# Linking Planning and Operations Initiative – A Data Driven Approach

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# Outline



- Emerging Transportation Scene
- Technology Enabled Transportation Solutions
- Ideas About IDEA
- About Linking Planning and Operations Initiative

# Emerging Transportation Scene in the US



- **Globalization and 21st Century Economy**
  - Metropolitan Areas as Economic Engines (18 Mega Regions)
  - Connectivity/Market Accessibility is key
  - Innovative Strategies and Collaborative Set-ups needed
- **Impacts on Transportation Infrastructure**
  - Increase in population (439 mil to 597 mil by 2050)
  - Increased demand for transportation services
  - Congestion Delays, System Deterioration, Bottle-necked Modal Systems
- **Transportation Infrastructure Investments**
  - 2.4% of US GDP (China – 9%, India – 4.9%)
  - Infrastructure Deficit (state-of-good-repair/$225 billion/year)
  - Alternate Financing Mechanisms - P3s/Pricing

# The Emerging Scene - How Can It Be Managed?



- **What Do People/Shippers Want?**
  - End-to-End Travel Solutions (on-time arrival/just-in-time delivery)
  - Travel Choices by time-of-day, mode, route
  - Traveler Information on mobile devices, in-vehicle, road-side
- **Need to have an "Integrated Approach"**
  - Institutional (common purpose & vision)
  - Functional (unified mission)
  - Information Sharing (collaborative decision making)
- **Need to develop "Synergy"**
  - Executive Leadership Level (Organized by Functions)
  - Program Management Level (Organized by Business Units)
  - Project Delivery Level (Organized by Jurisdictions)

# What Needs To Be Done?



- **New Concepts and Network Management Strategies –**
  - Highway-centric – Active Traffic Management (ATM)
  - Multimodal - Integrated Corridor Management (ICM)
  - Network-based - Dynamic Mobility Applications
- **Technology – "The Enabler"**
  - Utilize Today's Technologies – State-of-the-art & Disruptive
  - Harmonize Technologies - Transportation, Communication, Information
  - Develop Converged and Service Oriented Architectures
- **DATA – The Ultimate Driver**
  - Current State-of-Play – Disparate Databases and Systems
  - Desired State - Seamlessly Sharing Data/Information
  - Consolidated and Virtualized

FDOT

# Transportation Infrastructure Investments



Arterial Signal Systems

Freeway Systems

Rail Systems

Bus Systems

Parking Systems


- **Current State-of-Play**
  - Modally Invested
  - Independently Managed
  - Competing for Resources

