



Data Infrastructure and GIS: Florida DOT's Experience

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esri
Infrastructure Management & **20**
GIS Conference **20**

Impacts of Big Data

Managing Large Datasets

- Exponential Increase in Data
- Exceeds Current Storage Capabilities
- Rise in Unstructured Data
- Rise in Number of Data Formats

Challenges for 'Real-Time'

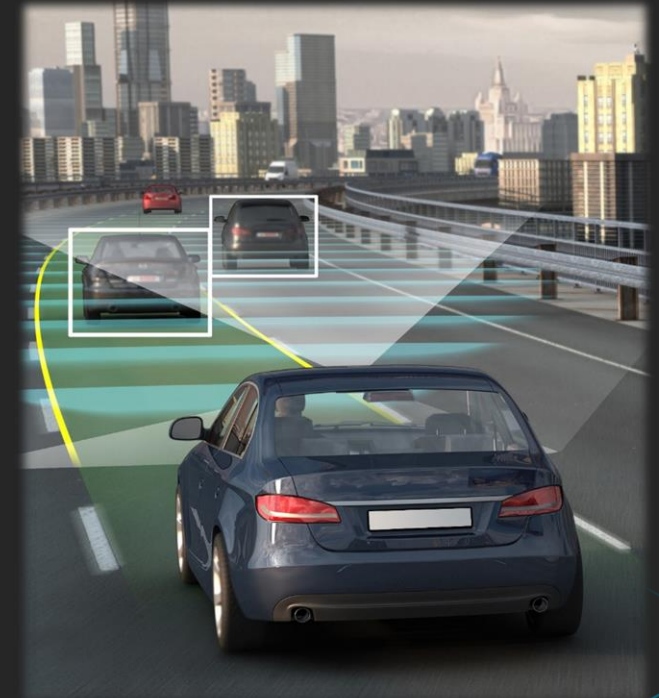
- Evolving Nature of Tools and Technologies Needed
- Common Definition of 'Real-Time'
- Irrelevant Architecture
- Internal Process Adjustments

Security

- Relating Data from Many Sources
- Need for Various Data Collection Strategies
- Data Inconsistencies

Staffing

- Shortage of Expertise
 - Big Data
 - Machine Learning
 - Artificial Intelligence
- Technology Cultural Change
- Employee Resistance to Change



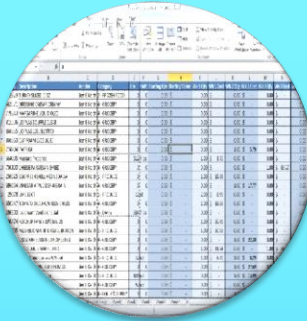
Top Challenges



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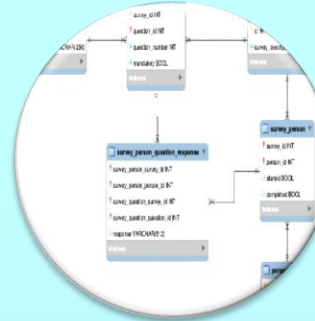
Person-to-Person Sharing

A heavy reliance on getting data from individuals instead of accessing data directly from applications and reporting tools



Extensive Manual Processing

A prevalence of manual, home grown processes for copying and transferring data (spreadsheets)



Limited or No Standardization

Extensive amount of effort required to relate information from multiple data sources



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Lack of Sustainability

A data driven agency poses new challenges

Other Challenges

It's hard to know what data is available

Information is organized around applications instead of around perspectives end users can relate to (e.g. business subject areas).

Data is hard to access

Security controls are scattered across many different tools and processes (e.g. RACF, AARF, applications, SharePoint, etc.) throughout 170+ centralized and local systems.

Lack of standardized approach

Many districts are moving toward the adoption of the GIS system as the entry point for information searches, but the approach has not been standardized across the districts.

No enterprise-level view of data

A majority of the district data efforts appear to focus on singular business issues without the added benefit of looking at the data from an overall business view to improve performance or reduce risk.

Teams want a "one stop shop"

Teams consistently stated they would like a "one stop shop" to access all information they need in one place, with a "Google Type" Search. Over 40 "Search Criteria" elements have been identified.

