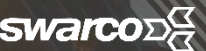




Digital Twins for Scenario Operations Analysis and Software Testing

Session 3D: Head in the Clouds

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The Better Way. Every Day. 

Scoping our Market Vertical



**Production &
Manufacturing**



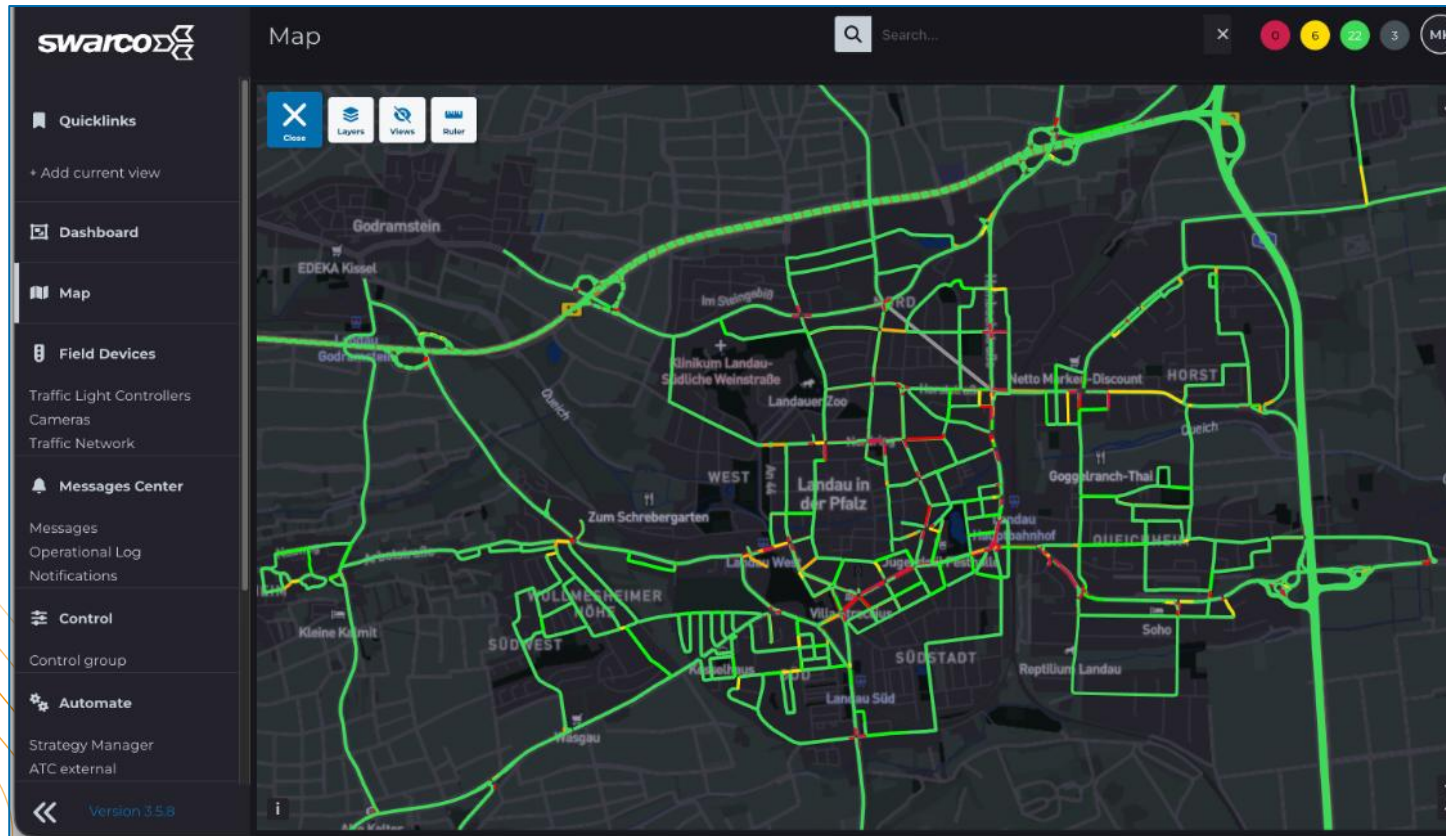
**Complete
Infrastructure**



**ITS Operations
& Maintenance**

Components

Building a digital twin today



System components

- Traffic management system
- Signal controller software
- Digital Twin Engine (Critical)

