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INTEGRATED TRANSPORT AND LOGISTICS PLANNING

Devrim Kara

IPIC 2019

10 July 2019

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We plan and optimise everything which moves people and goods worldwide.

CONTENT OF PRESENTATION

1. **Freight in transport modelling**
2. Logistics planning and optimisation
3. Case studies
4. Integration

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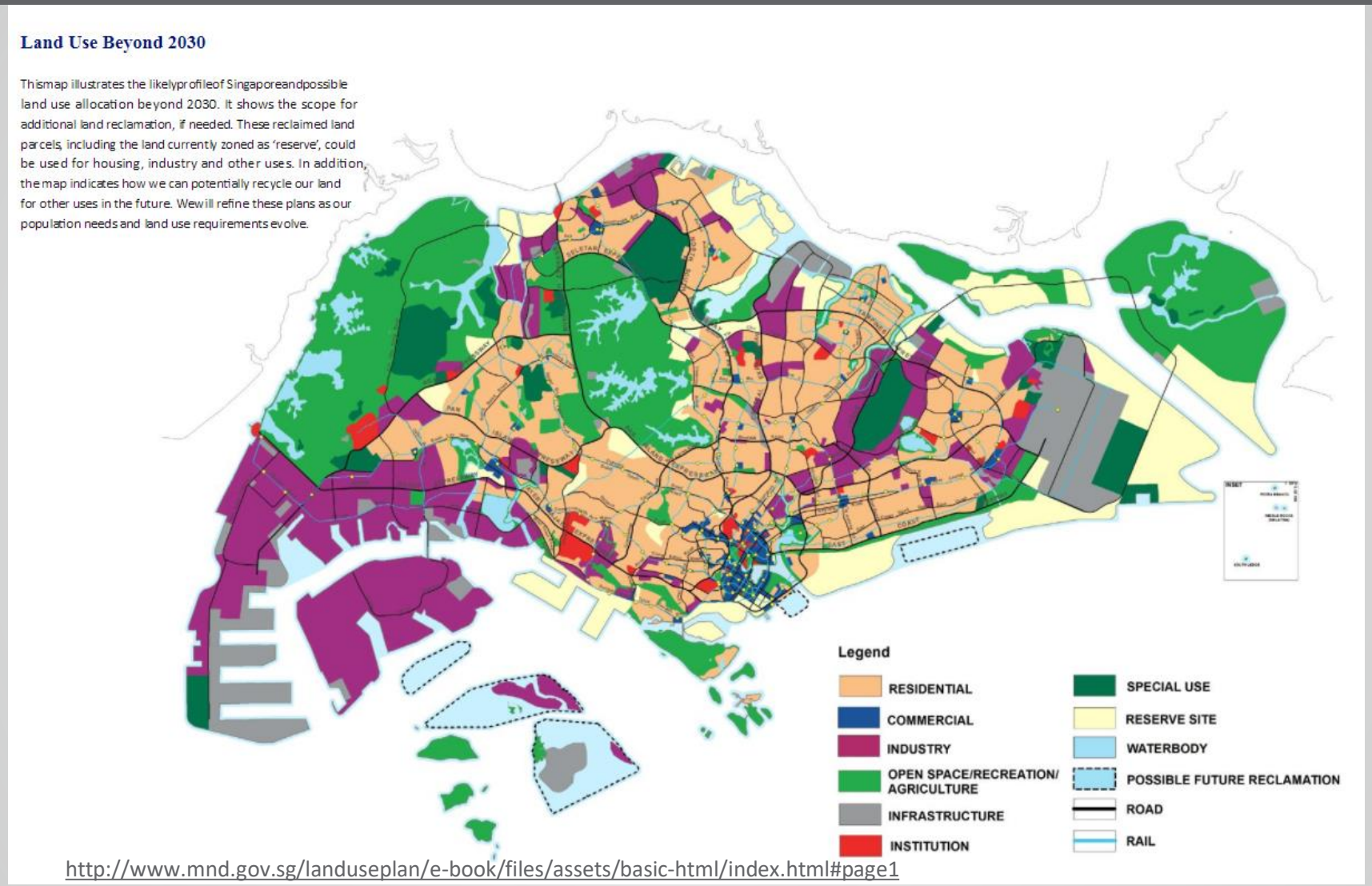
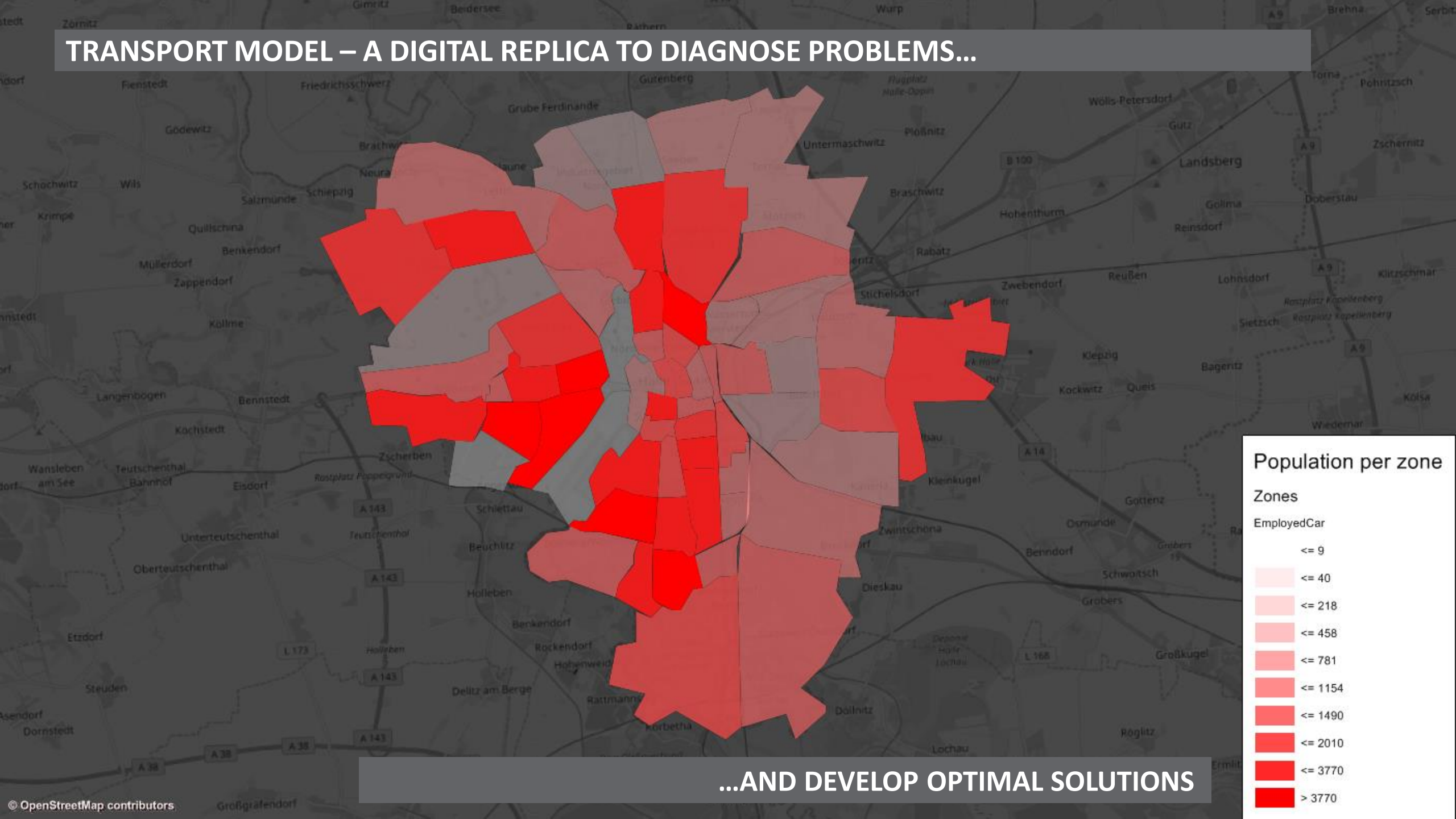
SOME PROBLEMS ARE TOO COMPLEX FOR A SPREADSHEET…



http://www.mnd.gov.sg/landuseplan/e-book/files/assets/basic-html/index.html#page1