2015 FDOT Starts the Journey

Other Issues:

- Lack of being able to project IT needs
- Proper strategic communications with the business areas
- Big Data is coming quickly
- Business Analytics is quickly evolving
- Business needs are becoming more “real time”
- Many lacked ability to improve technology “Investment with Intent”
- No real agility to quickly evolve to future systems (complete rebuilds)



Our Approach

- Institute an agency wide data governance initiative- ROADS
- Reorganize our key technology oversight and data management offices
 - Approach technology and data as Information Technology and Operational Technology
- Develop support beyond our key technology oversight and data management offices under Transportation Technology (ISM,OCM,PQI)
- Build all future technology projects with documented business goals and outcomes. (investment with intent)



Geospatial Shared Data- Maximizing Value for Stakeholders



Core building blocks are 3D models and data (geospatial) that brings organizational value when integrated.

Benefits to Enterprise Governance

Reliability

Ensuring information is secure, accurate, reliable and at the appropriate level to empower you do your job better.

Accessibility

Providing the ability to access relevant business data more quickly and efficiently by knowing where to find it.

Timeliness

Reducing the amount of time to locate the data you need and more time to analyze the data.

Productivity

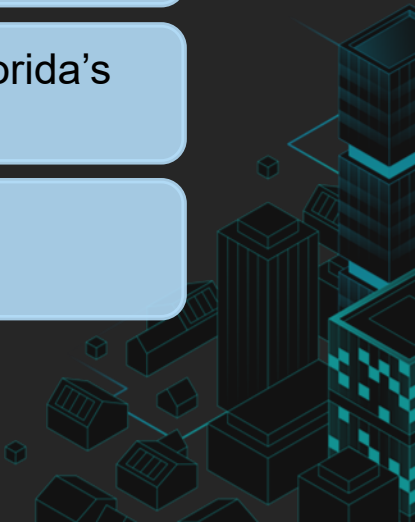
Effectively sharing information across our organization to enable better and faster decisions.

Integration

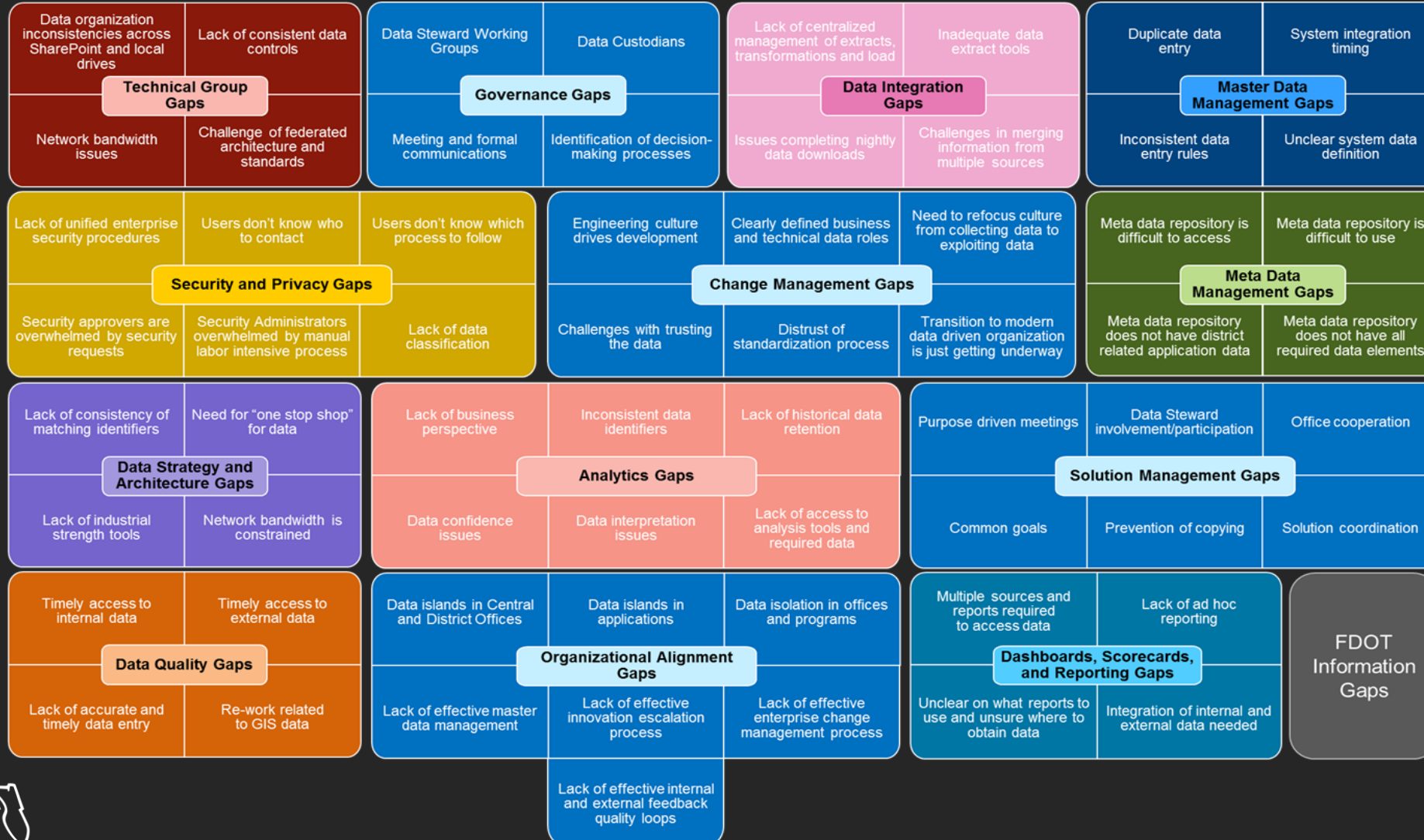
Enabling a greater capability to link data together from different Districts, Florida's Turnpike Enterprise, functional areas and systems.