# Integrated Transportation Infrastructure

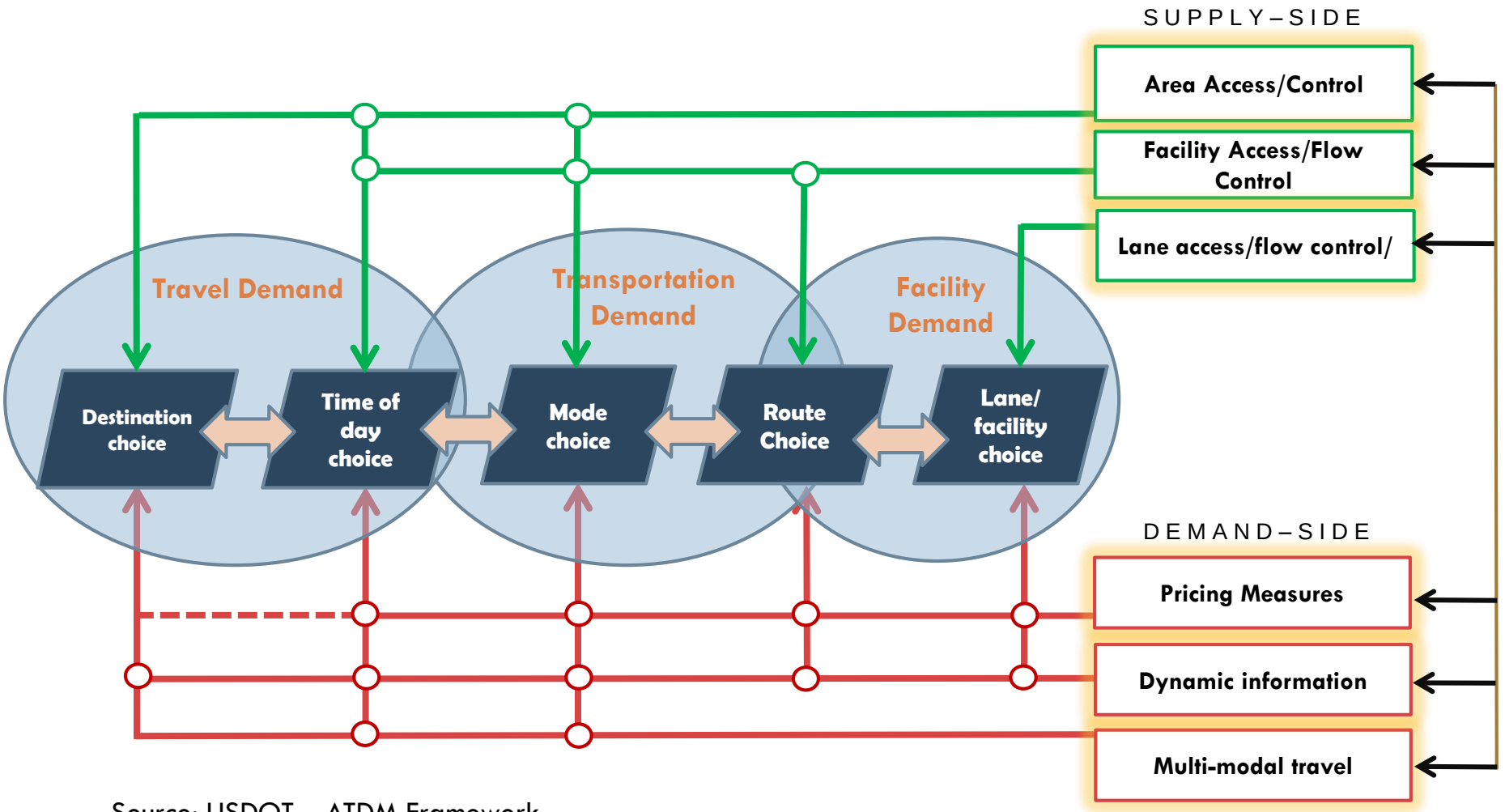


*Significant Congestion* | *Management Systems* | *Multi-Modal Capacity*


- **Desired State**
  - Common Vision
  - Collaboration
  - Shared Resource

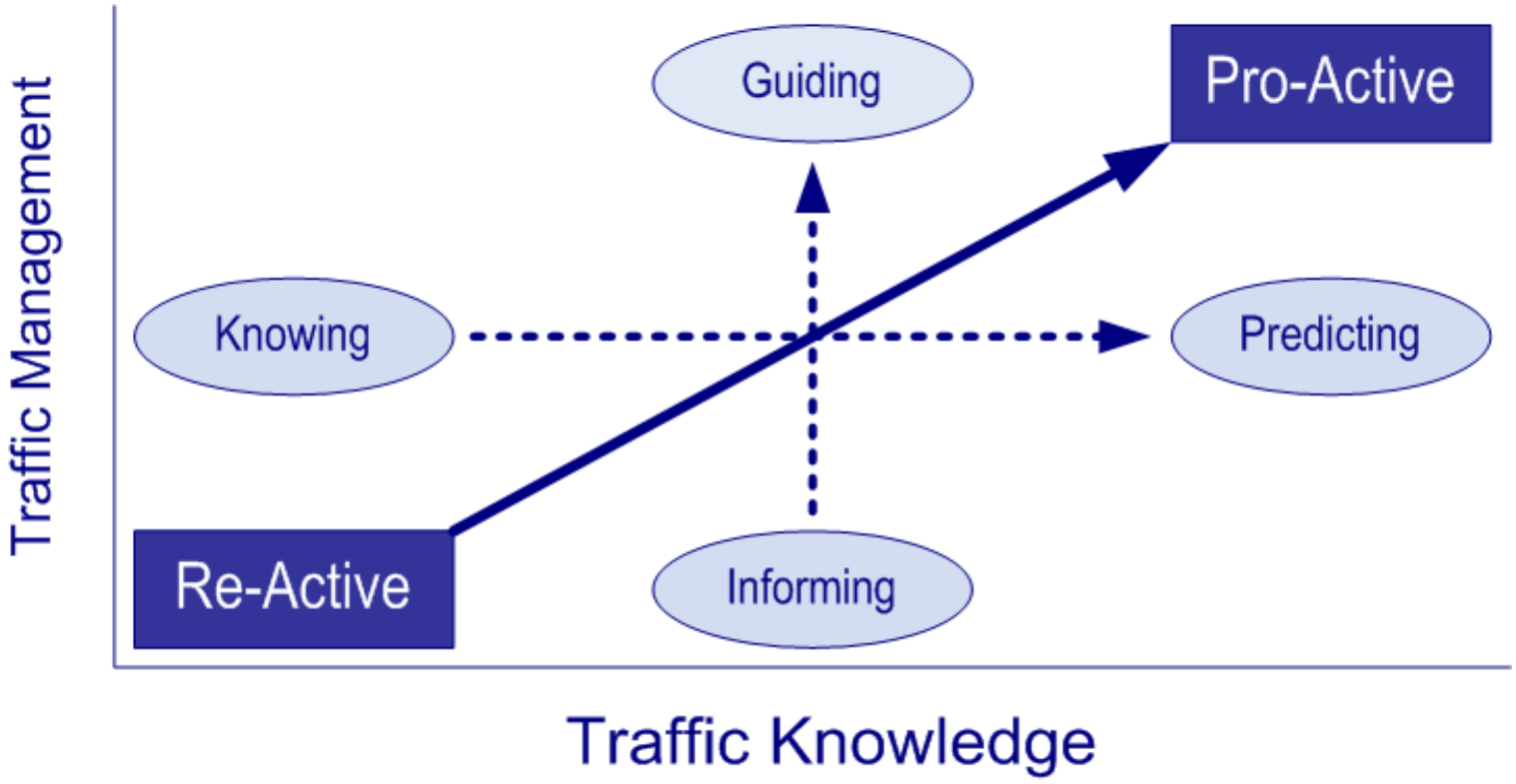
# Linking Demand & Supply






Source: USDOT – ATDM Framework

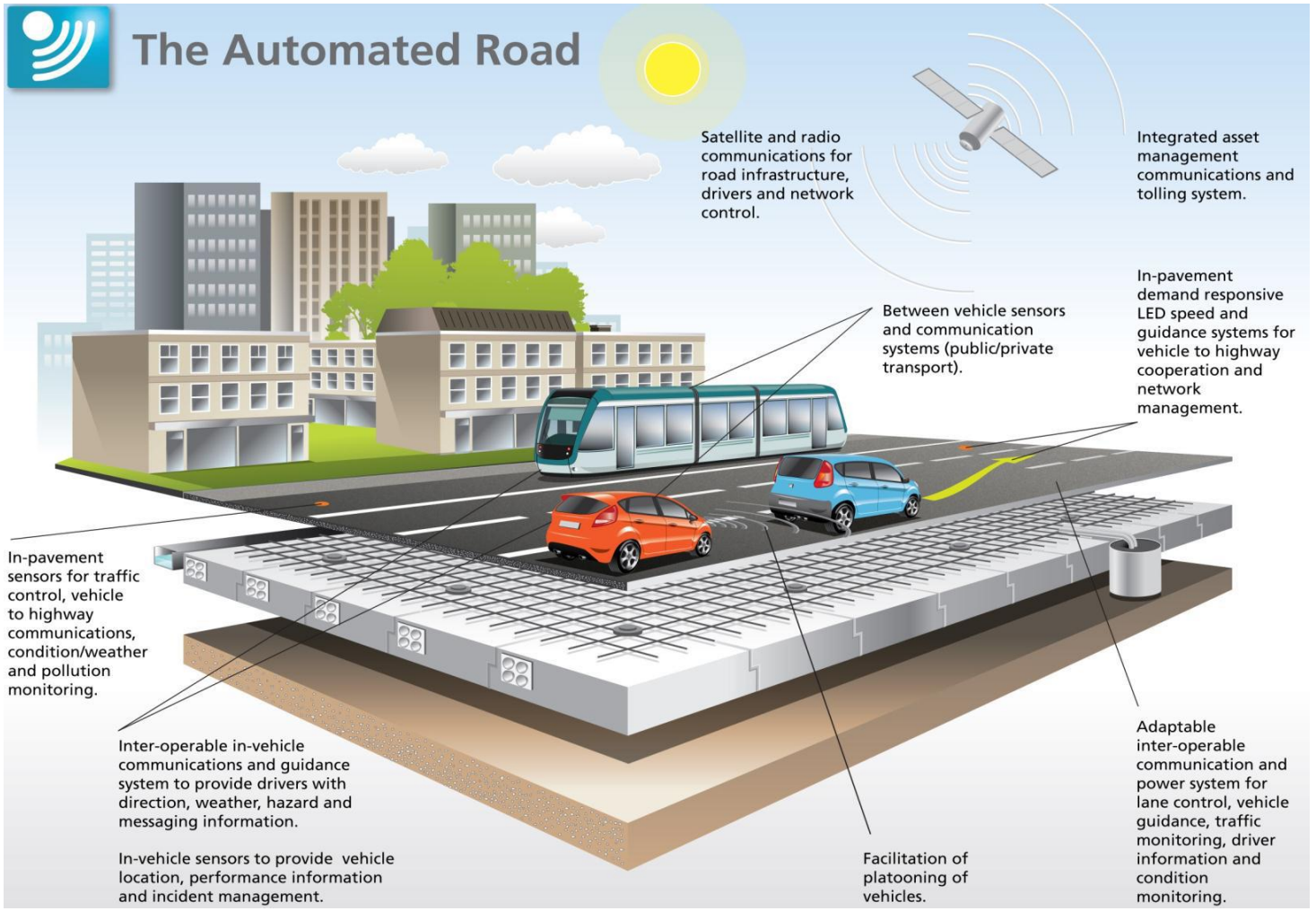
# Systems Operation & Management




Source: USDOT – ATDM Framework

