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École d'été internationale - Du 19 au 23 juin 2023

From territories to the global village : How to protect people in a globalize environment ?

UVSQ université PARIS-SACLAY

New paradigms of urban mobility in the learning city. What place for autonomous mobility?

Pr. Dominique Barth,
Université Paris-Saclay

VILLE DE SCEAUX À LA CROISÉE DES TALENTS

université PARIS-SACLAY | FACULTÉ JEAN MONNET DROIT-ÉCONOMIE-MANAGEMENT

EUGLOH

New paradigms of urban mobility in the learning city. What place for autonomous mobility?

Dominique Barth

—-

Pr., Université de Versailles -SQ / Université Paris-Saclay

- Directeur du laboratoire « **DAVID : Données et Algorithmes pour la Ville Intelligente et Durable** »
- Directeur de la Fédération de Recherche « **SIHS : Sciences Informatiques, Humaines et Sociales** » du CNRS
- Directeur du LabCom ANR « **HYPHES : IA & RO pour une approche systémique de la gestion et la résilience des réseaux d'infrastructures urbaines : énergie, mobilité, logistique »**

URBAN MOBILITY II

16 mai 2022 à 3 juin 2022
Institut Pascal
Fuseau horaire Europe/Paris

Entrer le texte à rechercher

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Mobility is an essential subject for smart and sustainable cities which gives rise to a wide range of scientific activities to meet technological and digital needs, social issues and legal and economic requirements. These activities imply multidisciplinary collaboration between these fields which is at the heart of the program proposed here according to three main themes: mobility as a service, mobility and the temporal organization of the territory, mobility and spatial planning.

Organisers:

- Dominique Barth, Pr. Laboratoire DAVID, computer sciences
- Eric Monacelli, Pr. Laboratoire LISV, robotics
- Jakob Puchinger, Pr. LGI/IRT SystemX, computer sciences

Pluridisciplinar scientific commitee

- Patrice Atknin, DS IRT SystemX, industrial systems,
- Yoann Demoli, MdC PRINTEMPS (UVSQ), sociology of mobility,
- Stéphanie Coeugnet-Chevrier, Chercheure, Institut Védécom, psychology and ergonomy,
- Valérie Gyselink, DR LAPEA (Univ. Gustave Eiffel), psychology,
- Patrick Haggard, Pr. UCL London, chaire d'Alembert IEA/Univ. Paris-Saclay, cognitive sciences,
- Sandrine Lacour, DR CNRS, ISSP (ENS Cachan), politic and law sciences ,
- Latiffa Oukhellou, dir. GRETTIA (Univ. Gustave Eiffel), computer sciences.
- François Sarfati, Pr. Centre Pierre Naville (UEVE), sociology of work

Commence le 16 mai 2022, 09:00
Finit le 3 juin 2022, 17:00
Europe/Paris

Institut Pascal
Rue André Rivière
91400 Orsay

Workshop 31 May - 1 June 2022.pdf

Sources images Internet

Sources images Internet

congestion, delay and comfort

Environmental impact, Economic cost

Quality of life, health, inclusiveness

Mobility suffered, mobility chosen

Sources images Internet

New mobility usages:

- Disruption through (technological) innovation
- Disruption through planning (politics)
- Price disruption (economic)

?

Sources images Internet

New mobility usages:

- Disruption through (technological) innovation

Sources images Internet

New mobility usages:
- Disruption through (technological) innovation

Autonomous mobility, Automated vehicle?
Public transport or individual vehicles?

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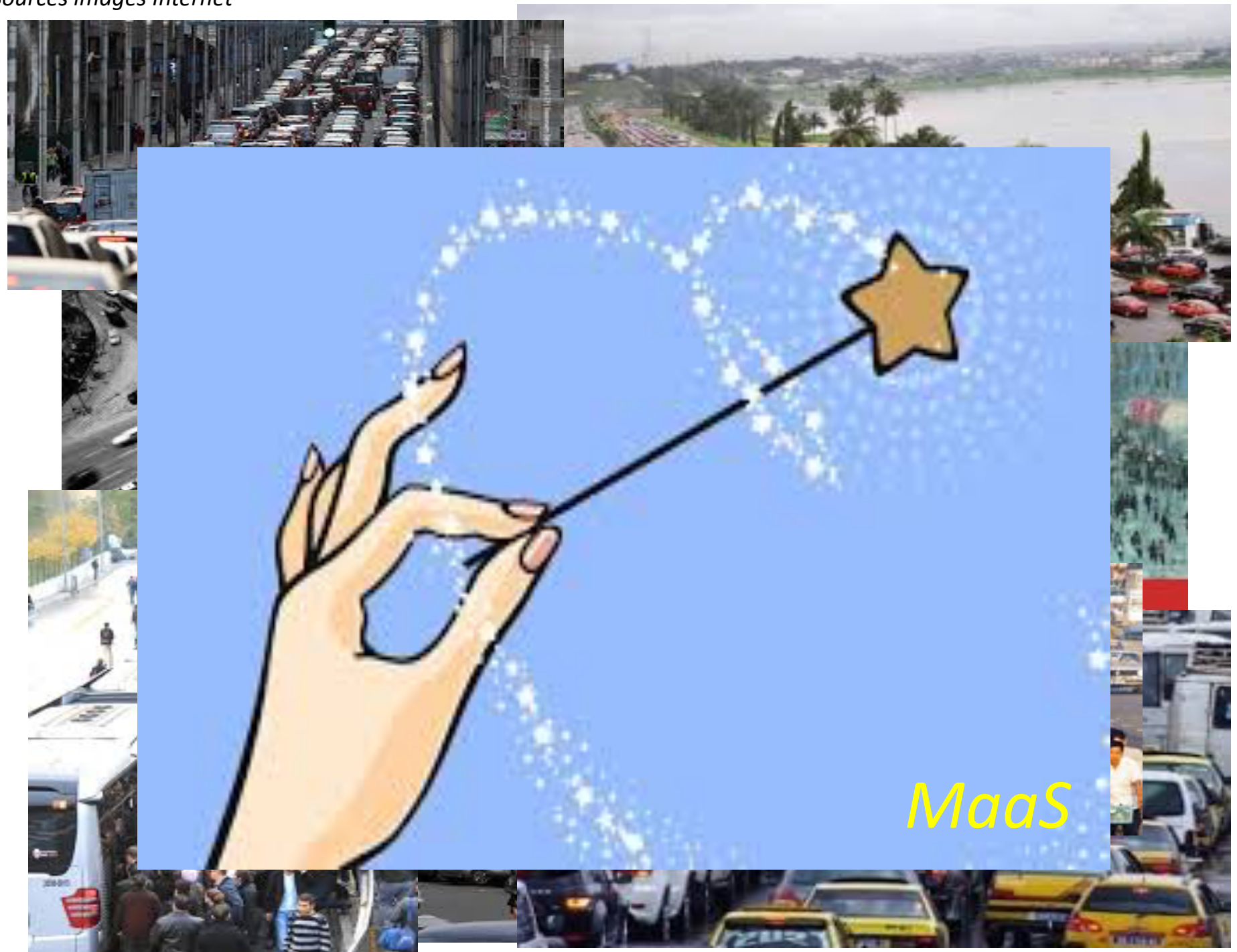