Sharing

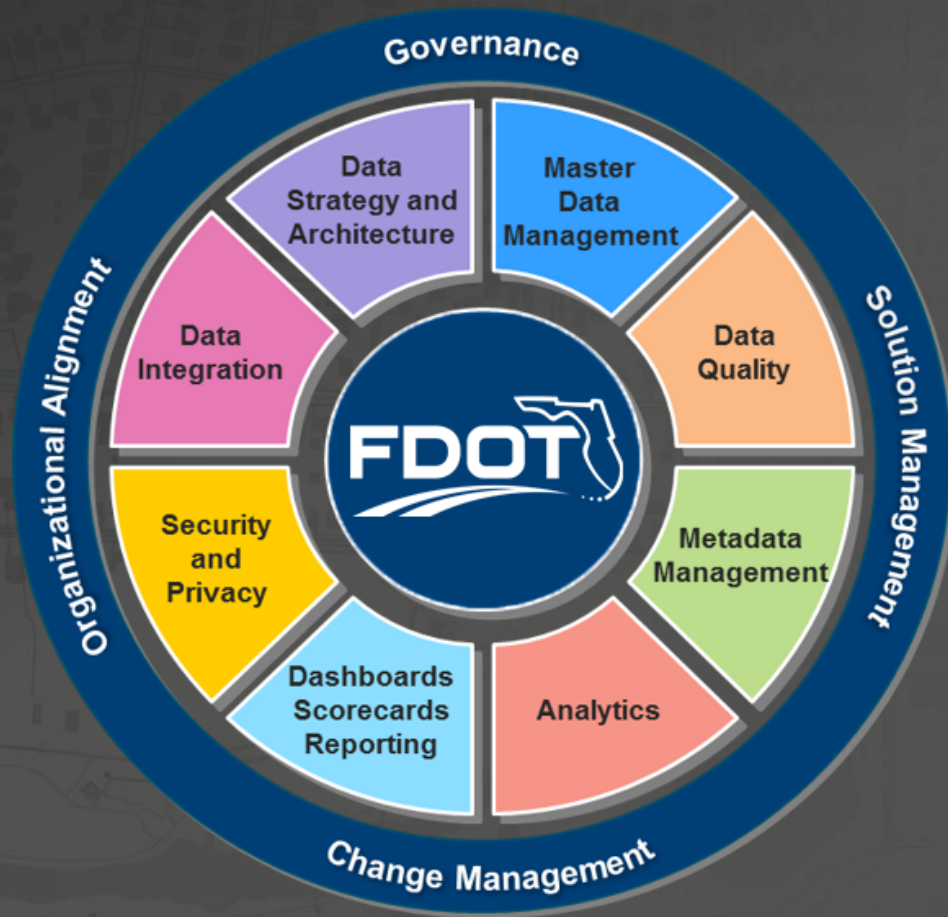
Removing barriers currently in place that prevent the efficient sharing of information.



