# Data Management

U.S. Department of Transportation
**Federal Highway Administration**

**Data Management** encompasses a set of coordinated activities for maximizing the value of data to an organization. It includes data collection, creation, processing, storage, backup, organization, documentation, protection, integration, dissemination, archiving and disposal.

## What it Takes

Reliable and consistent data provide a foundation for TPM, informing decisions about how to best use available resources to maximize performance. Data management practices require coordinated agency-wide planning in order to collect, store, and provide data most efficiently and effectively. Although many agencies are "data rich" and "information poor," improved data management practices can enhance abilities to use the data and become "information rich." Practices can be employed both agency-wide and within business units, as well as between agency partners. Cross-agency collaboration can create standardized data elements for aggregation and reporting.

The five data management subcomponents are interrelated. Data governance is the mechanism by which data quality, accessibility, and standardization are achieved. Coordinated data collection supports data standardization, and data standardization and integration efforts facilitate centralized access to data. Thus, a comprehensive approach to data management is critical.

## Implementation Steps

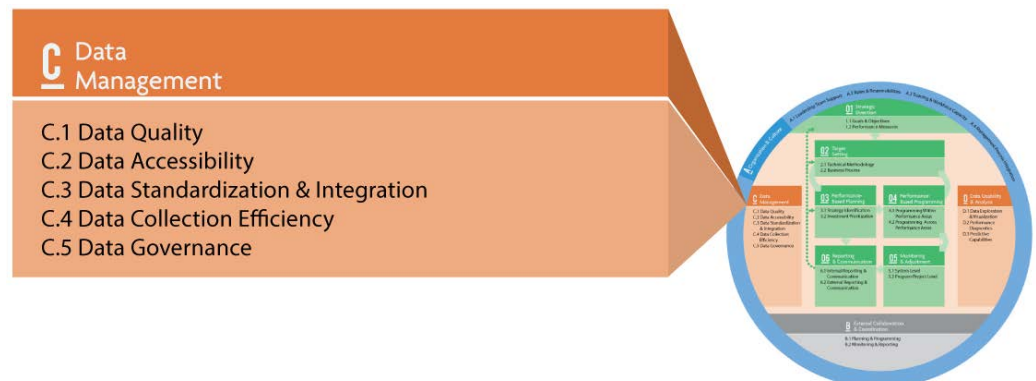Data management is broken down into five subcomponents:
- **Data Quality:** Processes and organizational functions to ensure data is accurate, complete, timely, consistent with requirements and business rules, and relevant for a given use.
- **Data Accessibility:** Processes and organizational functions to provide access to key data sets.
- **Data Standardization and Integration:** Processes and organizational functions to integrate and compare data sets as needed to support transportation performance management.
- **Data Collection Efficiency:** Efforts to maximize use of limited agency resources through coordination of data collection programs across business units and with partner agencies.
- **Data Governance:** Establishing accountability and decision making authority for collecting, processing, protecting, and delivering data.

| Data Quality | Data Accessibility | Data Standardization and Integration | Data Collection Efficiency | Data Governance |
|---|---|---|---|---|
| C.1.1 Establish data quality requirements and metrics | C.2.1 Establish requirements for different audiences | C.3.1 Assess data against standards and requirements | C.4.1 Identify opportunities for data collaboration | C.5.1 Define roles and accountability |
| C.1.2 Create data validation rules | C.2.2 Enhance data access methods and tools | C.3.2 Create and implement a data integration plan | | C.5.2 Implement governance structures and policies |
| C.1.3 Develop quality management processes | | | | |

## Making the Connection

**Data Management** (Component C) supports all agency transportation performance management activities. Because TPM depends on measuring performance, data collected through measurement must be accurate, usable, and available to be analyzed to support management decisions to improve performance results.

### Data Management and the TPM Framework



**C** Data Management

C.1 Data Quality
C.2 Data Accessibility
C.3 Data Standardization & Integration
C.4 Data Collection Efficiency
C.5 Data Governance

For more information on data management and the other components of the TPM Framework visit: **www.tpmtools.org**

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## Case Study: Implementation Step C.3.2

### Road centerline data standard: Oregon DOT

Oregon DOT has developed a statewide Road Centerline Data Standard, with the goals to:

- Ensure the compatibility of data sets within the same framework feature set and between other framework feature sets and themes;
- Assist agencies responsible for the creation, maintenance, and distribution of road centerline data sets by reducing the costs of data sharing, data development, and data maintenance between road authorities; and
- Ensure that road centerline attribution (including geometry) is as up-to-date, complete, and accurate as possible by relying on local road authorities' expertise and data quality mandates.