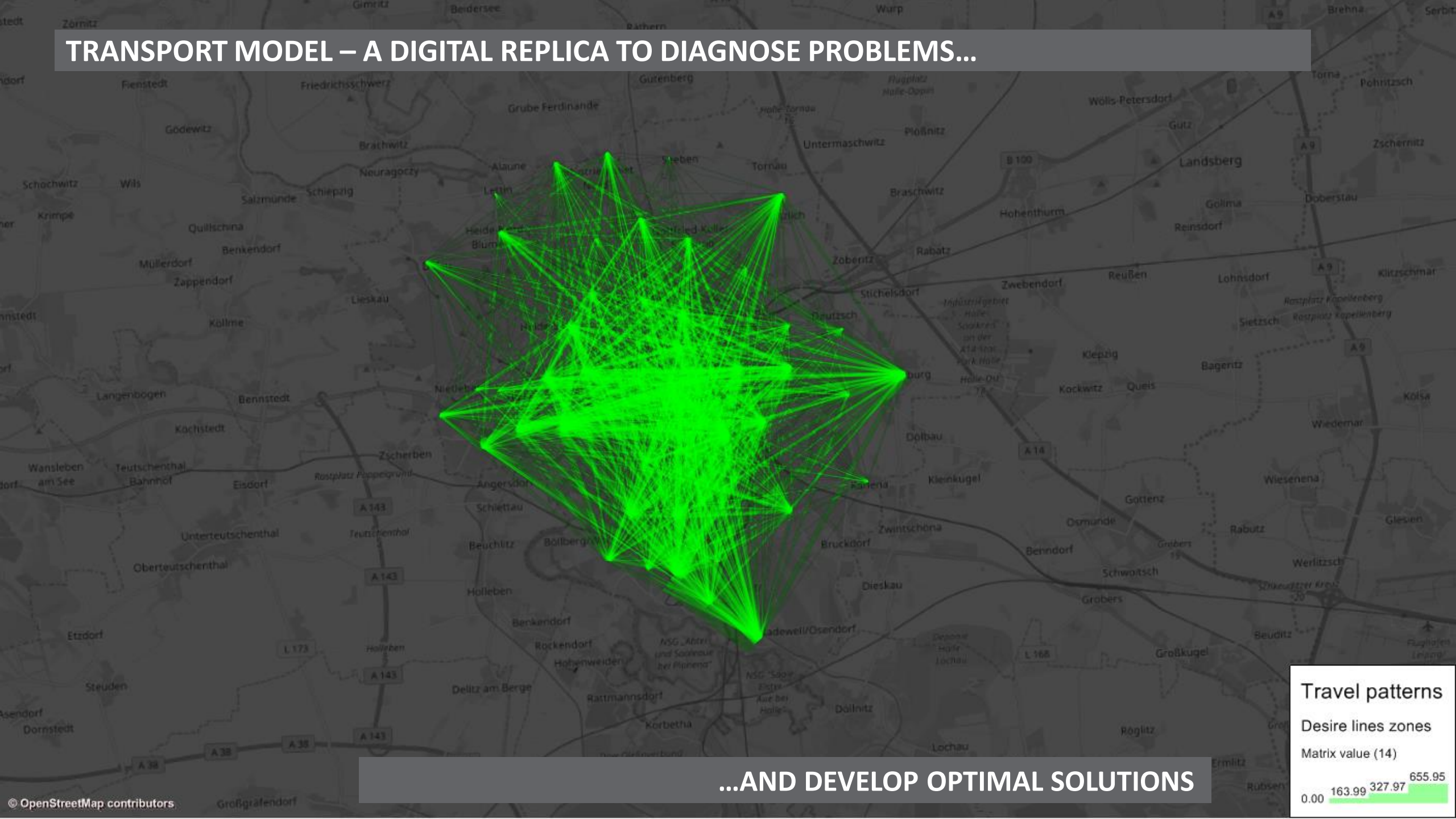
…AND TOO IMPORTANT TO LEAVE TO CHANCE

TRANSPORT MODEL – A DIGITAL REPLICA TO DIAGNOSE PROBLEMS…



…AND DEVELOP OPTIMAL SOLUTIONS

TRANSPORT MODEL – A DIGITAL REPLICA TO DIAGNOSE PROBLEMS…



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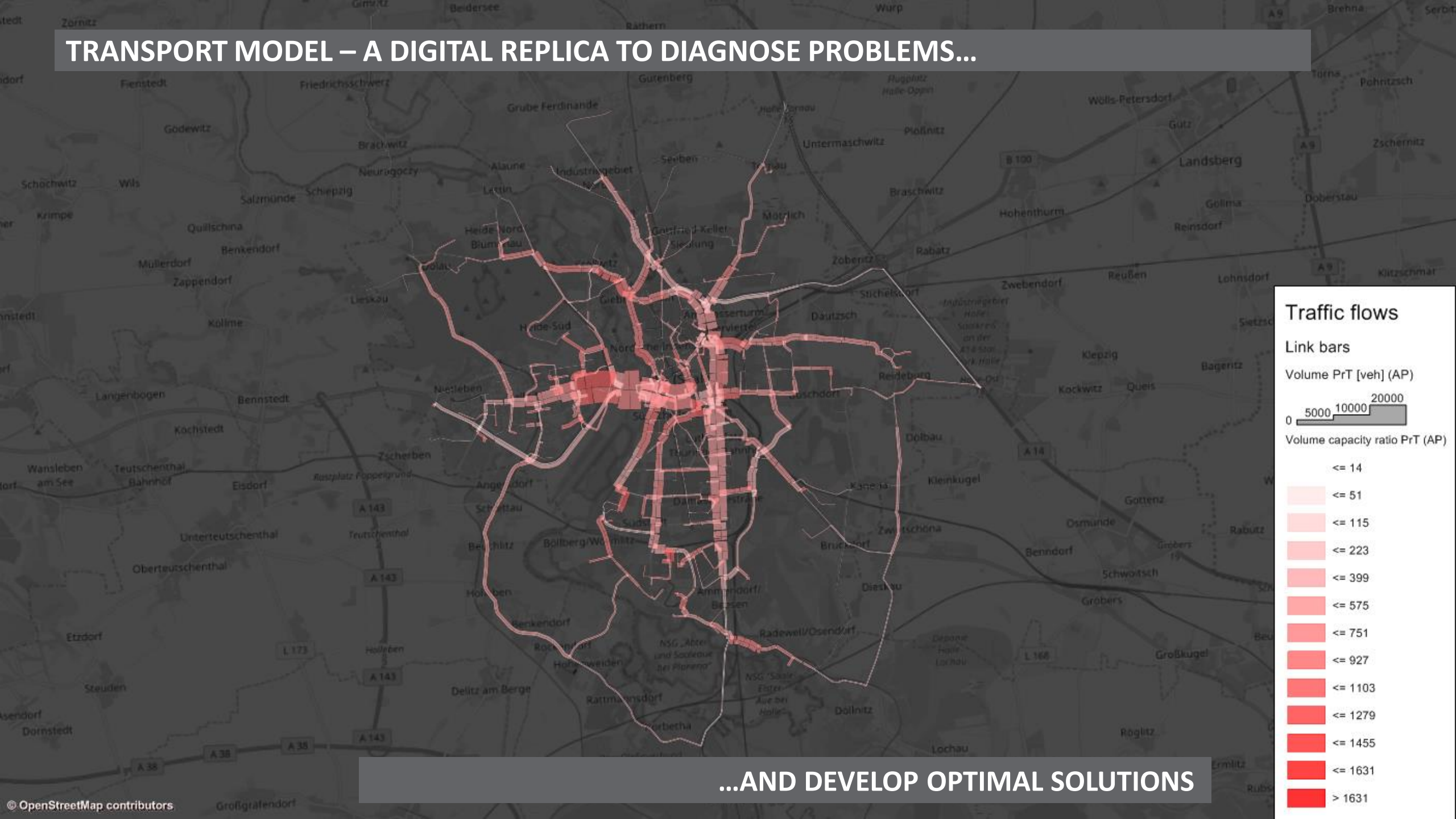

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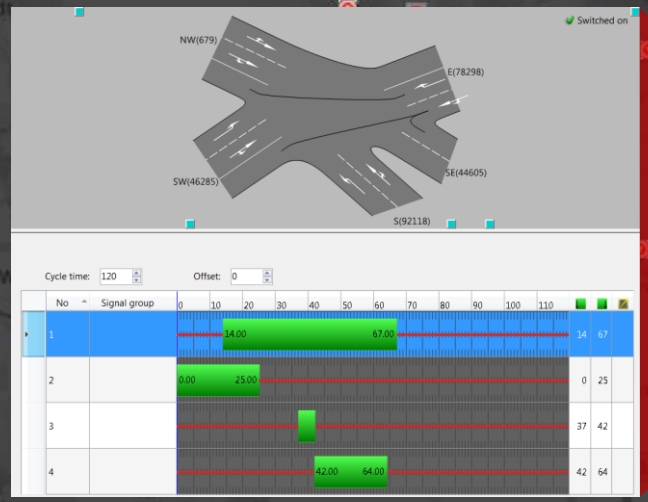

Junction control data

Nodes

Control type

- Uncontrolled
- Two-way stop
- Signalized
- All-way stop
- Roundabout
- Two-way yield

…AND DEVELOP OPTIMAL SOLUTIONS

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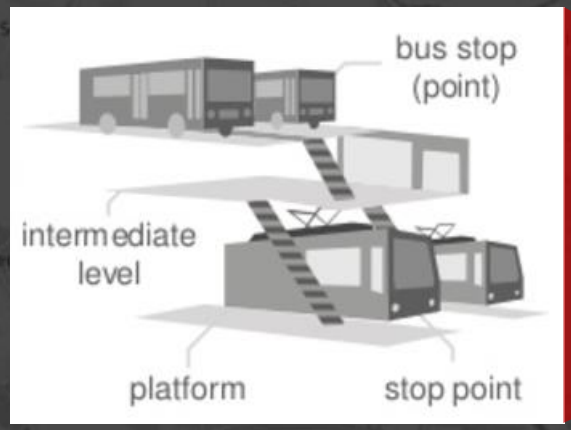
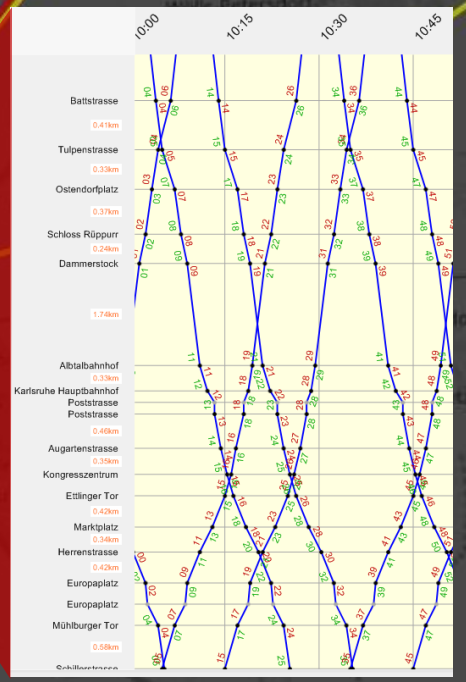
TRANSPORT MODEL – A DIGITAL REPLICA TO DIAGNOSE PROBLEMS…