Organizational Gaps



Key Data Governance Components



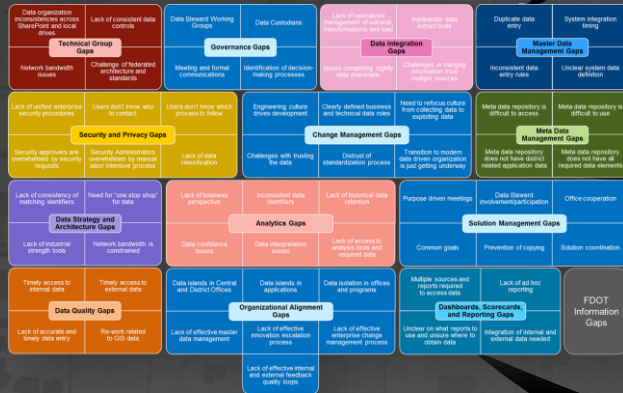
Component Model

- Effective data governance programs have many processes
- Each component is critical to the overall success of the program
- The inner components are related
- To achieve success, all components must be addressed



FDOT's Approach: ROADS

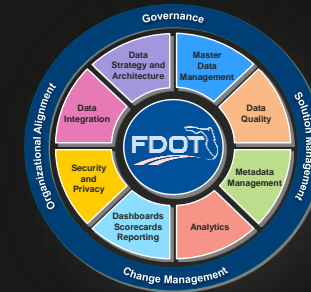
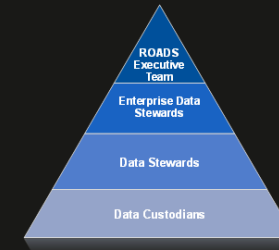
Reliable, Organized, Accurate Data Sharing (ROADS) - The ROADS Initiative is helping to close the data/information gaps identified by:



People: Managing a formal data governance structure to make key decisions related to data/information.

Process: Training FDOT on the Data Governance Component Model and implementing standard processes and routines to provide a formal approach to data governance.

Technology: Providing common standardized BI/DW tools, technologies and frameworks that will be used across FDOT to make data/information more accessible.



Data Governance Structure

- **Chaired by CIM Officer**
- Champions Data Quality Improvement
- Represents Organizational Stakeholders
- Prioritizes Data Issues
- Sets Data Governance Rules and Procedures

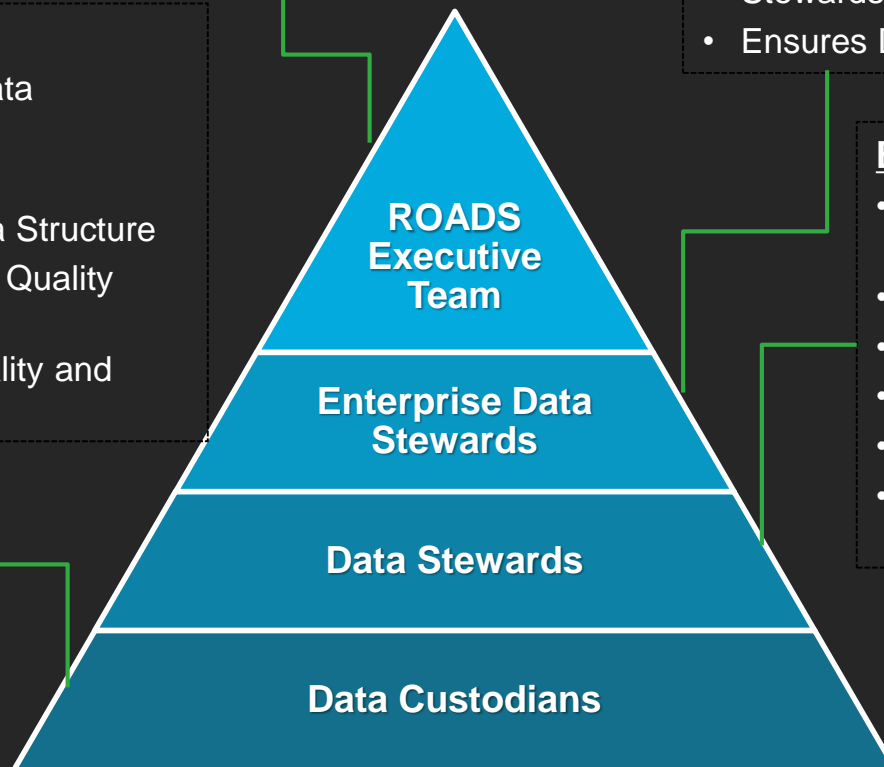
Technical Function Expert

- Supports and Implements Data Governance Activities
- Assists With Documentation
- Maintains Knowledge of Data Structure
- Identifies and Resolves Data Quality Defects
- Implements Data Confidentiality and Security Requirements

