DBP

Data Policy: Mobility Data Business Plan Guide for State and Local Departments of Transportation

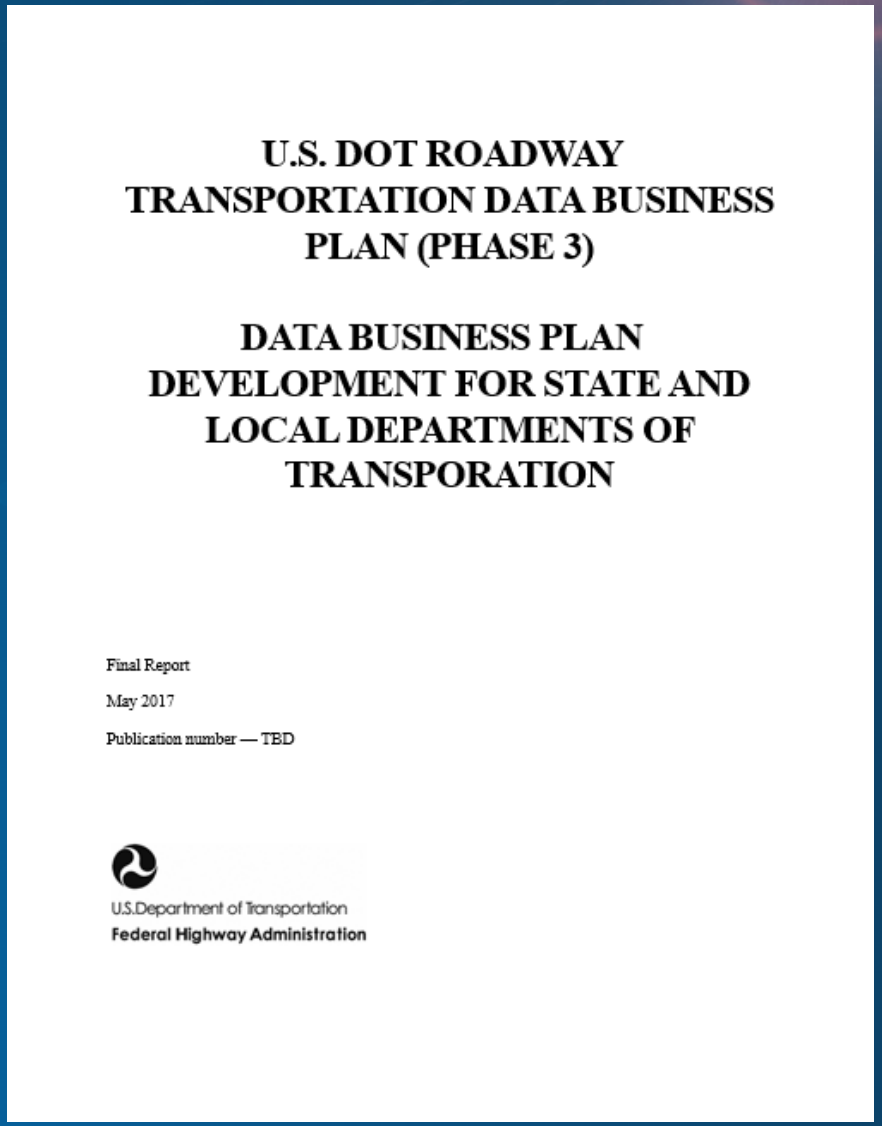
September 11, 2017

U.S. Department of Transportation
Federal Highway Administration

CAMBRIDGE SYSTEMATICS

Agenda

- Background
- Overview of Project
- Overview of Data Business Plan Development for State and Local DOTs
- Pilot Study Summaries
- Q&A



U.S. DOT ROADWAY TRANSPORTATION DATA BUSINESS PLAN (PHASE 3)

DATA BUSINESS PLAN DEVELOPMENT FOR STATE AND LOCAL DEPARTMENTS OF TRANSPORATION

Final Report

May 2017

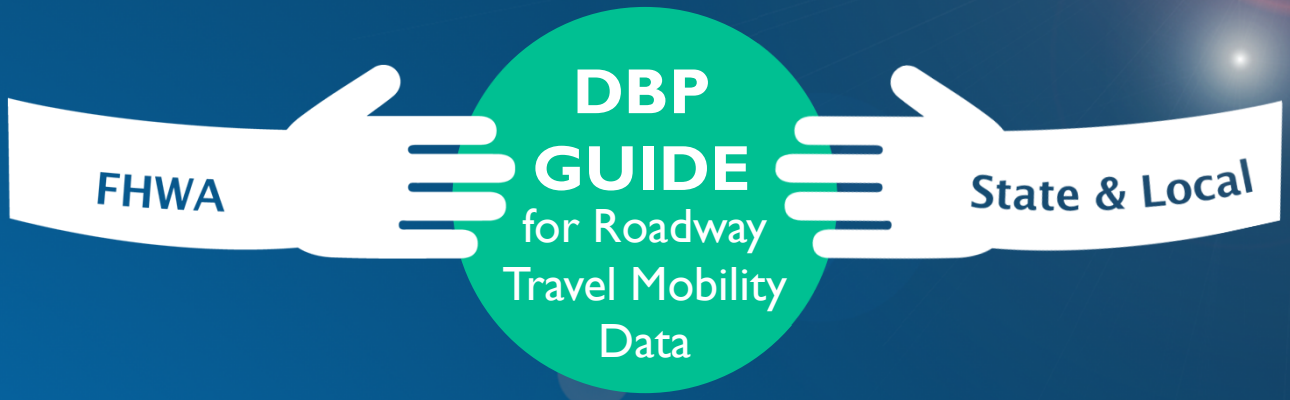
Publication number — TBD

U.S.Department of Transportation
Federal Highway Administration

Background

- FY 2010 – FHWA Office of Operations identified need to investigate inconsistencies between U.S. DOT Data Programs
  - » *Needs and Gaps in the Operations and Coordination of U.S. DOT Data Capture and Management Programs* White Paper
- FY 2011 – U.S. DOT Roadway Transportation Data Business Plan (Phase 1) to address data gaps
- FY2012 – Phase 2 to develop data governance manual and conduct test pilots
- FY2013 – Phase 3 to implement the Data Business Plan and develop *Guide on Data Business Plan Development for State and Local DOTs*

Project Overview and Goals



Instructions

- Stakeholder Outreach.
- Data and Gap Assessment.
- Data Governance.
- Data Management Practices.

DBP Pilots

Roadway Travel Mobility Data

"Roadway travel mobility data is travel data from the following roadway travel modes: vehicle, truck freight, bicycle/pedestrian, and transit. Travel data includes vehicle volume, speed, and lane occupancy data, as well as connected vehicle data such as vehicle location, presence and speed within the system, internal vehicle status such as fuel consumption rate, or externally measured data such as recorded external temperature and weather conditions. Travel data for transit could include location, speed and status data, passenger counts, and schedule adherence data. Freight carriers may supplement the standard location and position report with gross weight data or data regarding the type and time-critical nature of goods carried."

Source: U.S. DOT Roadway Transportation Data Business Plan (Phase 3), Data Business Plan Development for State and Local Departments of Transportation, May 2017

What is a Data Business Plan?

A Data Business Plan (DBP) guides an agency's data management practices.

- A DBP includes standards, policies, and procedures for data systems, databases, and business processes.
- This is a living document that describes the agency's vision, goals, objectives, and actions for data management.

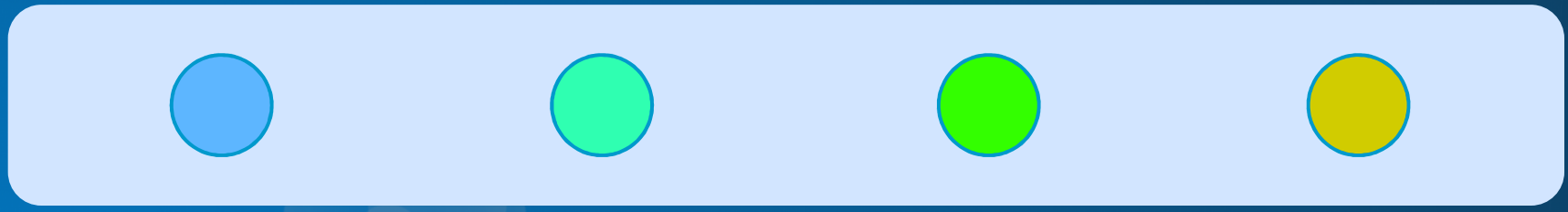
Source: NCHRP Report 666: NCHRP Report 666 – *Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies*

Benefits of Data Business Planning

Help State DOT and local partners understand:

- What mobility data is collected within the agency and at the regional level?
- How can data support mobility planning, operations, and performance management?
- Who is responsible for managing and updating data?

Identify potential duplicative data collection efforts.



Solidify working relationships by identifying how partner agencies share and exchange mobility data, both internally and externally.

Lead to more rapid, targeted data acquisitions and reduced data collection and management costs in the future.

Guide Steps

1. Establish Needs and Objectives.
2. Stakeholder Outreach.
3. Data Assessment.
4. Gap Assessment.
5. Improvement Strategies.
6. Data Governance Processes and Documents.
7. Data Management Practices.
8. Develop Implementation Roadmap.
9. Develop Data Business Plan.