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Sources images Internet

Offer a better mobility service for all, while reducing cost and environmental impact?

Orchestrate "tailor-made" different means of mobility for every need, with service quality guarantees

Enable a transition to new uses for all without rupture or coercion

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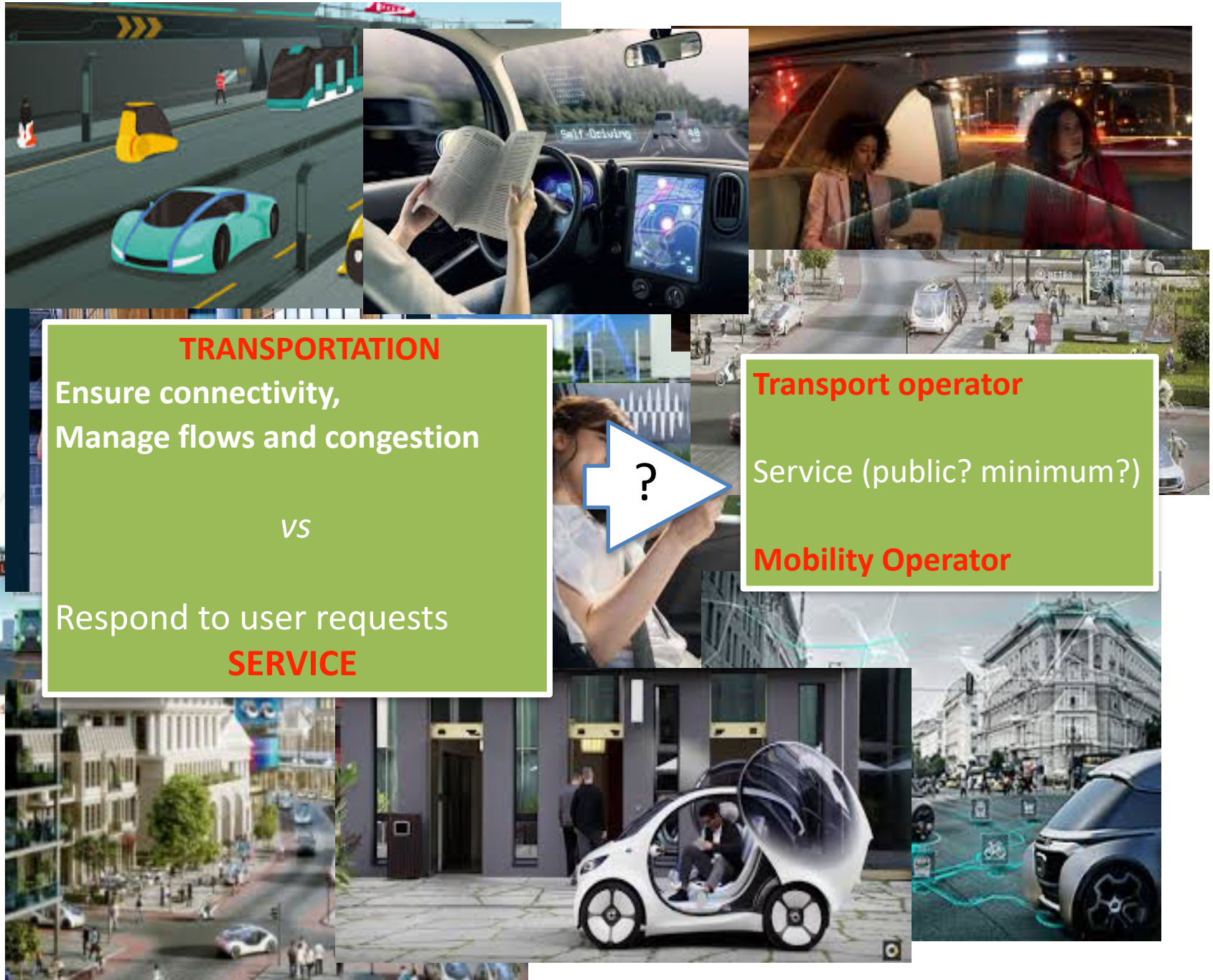