- **Chaired by Data Governance Administrator**
- Leads the Data Governance Working Group
- Acts as Liaison between ROADS Executive Team and the Data Stewards and Data Custodians
- Ensures Data Governance Compliance

Business Function Expert

- Collaborates Across Department on Data Governance Activities
- Defines and Maintains Business Metadata
- Coordinates Adequate Documentation
- Develops Data Quality Process and Standards
- Drives Remediation of Data Quality Defects
- Manages Data Confidentiality & Security Classification



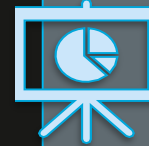
People, Processes and Technology



Implement Architecture



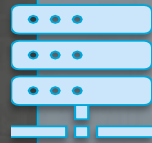
Address Bandwidth Issues



Establish Data Awareness



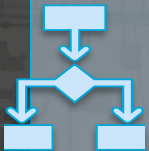
Move and Synchronize Data



Enable Data Consistency and Accountability



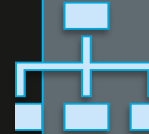
Institute Enhanced Reporting Capabilities



Implement Solution Management



Implement Change Management



Implement Organizational Alignment



Streamline Data Security



Implement Data Governance



Effective Data Governance

- Open Platforms
- National and International Data Standards
- Further Enable Self-Service (GIS Platform)
- Build Upon Existing Data Governance Foundation
- Support Innovation and Modernization
- Established Frameworks: Ongoing Reassessment of Tools, Processes and Procedures
- Increase Staff Awareness
- Formal Management of Vital Data and Technology Assets
- Continue Efforts to Promote Data Governance as a Priority
- Promote the Value of Managed Data through ROADS Initiative



CULTURAL CHANGE



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Key Projects

BI/DW	The <u>Business Intelligence/Data Warehouse</u> provides the tools and capabilities needed to improve the quality and accessibility of FDOT's data.
ECTS	The <u>Enterprise Correspondence Tracking System</u> , powered by GovQA, is used to submit online requests, report issues and access self-help resources.
EDMS	The <u>Electronic Document Management System</u> , powered by eDOCS DM, is for the storage, searching, and retrieval of documents and associated metadata.
IAMG	The <u>Identity Access Management and Governance</u> will help to ensure appropriate access to resources across our diverse technology environments.
IRAIS	The <u>Integrated Roadway Asset Identification System</u> will incrementally replace the Roadway Characteristic Inventory, technical architecture and business processes.
SoE	The <u>System of Engagement</u> provides a single enterprise view where FDOT workers and partners can consume, analyze and contribute to enterprise data.
WCMS	The <u>Website Content Management System</u> provides authoring, collaboration and administrative tools to create and manage website content.
WPPI	The <u>Work Program Integration Initiative</u> is a commercial-off-the-shelf application to support the FDOT work program.



FDOT's Integrated Approach



Key Initiatives



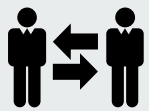
Why is the SoE important?



Equips FDOT to **establish reusable data sharing** methods and tools as required by ROADS policy, data governance, and insight



Provides FDOT with the right tools to **improve decision making and save time** in the search for data



Ensures **architecture, data and dashboards are sharable**, based on user credentials



Increases data governance and standards, simplifies making the true source of data available



Civil Integrated Management - GIS

- Apply GIS Governance across the Department
- Integrate core platforms making it possible to connect GIS and EDMS's
- Better leverage GIS org structure in the Districts, Turnpike, and Central Office (Centralized approach)
- Update legacy GIS applications with more modern and focused SoE Apps
- Develop programs/applications to support 3D modeling

