Making money out of public transportation

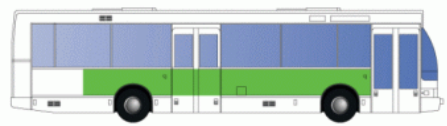
Performance measurement of bus and tram advertising

NGB/LNMB congress Lunteren 2007

Marieke de Koning, Pointlogic

enabling smart decisions

pointlogic



Subject

- Measuring the performance of advertising on trams and buses: how many people see the ads?
- The performance is used to determine the value of an advertisement and therefore the price
- If the performance is measured in a similar way as for other outdoor items (billboards) - performances can be compared

Overview

- Short introduction to some media terminology
- Measuring performance of billboards
- Measuring performance of tram and bus advertising
  - Differences from billboard performance approach
  - Method, assumptions and calculations
  - Results
  - Next steps

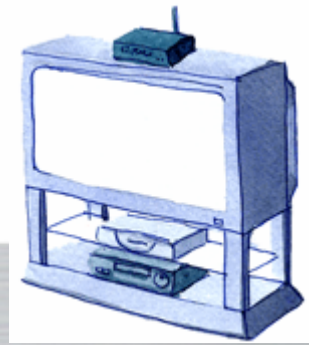
Pointlogic

- ‘Enabling smart decisions’
- Software and consultancy with a considerable mathematical component
- Main areas: media, marketing, HR
- Employs 65 people, 25 of them with a mathematical or econometric background

Media terminology

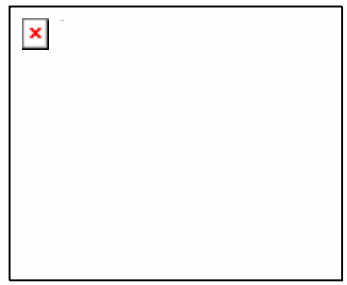
- Performance (and value) of media channels is measured in terms of *reach*
  - Gross reach/GRPs: how many people see an advertisement
  - Net reach: how many *different* people see an advertisement; % of people that saw at least 1 ad.

- Different ways to measure contacts
  - Survey: recall of contact (e.g. magazines)
  - Electronic panels (e.g. measuring TV reach with a set TV meter)
  - Diaries (e.g. radio)



Measuring outdoor billboard reach in Belgium

- Project carried out in 2003 for CIM – a media research JIC
- Reach measurement via a respondent trip research
  - Recall based methods are not useful for outdoor measurement
  - Traffic counts are insufficient for calculating net reach



Method: billboard reach

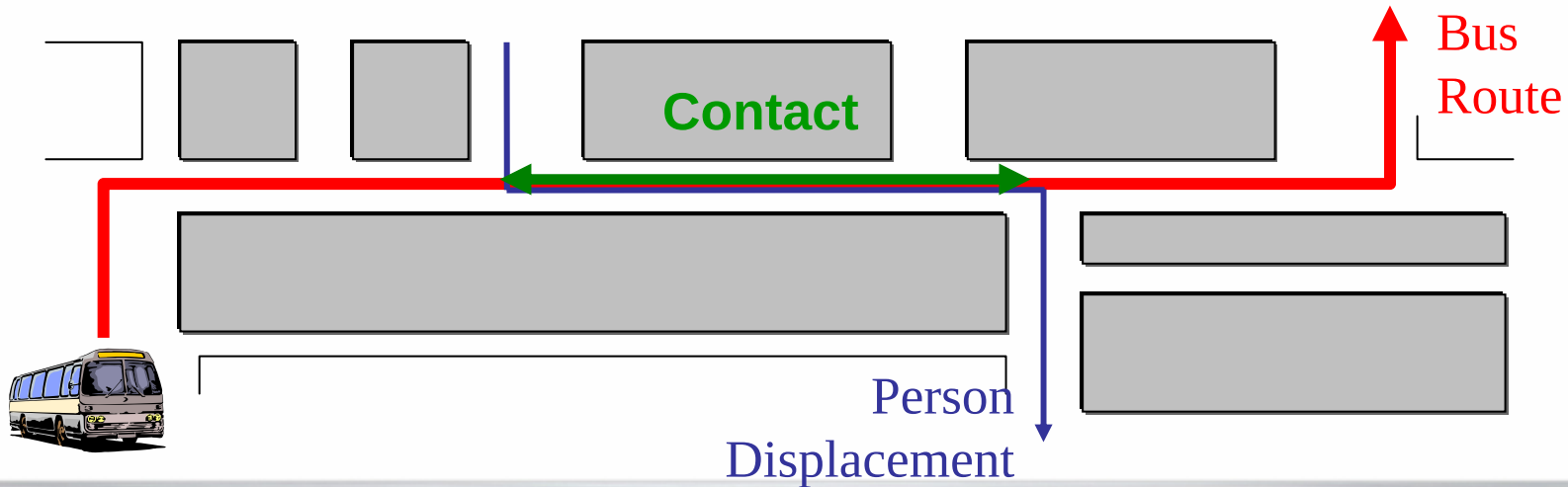
- A label model generates 2-4 possible routes for each persons trips (fastest, shortest, prefer highways, avoid intersections)
- A nested logit model generates probabilities associated to each route
- The generated routes are matched with the location of billboards
- For each billboard, the gross and net reach can be calculated by summing over the probabilities