…AND DEVELOP OPTIMAL SOLUTIONS

Public transport systems

Route courses

Transport systems

- Bus
- InterCity Rail
- Light Rail Transit
- Regional Rail
- Tram

Stops

- S

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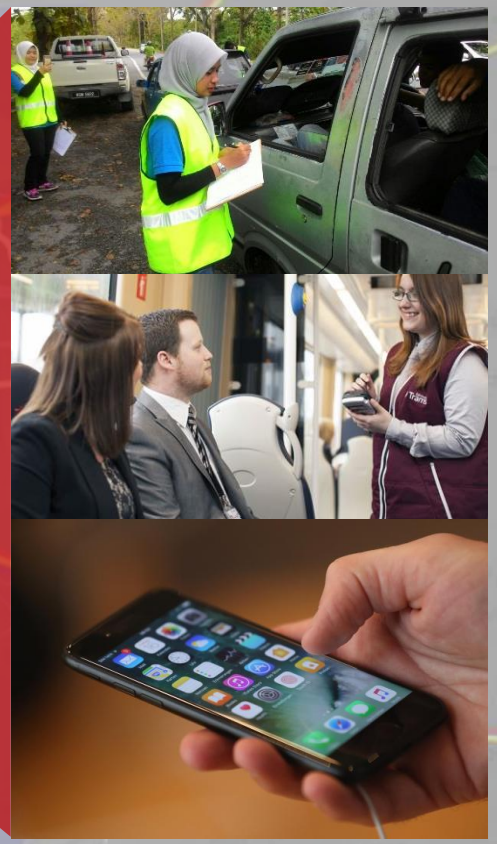
TRANSPORT MODEL – A DIGITAL REPLICA TO DIAGNOSE PROBLEMS…



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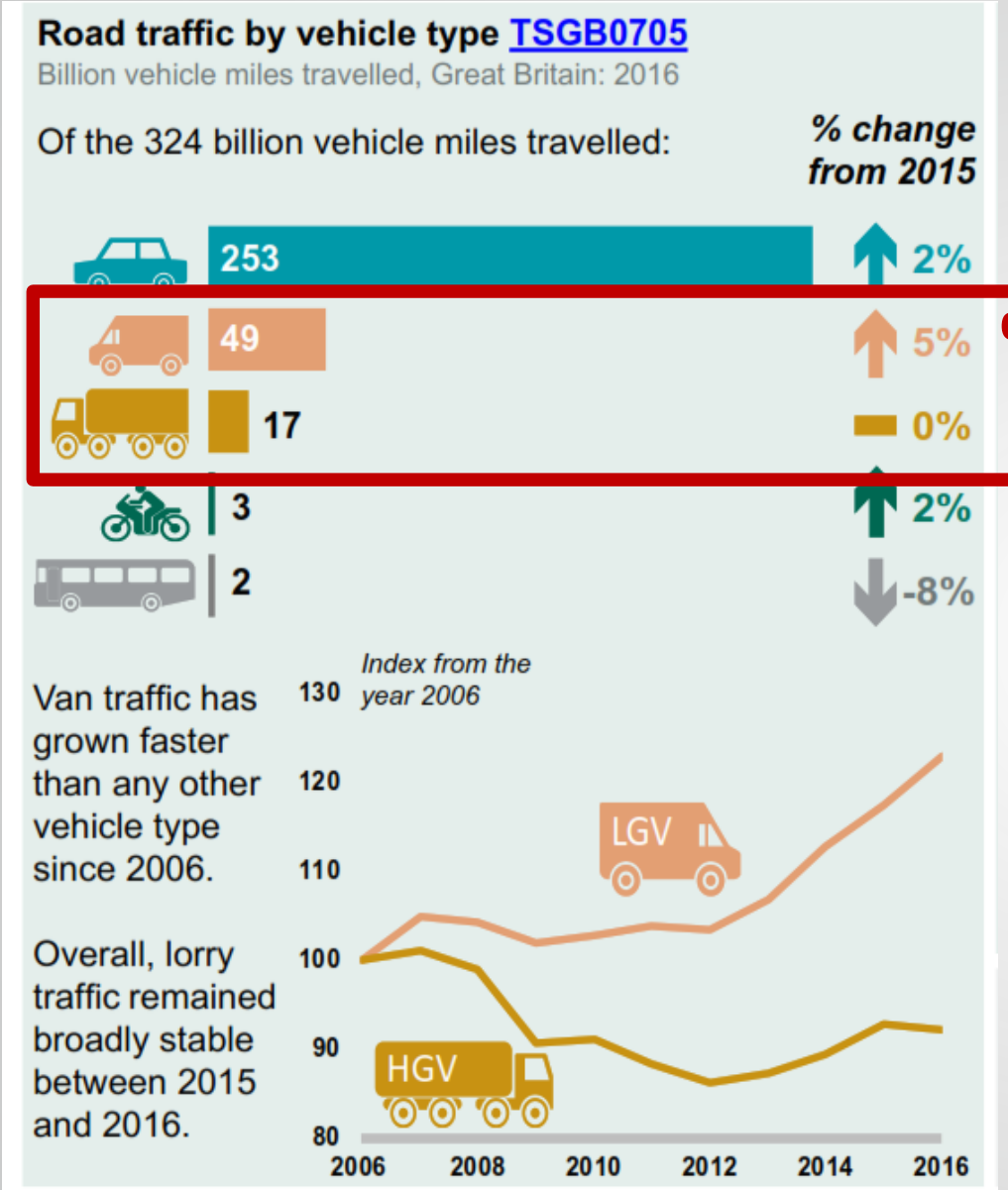
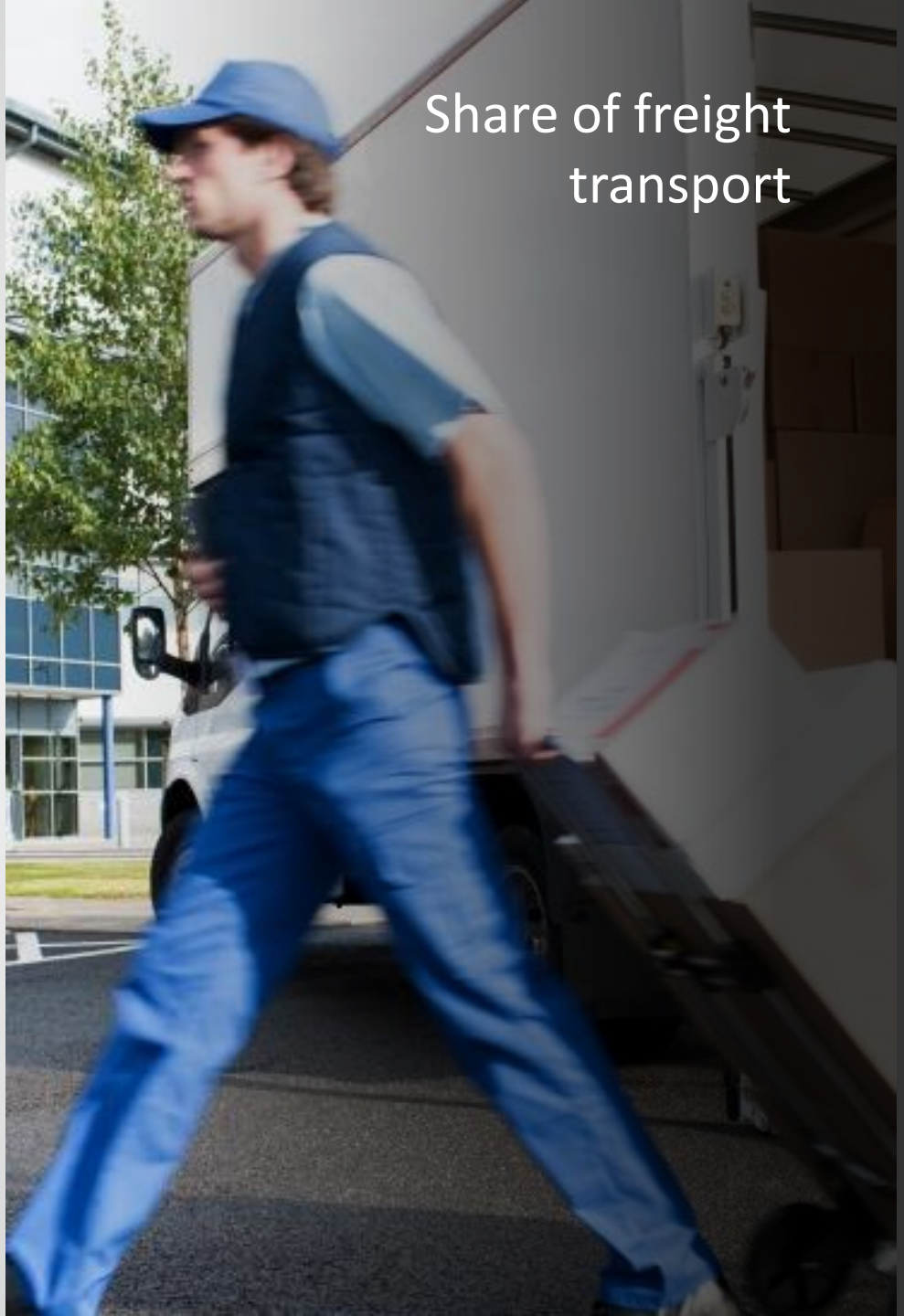
WHAT ABOUT FREIGHT?