Step 1. Establish Need and Objectives

Define High Level Challenges

Data Systems

- Data Collection
- Duplicative Efforts
- Data Storage
- Data Quality
- Data Standards
- Data Integration
- Documentation
- System Access

Technology and Tools

- Software
- Hardware
- System Interfaces
- IT Compatibility
- Business Intelligence Tools
- Analytical Tools
- Knowledge Management
- Network Issues

Management and Governance

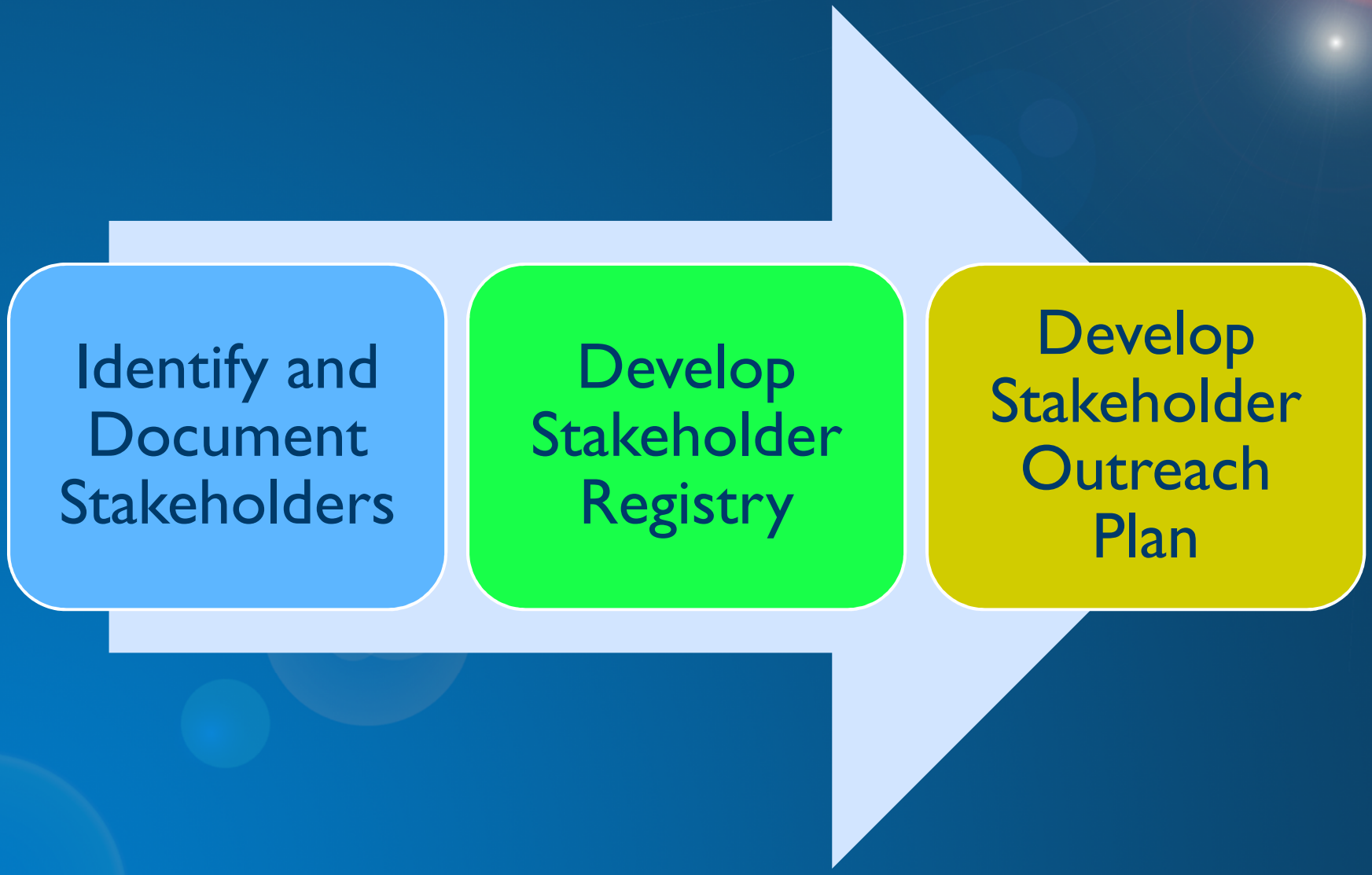
- Business Rules and Processes
- Data Management
- Data Governance
- Coordination Resource Availability
- Training Needs

Develop Outcome Statement

Describes the results the DBP will achieve

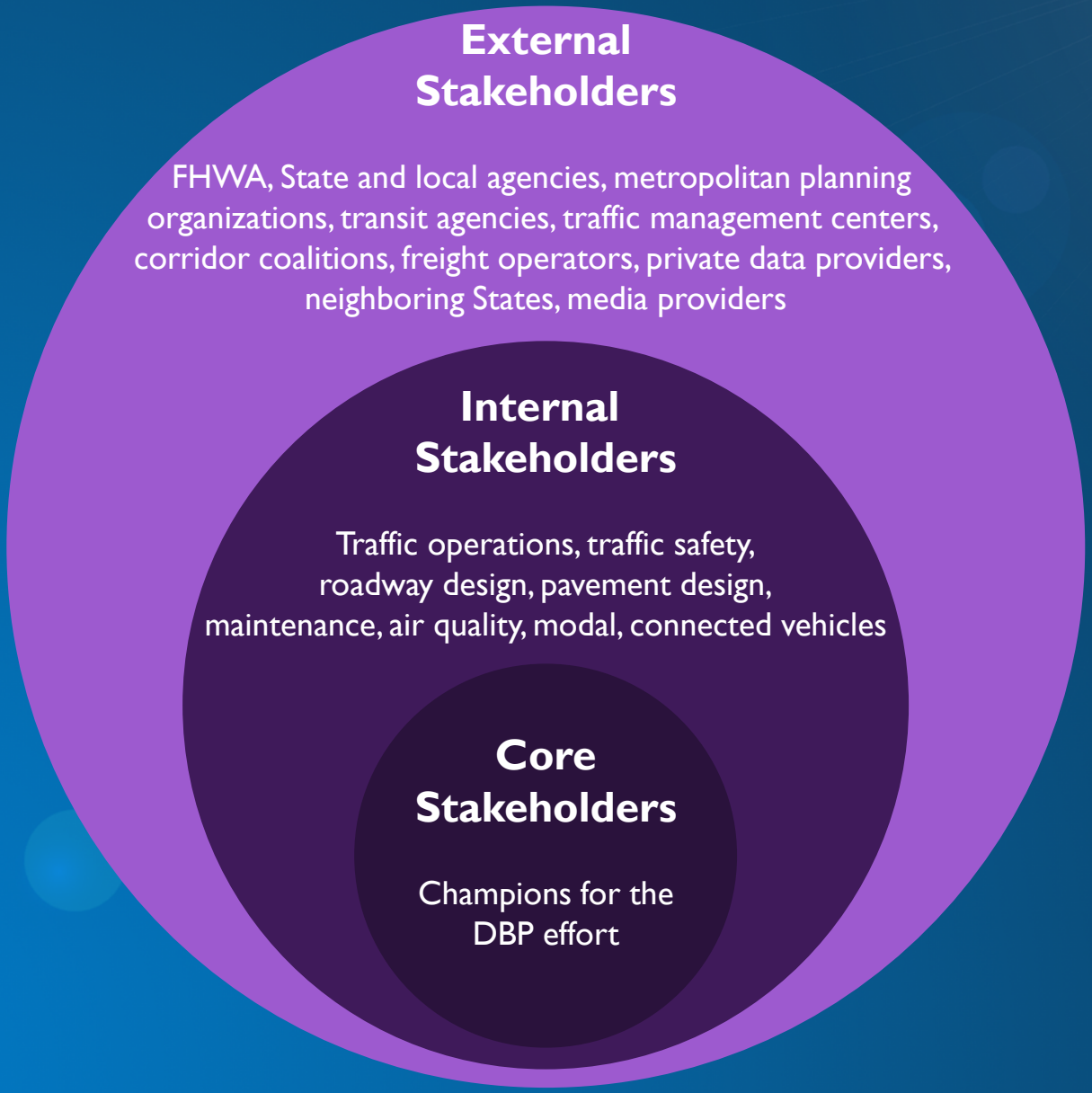
- Develop a framework for partner agencies to share mobility data for roadway users and freight within the region for planning purposes
- Develop a process for developing, collecting, calculating, and reporting on performance measures to support mobility in the region