TRANSPORTATION

Ensure connectivity,

Manage flows and congestion

vs

Respond to user requests

SERVICE

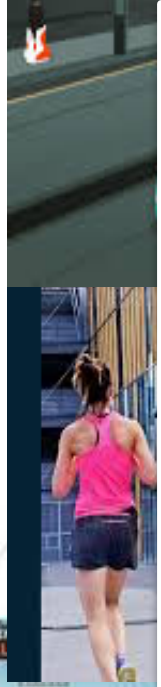
?

Transport operator

Service (public? minimum?)

Mobility Operator

Sources images Internet





Governance and actors of urban mobility

“Augmented” territorial governance and/or delegation of services to digital companies?

Who is the future "mobility operator"?

Mobility civil engineering company?

Transport equipment manufacturers?

Transport operators?

Energy supplier?

GAFAM?

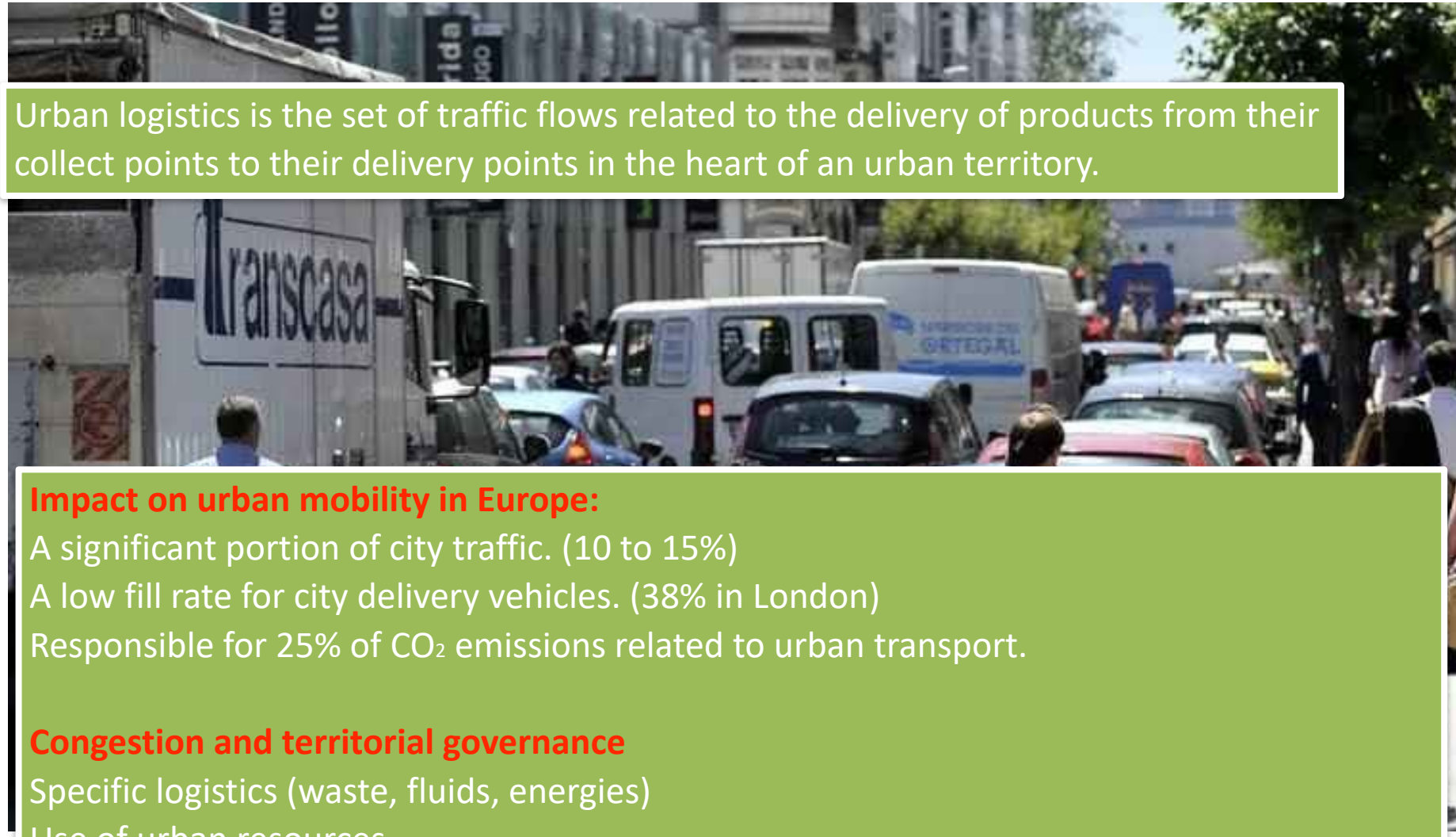
Who moves in a MaaS logic

A transport means?

A human being?

A Smartphone?