# Technology Enabled Integrated Infrastructure





# Supporting Technologies and Data Sources

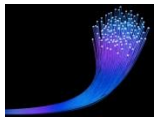


- Vehicle Detection Systems

- CCTV Cameras

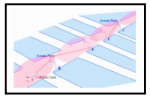
- Video Incident Detection Systems


- Full-Matrix DMS



- Fiber Optics Communications

- High-Speed Wireless Communications

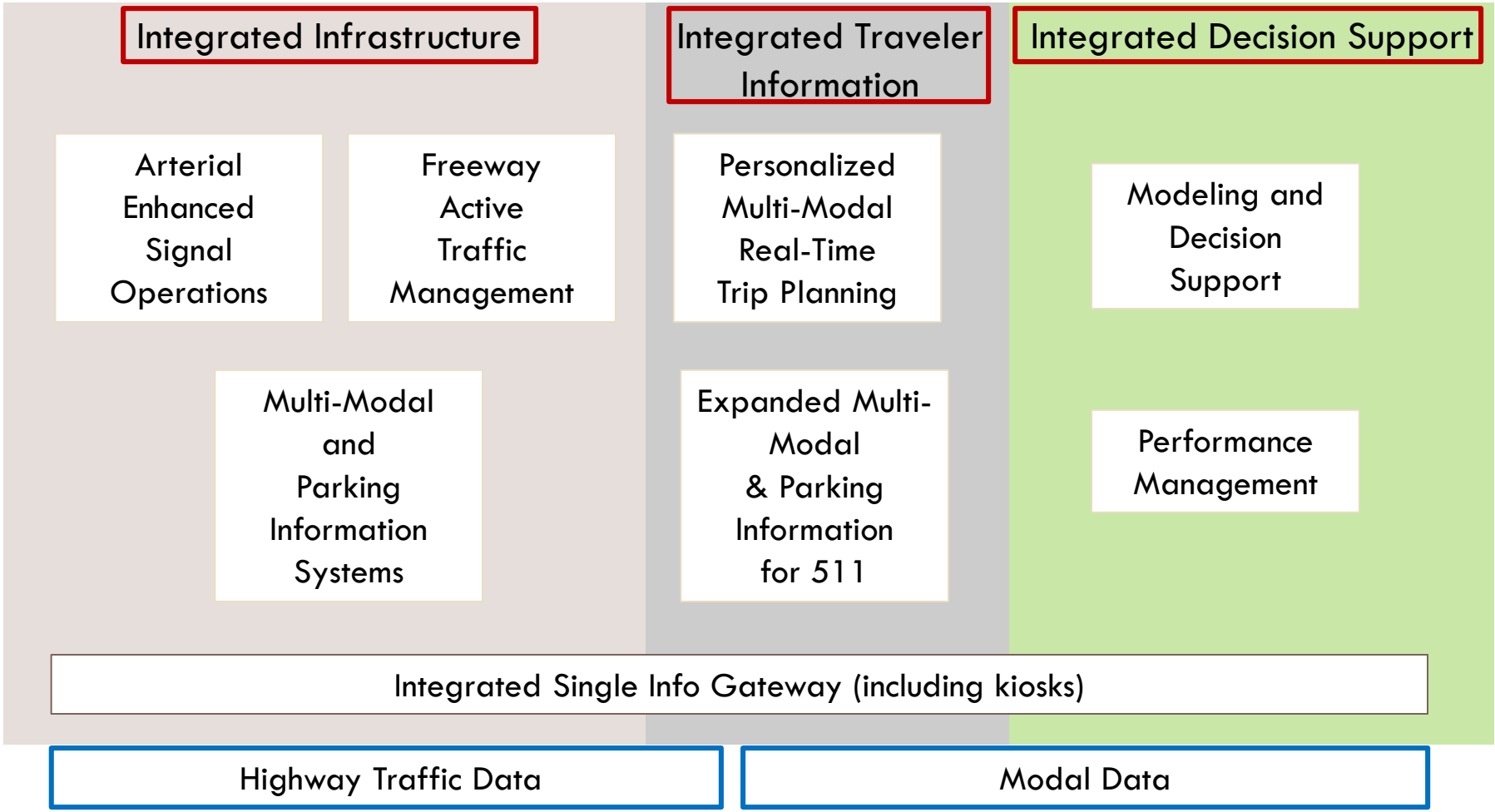


- Roadside Wireless Networks