Step 2. Stakeholder Outreach



Identify and Document Stakeholders

Step 2

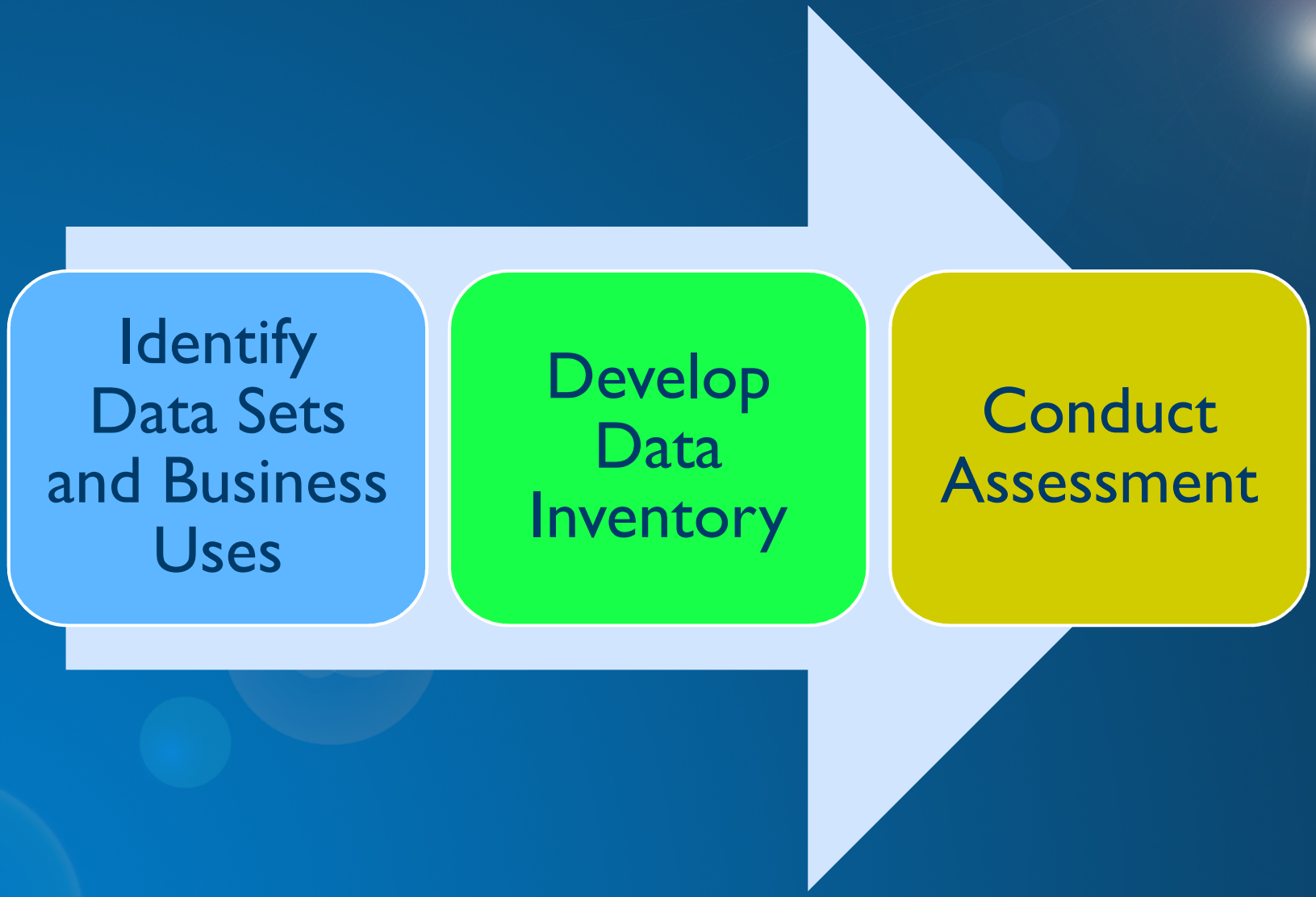


Develop Stakeholder Outreach Plan

Step 2

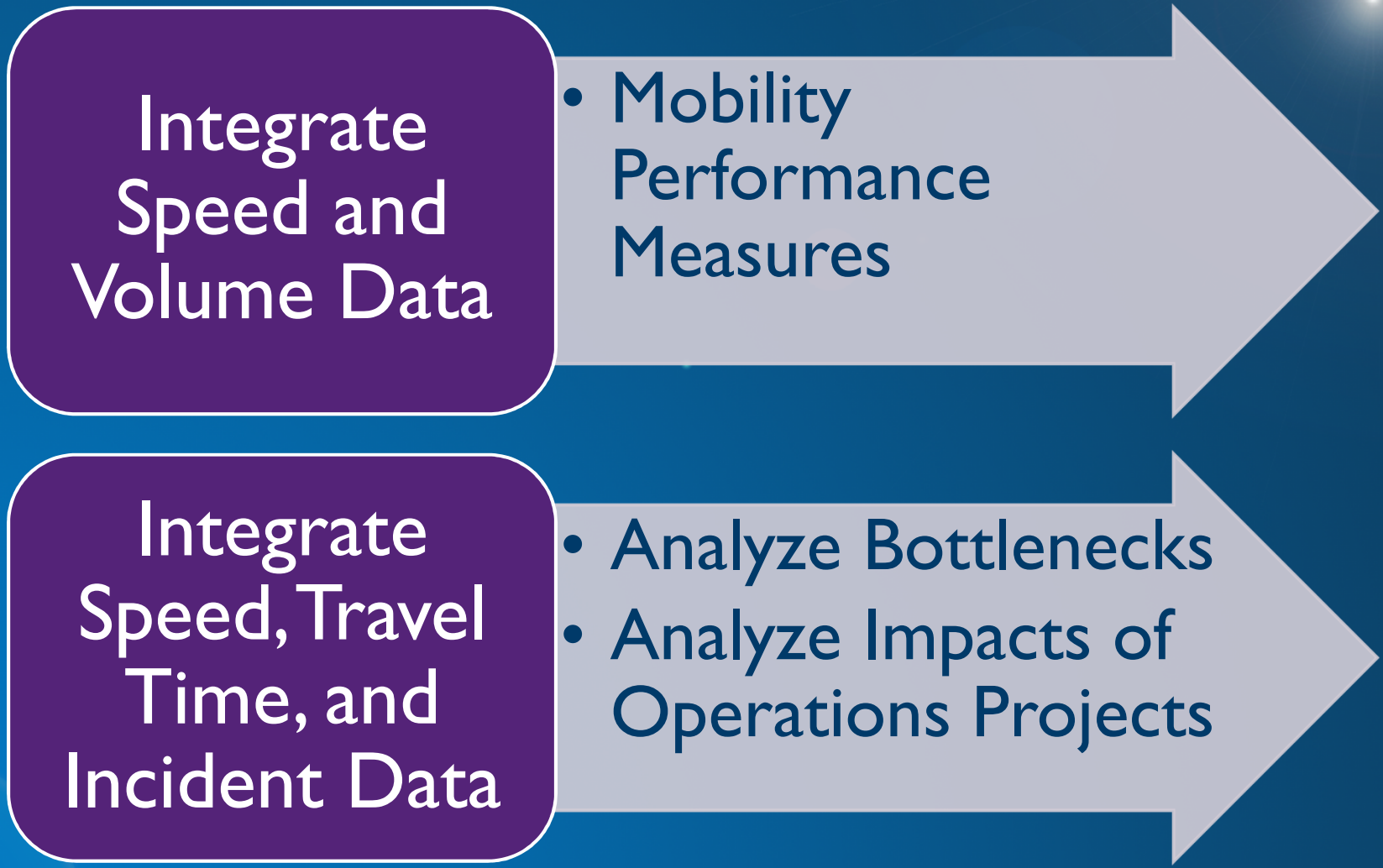
- Stakeholder involvement in each step of DBP development
- Desired feedback
- Engagement mechanisms
  - » Meetings
  - » Focus groups
  - » Workshops
  - » Surveys
  - » Briefings

Step 3. Data Assessment



Identify Data Sets and Business Uses

Step 3



Develop Data Inventory

- Increase knowledge of current and future mobility data collection activities in the region

Agency	Mobility Data	Data Source	Data Collection Method	Network Type	Geographic Boundary	Time Period	Purpose
County	Speed Travel Time	Google Traffic / Waze	Crowd-Sourcing	Freeways Highways Arterials	Within County Boundary	Ongoing	Operations Planning
DOT	Volume	Collected Internally	Count Stations	Freeways Highways	Within District Boundary	Ongoing Samples	Operations Planning Design

Conduct Assessment

- Assessment Areas
  - » Data collection, management and technical standards
  - » Data interoperability and expandability
  - » Data storage and access
  - » Technology and tools
  - » Data governance, culture, and collaboration
- Assess current level of maturity
  - » Data management maturity model

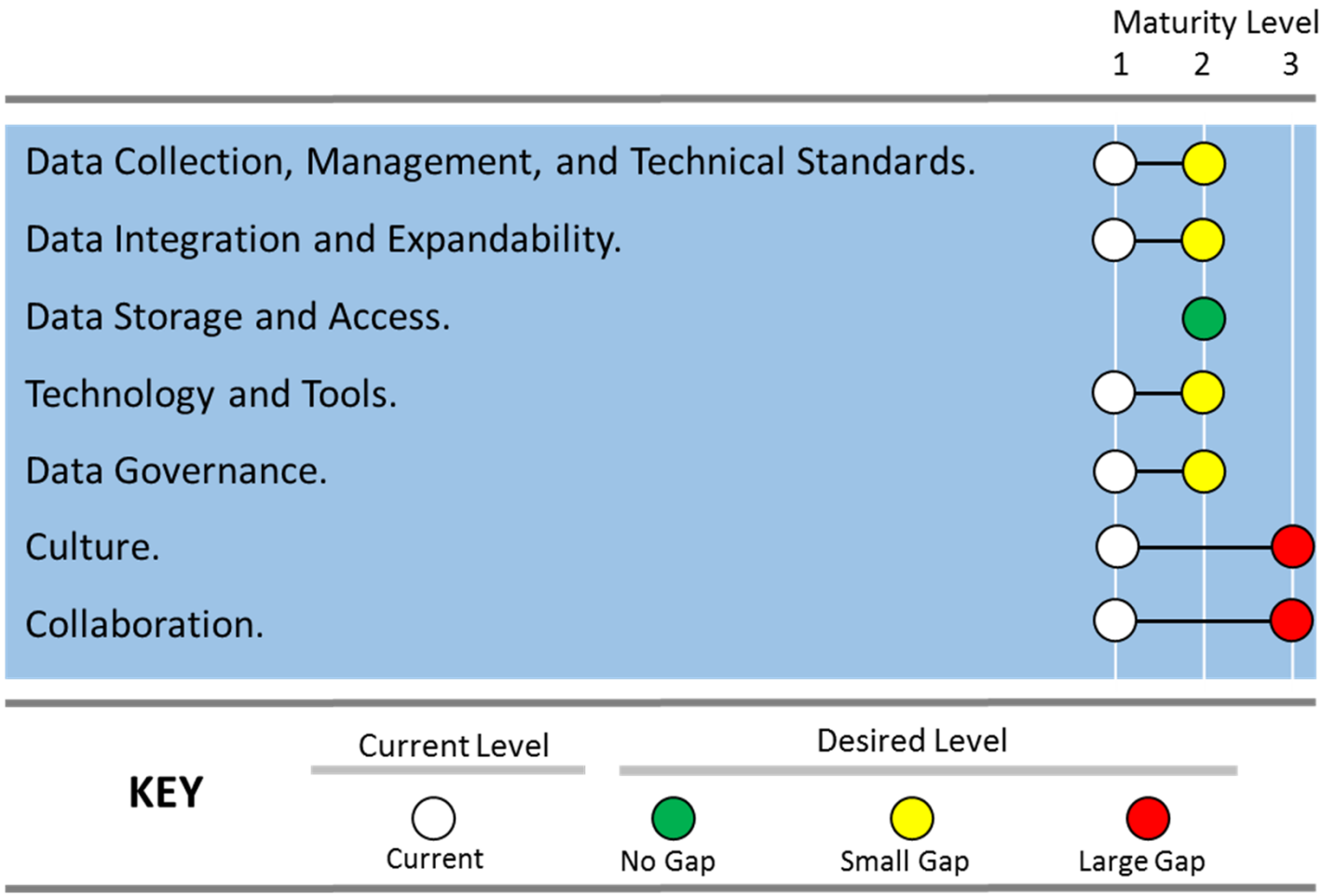
Conduct Assessment

Most Agencies Today

Goal

1 Initial/Under Development	2 Defined/Managed	3 Optimized
Ad hoc activities and relationships.	Processes are predictable and managed.	Governance is full, sustainable program priority.
Efforts are champion-driven.	Partnerships are aligned.	Top management support.
Limited accountability.	Rules for quality and processes.	There are formal partnerships.
	Training is taking place.	Continuous improvement.

