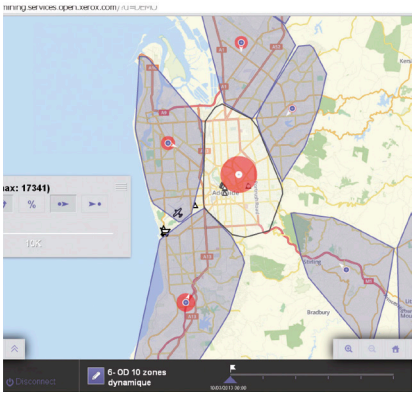
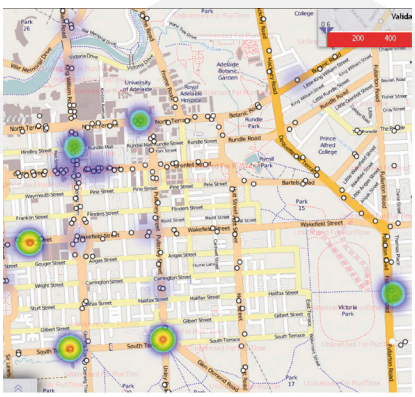
Adapting Public Transport to Ridership

Mobility Analytics Platform: analysis services based on ticketing data



Visualization, Analysis, and Simulation
MAP proposes three ways to improve the understanding network activity.

- Graphic representations make it possible to view and replay network activity intuitively, in particular using maps. They give a clearer understanding of ridership across the entire network or for a given line.
- Thanks to statistical algorithms, analyses offer strong value-added viewpoints concerning operation of the network, such as passenger profiling.
- Simulations are used to test network changes - routes, timetables, fares - using rules drawn from the analysis of user habits.



Conduent Transportation's Mobility Analytics Platform (MAP) explores, cross-references, and analyzes the data accumulated by public transport operators in order to help them improve their transportation services.

Ticketing Data Mining
On the basis of ticketing data – sales and reloads, validations, inspections – MAP provides the key to understanding user habits and network activity.

These ticketing data mining services are designed to meet precise requirements: determining vehicle loads, user profiles, peak periods, etc., thus complementing passenger surveys conducted in the field.

The results are put into context according to the characteristics of the network: local mapping, type and layout of lines, fare range, type of vehicle, etc.

MAP uses a dedicated server to import the data obtained from ticketing systems.

Clear, Customized Representations
The representations, analyses, and simulations produced using ticketing data are reviewed in the form of:

- interactive maps - with static or dynamic views
- detailed graphs
- data tables

These representations are totally customizable. Operators can:

- view, replay, and explore network activity over a given period of time
- choose the elements featured
- set thresholds and adjust scales

Visualizing: Network Activity Using Graphs
Bar charts, pie charts, curves, and tables provide a detailed understanding of network activity according to several criteria (type of vehicle, user category, type of ticket, etc.).

Visualizing: Records of validations on the network

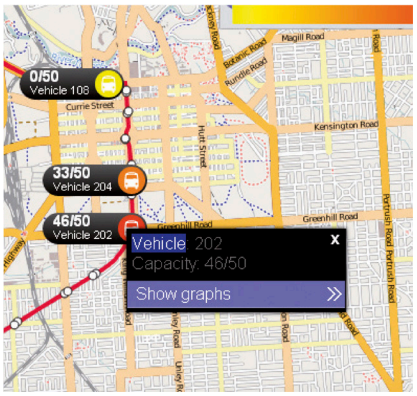
Where and when do peaks occur? What is the scale of these peaks? How are flows smoothed out over a long period?
The number of validations recorded at each stop/station are represented in heat maps (temperatures).

Reading the data is intuitive: the higher the number of ticket validations at a station, the more it appears as a hot spot (red).

In static mode, this visualization shows where the largest number of tickets were validated over a given period of time (chosen by the user).

In dynamic mode, it highlights periods and stops where peak ridership occurs by displaying the number of validations throughout a given time frame (for example a day).

An intuitive, spatio-temporal representation of network activity.



Analyzing: Vehicle loads and flows between zones

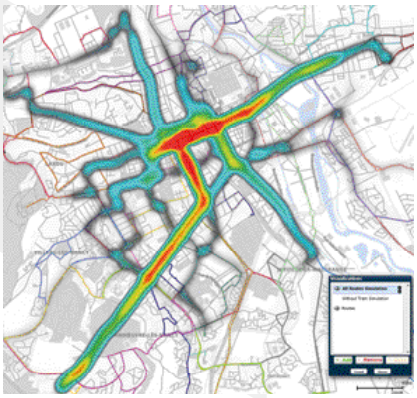
Which line sections are most used? Where and when are buses packed or underused? What are the main flows inside the urban area?
Vehicle loads are estimated using validation data, timetables and frequencies, and statistical algorithms. They are represented on an interactive map of the network.

These load projections are based on user profiling algorithms.

Using the validation data and statistical algorithms, MAP divides the travel area into different geographic zones. It then illustrates the internal, incoming, and outgoing flows for each zone.

This division into zones is determined using stop-clustering and user-profiling algorithms.

Assistance to adapt vehicle frequencies and capacities and improve the service.



Simulating: Route and timetable modifications

How can the service in a particular zone be improved? What impact will a timetable change, new route, or fare increase have?
MAP proposes simple and user-friendly tools to modify criteria that have an influence on public transport use: journeys, routes, times, fare ranges, etc.

The application simulates the operation of the network in these new conditions. The result is presented in the form of interactive maps and graphs.

The impact of the potential changes on ridership can be assessed by comparing them with real data, superimposing maps, or calculating discrepancies.

The simulation uses algorithms to estimate behaviour patterns derived from ticketing data and journey planner functions.

An intuitive assessment of public transport network adaptation scenarios.

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