Bus and tram reach

- In 2006, CIM and ClearChannel (exploits outdoor advertising) asked for an extension of the project to measure reach for bus and trams
- Basic concept: use the trip research and the bus/tram timetables to determine how many contacts people have with buses and trams
- Contrary to billboards, not only place is relevant since both person and bus are moving.
- Therefore also time and speed need to be taken into account: the bus and person need to be in the same place at the same time to generate a contact

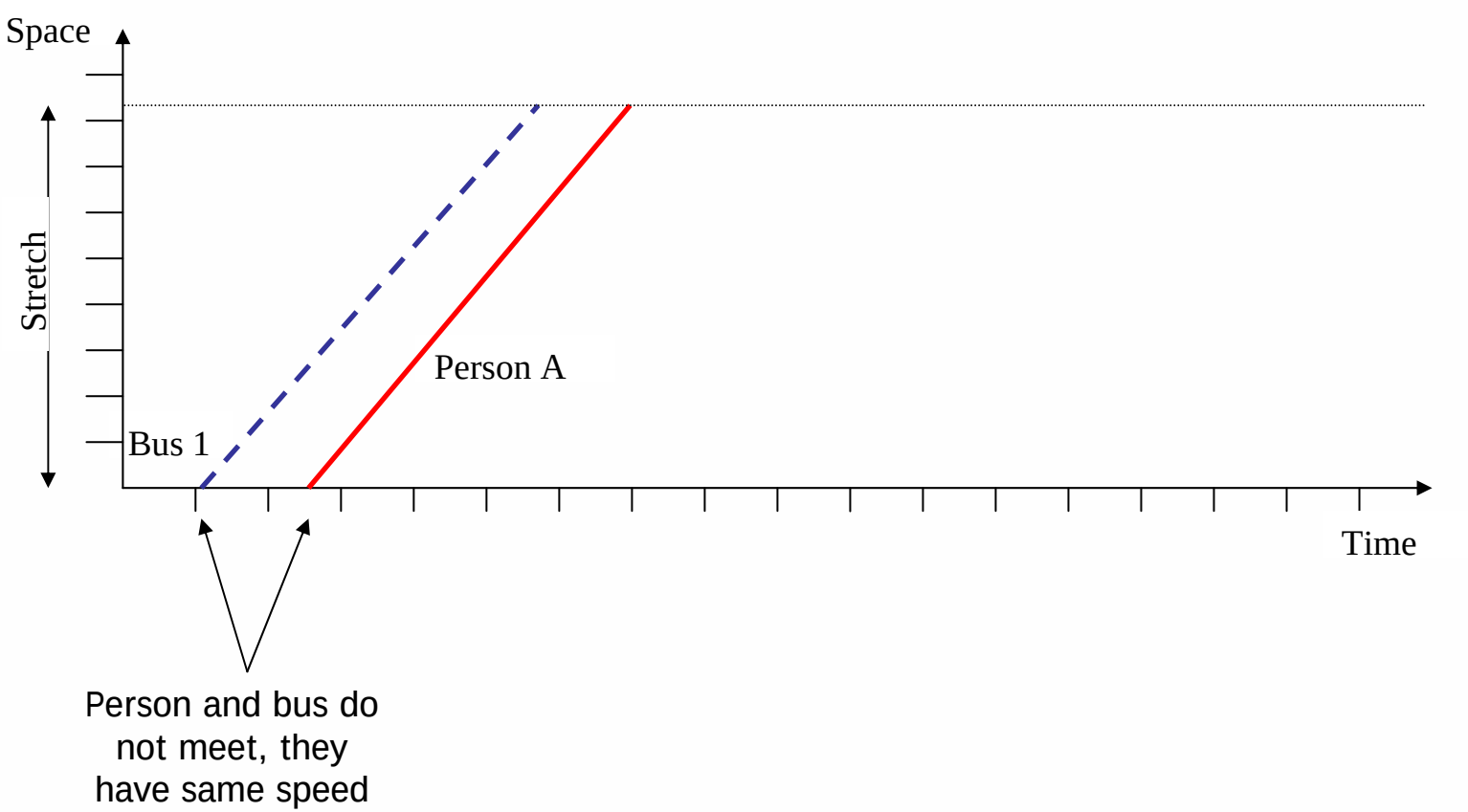
Bus and tram reach: general concept

- Two stage process
  - Determine if a person and a bus/tram make use of the same roads
  - Include time and speed to see if there actually is a contact between the person and bus/tram



Space-time graphs

Contacts between buses and persons can be graphed in a space-time graph; below a graph for a specific road/stretch