Data Inputs

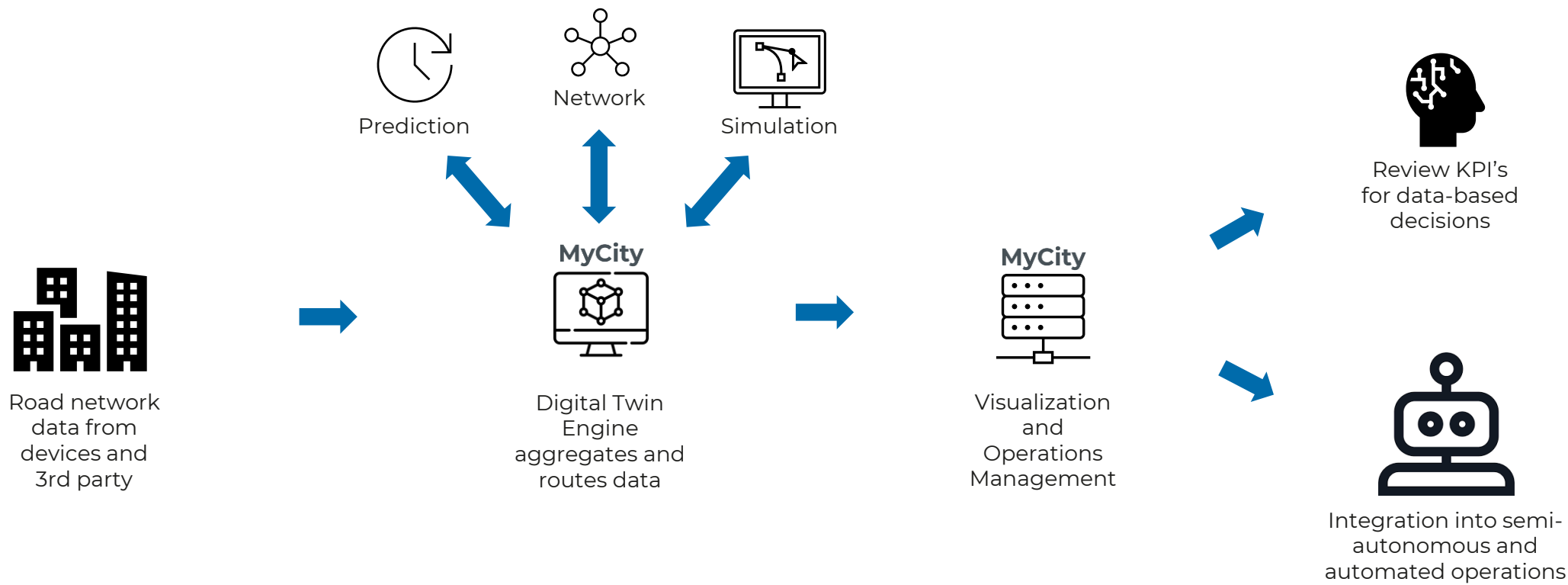
- Traffic flows
- Geometry
- Event or incident characteristics
- Configurations