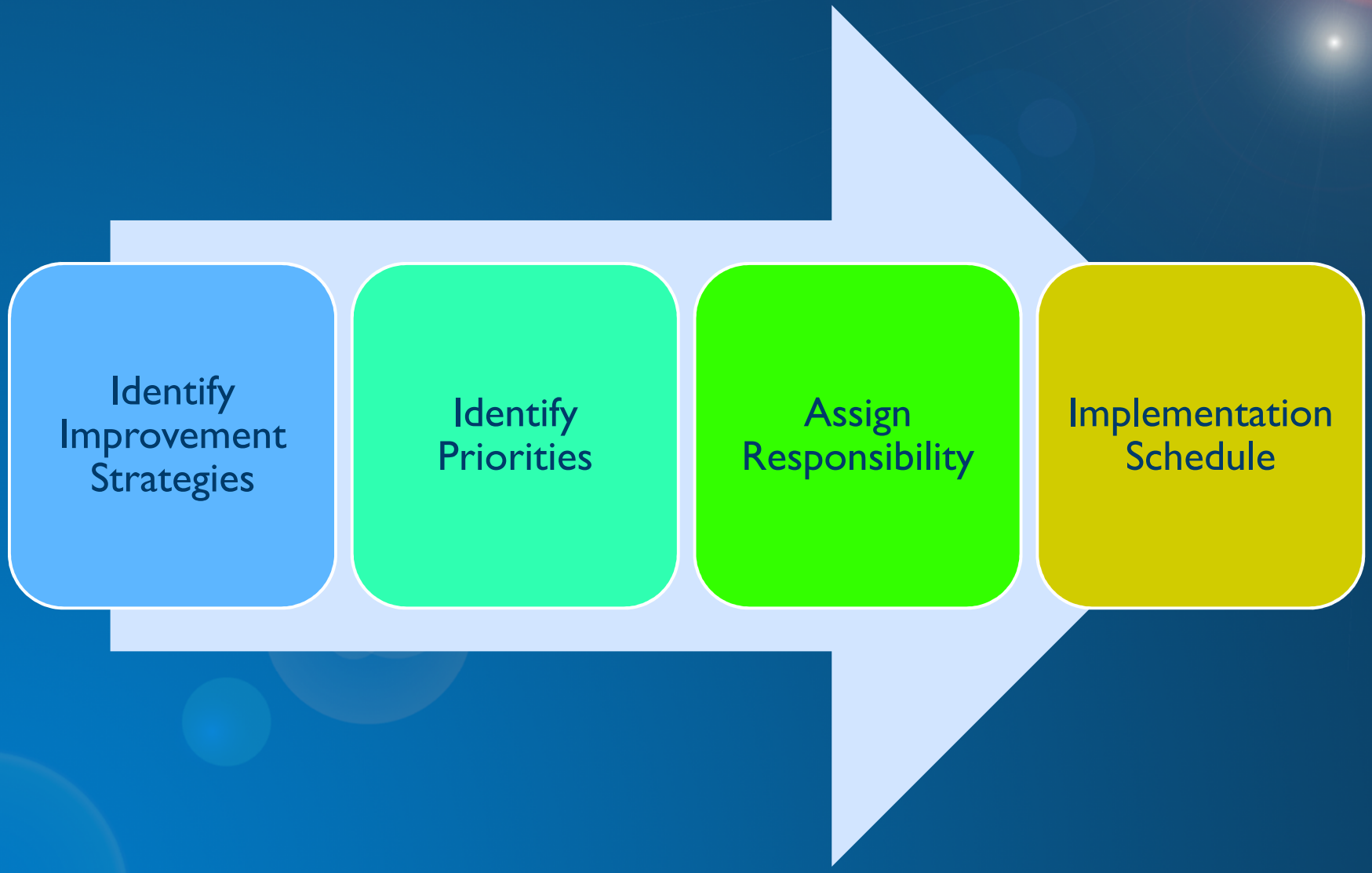
Conduct Assessment



Step 4. Gap Assessment

- Identify gaps and overlaps that exist in program activities
  - » Data Systems: Gaps related to data systems, data elements, data collection methods, duplicative data collection efforts, data storage environments, quality of data, data standards, data integration, data analysis, documentation, and system access
  - » Technology and Tools: Gaps related to software, hardware, system interfaces, IT compatibility, business intelligence tools, analytical tools, knowledge management, and network issues
  - » Data Governance, Culture, and Collaboration: Gaps related to business rules and processes, data management, data governance, coordination across business lines, resource availability, and training needs

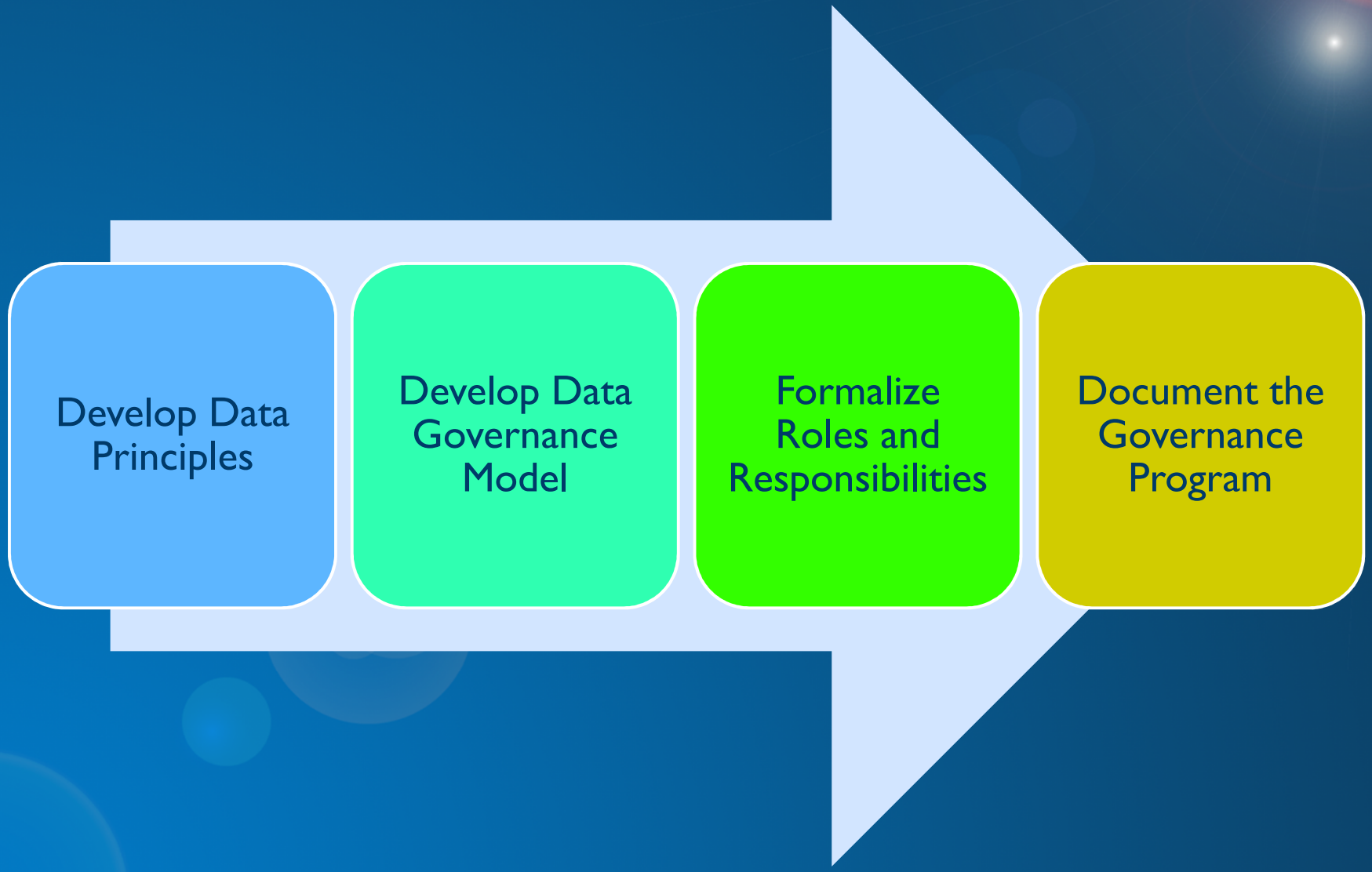
Step 5. Improvement Strategies



Identify Priorities

- Prioritize strategies to identify most critical needs
  - » Low Priority – Investment and benefit does not add significant value
  - » Medium Priority – Implement as time and investment permits
  - » High Priority – Implement as soon as possible, as these strategies significantly improve assessment area and gaps

Step 6. Data Governance Processes and Documents



Develop Data Principles

- VALUABLE – Data is an asset
- AVAILABLE – Data is open, accessible, transparent, and shared
- RELIABLE – Data quality and extent is fit for a variety of applications
- AUTHORIZED – Data is secure and compliant with regulations
- CLEAR – There is a common vocabulary and data definition
- EFFICIENT – Data is not duplicated
- ACCOUNTABLE – Decisions maximize the benefit of data

Source: AASHTO Subcommittee on Data, Data Subcommittee Efforts on Core Data Principles

Develop Data Governance Model

Step 6

Data Governance Roles

Role	Description
Data Governance Council	Senior level managers who establish policies for data management
Data Stewards	Ensure data is collected, managed, and used in accordance with policies
Data Business Owners	Establish business requirements for use of data
Data Custodians	Provide IT support for data systems
Working Groups	Research technical issues and provide recommendations to the Board
Community of Interest	Stakeholders who share a common interest as users of data systems

Develop Documentation

Step 6

Data Governance Manual	• Documents policies, standards, roles and responsibilities for data management
Data Catalog	• Documents data systems and offices responsible for maintaining those systems
Business Terms Glossary	• Defines commonly used business terms

Step 7. Data Management Practices

- Implement data management policies and procedures for data collection, processing, analysis, and integration.

Data Acquisition	Data Quality	Data Standards
Business Analysis Tools	Data Privacy and Security	Data Storage and Access
Performance Measures	Risk Assessment	Knowledge Management

Step 8. Develop Implementation Roadmap

Step 1: Execute a Memorandum of Understanding.	• Execute MOU to engage regional stakeholder agencies in the DBP implementation process.
Step 2: Obtain Regional Coordination and Buy-in.	• Identify stakeholders. • Implement data governance framework. • Develop and publish a data catalog. • Conduct annual review of mobility data programs. • Develop vendor contract language to enable data sharing.
Step 3: Improve Data Integration and Collaboration.	• Address needs for data standards. • Address data security and privacy issues.
Step 4: Build a Data Sharing Platform.	• Post all data in Open Data Format. • Develop Data Governance Manual. • Address data collection and integration. • Develop a data warehouse. • Extend/leverage Waze data.
Step 5: Implement Performance Measure to Track Success.	• Adopt performance measures. • Document measures in Data Governance Manual. • Develop plan for monitoring program activities.