Share of freight transport

CONTENT OF PRESENTATION

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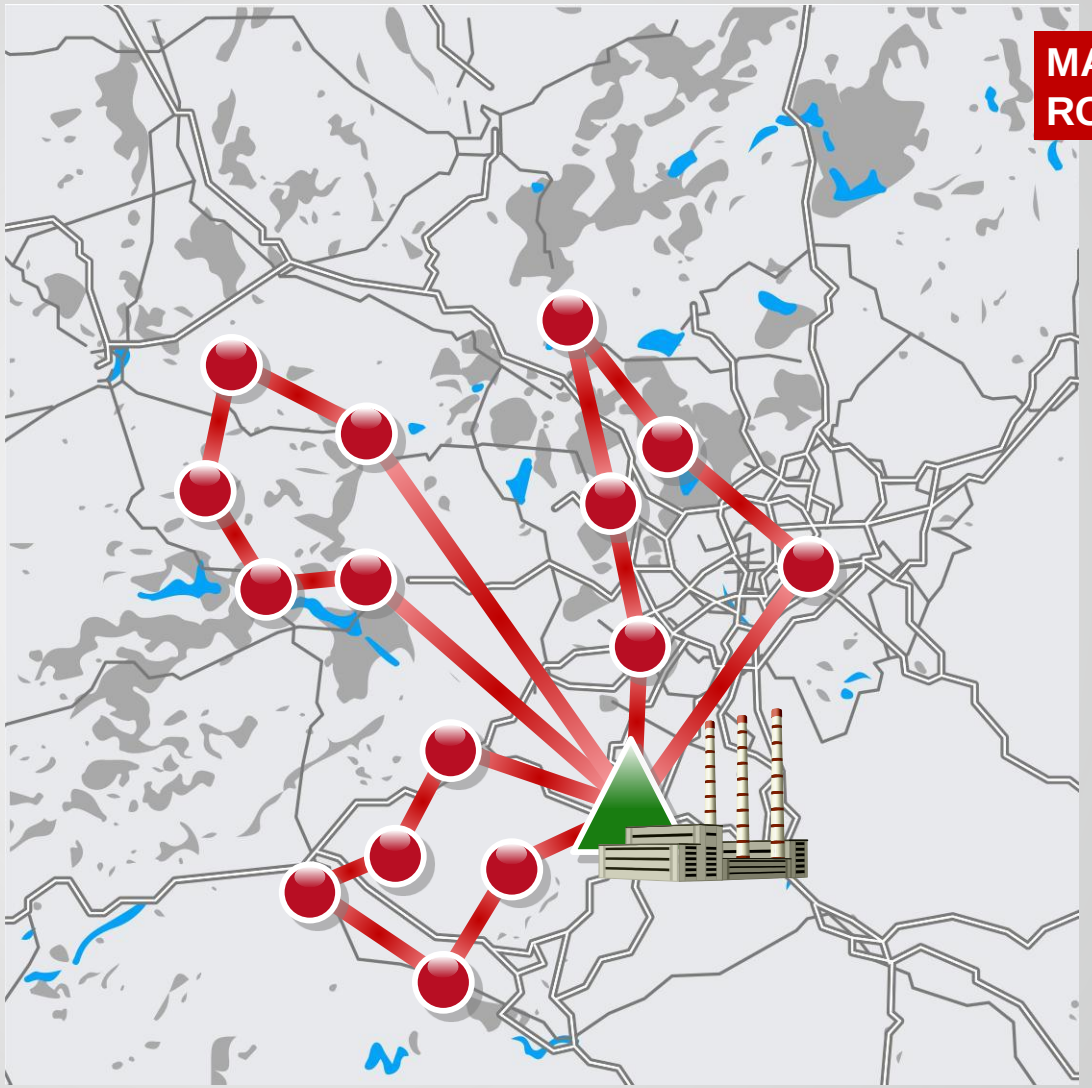
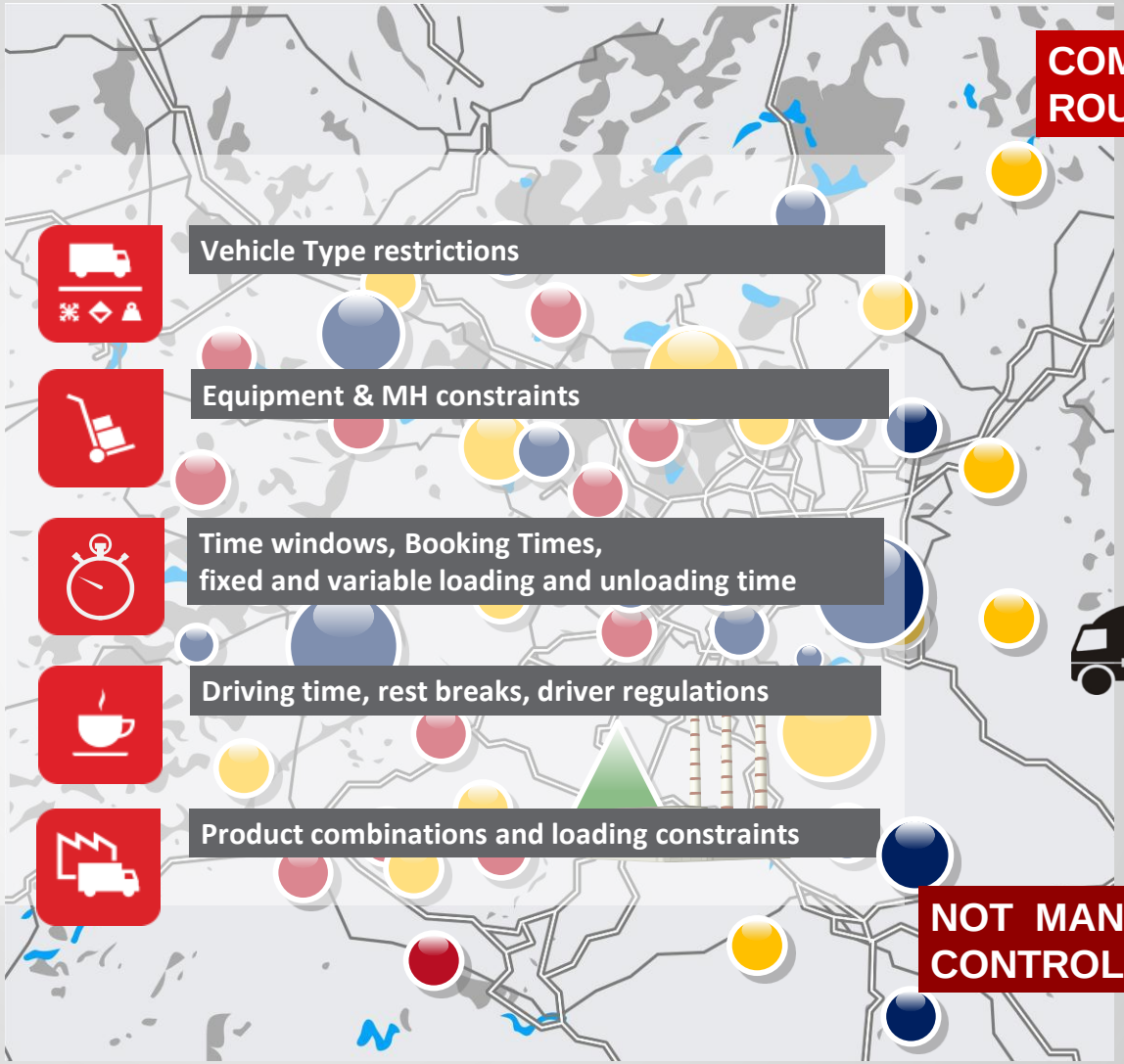
Why Route Optimisation?



MANUAL ROUTE PLANNING

PLANNER CONTROL

Why Route Optimisation?