Enhancements

- Simulation Models
- Predictive network loading
- AI-assisted algorithms

Workflow

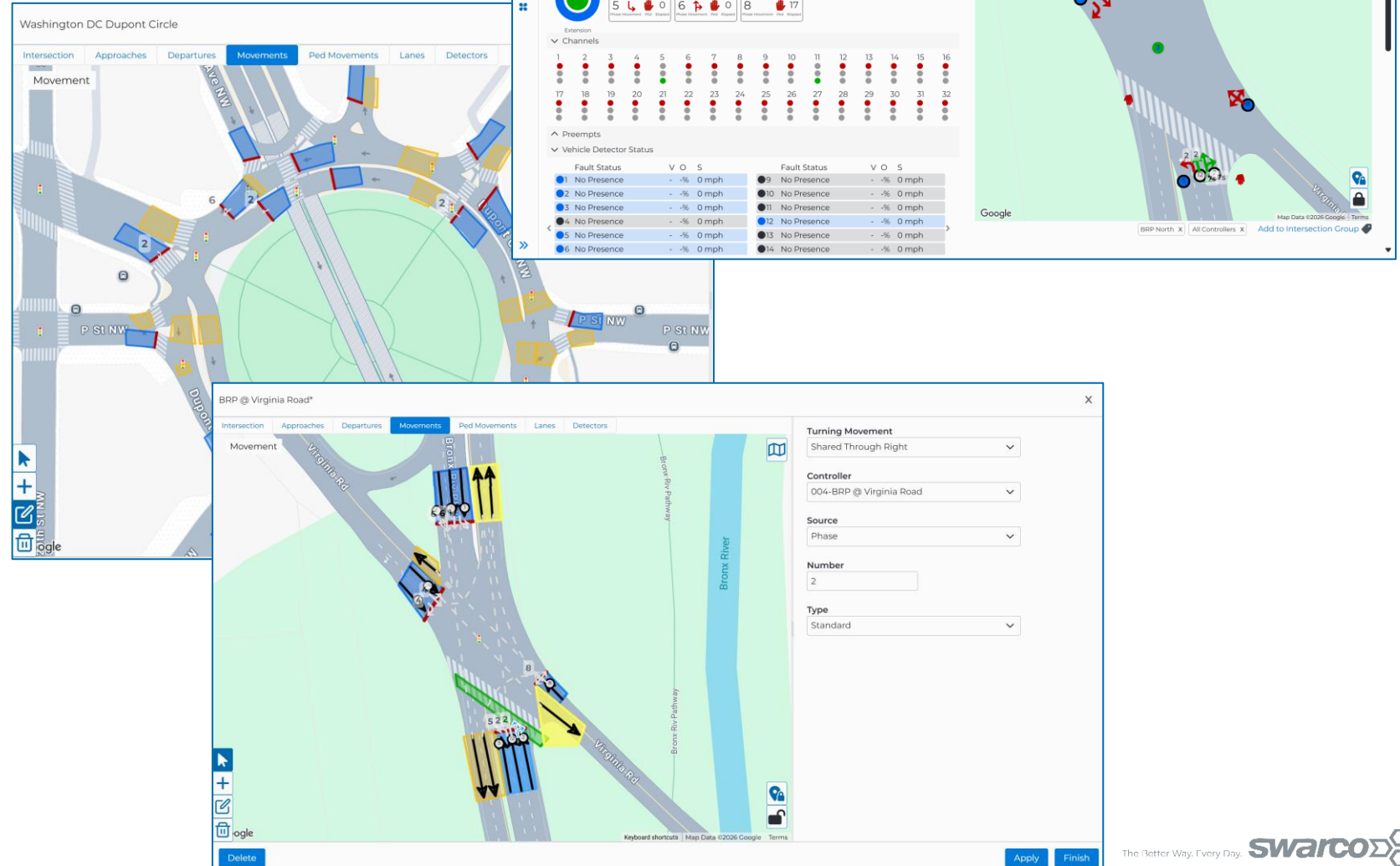
Seamless interactions



