MOBILITY ON DEMAND (MOD) PROGRAM
MOD Marketplace Overview

Photo Source: U.S. DOT

Innovations in transportation such as ridesourcing services, bikeshare, automated vehicles, and other shared-use travel options are changing the way people travel and the way goods are delivered. These innovations also have the potential to fundamentally reshape and help create a more flexible, user-centric transportation system that allows for mode shifts based on convenience, accessibility, reliability, cost, and trip duration.

An MOD Marketplace is a digital platform that integrates multimodal supply for personal mobility and goods delivery services into a trusted venue for consumers to plan, reserve, and purchase services in a maximally flexible manner. It matches consumer demand for these services with supply provided by transportation agencies and operations managers, as well as private mobility and goods delivery providers. By streamlining multimodal travel choices for users, an effective MOD Marketplace will support the U.S. Department of Transportation (U.S. DOT) MOD vision, which seeks to leverage innovative technologies and public-private partnerships to provide safe, reliable, equitable, and seamless mobility and goods delivery for all users. However, a true MOD Marketplace does not exist yet, and the ConOps describes how this full-fledged implementation will function.

Photo Source: U.S. DOT

Purpose

The MOD Marketplace ConOps defines a blueprint for a prototype MOD Marketplace system and provides overall context for the MOD Marketplace. Public and private stakeholders can use the document in considering establishment of an MOD Marketplace, with a focus on:

- Capturing and documenting user needs as they relate to an MOD Marketplace technical platform
- Describing the proposed system and components from a user's point of view
- Understanding potential institutional, operational, technical, and policy constraints that stakeholders may encounter when implementing an MOD Marketplace platform.

Intended Audiences

The ConOps is intended for transportation professionals who will be involved in the planning, design, and implementation of an MOD Marketplace and will need to understand the various subsystems required for a successful MOD Marketplace implementation. Key audiences include:

- Transportation service providers
- Transportation and operations managers
- App and technology providers
- State and local agencies
- System integrators
- Public sector IT departments.

Intelligent Transportation Systems Joint Program Office

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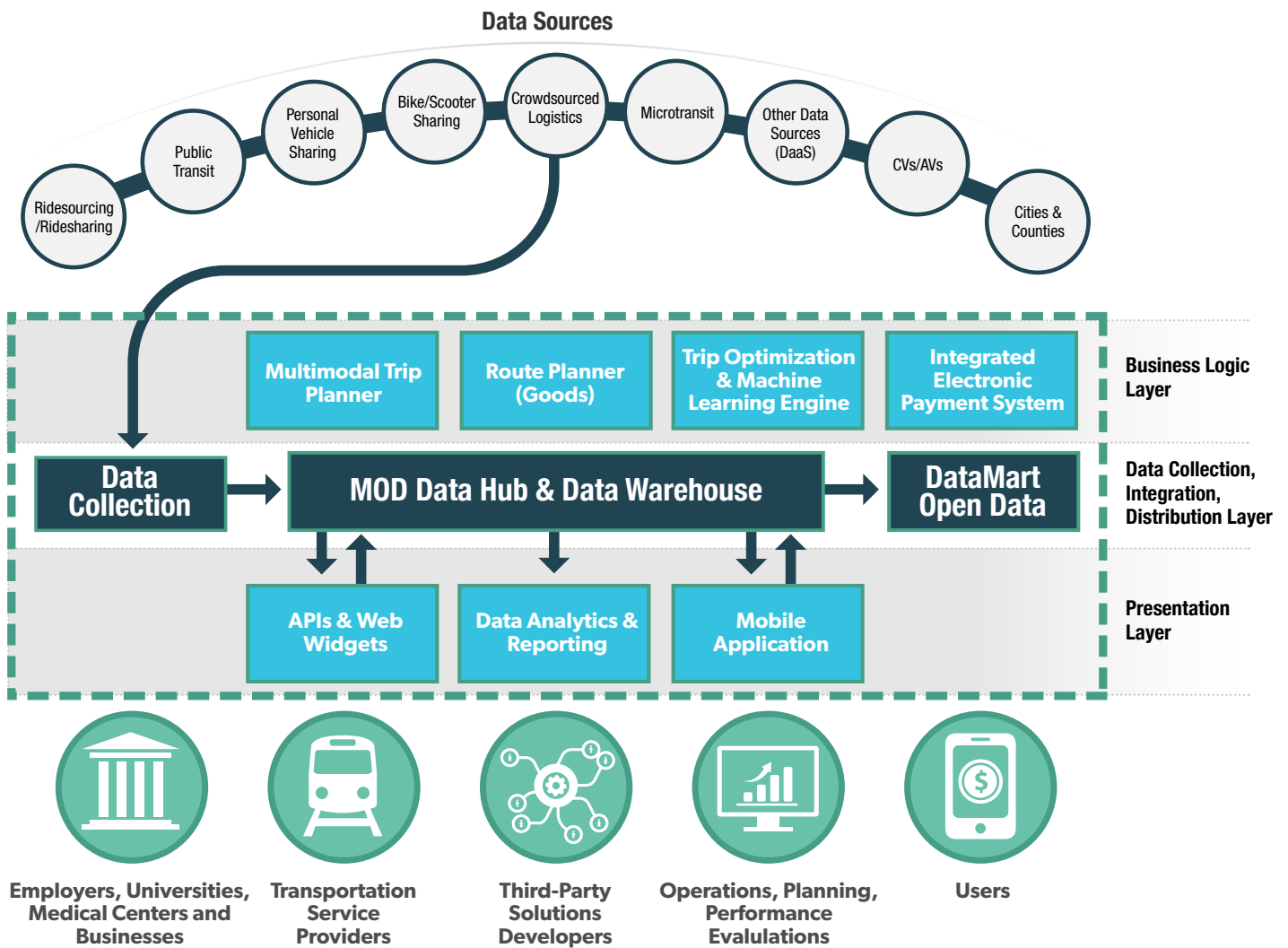
U.S. Department of Transportation Federal Highway Administration