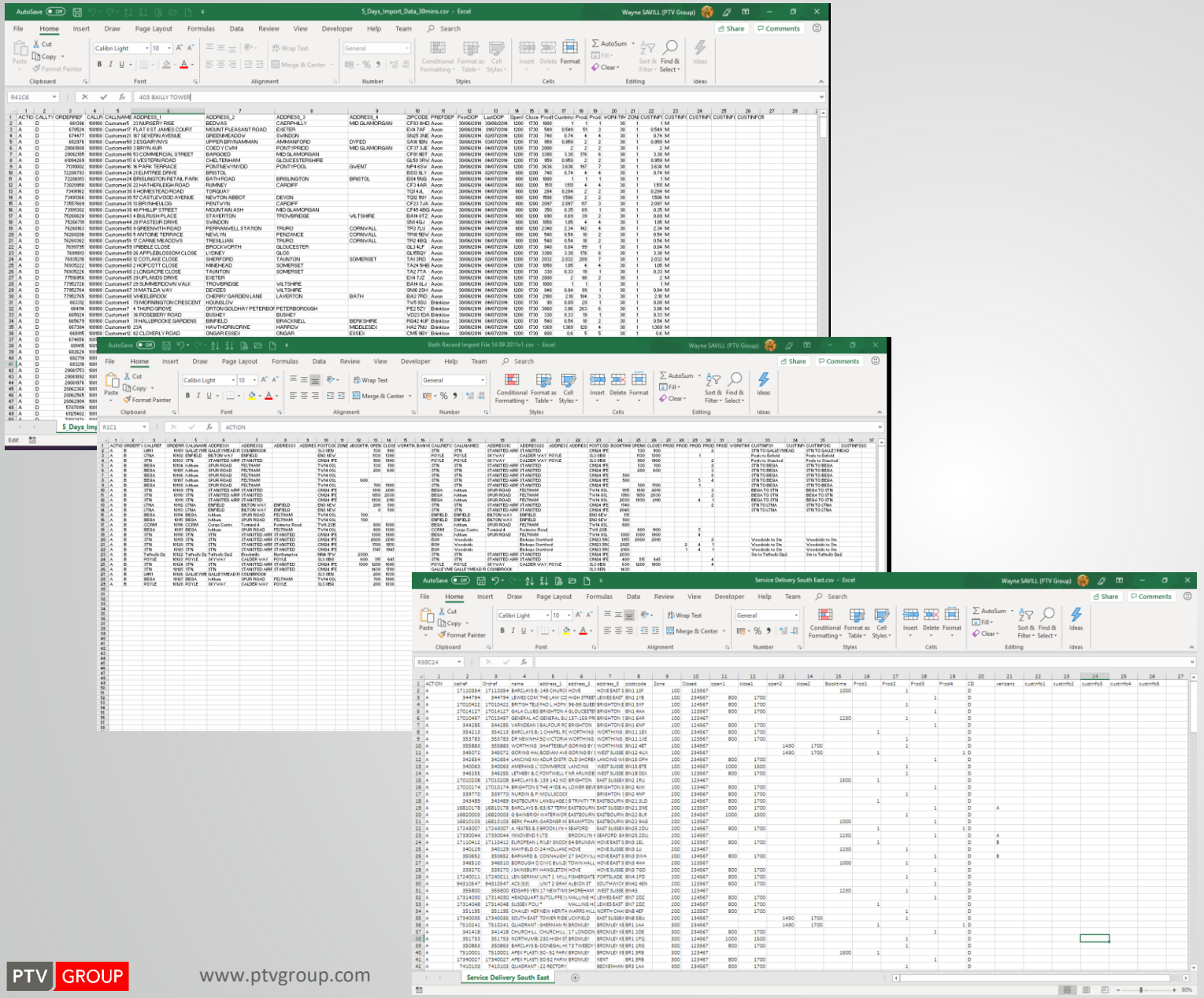


COMPLEX ROUTE PLANNING

- Vehicle Type restrictions
- Equipment & MH constraints
- Time windows, Booking Times, fixed and variable loading and unloading time
- Driving time, rest breaks, driver regulations
- Product combinations and loading constraints

NOT MANUALLY CONTROLLABLE

What Data is Required?



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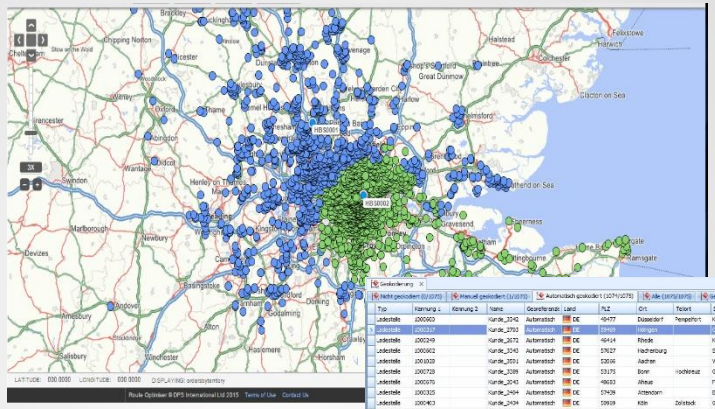
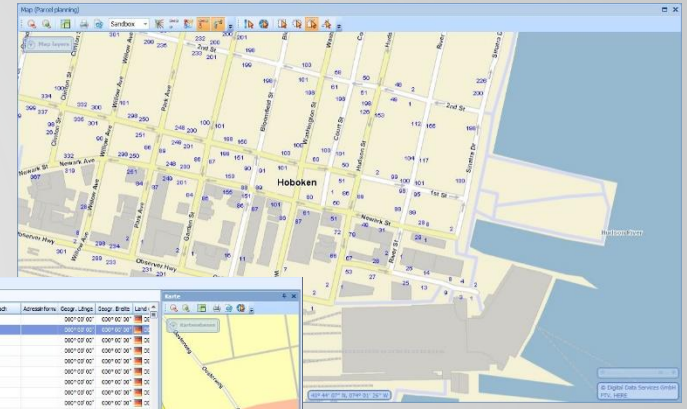
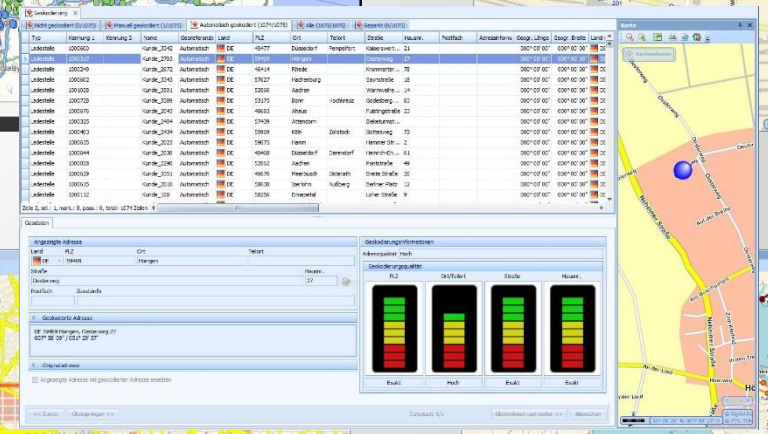
Maps help to Visualise Data

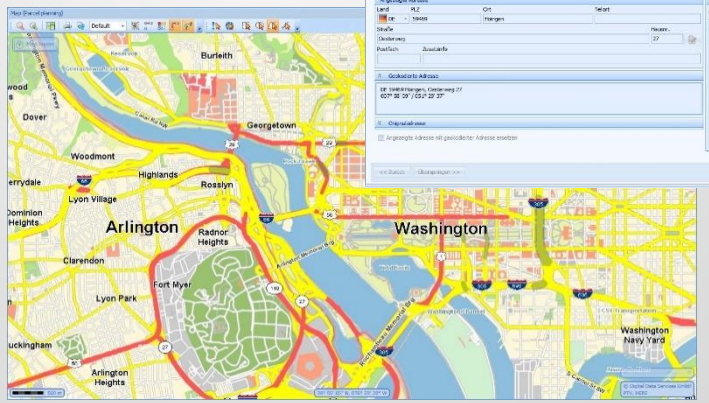
Maps:

- City level
- Country and Continental Maps
- Various Mapping Databases







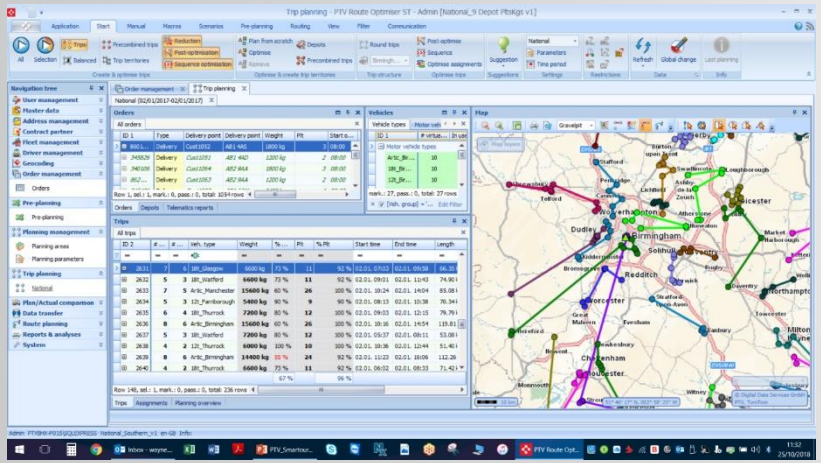


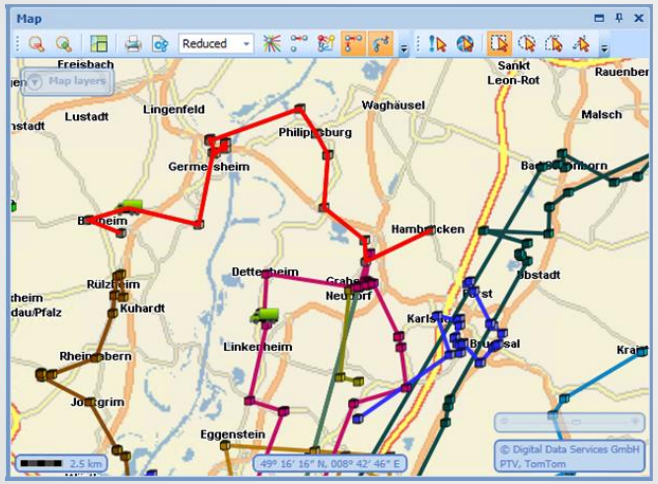
MAKE INFORMED DECISIONS TO EXECUTE YOUR PLAN

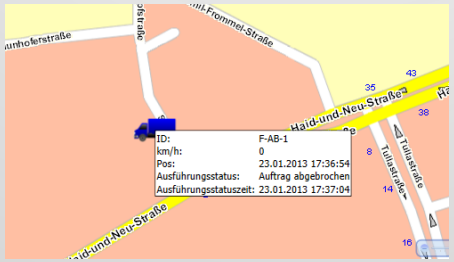
Navigation:

- Transfer of the planned routes
- Current status update
- Evaluate delays and deviations
- Keep your Customer informed

- Route / Re-Route your Driver
- Compliance/plan v actual
- Exchange of information with the driver
- Manage the Plan & Keep Control







Use Cases Overview

- Geocoding
- Mapping
- Routing
- Trip optimization
- Tracking and tracing
- Map matching
- Emissions calculation
- Toll calculation
- Traffic information
- Radius search
- Geofencing
- Navigation

WHAT ABOUT MULTI-MODAL TRANSPORT PLANNING?