Congestion and urban logistic



Urban logistics is the set of traffic flows related to the delivery of products from their collect points to their delivery points in the heart of an urban territory.

Impact on urban mobility in Europe:

A significant portion of city traffic. (10 to 15%)

A low fill rate for city delivery vehicles. (38% in London)

Responsible for 25% of CO_2 emissions related to urban transport.

Congestion and territorial governance

Specific logistics (waste, fluids, energies)

Use of urban resources

Congestion and urban logistic

Urban logistics is the set of traffic flows related to the delivery of products from their collect points to their delivery points in the heart of an urban territory

- Uses shared resources of the territory (roads, parking spaces, energy)

  IoT and IA for a plastic territory

- Increasingly subject to quality of service and environmental constraints (LOW EMISSION ZONES)

- Increasingly dynamic collection and delivery services

  Autonomous vehicles for urban logistic

Impa
A sig
A lov
Resp

Congestion and territorial governance
Specific logistics (waste, fluids, energies)
Use of urban resources

Sources images Internet

MaaS and LaaS: promise or utopia?

A

B

MaaS and LaaS: promise or utopia?

A

B

D. Barth, DAVID / SIHS, UVSQ

MaaS and LaaS: promise or utopia?

P

A

B

Comfort
Trust/availability
Return guarantee
Security
Access to service

Parking,
Information,
Pluri(bi) modality
Cost,

QUALITY OF SERVICES

MaaS and LaaS: promise or utopia?

P

A

B

Response to feelings of insecurity

Comfort

Life quality

Reliable information to users

Multi-modality

Last mile mobility and logistic

Car sharing

Bike sharing

Autonomous vehicles

Parking assistance

Electrical mobility

Return guarantee

MaaS and LaaS: promise or utopia?

A

B

Car sharing

Parking assistance

on

ng

guarantee

…. yes, but need DATA

- Relevant

- Sufficient

- Qualified

MaaS and LaaS: promise or utopia?

P

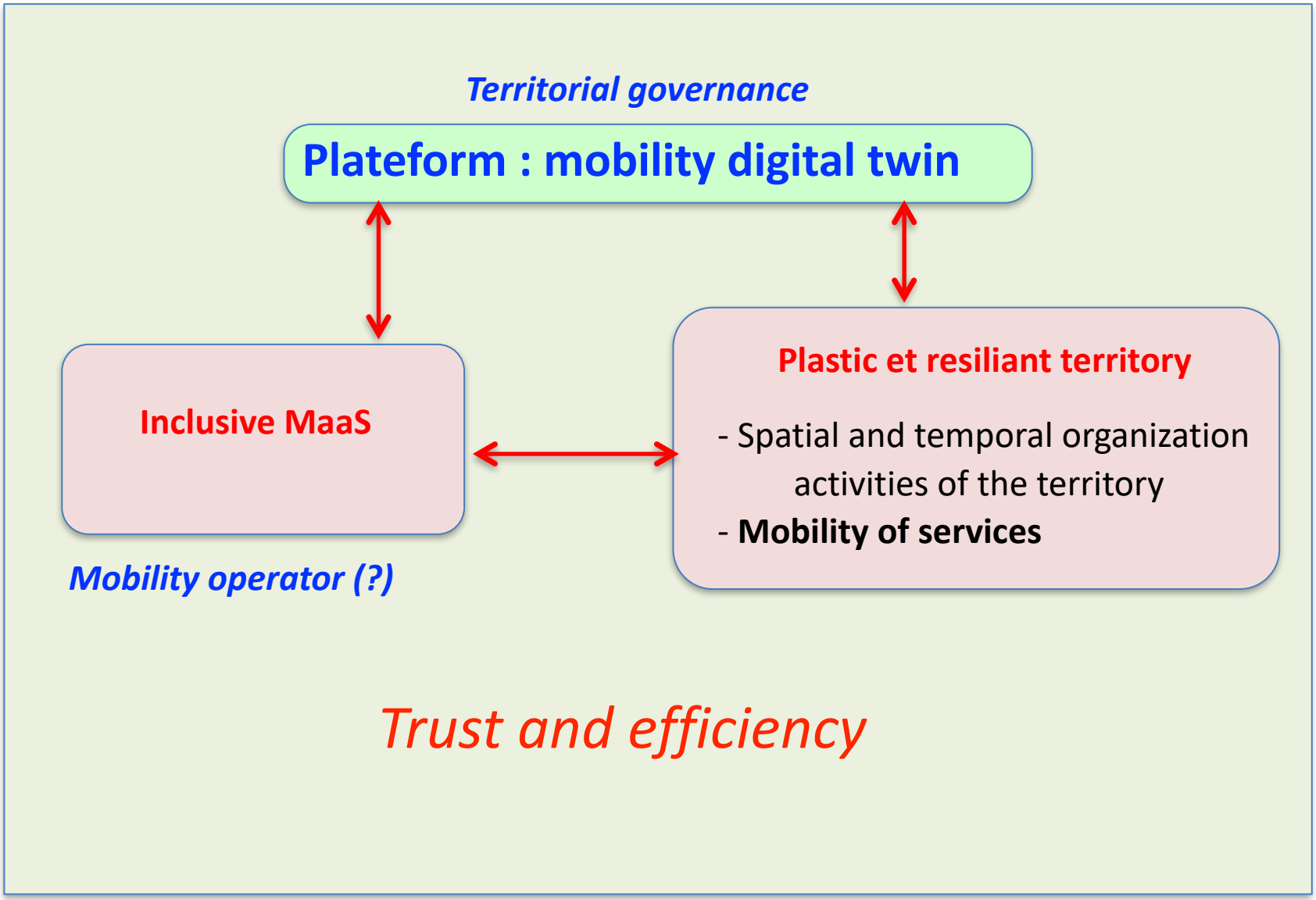
A

B

Digital Orchestration

Inclusive MaaS

MaaS and LaaS: promise or utopia?