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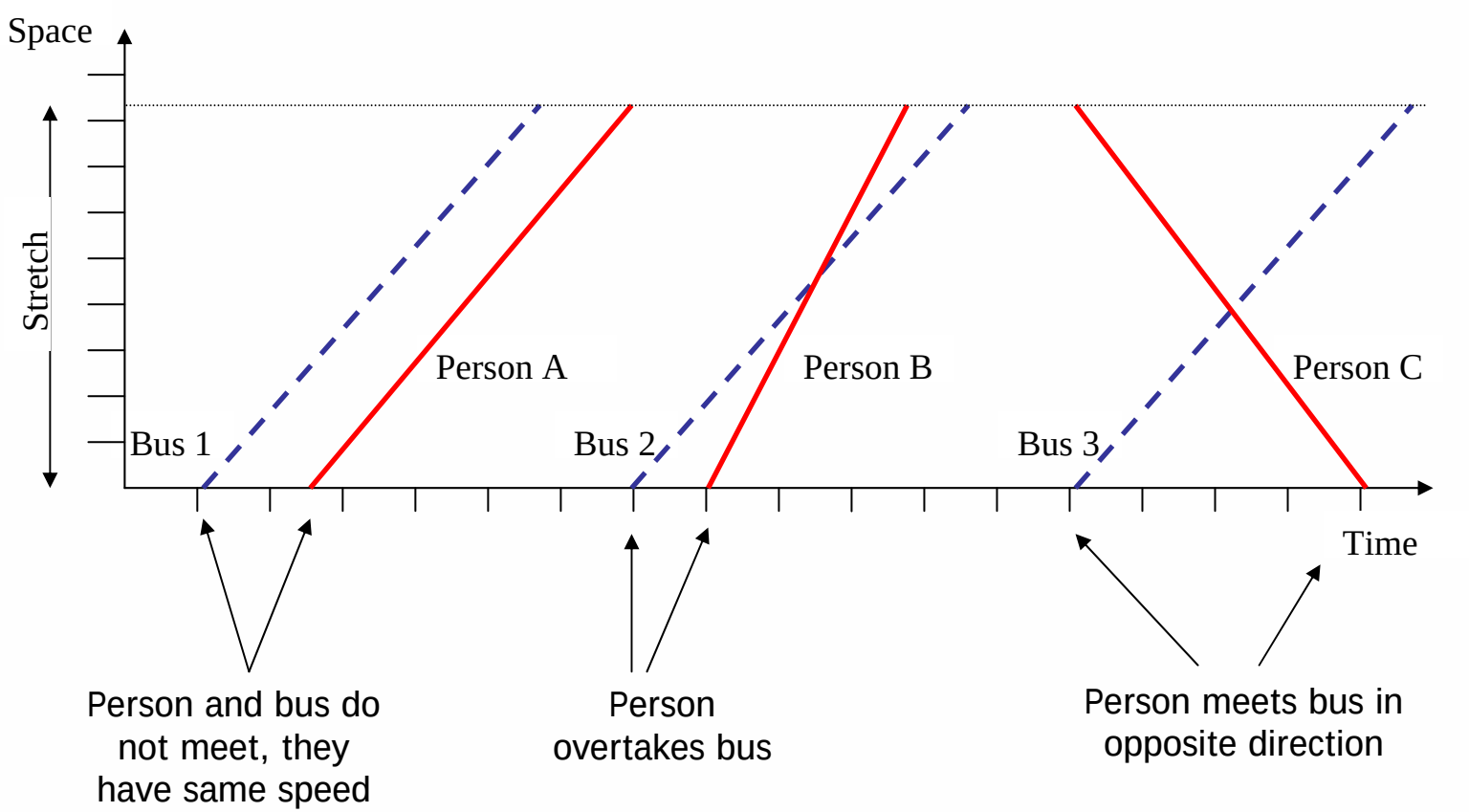
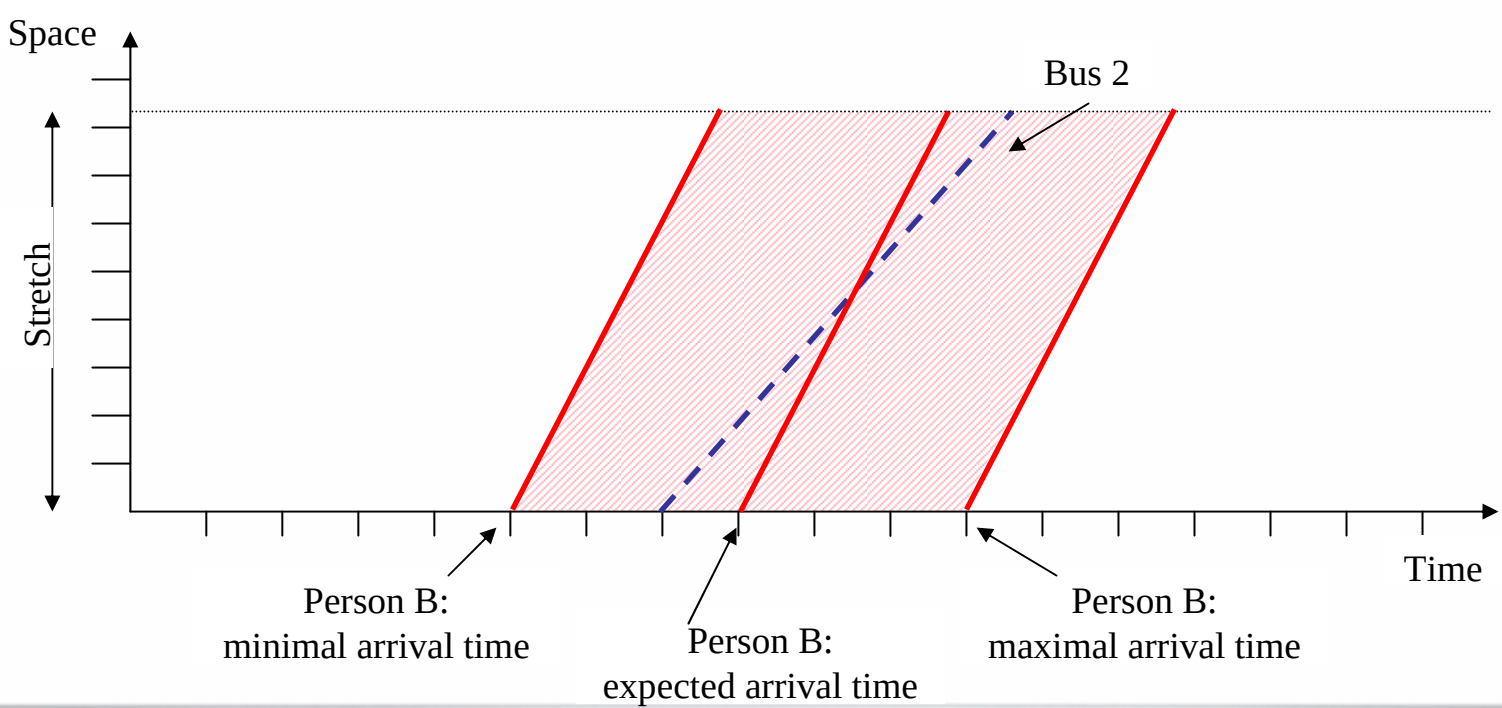