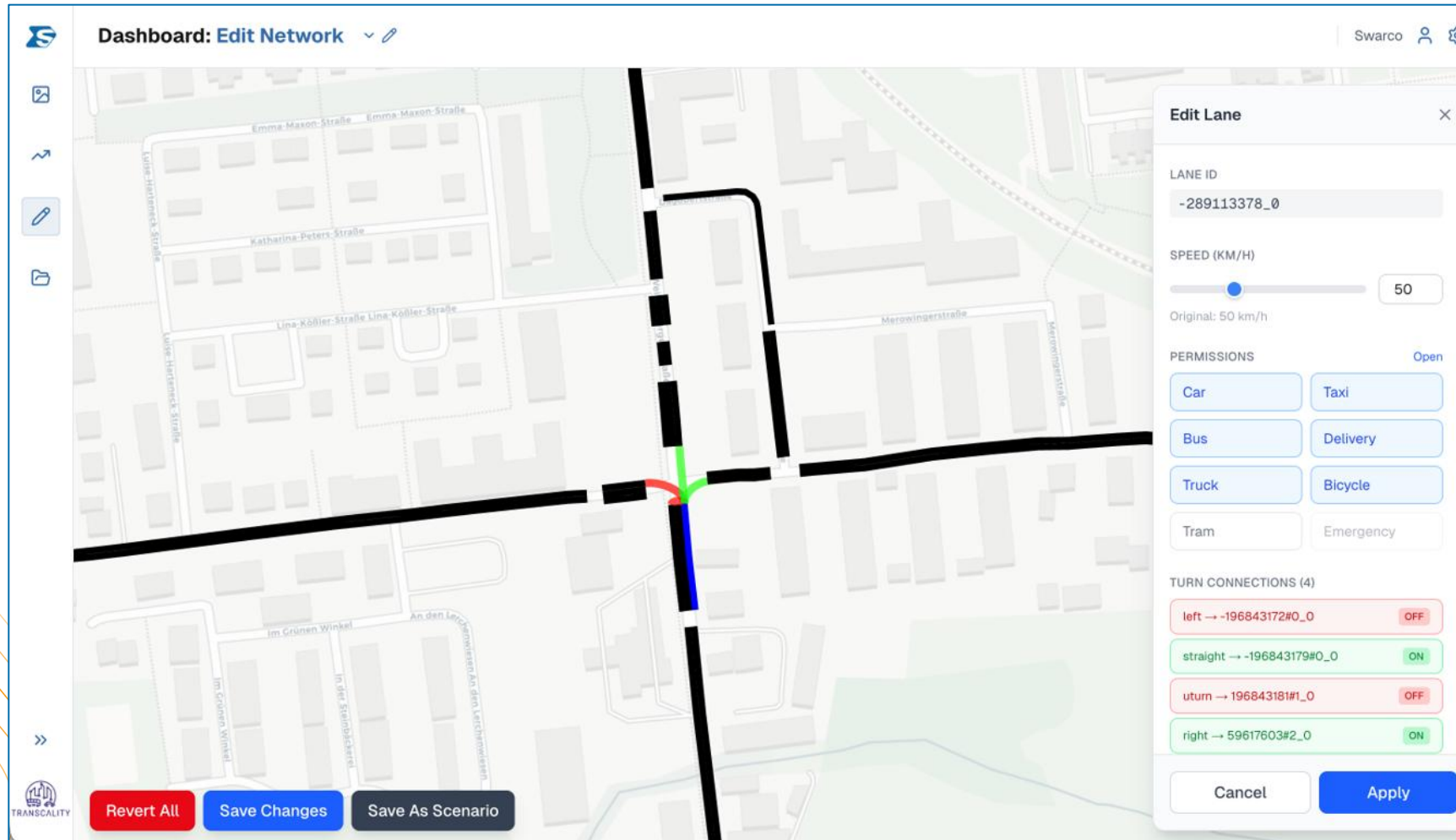
Building the Network

Establishing the Single Source of Truth

- Detailed geometry
- Movement-based
- Defined data collection



