

Timeless Principles for Putting Freight Data to Work

Executive Brief

Data Acquisition Principles

Data acquisition and management principles inform how agencies should collect, purchase, or otherwise obtain data. This includes how agencies should anticipate storing data.

- 1 Focus on inter-operability and standards.** Transportation agencies should work with technology experts, system users, and technology vendors to identify platforms for data storage and analysis that are adaptable for the future.
- 2 Procure services, not assets.** Agencies should avoid betting on specific large-scale investments that could become obsolete as technology advances. Instead, agencies should consider using data and analysis services that third-party providers can upgrade and maintain.
- 3 Leverage private datasets.** The value of data for decisionmaking is important for the private sector, and many private firms have begun to collect their own “big data.” This data may be useful and available to transportation agencies that are willing to collaborate with the private sector to solve freight transportation problems.
- 4 Fuse multiple data sources.** Fusing data from multiple sources, for example GPS and administrative records, works on the principle of “the whole is greater than the sum of its parts” – that is to say fusion can yield deeper insights into transportation phenomena than would be possible

Stewardship Principles

Stewardship refers to the design and application of data management principles covering collection, storage, retention, aggregation, de-identification, and procedures for data access, sharing, and use.

Transparency & Openness	Individuals should be able to acquire information about how public and private entities are involved in the collection, storage, or use of personal information.
Purpose Specification	Agencies should clearly and specifically state why they are collecting information. Any changes to the purpose should be clearly stated.
Data Minimization, Retention, & Use Limitation	Agencies should only collect the information that is both directly relevant and necessary to meet their objectives. Agencies should only retain information as long as is necessary to meet their objectives.
Data Quality & Accuracy	Agencies should strive to ensure data is accurate and high quality. Incorrect information can negatively harm individuals. Regular audits can help ensure the data are accurate.
Accountability	Agencies are responsible for complying with data privacy rules.
Security	Agencies must protect personal data with reasonable security measures to prevent loss, unauthorized access, or disclosure.
Data Management	Agencies must curate, store, geocode, provide access, and update their data and metadata.

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Visualization & Communication

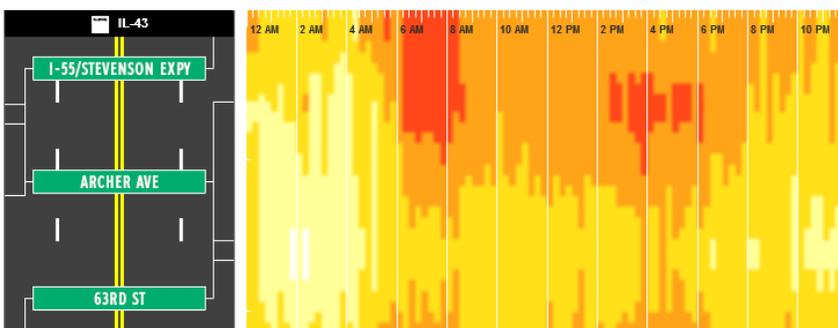
Data visualization refers to the use of visual objects to communicate insights from data, with the goal of facilitating either analysis or communication. As the complexity of data sets has grown, so too has the need for data visualization skills to extract and communicate meaning from larger and larger amounts of data. Visualization can be particularly valuable for communication with decision makers and the general public. Best practices for visualization and communication include:

- 1 Illustrate steps of analytical processes.** Break down analytical processes into a series of maps or figures, so that audiences can see how analyses were conducted, and the results of these analyses.
- 2 Keep visualizations simple.** Readers should be able to easily interpret and understand the message of visualizations without frequently referring to a key or legend.
- 3 Keep visualizations relevant.** “Less is more:” only show information that is directly relevant to the message or story, especially when creating maps: don’t map or label extraneous features that are not immediately relevant.

Sample Visualizations



Students at **Georgetown University** used delivery data provided by UPS to map the quantity of packages delivered in a specific neighborhood, and the address type (business, non-business) where those packages were delivered. This allows readers to quickly identify areas where delivery volumes are highest.



The **Chicago Metropolitan Agency for Planning** used NPMRDS data to visualize average truck speed on a corridor. The x-axis shows time of day in 15 minute increments, while the y-axis shows the specific location on the corridor. This allows readers to quickly see both when and where truck congestion occurs.



The **Texas Border Crossing Information System** tracks truck queue times at border crossings, and publishes this information in real-time to help travelers plan trips and avoid long lines. Historic data also helps border authorities adjust staffing levels to reduce waits.