- Bluetooth Probe Readers

# Technology Enabled Integrated Transportation Systems Operation - Building Blocks

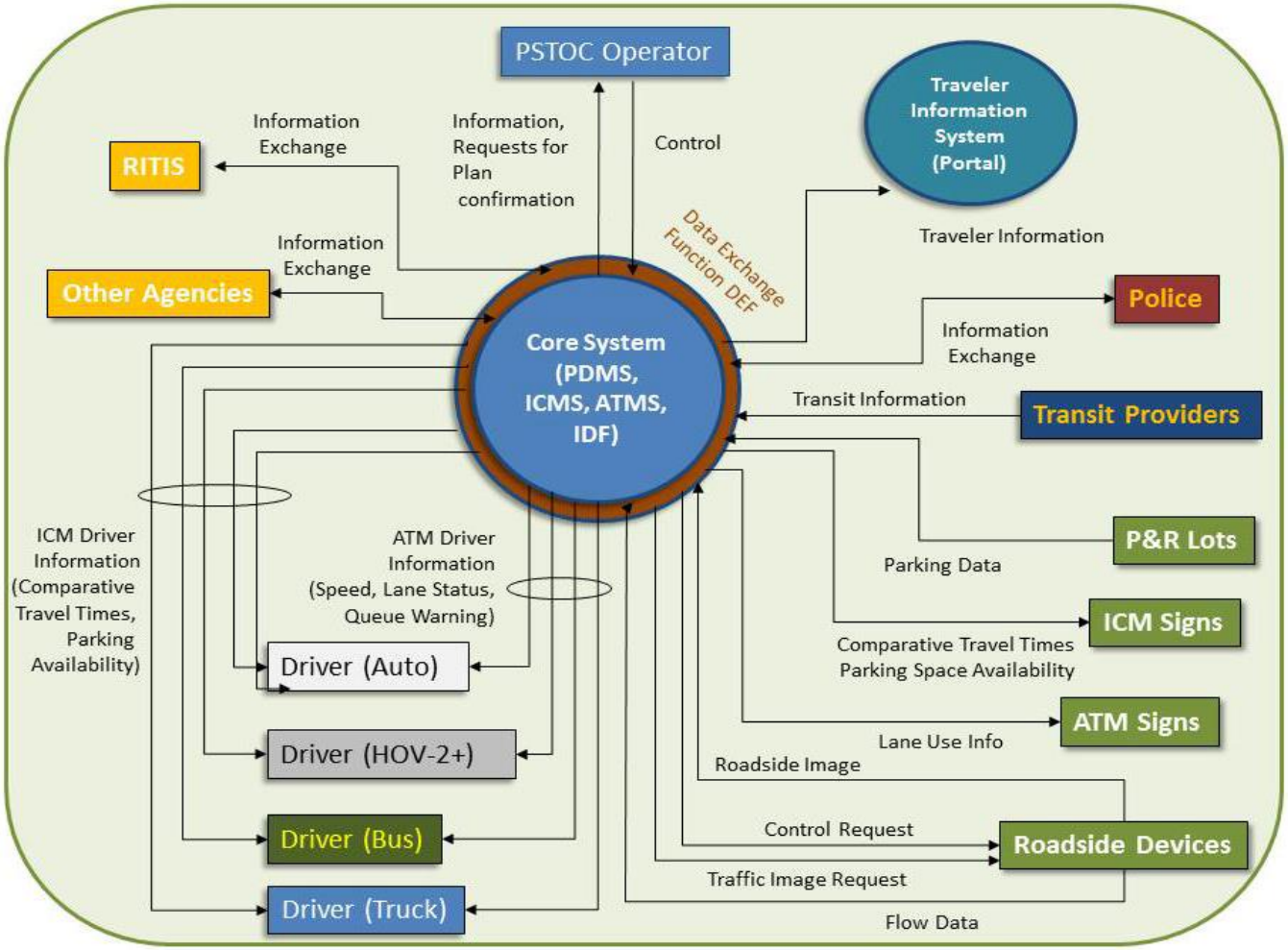





Source: VDOT – ICMS Framework

# System Architecture Example for ICM

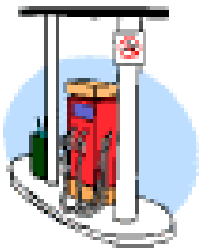





Source: VDOT – ICMS Framework

# Florida Preparing for Dynamic Mobility Applications

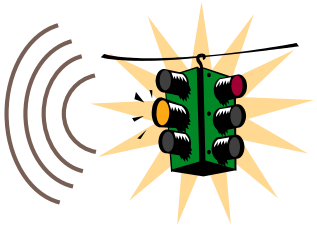




E-payment

"The Network"