Core Components of an MOD Marketplace

An MOD Marketplace system relies on the following multi-tier architecture to deliver seamless, on-demand mobility services to consumers. Figure 1 shows how all these components fit together. The following are the most important components of an MOD Marketplace system.

Figure 1: MOD Marketplace High-Level Architecture

Data Sources

Ridesourcing /Ridesharing · Public Transit · Personal Vehicle Sharing · Bike/Scooter Sharing · Crowdsourced Logistics · Microtransit · Other Data Sources (DaaS) · CVs/AVs · Cities & Counties

Business Logic Layer
Multimodal Trip Planner · Route Planner (Goods) · Trip Optimization & Machine Learning Engine · Integrated Electronic Payment System

Data Collection, Integration, Distribution Layer
Data Collection → MOD Data Hub & Data Warehouse → DataMart Open Data

Presentation Layer
APIs & Web Widgets · Data Analytics & Reporting · Mobile Application

Employers, Universities, Medical Centers and Businesses · Transportation Service Providers · Third-Party Solutions Developers · Operations, Planning, Performance Evaluations · Users

Data Collection, Integration, and Distribution Layer

This layer forms the central backbone of the Marketplace platform and is responsible for collecting data from data suppliers, fusing and integrating data into a database, supplying the data to the various MOD Marketplace subsystems, and disseminating the data to travelers and other third-party consumers.

Business Logic Layer

The Business Logic Layer transforms raw data from the Data Collection layer into useful information and then feeds this information to the Presentation Layer to display to the end user based on their trip request. The multimodal trip engine is the core subsystem of this layer, supported by the route planner, integrated electronic payment system, and the trip optimization and machine learning engines. The multimodal trip engine takes information like transit arrival times, sidewalk networks, shared mobility availability, and traffic information from the Data Collection Layer and then computes multimodal origin/destination travel options in response to a request from a traveler or goods provider.

Presentation Layer

The Presentation Layer is responsible for the formatting, delivery, and display of information to a frontend user. This can include application programming interfaces and web widgets, data analytics visualization and reporting tools, and/or a mobile application.

Current Situation

To date, a variety of public-private sector MOD initiatives and partnerships have been implemented in the U.S. with the support of federal, state, and local governments. However, none of these examples represent a full-fledged MOD Marketplace platform, as outlined in the ConOps. But the underlying partnerships and technologies represent progress toward a full-fledged MOD Marketplace. Some examples of these initiatives include:

- Providing a multimodal trip planning app with electronic payment option
- Gap filling in the transit system and providing first/last-mile solutions
- Reducing parking demand
- Promoting mobility for travelers with special needs
- Establishing specialty mobility programs
- Providing goods delivery on demand.

Evolution of the MOD Marketplace

Over the past several years, the market share of shared mobility services and personalized travel options has continued to grow, making the MOD Marketplace a critical integrator of mobility options. While many MOD initiatives have been launched throughout the country, there are gaps between the currently planned and implemented MOD platforms and the overall goals and objectives of U.S. DOT's MOD vision. Potential improvements include:

- Providing users with reliable, accessible, convenient, comprehensive, safe, and efficient mode-agnostic multimodal options that prioritize different modes depending on user needs
- Setting data privacy policies that limit unnecessary data collection and provide users with insight on the exposure of personal data and a clear process for consent
- Creating an integrated electronic payment system that allows users to pay for an entire multimodal trip from origin to destination in a single application
- Developing and promoting the use of services and tools to meet the needs of older adults and people with disabilities
- Increasing travel options in disadvantaged neighborhoods and supporting analysis of available mobility options at a micro-level
- Improving collection, storing, management, and sharing of supply- and demand-side data to support enhanced analysis and the continued advancement of connected, automated, and other Internet of Things applications
- Standardizing technologies and open data standards to accelerate the pace of MOD growth and support multimodal integration
- Integrating MOD data into traffic operations tools and strategies.

For more information about this initiative visit https://www.its.dot.gov/research_archives/mod/index.htm, or contact:

Robert Sheehan, Program Manager, Multimodal ITS Research and Deployment
Intelligent Transportation Systems Joint Program Office
(202) 366-6817 | robert.sheehan@dot.gov

FHWA-JPO-20-820

Intelligent Transportation Systems Joint Program Office

U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Highway Administration