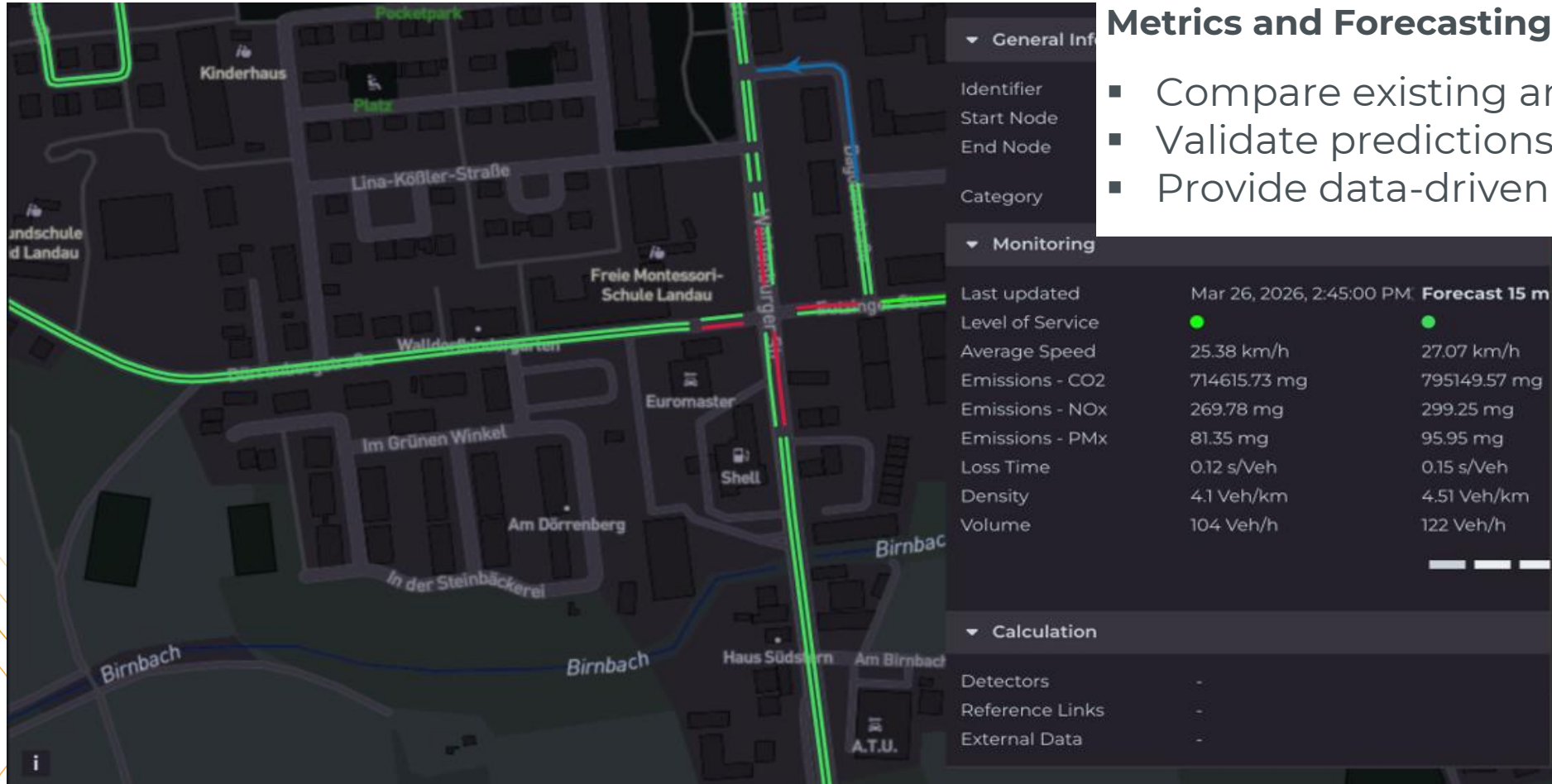
Network Changes and Scenarios



Flexible Model

- Blocking incidents
- Construction closures
- Modified configurations
- Geometric changes