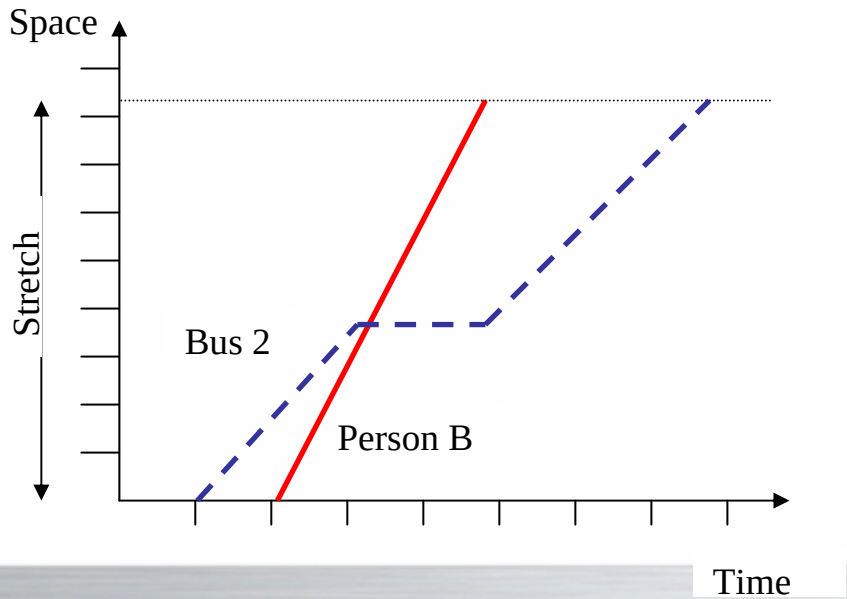
Refining: adding uncertainty

- For each respondent we only know the time interval of departure. The time he arrives at a certain part of the route is estimated and therefore not certain. We deal with this by using a time interval with uniform distribution.
- Added advantage: the contacts generated will be more representative given the fact that we use a sample: instead of few 1 contacts we have a larger set of contacts between 0-1.



Refining: bus stops

- Buses stop for a short while on bus stops – this affects the number of contacts
- Assumption: we correct for the stops by using a lower bus speed
- Advantage: easier, we do not need to know the precise placement of the bus stop on the road
- Not a big problem since roads are defined as very short segments