Opportunity for Innovation



Signal Phase and Timing

Safety Messages

- Real Time Network Data
- Situation Relevant Information


Probe Data

# Do We Have An IDEA?



Integrated Data Exchange Architecture (IDEA)

# IDEA Elements



## Data Acquisition

- Multi-agency partnership (DOT, transit service providers, toll agency, etc.)
- Data monitoring and archiving

## Data Processing

- Static and real-time data collection and processing
- Feed into modeling/simulation

## Data Sharing

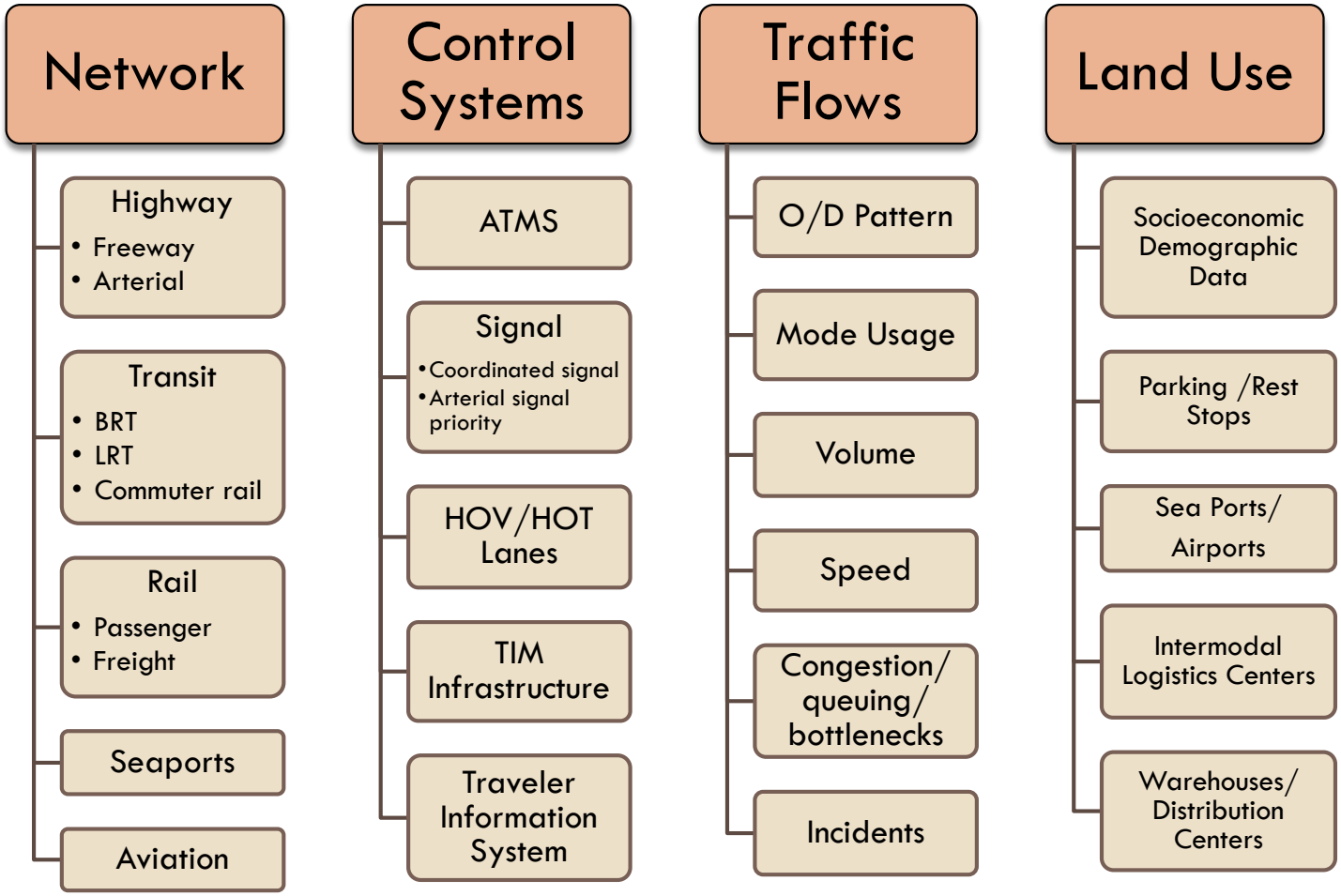
- Data sharing protocols
- Dissemination for traveler information system

## Data Integration

- Methodology and tools for data integration/fusion (consistency and quality)
- Innovative data storage, accessing and analytics methods