Towards what territorial solutions?

Digital city and mobility:

Optimizing time: towards coordination of schedules and resources

- **Observatory of mobility:** knowing (quantity and quality) timetables, flows, activities, populations.
- **Know the constraints and resources:** mobility/activity resources, service and mobility constraints, distances and lifestyles?
- **Diagnose, simulate and predict** for a consultation for the organization of time.
- **Targeting, supporting and encouraging** mobility alternatives.

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RENNES, VILLE ET MÉTROPOLE

(Sources Photos : Internet)

Towards what territorial solutions?

Digital city and mobility:

Optimizing space: towards relocation and demobilization?

- **Reconciling land use planning and mobility,**
- **Bringing housing closer to workplaces** (rethinking territories as "villages").
- **Bringing work closer to housing:** teleworking, third places, mobile offices (psycho-social risks, work in 2030?)?
- **- Reduce the mobility of energy** by localizing its production?
- **- Bring services closer to citizens** (mobile, virtualized)?

(Sources Photos : Internet)

Autonomous mobility, territories and citizens

Theme 1: Why autonomous mobility?

Theme 2: Autonomous vehicles, what impact on employment and economic dynamism in the territories?

Theme 3: Life on the move

Theme 4: The autonomous vehicle, an innovation that accentuates the fractures in the relationship to mobility?

INSTITUT VEDECOM
DU VÉHICULE DÉCARBONÉ ET COMMUNICANT ET DE SA MOBILITÉ

SQY Terre d'innovations

UNIVERSITÉ DE VERSAILLES ST-QUENTIN-EN-YVELINES
UFR DES SCIENCES
université PARIS-SACLAY

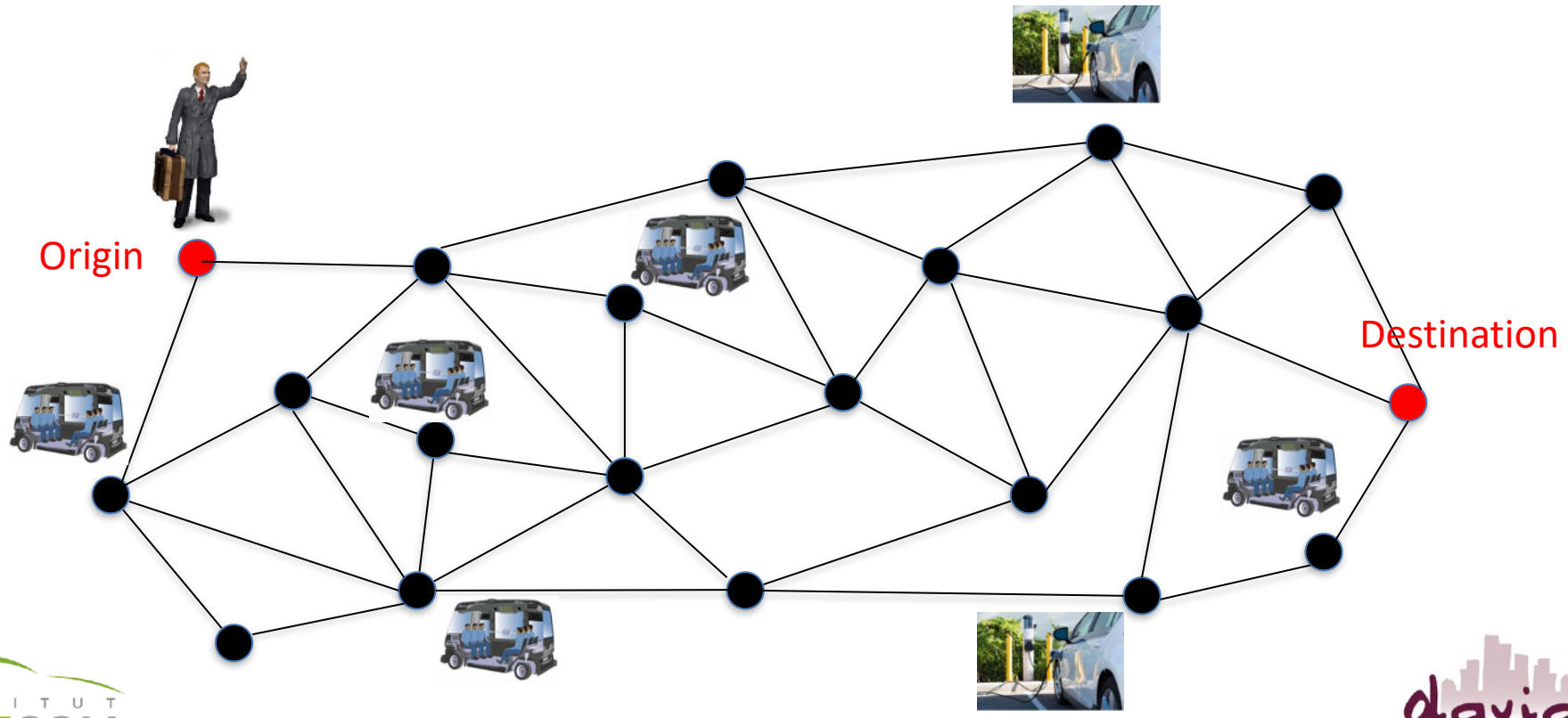
SIHS
FÉDÉRATION DE RECHERCHE

Machine Learning for Urban Mobility

MANAGEMENT OF A FLEET OF AUTONOMOUS SHARABLE ELECTRIC TAXIS

« Service of autonomous shuffles needs learning territory »

