

Photo Source: USDOT

THE OPERATIONAL DATA ENVIRONMENT (ODE)



YOUR SCALABLE, OPEN SOURCE SOLUTION FOR CONNECTED VEHICLE DATA

The Intelligent Transportation Systems Joint Program Office's (ITS JPO) Operational Data Environment (ODE) is a real-time data acquisition and distribution software system that processes and routes data from various connected devices – including connected vehicles, personal mobile devices, infrastructure components, and sensors. The ODE then distributes this data to subscribers, who can use the data to operate real-time applications supporting the operation and maintenance of the transportation system, such as red-light controls and intersection safety. The system can also be used for related research and development efforts.



Vision

The vision of the ODE is not only to provide a scalable, data router software system to support the ongoing connected vehicle research efforts – such as the Connected Vehicle Pilot Sites – but also to serve as an open source, open build system with an active group of collaborators who can define and develop its capabilities. This community of collaborators will be able to work with the ITS JPO to ensure the ODE continues to be maintained and that the contributions are high quality and in alignment with software development best practices. This model will ensure the long-term viability of the ODE and has many other benefits including increased flexibility, superior security, and enhanced customizability.

Benefits

- The ODE will complement connected vehicle infrastructure by brokering, processing, and routing data from various data sources, including connected vehicles, field devices, and transportation management center (TMC) applications. The ODE is the backbone of the connected vehicles data provisioning systems. It is destined and designed to become the information super highway for the Connected Vehicles. Data users include, but are not limited to, transportation software applications, the Research Data Exchange, and the U.S. Department of Transportation's Situation Data Warehouse.
- The ODE can provision data from different data sources to software applications that have subscribed to the ODE. In the other direction, the ODE can accept data from connected vehicle applications and broadcast them to field devices through road side units and the Situation Data Warehouse, which in turn will transmit the data to Sirius XM satellites for delivery to the connected vehicles in the field.