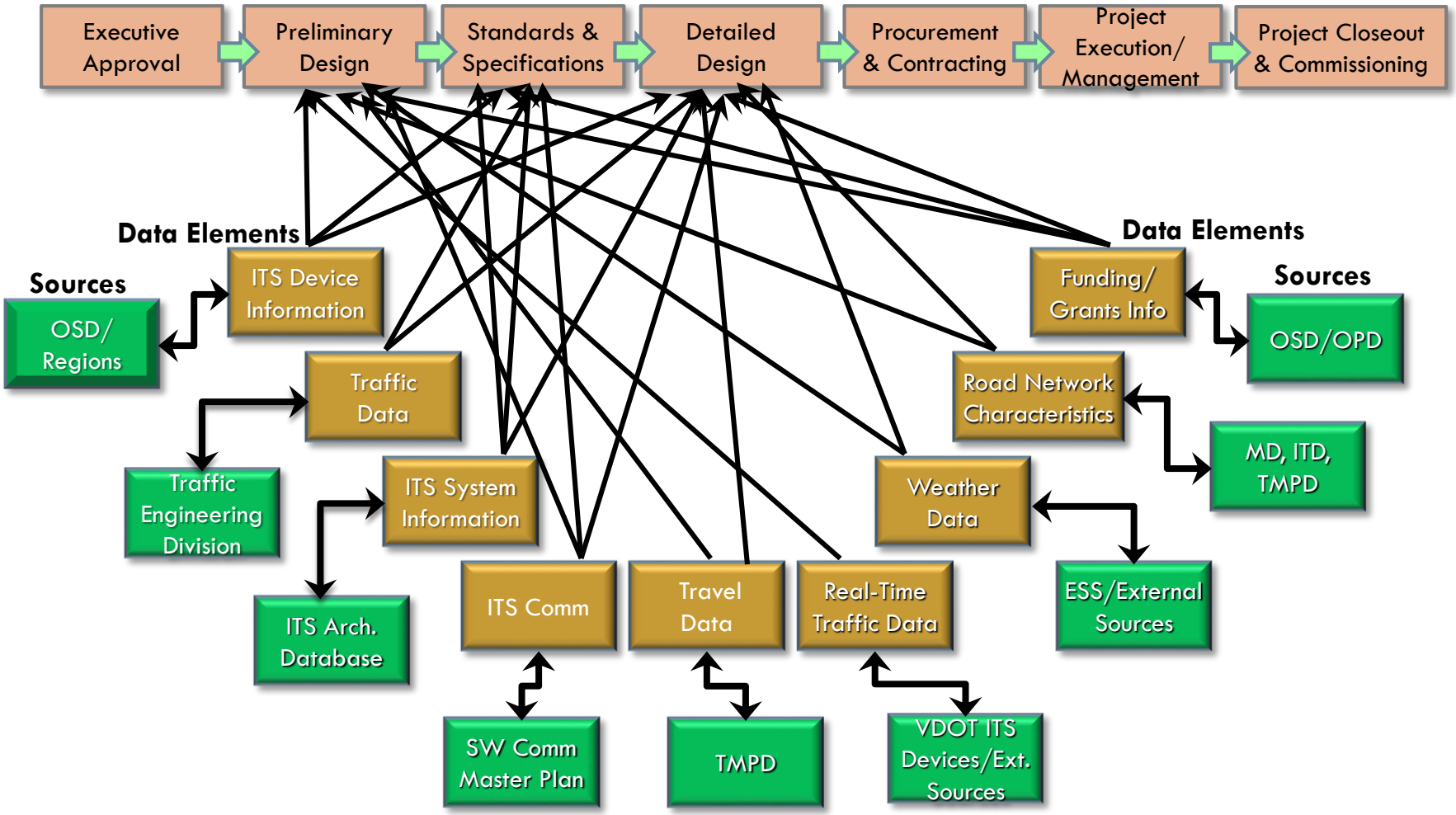
# Multimodal Transportation Data





# Transportation Databases for Project Development Today



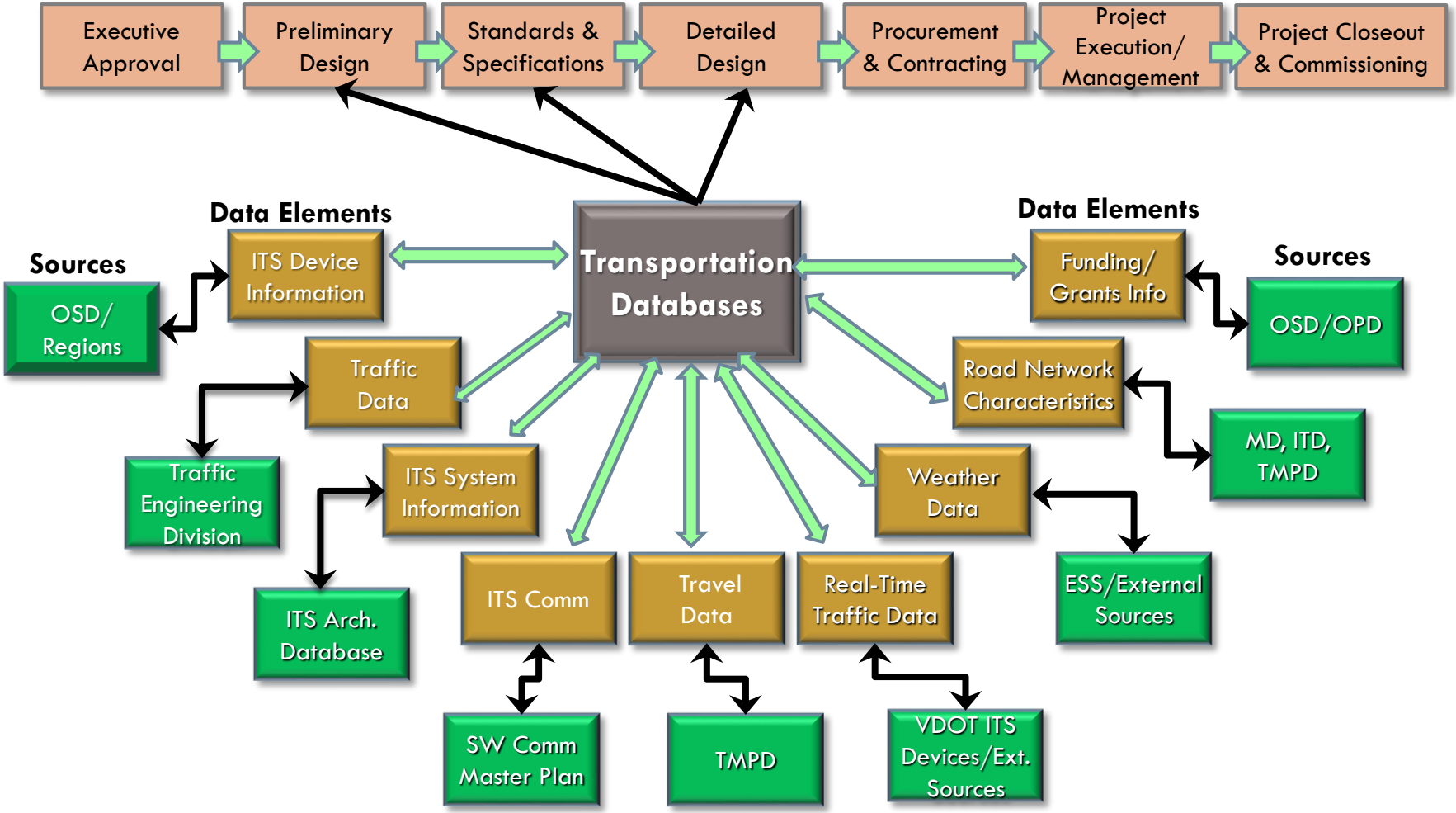



Multiple Sources of Unlinked Information

Source: VDOT – Data Integration Initiative