Insights and KPIs



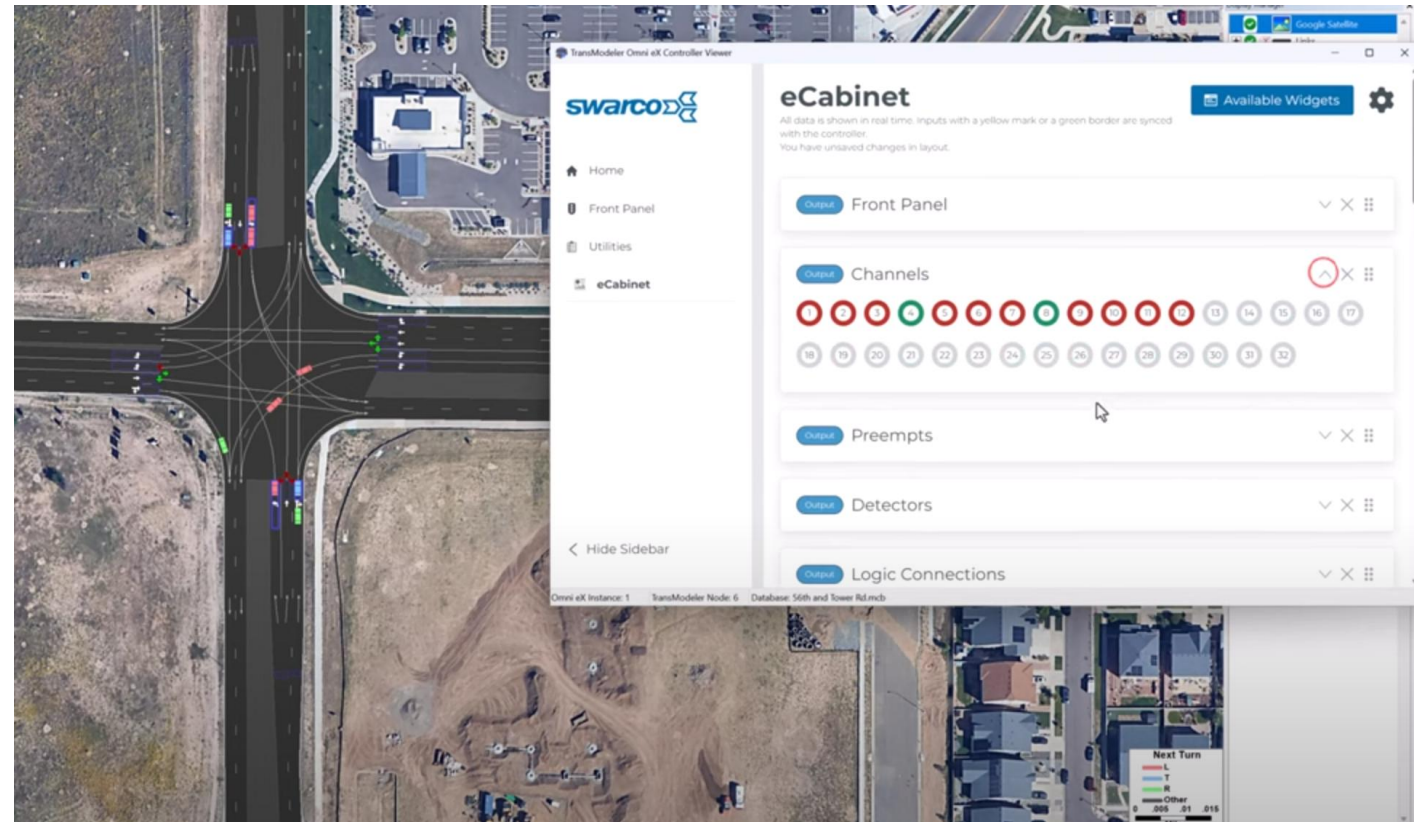
Metrics and Forecasting

- Compare existing and projected impacts
- Validate predictions
- Provide data-driven decisions

Pre-Deployment Validation Testing

Simulation in the loop

- Run 1000's of virtual intersections
- 1000x speed
- Full functionality
- Integrated controller I/O
- Auto-configure
- Agency-specific configurations



Tying It All Together

Examples and Benefits

1 Ad-hoc, scenario-based analysis

Using current device configurations and near real-time or historical snap-shot of traffic loading, analyze impacts of timing configuration changes, operations updates, or incident plans in an operations environment.

2 Validate software updates

Test a new software update against the customers entire system using up-to-date configurations, current traffic conditions, and emulated conflict monitors.

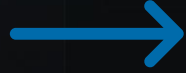
3 Open-source data models

Further the sharing and synchronization of data throughout the full ITS solution. Add new devices, associated meta-data, and connect via streaming APIs.

A Day in "the Life"

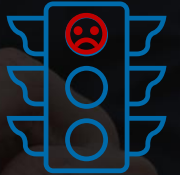


Review Issues
Select Recommendations



Run scenarios:

All-walk application at Main for Mayor
Half cycle Hobby Lobby signal for council member
B City's stadium exit plan (unfunded)



Validate controller software update
Deploy updates



Complaint Call
Bureaucracy



The Better Way. Every Day.

Let's start
the journey
together.