Management of a fleet of autonomous, electric and shared taxis



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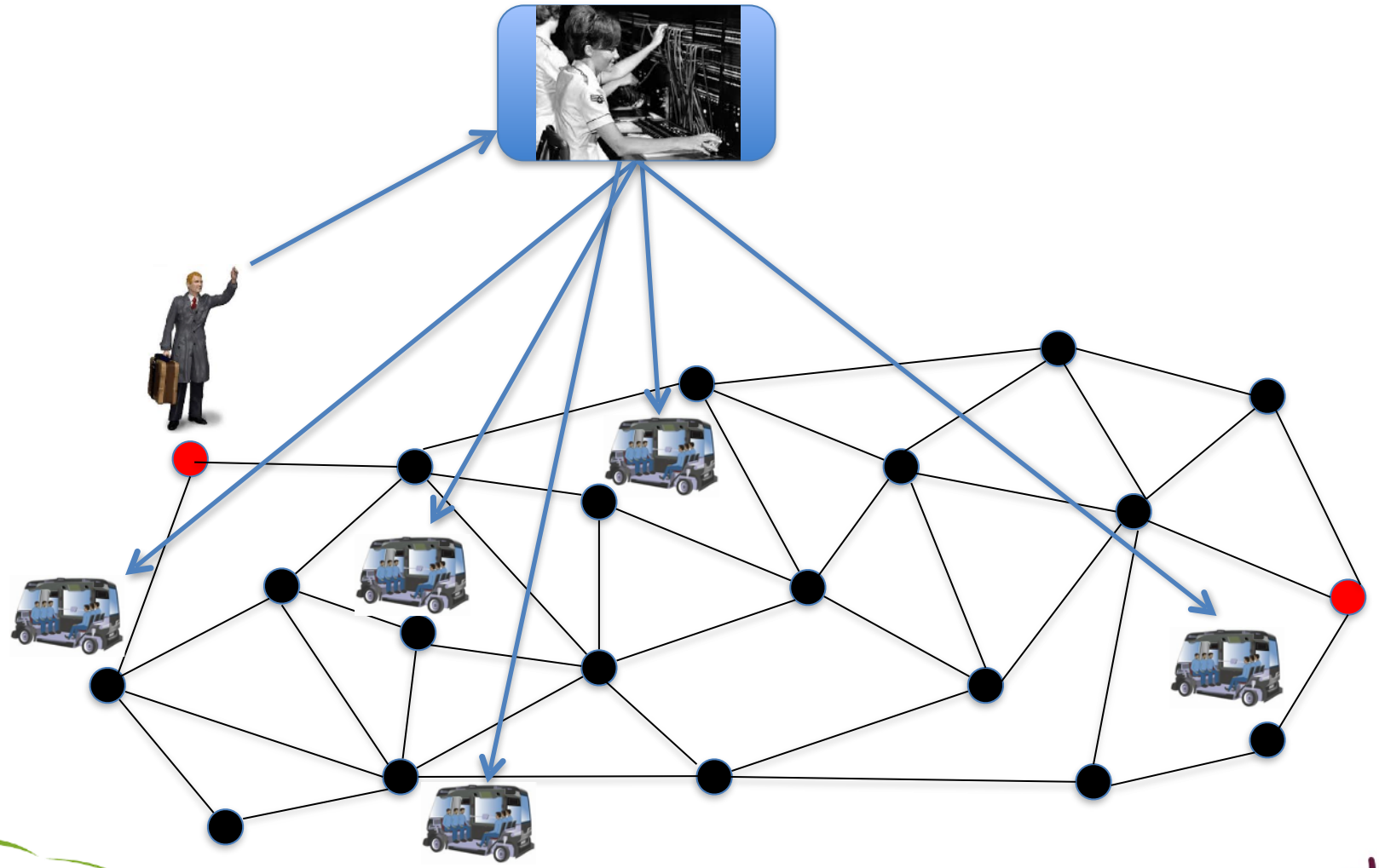
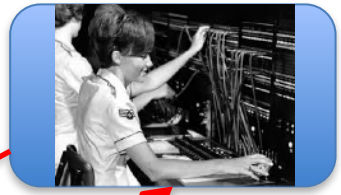
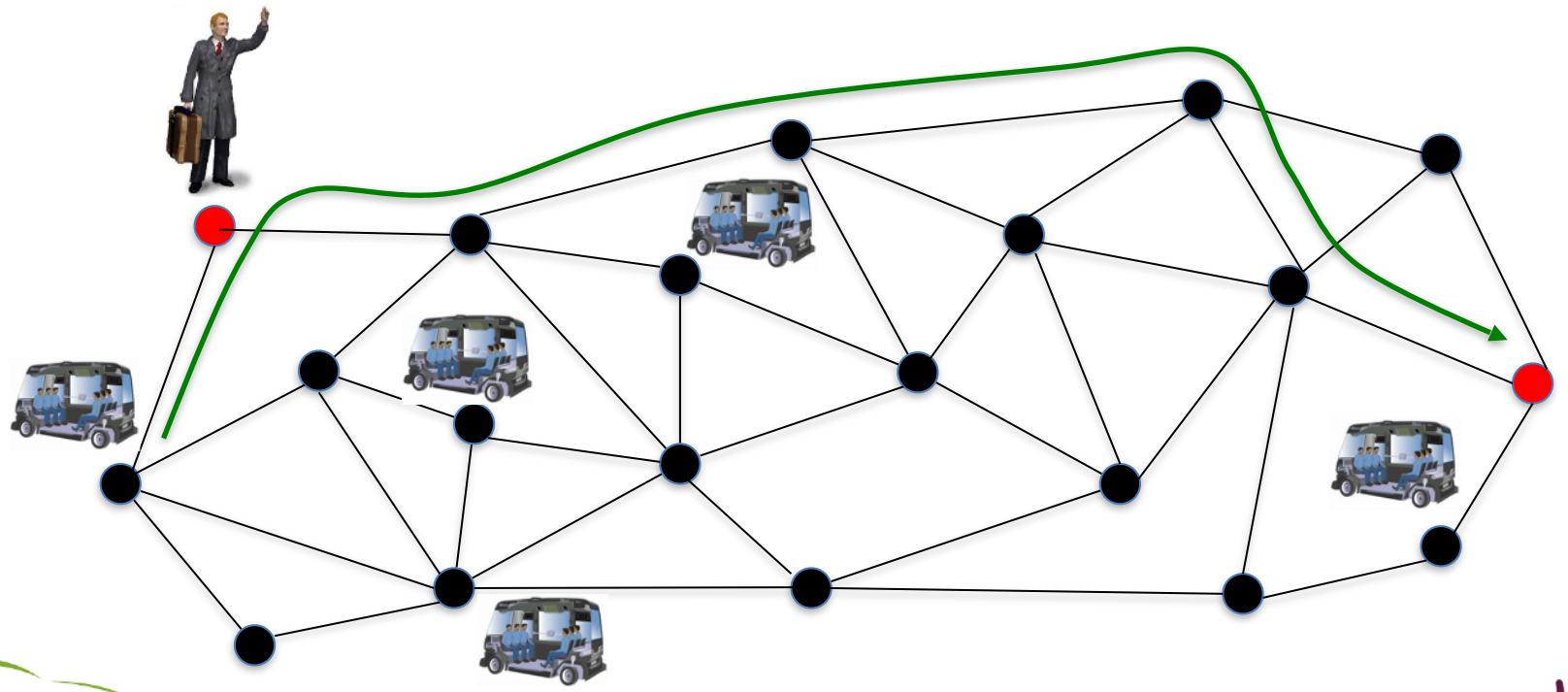