U.S. Department of Transportation

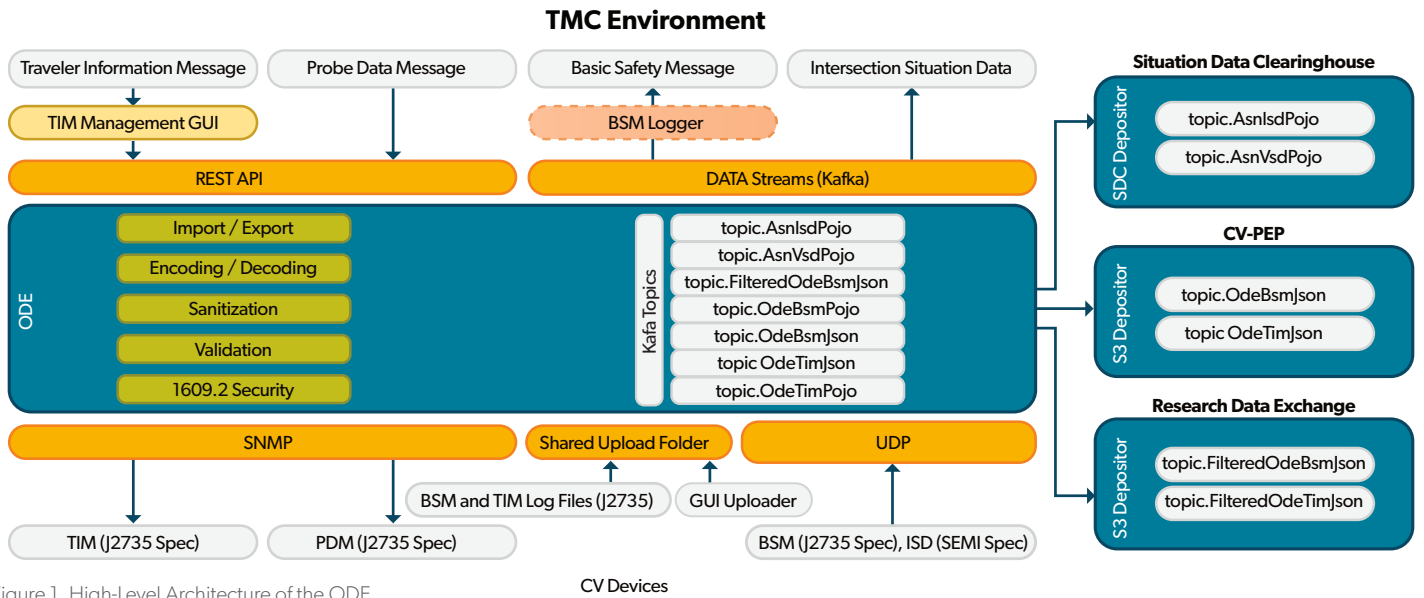


Figure 1. High-Level Architecture of the ODE

Photo Source: USDOT

THE ODE AS A SOLUTION

The ODE is being developed under Agile development methodologies, using an open architecture approach in an open source environment. As an open source software application, the ODE will enable data transfers between field devices and backend TMC systems for operational, monitoring, and research purposes. The system will allow applications to submit data through a variety of standard interfaces, supporting both the producers and consumers of connected vehicle data.

As a smart data router, the ODE is intended to be source and sink agnostic. It is capable of transmitting data for any accessible source and depositing these data into any data store. As such, the ODE is a plug and play solution that is meant to fit a myriad of streaming architectures. It can collect data from a multitude of data sources and provide them to single or multiple repositories.

The ODE is supported by a community of developers and users that can rapidly extend the capabilities of the ODE as needed. This will allow the ODE to be customized and enhanced to meet user's exact and evolving needs. Users are encouraged to use the ODE's open source software and modify it to suit their needs. Since the code is open, it's simply a matter of modifying it to add the functionality they need.

New users are constantly being added as the ODE moves towards deploying its minimum viable product and beyond. See Figure 2 for a short list of notable users and collaborators.

Collaboration with the transportation and research communities is critical to the development of the ODE. It relies on a host of open collaboration tools that can be accessed by all stakeholders and interested parties, including:

- [GitHub](#) – Code Repositories
- [Jira](#) - Agile Project Management
- [Confluence](#) – Project's Wiki Page
- [Travis](#) - Continuous Integration and Delivery
- [SonarQube/SonarCloud](#) – Static Code Analysis.

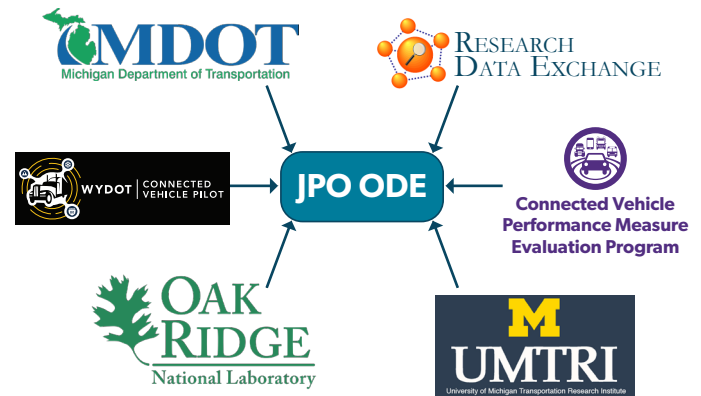


Figure 2. Some of the ODE's Notable Users and Collaborators

Photo Source: USDOT

GETTING STARTED - COLLABORATING AND CONTRIBUTING

The entire ODE code base is available at: <https://github.com/usdot-jpo-ode/jpo-ode>. This repository is complete with user and quick start guides to support the installation and operation of the system. If issues arise during the installation or operation phase, please let us know by using the "Issue" feature in GitHub.

For more information about this program, please contact:
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