Step 9. Develop Data Business Plan

- Data Business Plan includes
  - » Need, Scope, Objectives, and Outcome Statement
  - » Stakeholders
  - » Data and Gap Assessment
  - » Data Governance Framework
  - » Implementation Roadmap

Pilot Testing

Pilot Testing of the Data Business Plan Guide

Three Pilot Sites	Hillsborough MPO
	Mid-America Regional Council
	Maryland DOT SHA
Pilot Testing Objectives	Pilot Test Data Business Plan Guide Steps
	Develop Localized Data Business Plans for Pilot Sites
	Revise the Guide based on Lessons Learned

Hillsborough MPO (Tampa, FL) Data Business Plan Pilot

Hillsborough MPO
Metropolitan Planning for Transportation

Project Goals

- Identify and catalogue mobility/transportation-related datasets within the county
- Determine data gaps and redundancies
- Establish a mechanism for sharing existing datasets and collaborating with partners to produce new, needed datasets

Survey Results

- Data collection/production/utilization efforts

Table 3-1. Mobility Data Inventory

Organization	Mobility Data Collected	Data Source	Data Collection Method	Network Type	Geographic Boundary	Time Period	Real time vs Archived	Purpose
Tampa-Hillsborough Expressway Authority (THEA)	As a toll road, THEA primarily collects transaction data. However, they do collect some mobility data such as traffic volume counts and speeds. It is collected using microwave. They are installing Bluetooth as part of an ITS project.	Obtained from another agency – FDOT Other – If we need travel speed, we will do traffic engineering studies	Bluetooth (FUTURE)	Highways	Lee Roy Selmon Expressway, Meridian Avenue, and Brandon Parkway	Samples	Real-time Archive	Operations Planning
Hillsborough County	Speed (FUTURE) Travel times (FUTURE)	Other – Google Traffic/Waze (FUTURE)	Other – Crowdsourcing (FUTURE)	Freeways (FUTURE) Highways (FUTURE) Arterials (FUTURE)	Within Hillsborough County (FUTURE)	Ongoing (FUTURE)	Real-time (FUTURE)	Operations (FUTURE)
City of Tampa	Volume Speed Travel times	Obtained from another agency – FDOT Other – Google Traffic/Waze Collected internally using machine counters and laser/radar devices	GPS Bluetooth/BlueTOAD Other – Crowdsourcing Other – machine counter and laser radar devices	Freeways Highways Arterials	Within the City of Tampa and adjacent surrounding areas	Ongoing Samples	Real-time Archive	Operations Planning
Florida DOT District 7	Annual traffic count program	Collected internally –	Bluetooth/BlueTOAD	Freeways Highways	Throughout District 7 and Statewide	Ongoing Samples	Real-time Archive	Operations Planning

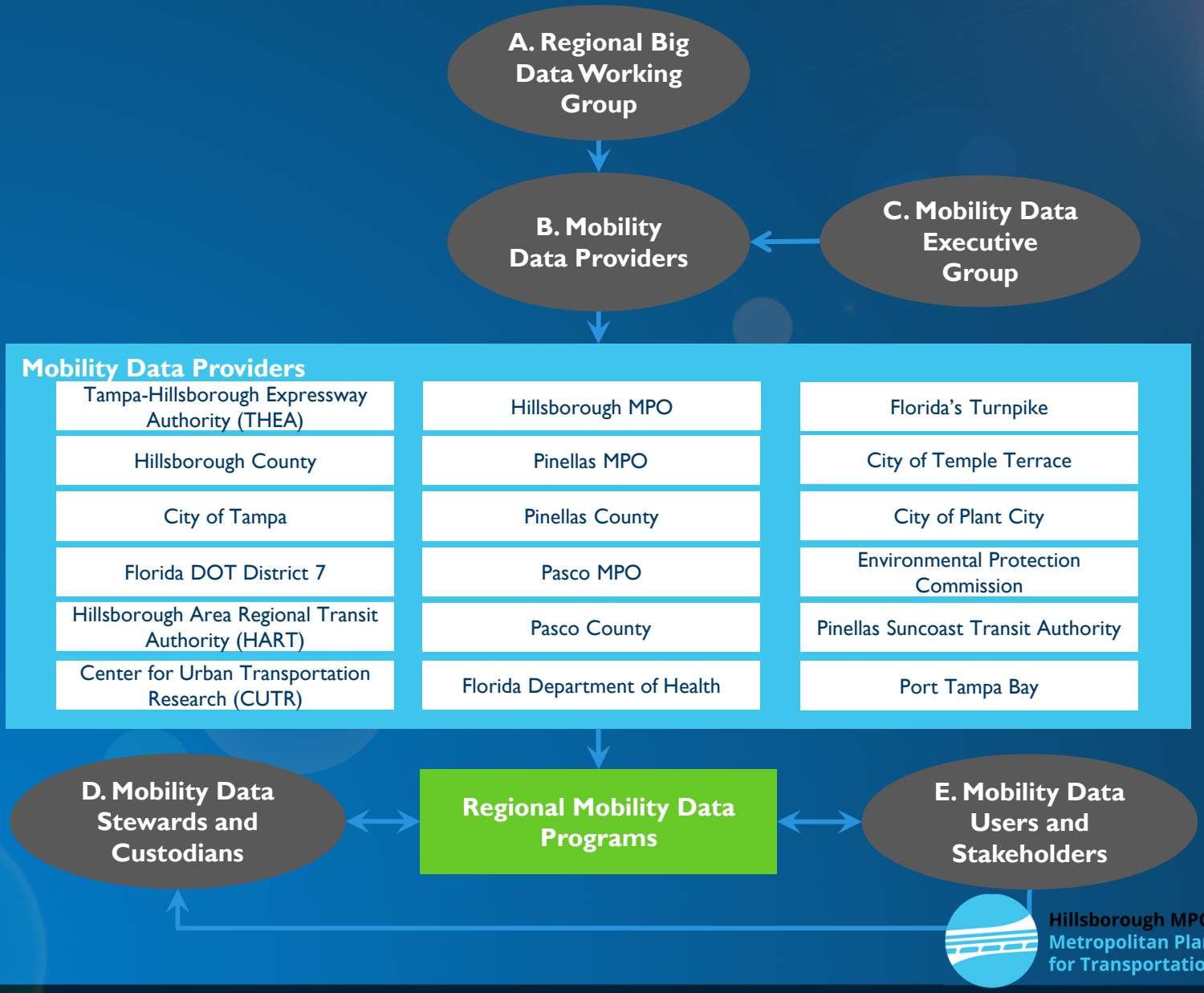
Focus Group Follow-up RE: Data Portal

- Warm response to the idea of publishing data in open-format
- Warm response to sharing data incrementally
- Discussion RE: Importance of gaining executive level support
- Concerns about data standardization – will the datasets truly be compatible?
- Concerns about flexibility for participants
- Concerns about personally identifying information

Recent Progress

- Regional Big Data Working Group Kick-off
  - » Invited four presenters to share their vision for a shared data platform
- In the process of finalizing wanted/needed features for the platform
- Identified two possible platform providers
- Time to talk about $$$

Some Data Champions Have Faded, Others Have Emerged



Hillsborough MPO
Metropolitan Planning for Transportation

Next Steps

- Execute memorandums of understanding with small group of partners
- Determine which provider will build the platform
- Sign interlocal agreements to finance platform development and maintenance agreements

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Hillsborough MPO
Metropolitan Planning
for Transportation

Mid-America Regional Council (MARC) (Kansas City, MO) Data Business Plan Pilot

Introduction

- MARC is both an association of governments and the MPO for the Kansas City region
- Important activity: Performance management
- Three challenges for MARC to address:
  1. Be better equipped and prepared for *Digital Transportation*
  2. Develop an interest in more scenario planning
  3. Analysis-driven policy making
- Convey to partners: Not just collecting data for the sake of data, but to serve a purpose and understanding of the region
- DBP pilot opportunity came at a crucial time of momentum

MARC
MID-AMERICA REGIONAL COUNCIL

Introduction (continued)

- DBP provides a framework to support mobility performance management
- Data types:
  - » Transit on-time performance
  - » bicycle/pedestrian counts
  - » Travel time/speed for vehicles and freight
  - » Vehicle miles traveled for vehicles and freight
- *The long term vision of the DBP is for internal and external stakeholders to know what mobility data is available and how they can obtain it*

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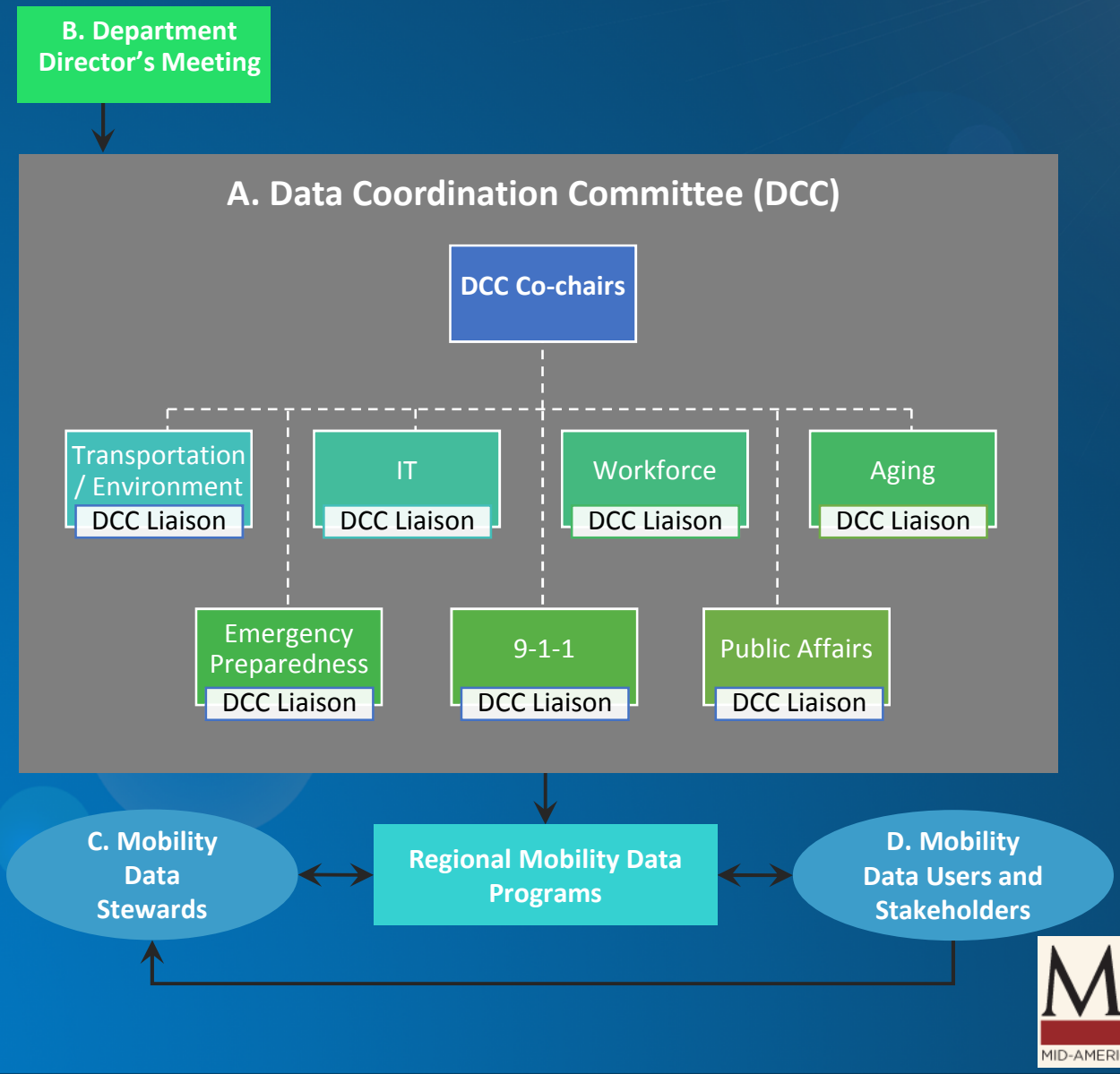
Data Governance Model