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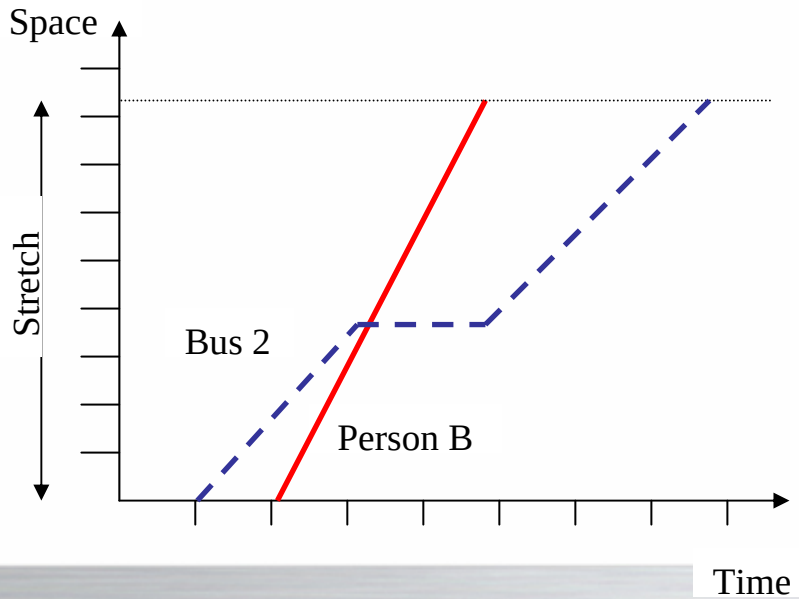
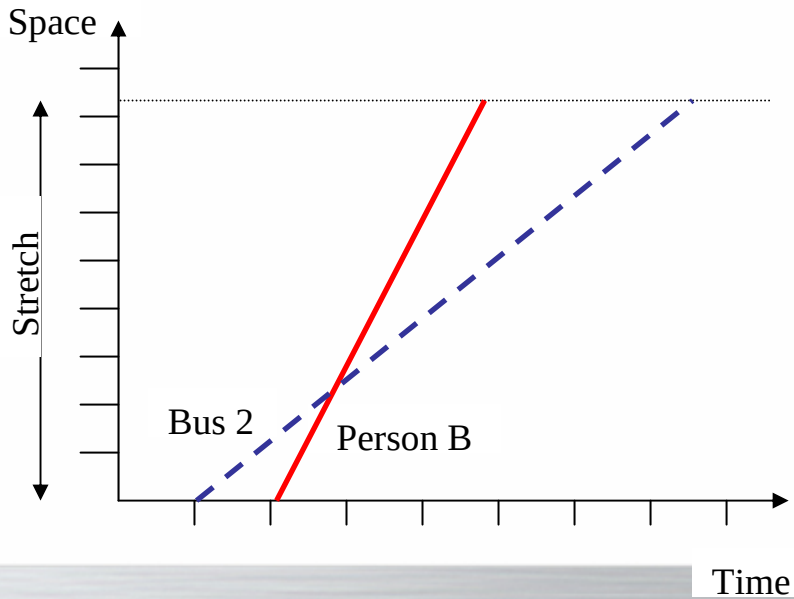
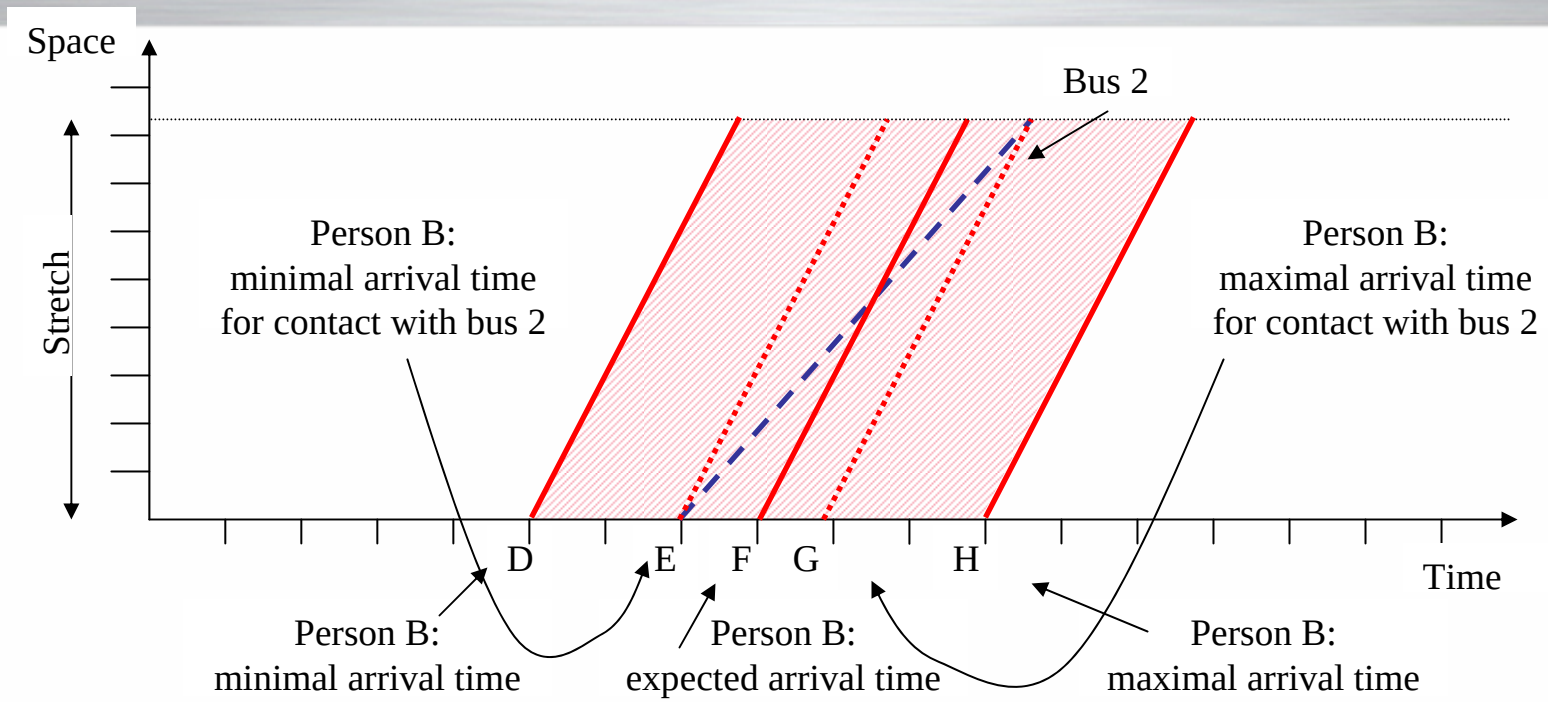




