DATA ECONOMY

Tom Roff, FHWA
Rich Grady, Applied Geographics
Paul Sheedy, Transportation Consultant
April 25, 2019
GIS-T 2019 Orlando Florida
HPMS REASSESSMENT

- Driven by Legislative Requirements, Process Efficiencies, and System Performance.
- Recommendation Report Completed in Fall, 2018
- Recommendations introduced the Data Economy concept
WHAT IS DATA ECONOMY?

- It is the **process of minimizing the level of effort** required for each State DOT to produce the HPMS data extract, from a data management perspective.

- It is a **reporting approach that provides a data model that accepts State DOT data in a format closer to the native structure of DOT databases** through the removal of required calculations, aggregations, and coded values.

- The overall goal is to **increase data quality** by **reducing the barriers** in the collection and reporting process.
WHY DO IT?

- Reduce the burden of responsibility on State DOTs to provide data to the FHWA that can be acquired through alternative third-party sources.
- Utilize advances in LRS and temporal asset data management.
- Increase the flexibility of HPMS data reporting.
- Reduce reporting burden on the States by simplifying calculations and eliminating interdependencies where possible.
- Facilitates and standardizes the data submission for increasing amounts of data due to additional program requirements like MIRE (i.e., collect once, serve multiple needs)
- Align with other FHWA program initiatives (e.g., MIRE, freight)
- Provide a database for the FHWA that can support data submitted from State DOTs and data procured through alternative sources
Data items should exist independently of each other, and multiple data items will exist in the same location along a roadway in a network topology.
HOW TO DO IT?

The HPMS database should accept a broader extent of data on a dual carriageway model

| Pavement Conditions | Traffic Counts | Geometrics | Designations |

HPMS currently accepts Pavement Data on both sides of the Interstate

Extension of this concept to other data

Facilitates a Hierarchical Structure
States should not be required to simplify or abstract their data, and instead should be allowed to report the data that they have in its entirety, with consideration given to the required extents of certain data items (e.g., items required on a sample)
A data inventory should be implemented that segregates data into roadway elements (network), facility data (current HPMS data), and intersection level data to establish the base roadway network.
Topologic principles should be applied to the base roadway network to support the location (LRS) of HPMS inventory data as well as the fundamental geometric components that represent roadway intersections by 2016 (i.e., coincident with MIRE implementation)
• Providing a database structure that can store data in a structure closer to the native DOT database content (e.g., both sides of a divided facility)
  • Reduce the annual burden of HPMS preparation, and
  • Allow State DOTs to report roadway data with the level of precision that it is currently cataloged and maintained within the native DOT databases
• Report data for programs such as MIRE in coordination with HPMS
• Remove the need for aggregation, summation, or calculated coding
  • Rather, the calculations required to support FHWA models and systems, should be performed by the FHWA through standardized processes.
• Create an opportunity for 3rd party users of the data and other FHWA programs to analyze the raw transportation data rather than processed information to meet a broader range of goals and to create derivative products or analysis
DATA ECONOMY OBJECTIVES

- Reduce reporting burden on the states by simplifying calculations and reducing interdependencies
- Take advantage of new sources of data
- Take advantage of advances in LRS and Asset temporal data management
- Increase the flexibility of HPMS data reporting by allowing State reassembly of granulated data
- Accommodate increased reporting requirements (MIRE FDE’s)
DATA ECONOMY IMPACT: OREGON

- Simplify biggest heartburn Data Items:
  - Should Type and Width L/R (Predominance over Sample Section)
  - Median Type and Width L/R (Predominance over Sample Section)
  - Turn Lanes L/R
    - Requires: Lane asset, Signals Asset, Intersection Asset, Ramps Asset, Turn Restrictions
- Curves/Grades
  - Would like to report measured degree per linear location – much simpler!
  - Would like to avoid reporting where data is not present
- HPMS Reporting system is built and working – changes to the spec require changes to the system. A more direct path to the FHWA will reduce required system changes
DATA ECONOMY IMPACT: CONNECTICUT

- Curves/Grades requires significant work
  - Data quantity is large
  - Processing is only for HPMS
- Field crew work is cumbersome to support current PCT Passing Sight Distance.
  - Requires field crew to judge, then compare, derive minimum for sample panel
  - Fortunately, changes are infrequent
- Data Item simplification is what CTDOT is hoping for
  - Data Item preparation is a significant activity for a significant timeframe – would like to reduce)
  - Expertise level required is High – a reduction means more assistance from others
ARIZONA DOT EXAMPLE

Data Economy from a State DOT’s Perspective
AZGEO Clearinghouse is a cooperative project sponsored by the Arizona Geographic Information Council (AGIC), which includes ADOT.

- The data and services available on AZGEO are contributed by a variety of public agencies in Arizona.
- Contributing members agree to provide data, metadata, and services in agreed upon formats which are standardized for user convenience.
- Online “Groups” are set-up around different data themes and programs, including the “Arizona Centerline Unification” Group.

The Centerline Group supports Arizona’s objective for attaining and maintaining a unified statewide authoritative roadway centerline feature class.

- Minimizes redundant efforts across different government agencies.
- Facilitates 2-way exchanges, conversations, and tickets between ADOT and the E-9-1-1 roadway centerline maintainers in county/tribal governments OR roadway functional classification agents in all non-State government agencies.
STANDARDIZED METADATA

All AZGEO data includes the following metadata:
- Data Custodian
- Access and Use Constraints
- Data Abstract
- Data Purpose
- Keywords/Data tags
- Publication Date
- Spatial Extent
- Projection, Datum, Units
- Time period of data
- Project status
- Update frequency
- Next expected update

AZGEO Usage Statistics

Controlled Access

Standardized Metadata

Subscribe to Data

1. Join Groups
Join AZGEO Groups (or start your own) to gain access to group documents, datasets, and services.

2. Download Data
Search for data in the catalog or use the map viewer to explore map services and extract data.

3. Give Back
Give back to the community by contributing your GIS data and metadata and sharing it with AZGEO groups.

AZGEO USAGE STATISTICS

- 5743 screened and approved users
- 408 agencies and organizations
- 307 datasets
- 166 services

CONTROL ACCESS TO YOUR DATA

Who can access this data?
- Group A
- Group B

SUBSCRIBE TO DATA AND GET NOTIFIED WHEN ITS UPDATED!
Contacts
Tom Roff  thomas.roff@dot.gov
          202-366-5035
Rich Grady  grady@appgeo.com
          617-447-2455
Paul Sheedy  sheedy.paul@gmail.com
          617-633-8008