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MID-AMERICA REGIONAL COUNCIL

Outcome / Implementation Plan

1. Establish the Data Coordination Committee.
2. Hold first meeting.
3. Assign tasks.

- Meeting plan.
- Coordination with department directors.
- Linear referencing system.
- Process for testing data projects.
- System of internal communication and collaboration.
- Coordinate data integration processes.
- Identify best practices for data management.
- Address needs for each data type.
- Address data culture, including skill development.
- External collaboration.

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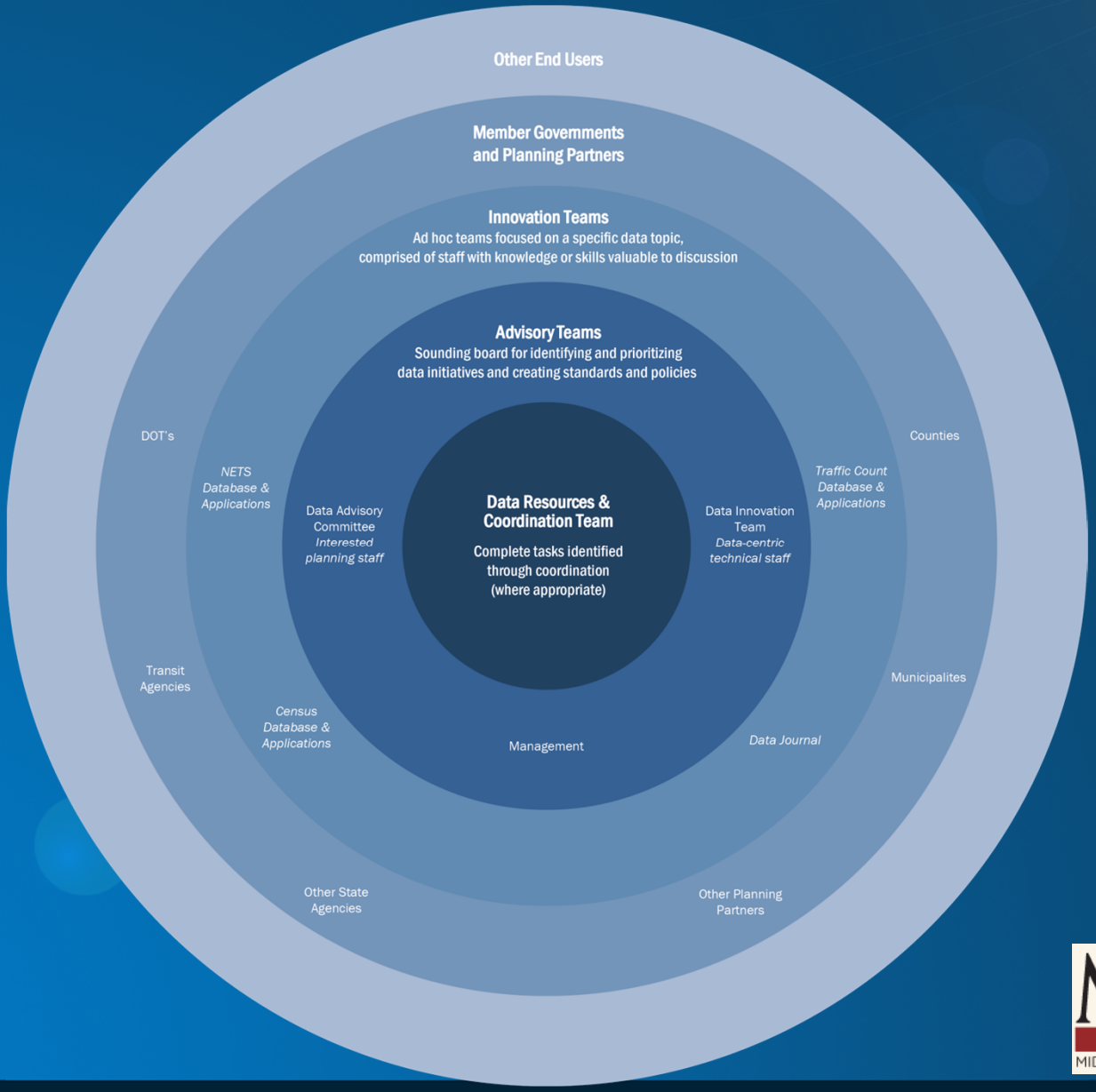
Data Coordination Framework at Delaware Valley Regional Planning Commission



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Maryland DOT State Highway Administration (MDOT SHA) Data Business Plan Pilot

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

Background

- Mature data management practices – *Mobility Programs* and *Transportation System Management and Operations (TSM&O) Plan*
- Annual Mobility Report (now in its 6th year) is part of the transportation decision-making process
- Data Business Plan is considered a key foundation to data driven decision-making
- Recently re-organized to create the Innovative Planning and Performance Management Division

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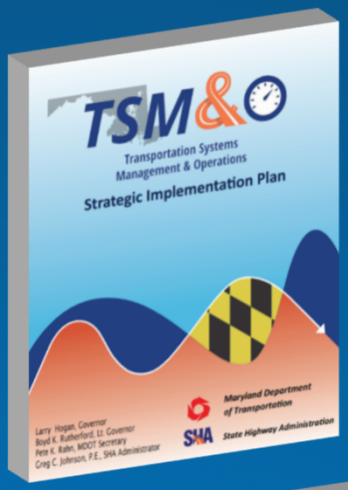
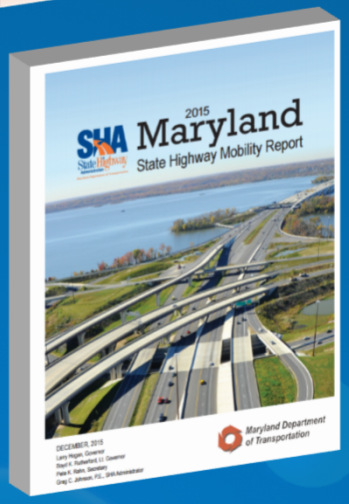
STATE HIGHWAY ADMINISTRATION

Strong Foundations






Construction

CAD

Analytics


Traffic


Multimodal


Weather


Travelers

Travel Info

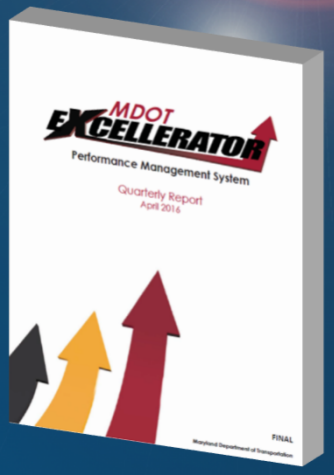

Signals/Lane Control Signals

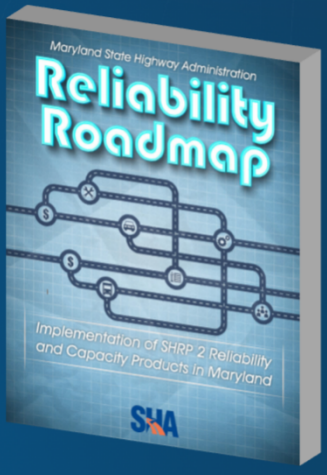
Data Warehouse

Parking


Media

TSM&O and Performance Based Planning/ Programming





Sources: MD Mobility Report and MD TSM&O Plan:, http://www.roads.maryland.gov/Index.aspx?PageId=711
MDOT Excellerator: http://www.mdot.maryland.gov/newMDOT/Planning/Excellerator/MDOTExcellerator
MD CHART Program: http://www.chart.maryland.gov/