Work on the data standard began in 2004, and Oregon DOT adopted the standard in 2006, with only minor changes since then. The data standard describes the elements and data structure necessary to adequately describe, produce, and use road centerline data produced in Oregon. It does this through a core set of geospatial information and geometry to support the need for an accurate and current representation of Oregon's traveled road infrastructure.

Initial applications of the road centerline data include route-milepost and address range methods of linear referencing, and digital interaction between the road centerline data set and the hydrography data set(s). Future applications could include network connectivity solutions to support oversize vehicle routing, emergency response, and planning for intelligent transportation system deployments.



Source: Oregon Department of Transportation, Oregon Road Centerline Data Standard, Version 6.0 (November 2014).
http://www.oregon.gov/DAS/CIO/GEO/fit/transportation/docs/TransStandardVersion_6_0.pdf. Oregon Geospatial Enterprise Office. (2012). Oregon Geospatial Standards Development Guidelines. Salem, OR. https://www.oregon.gov/geo/standards/FIT%20Standard%20Development%20Process,%20v.1.1.pdf

## Perspectives

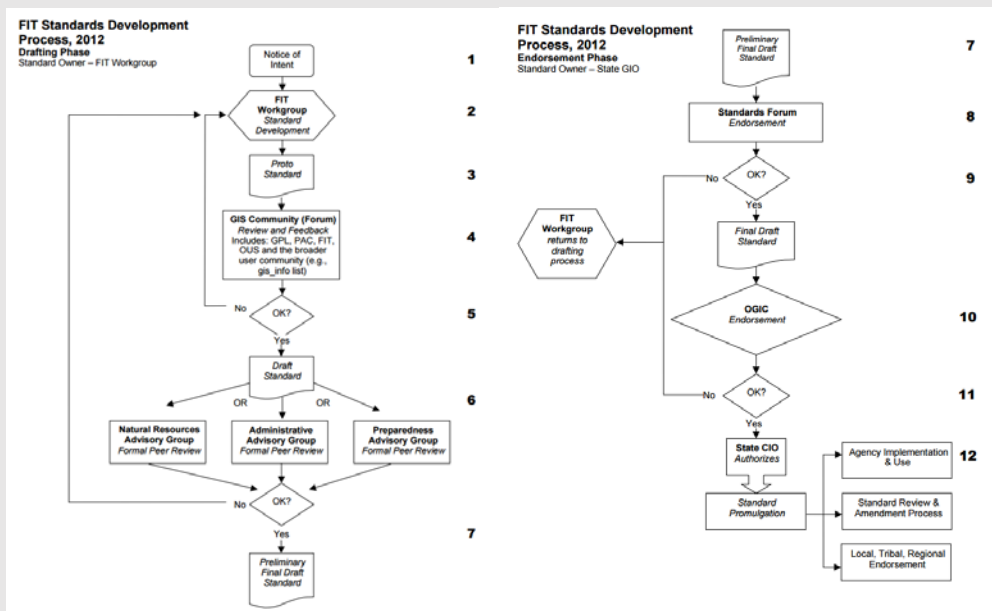"One asset that is owned by virtually all transportation agencies – yet often overlooked – is data."

*— NCHRP Report 814:- Data to Support Transportation Agency Business Needs: A Self-Assessment Guide*

"Data is needed to create information, which is used by knowledge workers to do their jobs. The right knowledge used by the right worker can turn into wisdom. Without quality data, information and knowledge are suspect and wisdom is unattainable."

*— Minnesota DOT, Data Business Plan*

"As I discussed what was possible with maintenance, traffic, safety, planning, our GIS staff and other leaders, it became readily apparent that different departments were collecting duplicate data sets and that working together we could invest in a data set worthy of the UPlan system and our asset management goals."

*— Stan Burns, Utah DOT*

## Connect Online to Learn More

Visit the TPM Toolbox online to learn more about data management and to take your own TPM Capability Maturity Self-Assessment: **www.tpmtools.org**