CONTENT OF PRESENTATION

1. Freight in transport modelling
2. Logistics planning and optimisation
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Figure 1: Model areas and highway zone detail

- Transport for West Midlands
- Multi-modal transport model
- Includes cars, bus, rail, light rail, walking, cycling

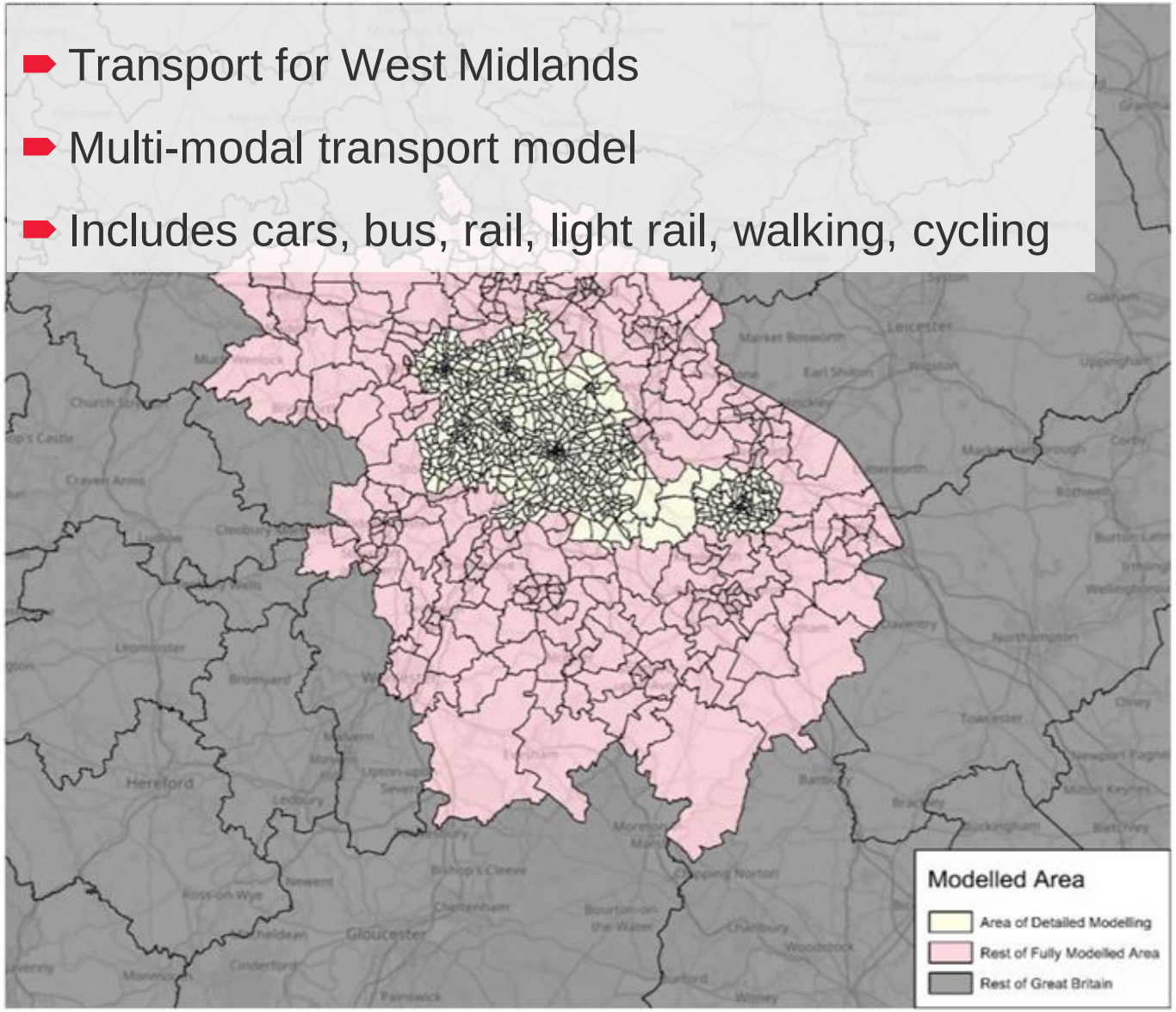


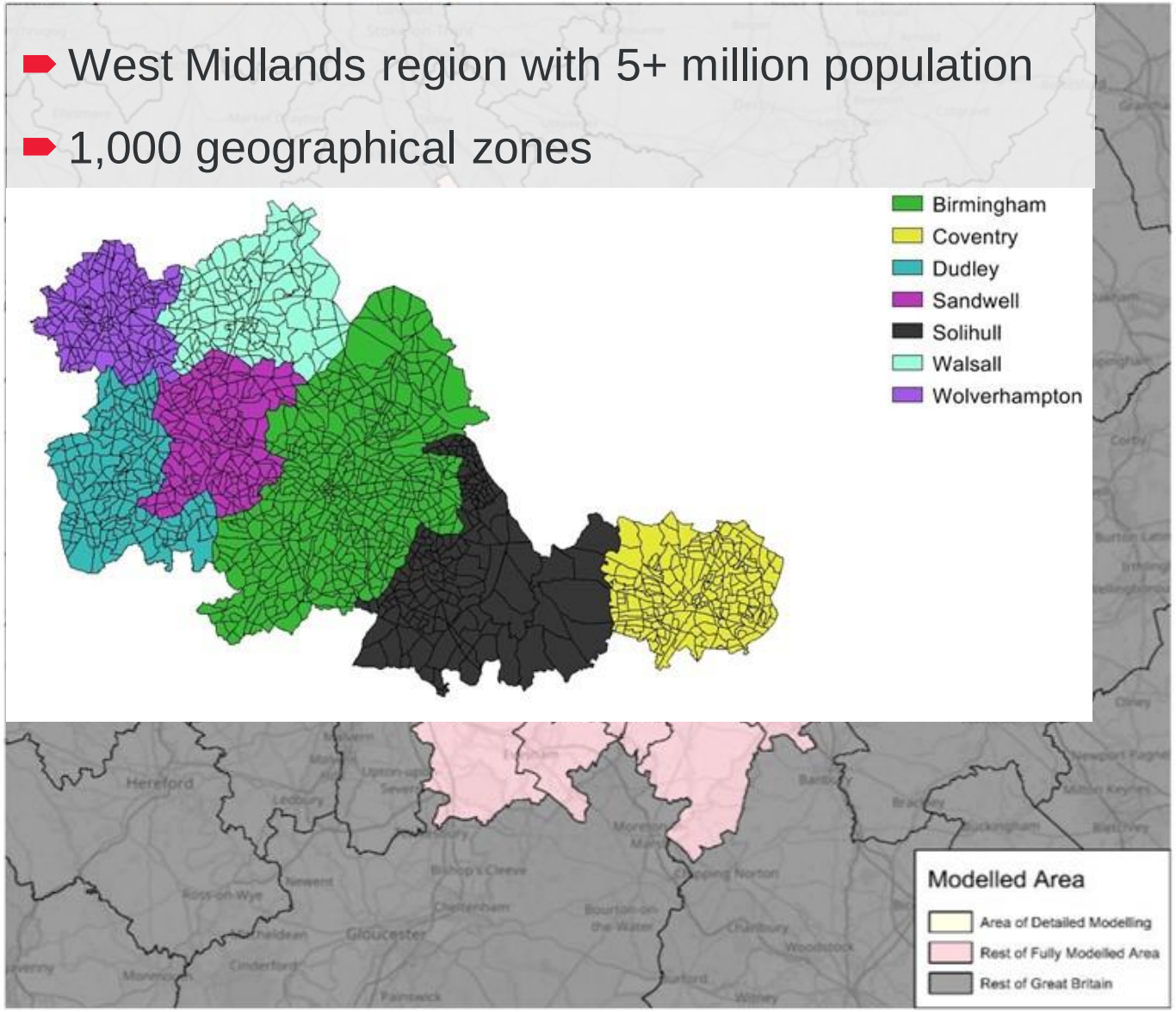
Image Source: https://www.tfwm.org.uk

West Midlands PRISM Transport Model

West Midlands PRISM Transport Model

Figure 1: Model areas and highway zone detail

- West Midlands region with 5+ million population
- 1,000 geographical zones



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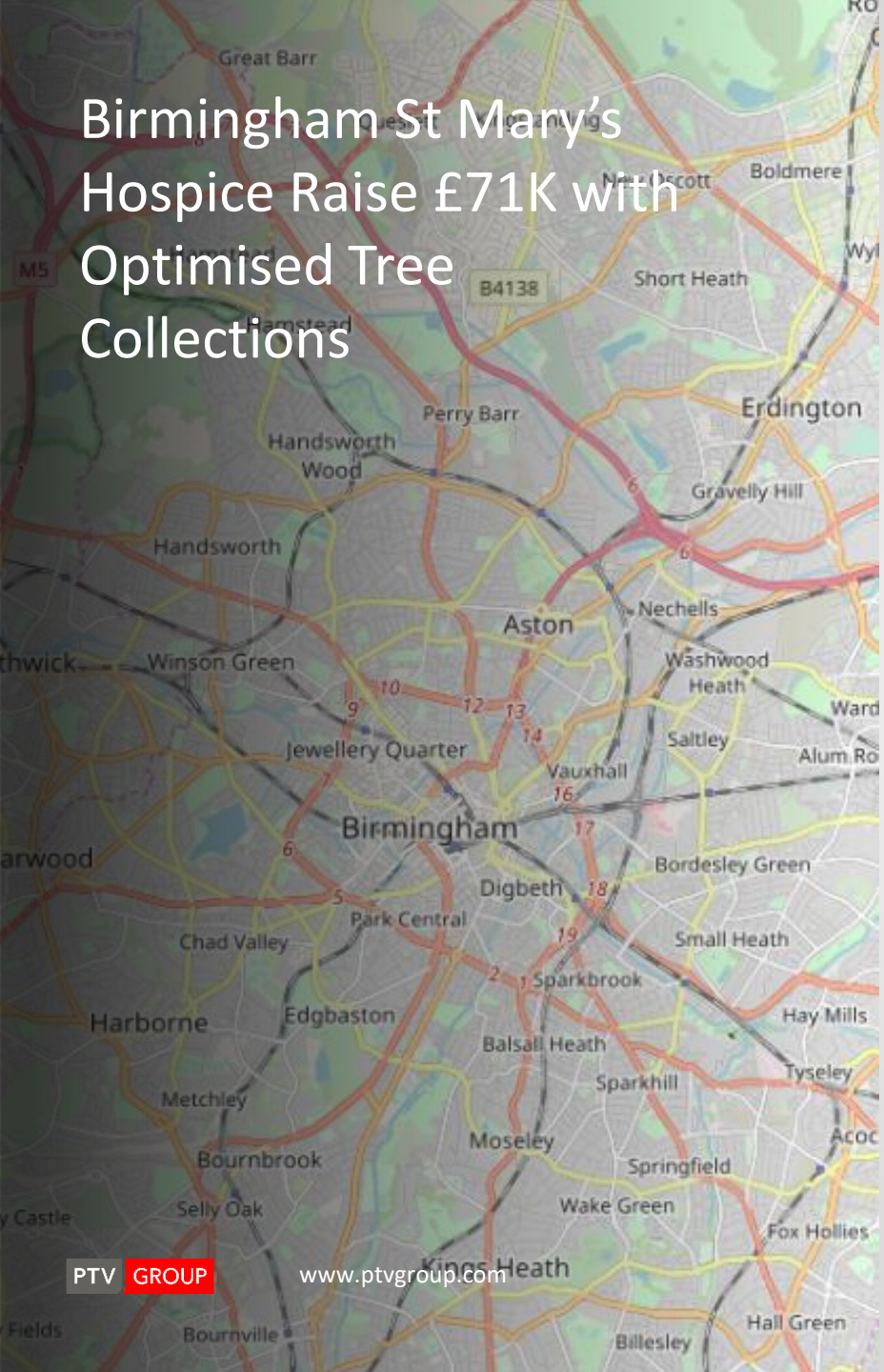
Birmingham St Mary's Hospice Raise £71K with Optimised Tree Collections



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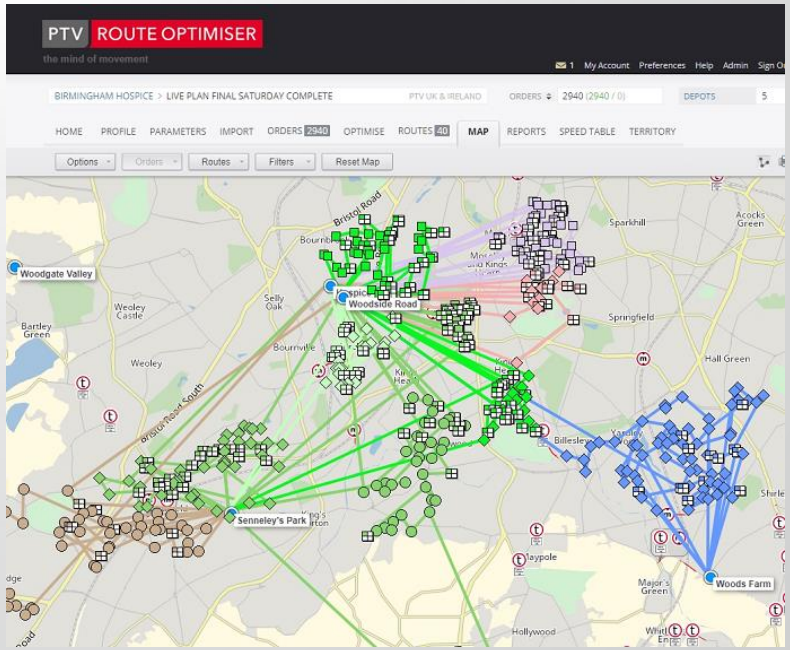
The Most Magical Time of the Year

- Almost every home buys a Christmas Tree