Calculation of contact probability

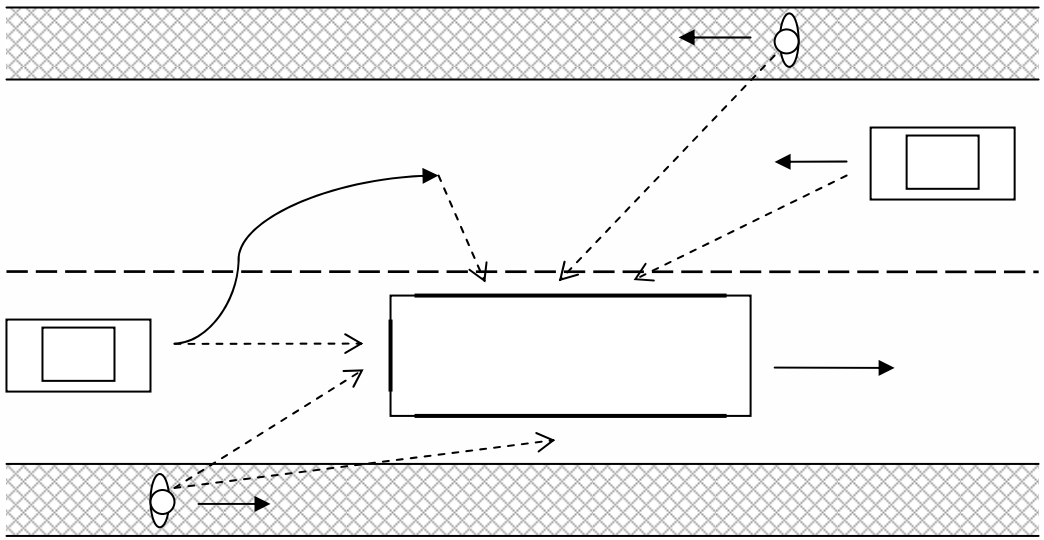


- Determine minimal and maximal time (E, G) that person can arrive to have a contact with the bus (person-line crosses bus-line at beginning or end of road)
- Determine overlap with actual arrival times (D, H)
- Calculate contact probability: [G-E]/[H-D]

Visibility of bus/tram sides

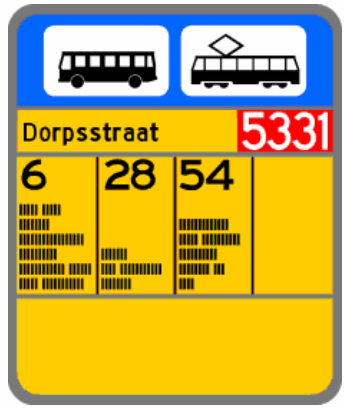
- Determine which sides of the bus/tram are visible when a person meets a bus/tram
- Depends of:
  - Direction (same direction or opposite direction)
  - Transport mode person (by foot, by car)
  - Position bus/tram on road (many trams drive in the middle of the road)
- Note:

