How to find a Zip+4?

• Street Address Based Zip+4’s
  - Method #1
    • Determine those 5 digit zip codes that are completely contained within Municipal Taxing Areas
    • Assign Municipal Tax Area IDs to Zip+4 within each of the contained Zip+4s
    • Don’t need to find exact location in this case
How to find a Zip+4?

• Street Address Based Zip+4’s
  - Method #2
    • For each Zip+4, determine low, middle, and high address in range (ModelBuilder)
    • Geocode low, middle, and high addressed (ModelBuilder)
    • Build a line from valid geocoded points for each zip+4 (VBA)
    • Line represents Zip+4 location
    • Overlay Analysis to assign Tax Area IDs from Municipal Tax Area Polygons to Zip+4 Line Features (VBA)
      - If zip+4 in multiple tax area jurisdictions, Assign to Lowest Rate
Geocode From, Middle, and To Addresses for each Zip4

Model Preconditions: USPS Zip4 data has been converted into a geodatabase table, address locator serviced defined and utilizing current street data.

Geocode High Address in Range

Create the FREQ Table with one record per Zip4

Geocode Low Address in Range

MidSUB1: Geocode Midpoints, Addresses where High Add - Low Add IS NOT an even multiple of the number 4

MidSUB2: Geocode Midpoints, Addresses where High Add - Low Add IS an even multiple of the number 4
Street Zip+4s Lines

derived from geocoding low, mid, high addresses
Street Zip+4s Lines

derived from geocoding low, mid, high addresses
Street Zip+4s Lines

derived from geocoding low, mid, high addresses
Lowest Rate

- **Street Address Based Zip+4’s**
  - Method #3
    - Assign unmatched zip+4’s to county tax area jurisdiction using AIS Zip+4 county attribute
    - Rationale: County governments provide some services to all zip+4s within county
    - Added benefit:
      - Gives cities incentive to provide complete and correct GIS street centerline data
        » Better data → More revenue
Manual Corrections

- USTC logs reported problems
- Point feature class of corrected zip+4 locations is maintained.
- Overlay Analysis (Identity) to assign Tax Area IDs from Municipal Tax Area Polygons to Manual Correction Point Features
- Manual Corrections takes precedence all other methods
Assignment Method Hierarchy

1. Manual Corrections
2. PO Box & GD Zip+4s
3. Street Address: Zip+4 with parent Zip5 completely contained within Tax Jurisdiction
4. Street Address: Geocode Derived Lines
5. Street Address: Lowest Rate
Final Output

- Each Zip+4 assigned to a taxing jurisdiction
- Product is fixed width text file modeled on the Mobile Telecommunications Sourcing Act Electronic Database Standards
- Includes:
  - zip+4 descriptive info from AIS
  - taxing jurisdiction ID number
  - assignment Method
  - FIPS
  - longitude & latitude
- Simplified Product & Web Services
Questions???

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