- Project starts 6 months in advance
- Volunteer tree colectors and vehicles are recruited
- Trees chipped at a site for compost and biomass fuel

Birmingham St Mary's Hospice Raise £71K with Optimised Tree Collections

Treecyling 2019 Key Facts

- 3,726 households booked to have their trees collected
- £71,882.00 was raised by the project
- 39 vans were donated by local companies
- 149 volunteers gave up their weekend to collect the trees
- Minimise number of vehicles, distances, volunteers
- Private business are more cost conscious than charities…



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4. **Integration**

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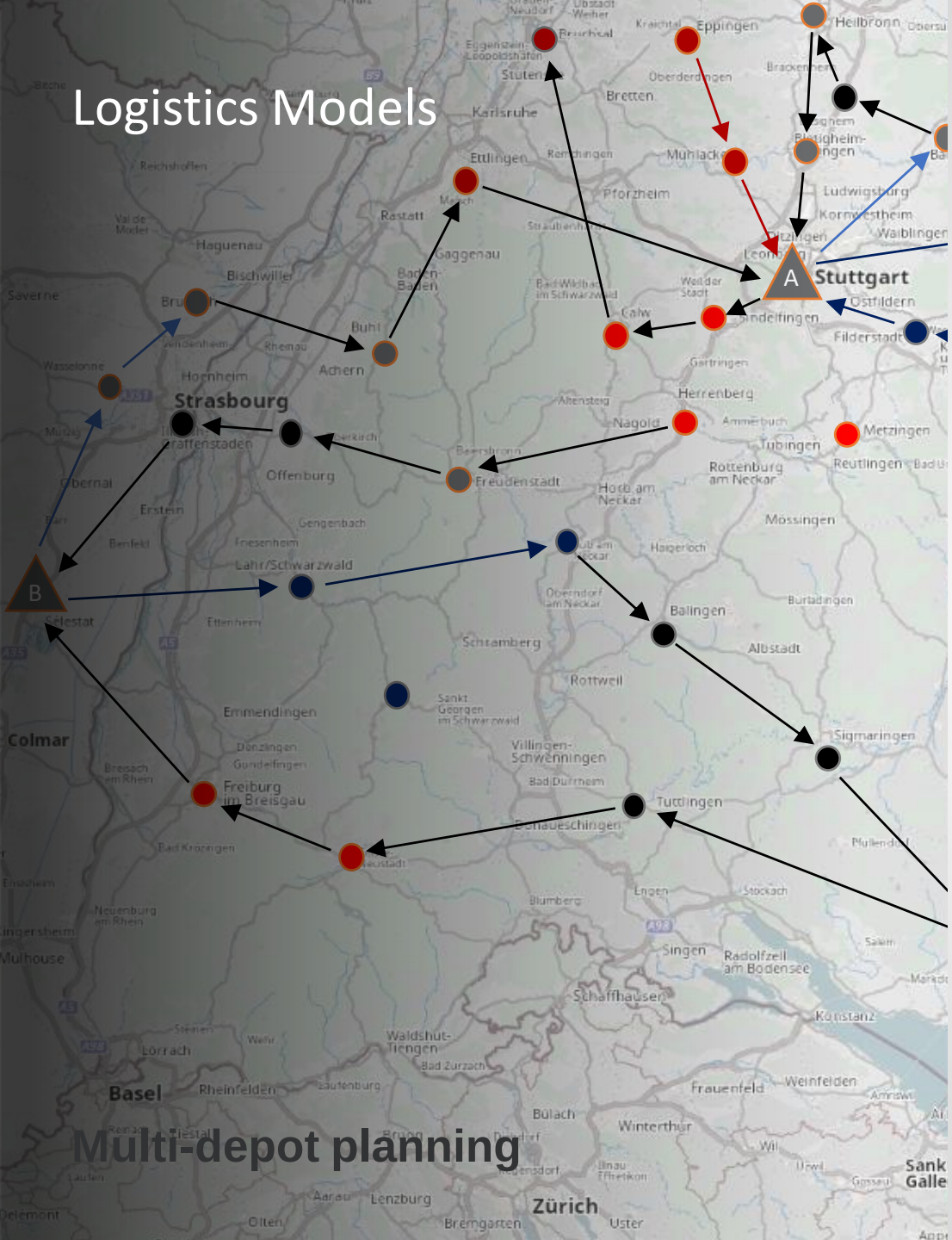
Logistics Models



Can help:

- Fleet assignment to complex O/D trips
- Optimal location/usage of depots
- Costs and emissions major consideration

Don‘t take into account:

- Road network capacity
- Public authority policies
- Congestion in real-time or future