  We calculate OTS (opportunity to see), not actual contacts



Bus and tram routes and schedules

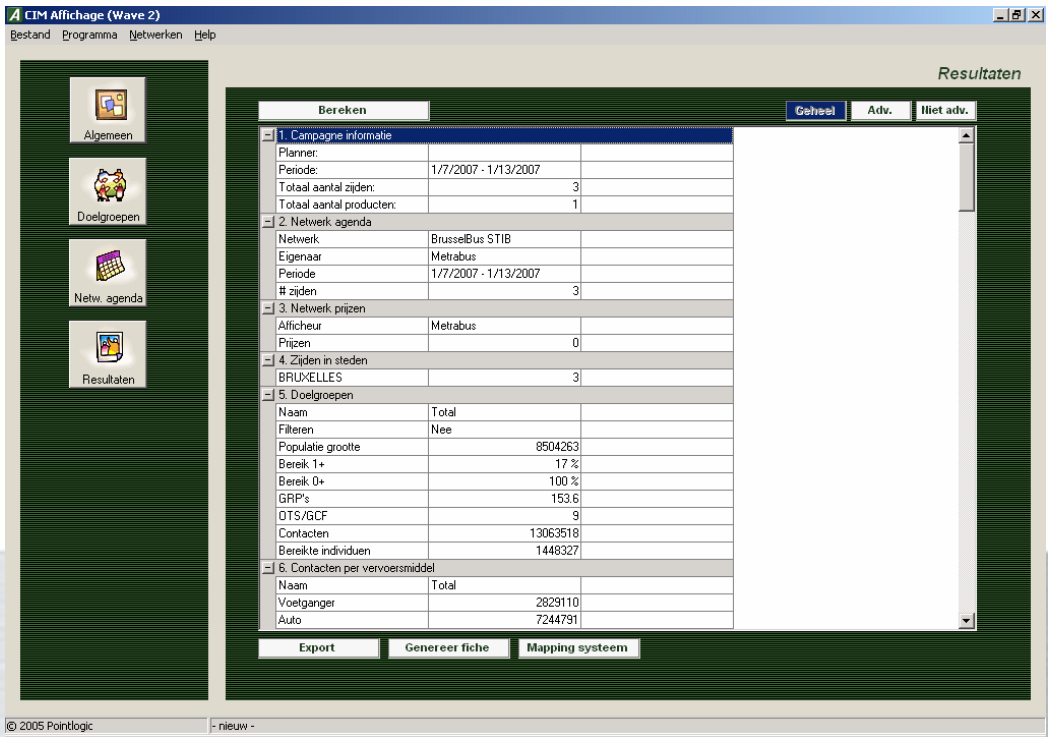
- We need exact bus and tram routes including times to be able to calculate contact probabilities
- Input data:
  - Bus and tram stops (location)
  - Routes (sequence of stops)
  - Schedules (time the bus/tram is at each stop)
  - Tunnels
  - Positions of trams on roads



- Reconstruction of routes
  - Digitalisation of data (stops, tunnels, positions on road)
  - Application of route planner to create exact routes between bus stops (shortest route)

Implementation

- The raw matched data contains about 250 million records
- This is aggregated to depot level – advertisements cannot be bought for specific buses but only for depots
- The final data is combined with the billboard data and placed under planning software



Some results – billboards vs. buses and trams

- Average daily number of contacts in three cities, for billboards, buses and trams

	Billboard	Bus	Tram
Brussels	14,229	3,812	13,184
Charleroi	13,061	3,882	
Namur	9,399	5,044	

- Buses and trams are not on the street all day, this results in a lower level of contacts
- Trams drive on main roads and therefore generate more contacts

Some results - contacts for different sides

- Average daily number of contacts for trams and buses in Brussels

	Left side	Right side	Factor
Tram	7,056	6,128	1.2
Bus	3,510	562	6.2

- The left side of buses/trams generate more contacts: most people pass on the left side
- For trams, the difference is much smaller because a lot of trams drive on the middle of the road

Some results – net reach billboards vs. buses and trams

- Case: set of buses in Brussels compared to a set of billboards in Brussels

	Buses	Billboards
Net reach	17%	16.7 %
GRPs	153.6	342.3
Nbr of contacts	13,063,518	29,108,814
Nbr of people that were reached	1,448,327	1,423,503

- With a similar net reach, billboards generate more than twice as much contacts
- Buses are far more efficient in generating net reach

Next steps

- Extension of calculations for people travelling with public transportation
- Calculation of reach for ads inside railway and subway stations (also on the platforms)
- Application of calculations to new, larger respondent trip research
- ... changes in bus schedules to generate more contacts...? Probably not!