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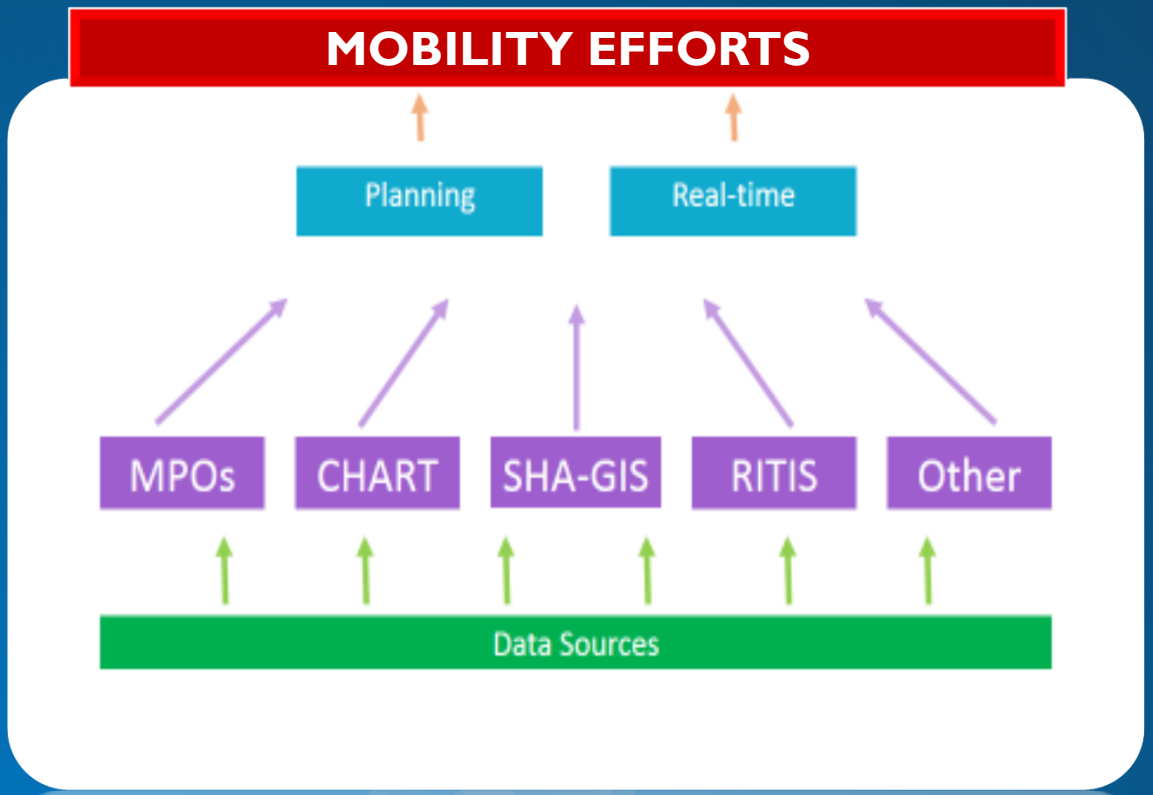
Planning, Operations, and TSM&O Data



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Outcomes of SHA Mobility DBP

- High level action plan for improving mobility data and serve as the TSM&O DBP recommended in the TSM&O Strategic Plan
- Pilot of the FHWA Data Business Plan Guidance for State and Local DOTs
- Example of how other areas within MDOT SHA could approach the process of developing similar plans
- Documentation of existing geographic information system related data governance
- Recommendations for MDOT SHA to enhance data governance activities at an enterprise level

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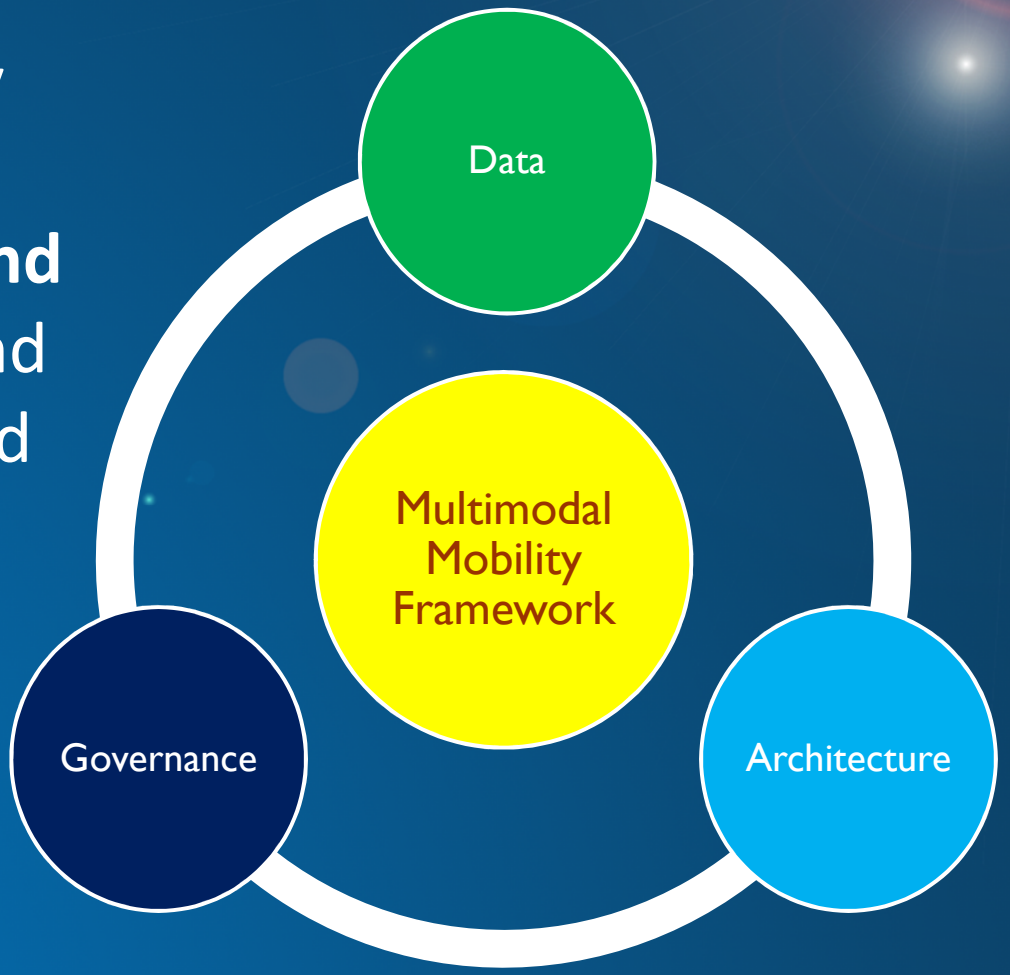
Multimodal Mobility Framework

The Multimodal Mobility Framework is the **interaction, structure, and components** for Maryland DOT SHA to **integrate** and **report** on **mobility data**



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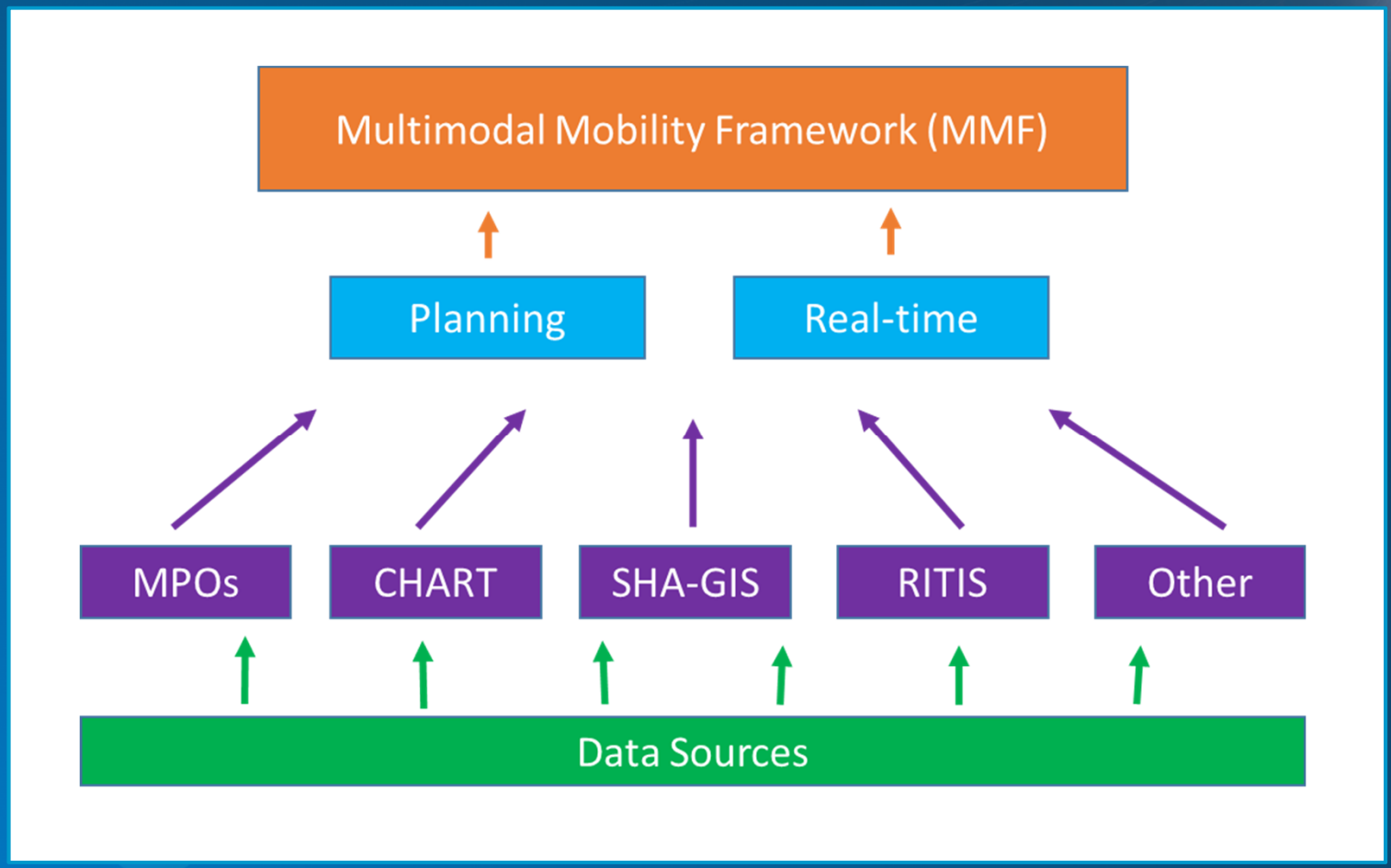
Architecture