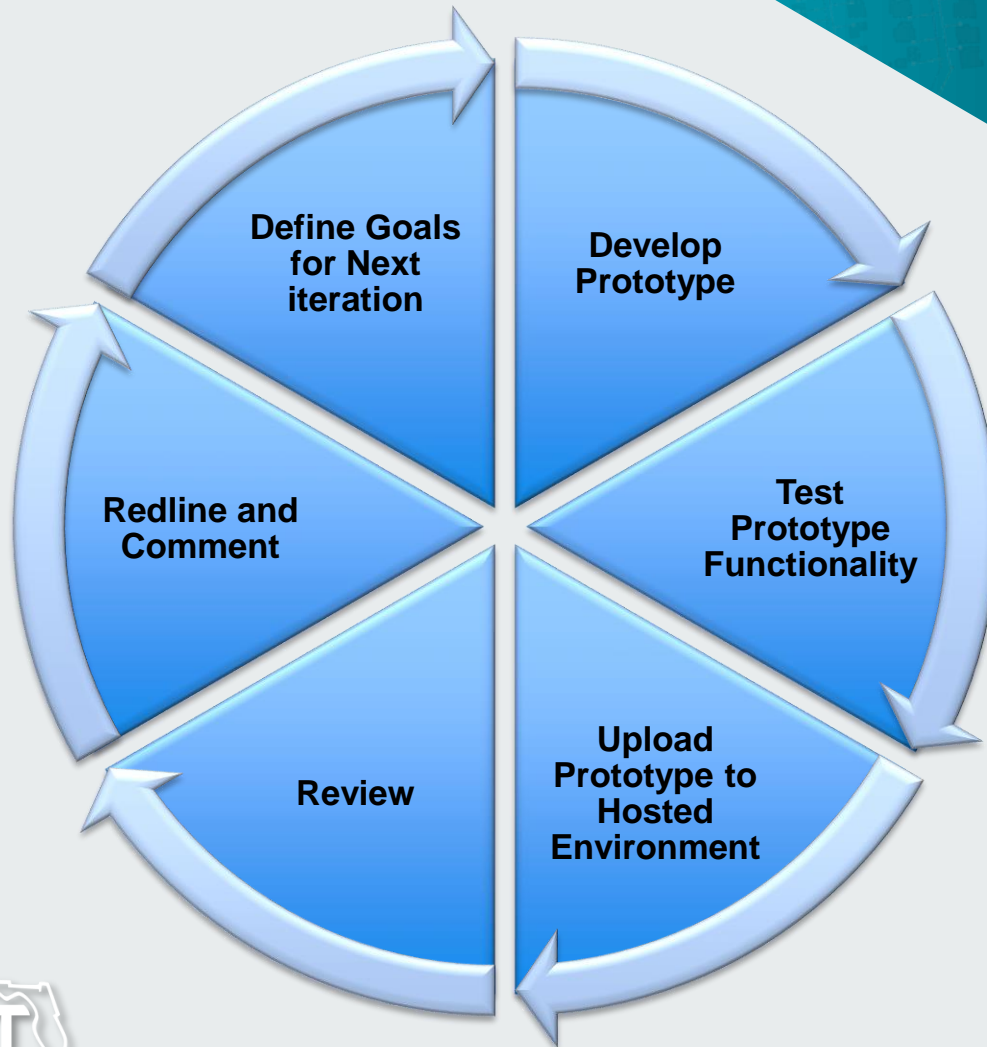


What are the benefits of the SoE?

- Provides **single destination** for authoritative data **across FDOT programs** if the data is *spatially aware*
- **Maximizes ROI of data governance investments** (ROADS) through suites of useful apps that consume quality data
- Production and publication data sources are isolated to **separate data management**



How We Will Wash, Rinse, Repeat



Prototypes to Production

Acceptance	Operations Dashboard
Construction Crash Dashboard	Operations Dashboard
Construction Crash Mobile Suite	Mobile App
Friction	Operations Dashboard
FWD Dashboard	Operations Dashboard
Active Construction Projects	Web App Builder
Pavement Conditions Surveys	Operations Dashboard
Pavement Overview SMO Dashboard	Operations Dashboard
Work Program FAA Permit Check	Web App
Local Agency Program Projects	Web App
Traffic Safety Portal	Operations Dashboard
FDOT SAPMP Interactive Web Application	Web App
FDOT SAPMP Interactive Web Application	Web App
Certified Business Enterprise Viewer	Web App
Return to Office	Operations Dashboard
Facilities Operations	Operations Dashboard



Thank You