# Transportation Databases for Project Development Tomorrow



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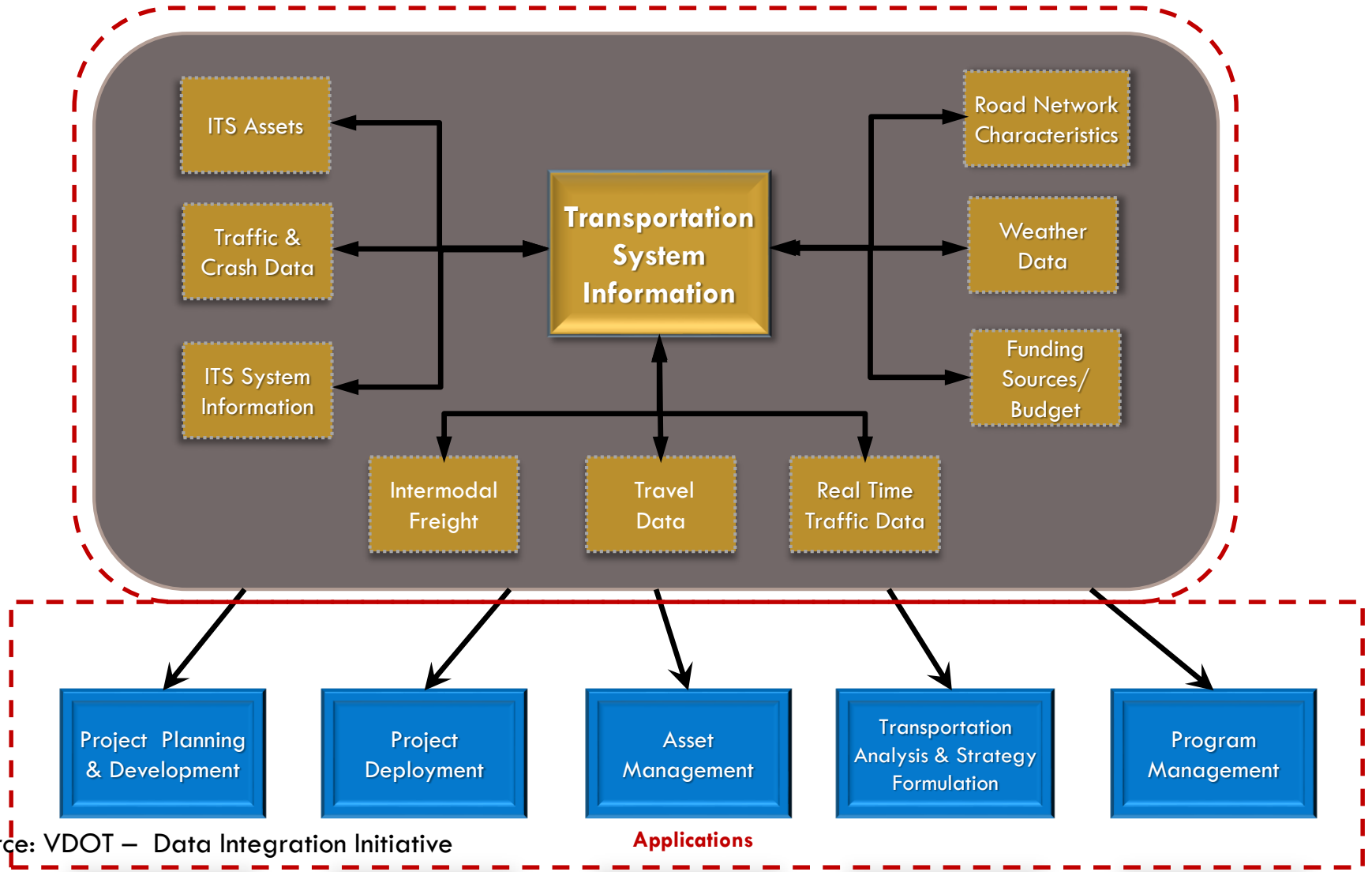
# Integrated Transportation Database for Systems Management and Operations