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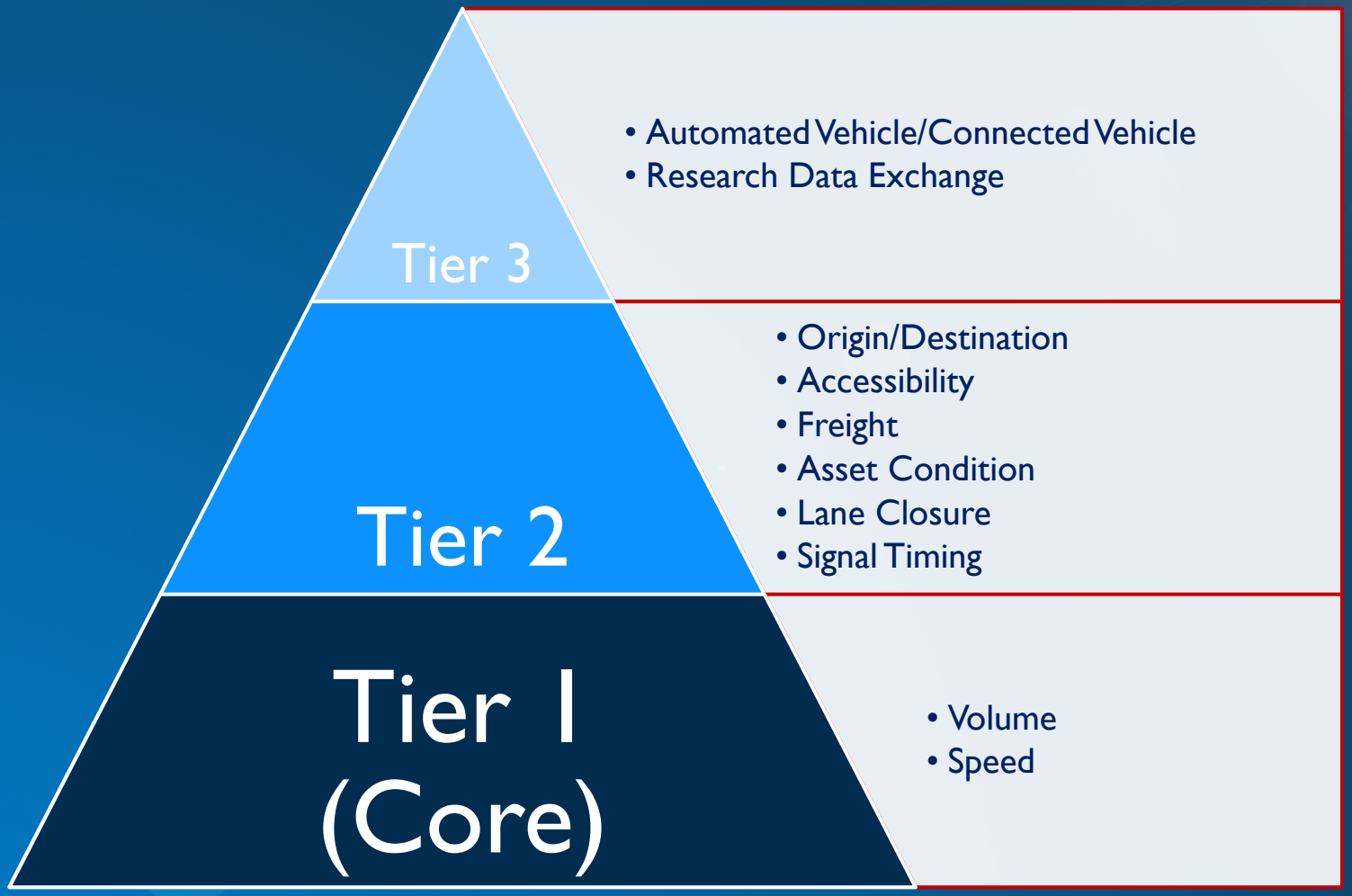
Three Tiers of Data



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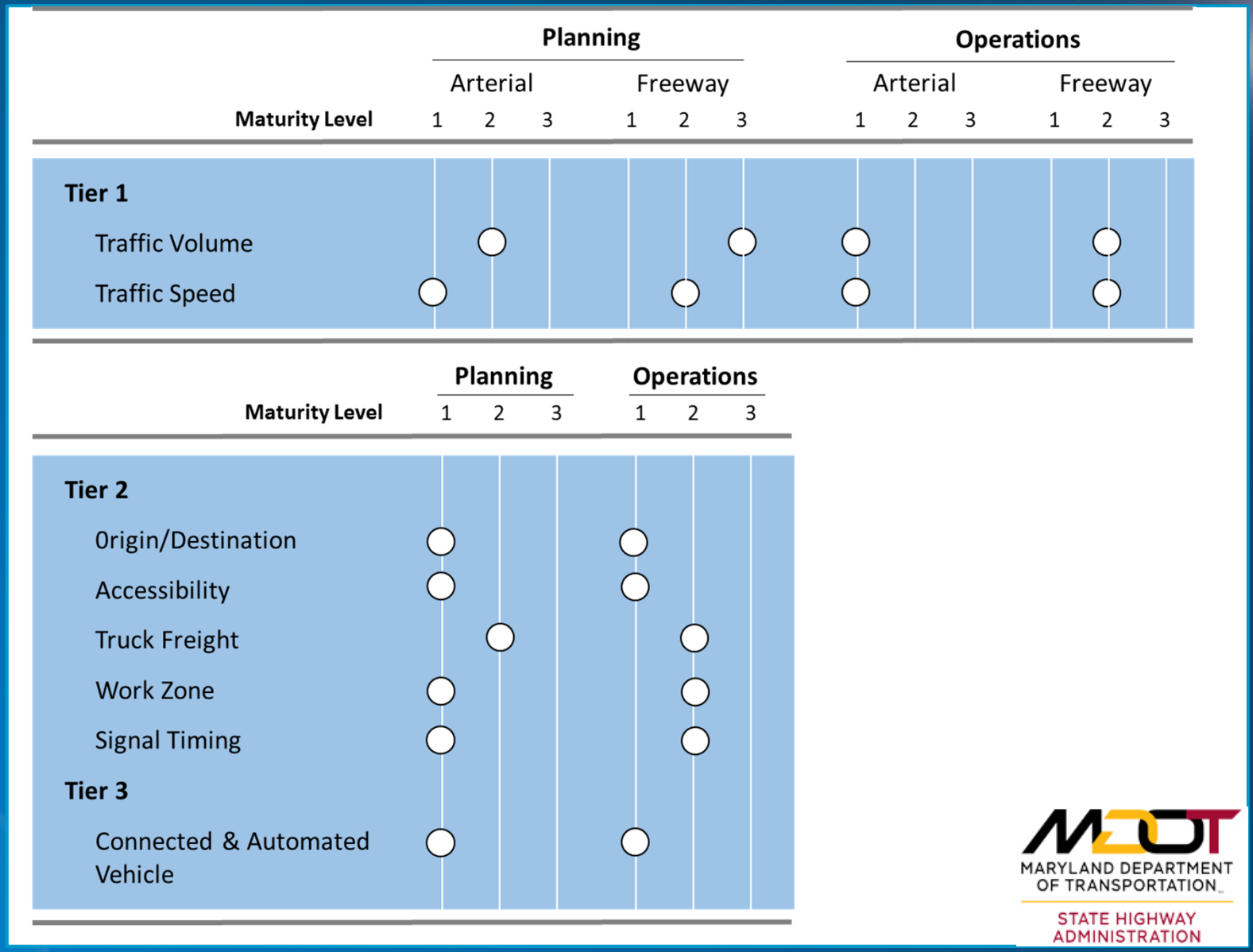
Capability Assessment



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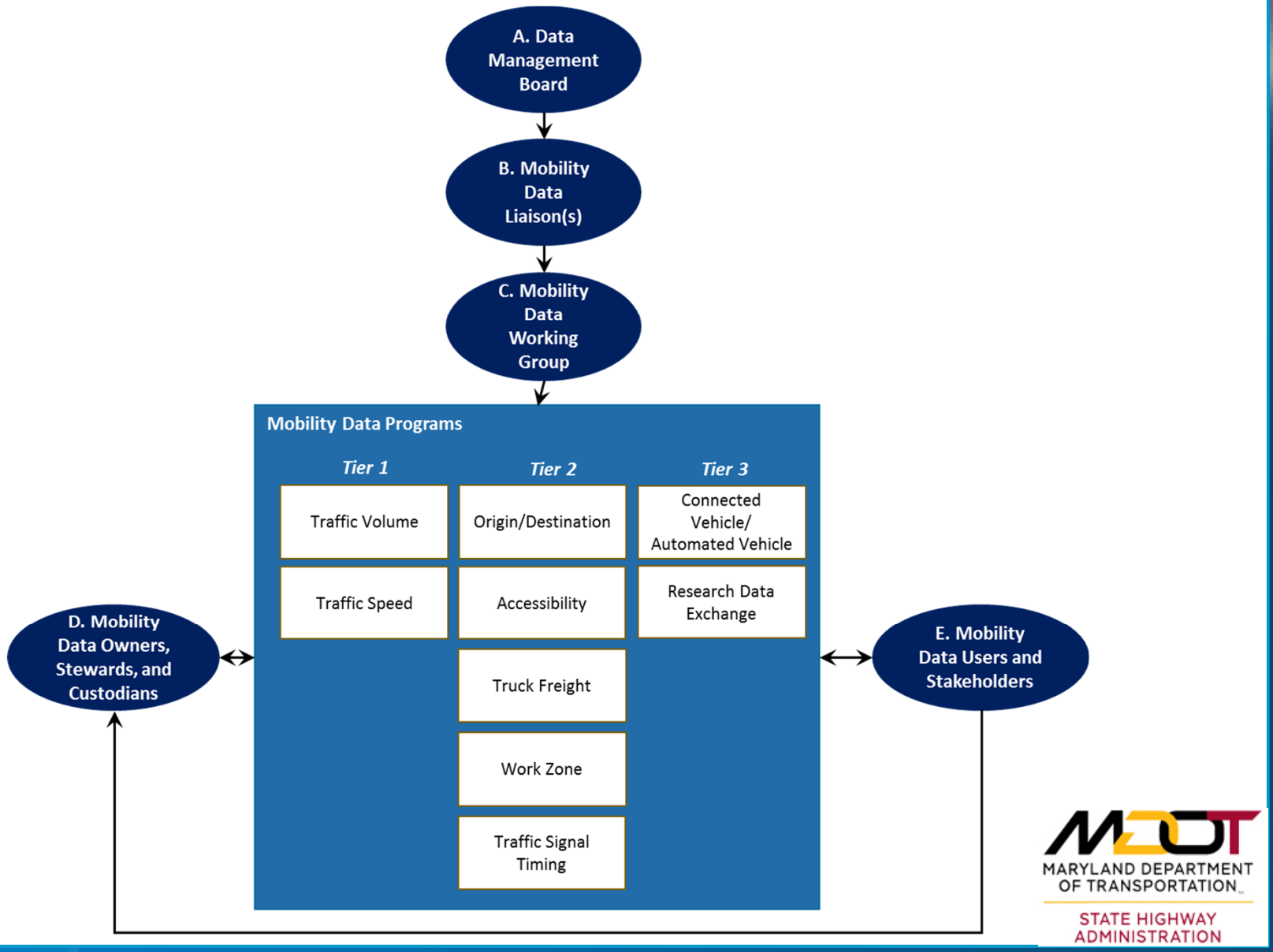
Data Governance Framework



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Implementation Plan

Data

- Address General Action Items from Data Assessment
- Address Action Items Specific to Each Data Type from Data Assessment

Architecture

- Finalize High Level Architecture

Governance

- Implement Data Governance Framework

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