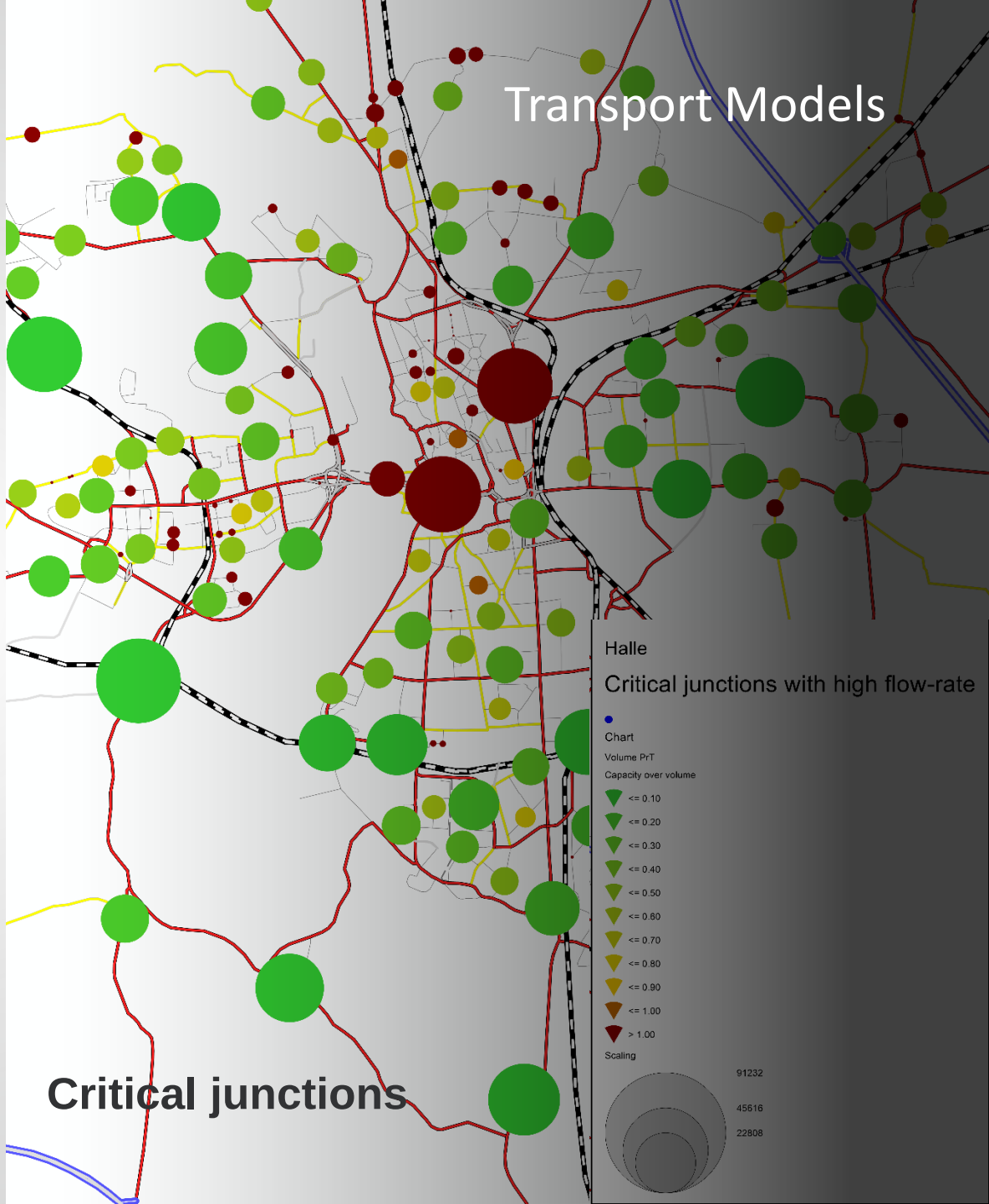
Transport Models

Can help:

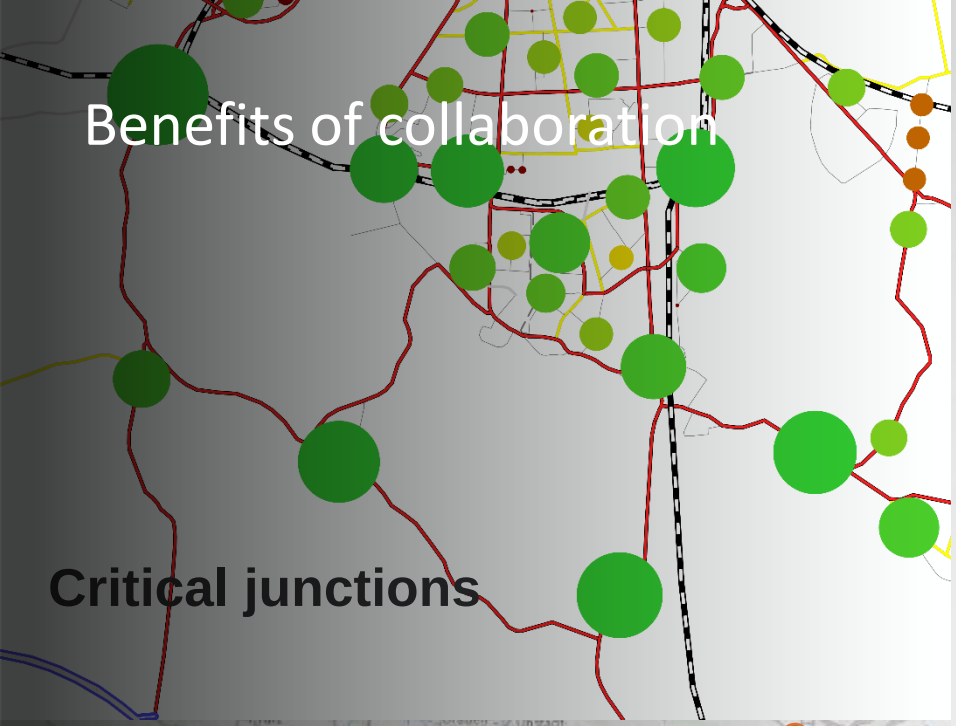
- Impact of future freight plans on roads
- Test interventions, policies and their impact
- Holistic impact assessment

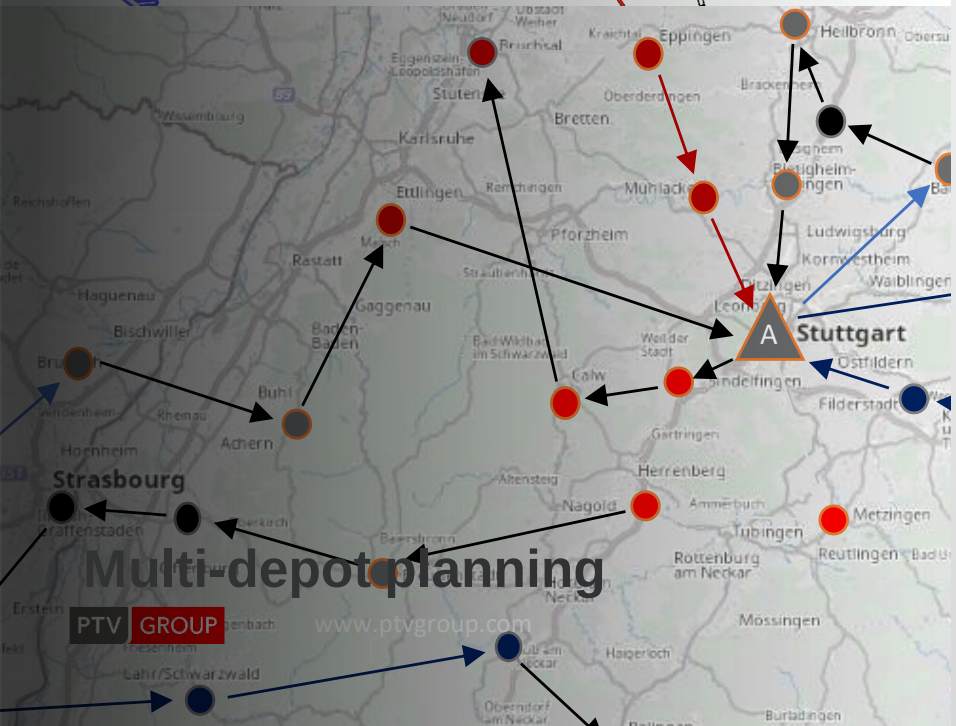
Don‘t take into account:

- Detailed freight O/D or routing
- Trip purpose and freight type
- Future O/D and routing



Benefits of collaboration





For Transport Planners

- More detailed freight data
- Better understanding of freight planning
- Transport plans and policies that integrate freight
- **Minimise impact on performance, air quality and safety**

For Freight Planners

- Obtain traffic flow and road capacity/perfomance data
- Increase efficiency of depots and route optimisation
- Reduce delays, costs, emissions and accidents
- **Influence policy rather than just react to it**

COLLABORATION IS KEY!

Making better use of transport network!

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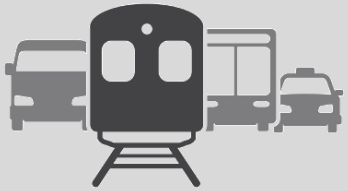
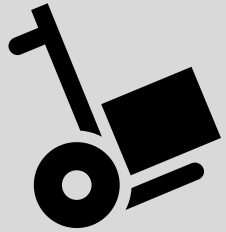
More efficient fleet and resource planning!

Responsibility to deliver and manage infrastructure	Plan the future infrastructure	Improved journey times, emissions and cost	Faster and reliable delivery	Stakeholder representation	Lower costs and higher profits
				fta Leading UK Logistics	
TRANSPORT AUTHORITIES **POLICY MAKERS**	**TRANSPORT PLANNERS**	**PASSENGERS**	**FREIGHT CUSTOMERS**	**INDUSTRY REPRESENTATIVES**	**LOGISTICS INDUSTRY**

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THANK YOU!