Transportation Databases

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# Linking Planning & Operations Initiative



- Development of an Integrated Transportation Systems Management Practice
  - Connecting Agency Functions, Programs and Projects
- Enhancing System Efficiencies
  - Adopting an All-Roads-All-Modes Approach
- Achieving Economies of Scale
  - Incorporating ITS and Operational Elements early on in the Planning and Project Development Processes

# An Integrated Approach



## Institutional

- Shared Vision
- Collaborative Goals
- Resource Arrangement

## Functional

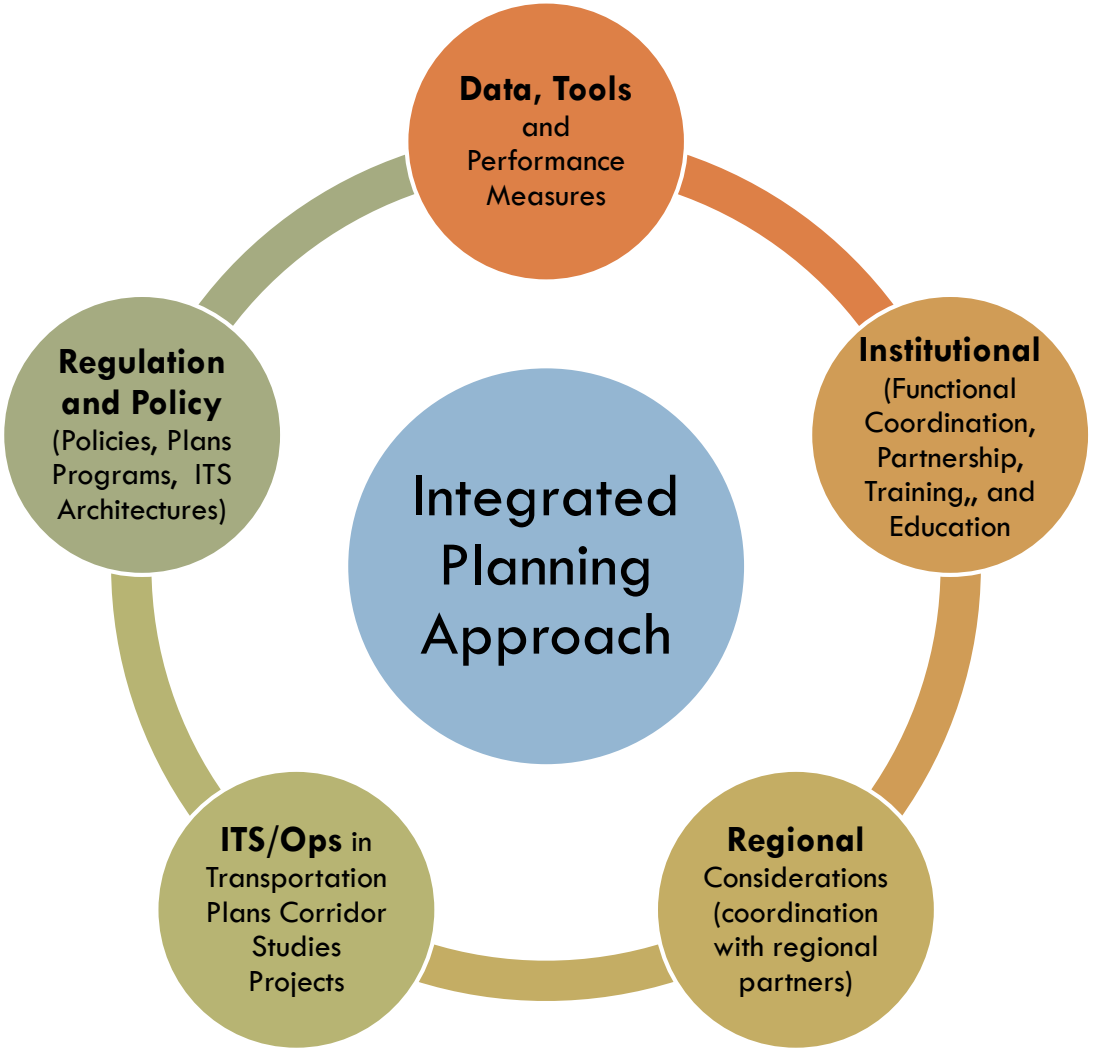
- Business Programs
- Relationships & Procedures
- Consolidate Service

## Information

- Data & Information Sharing
- Performance Measures
- Analysis Tools

# Synergy for Collaboration and Coordination






- Multi-Level Collaboration
  - Executive Leadership Level
  - Program Management Level
  - Project Delivery Level

# Linking Planning and Operations



## Key Features

- **Linking Demand and Supply**
  - Closing the GAP, Network Management, Risk Assessment
- **Going beyond Projects and Programs**
  - Cross-functional Integration – Institutional, Business, Technical
- **Information Sharing and Knowledge Management (KM)**
  - Data Business Plans, Big Data Analytics, SOAs, KM Practices
- **Infrastructure and Human Capital Management**
  - Transportation and Agency
- **Step Up!!!**
  - Bold, Innovative, Inspiring
  - Consistent, Predictable, Repeatable

# Thank You!



## NEW DATA TECHNOLOGY, NEW CAPABILITIES

Passive data collection has captured considerable attention from transportation planners over the last several years. These new technologies, including the ability to compile data from large numbers of mobile devices, are starting to transform the travel planning landscape, and non-urban areas may reap the greatest benefit. For the first time, cellular data allows less-populated areas to develop travel models based on actual, current, local data rather than purely synthetic models.

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