First « yes »



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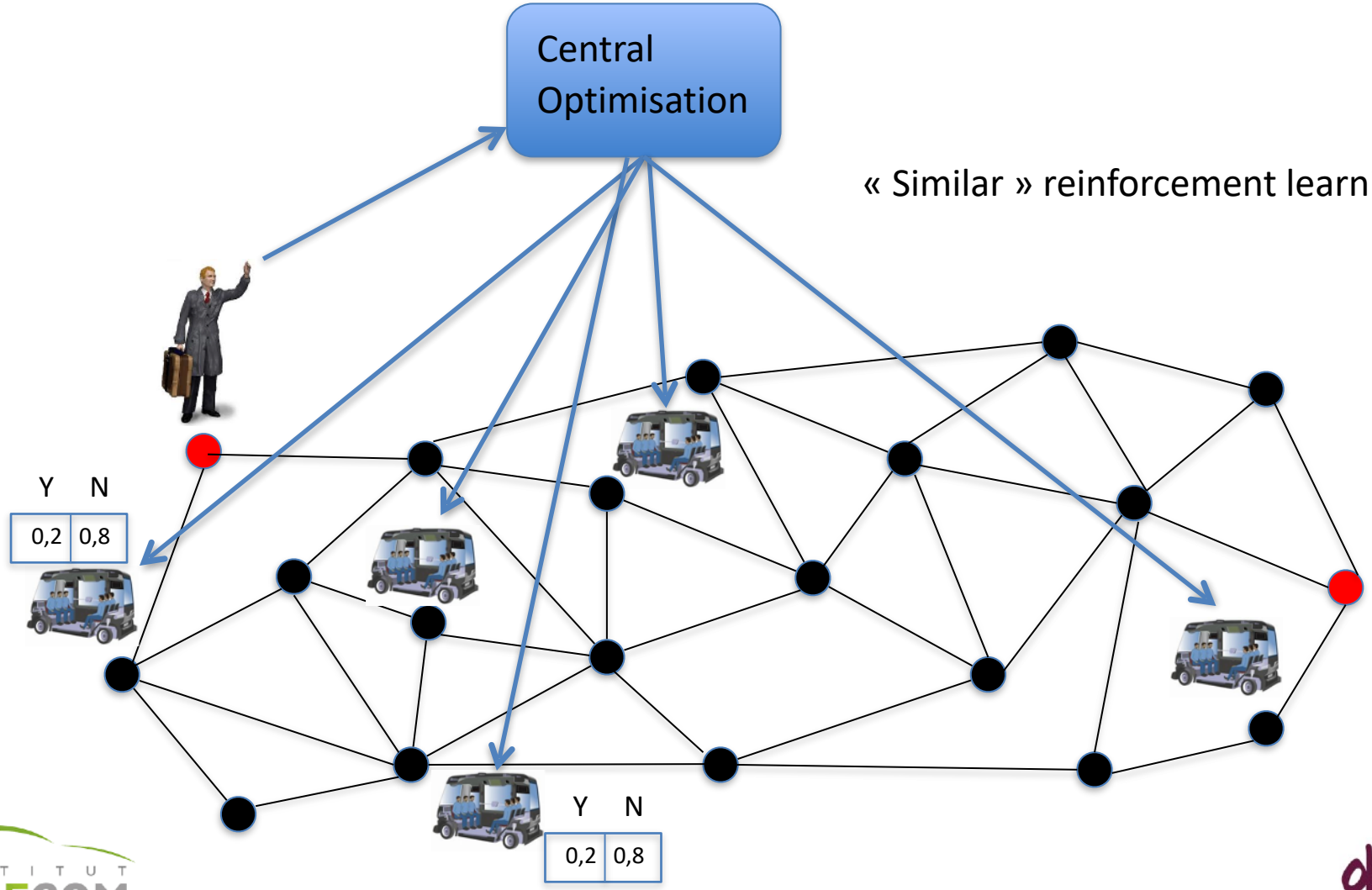
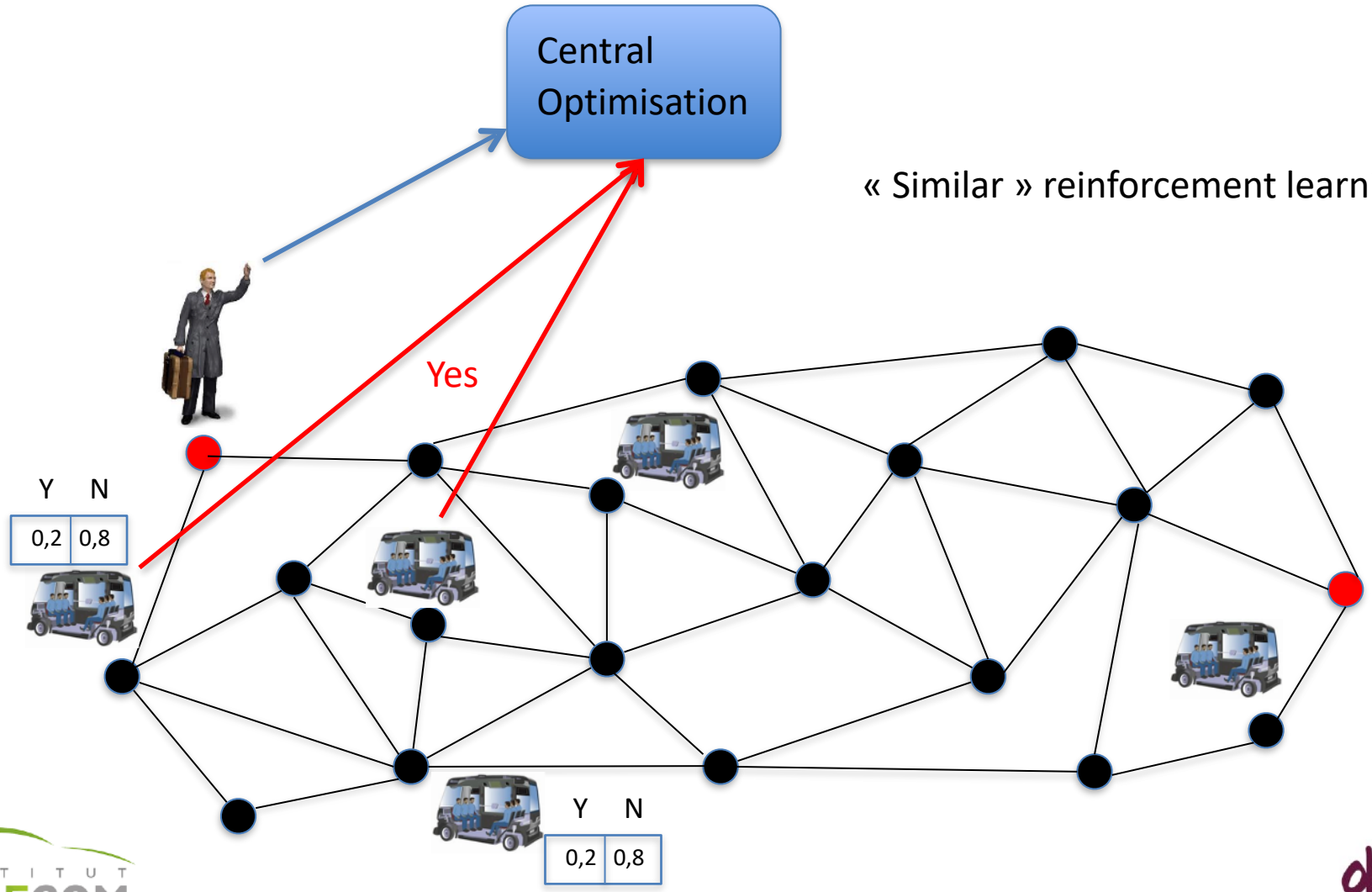
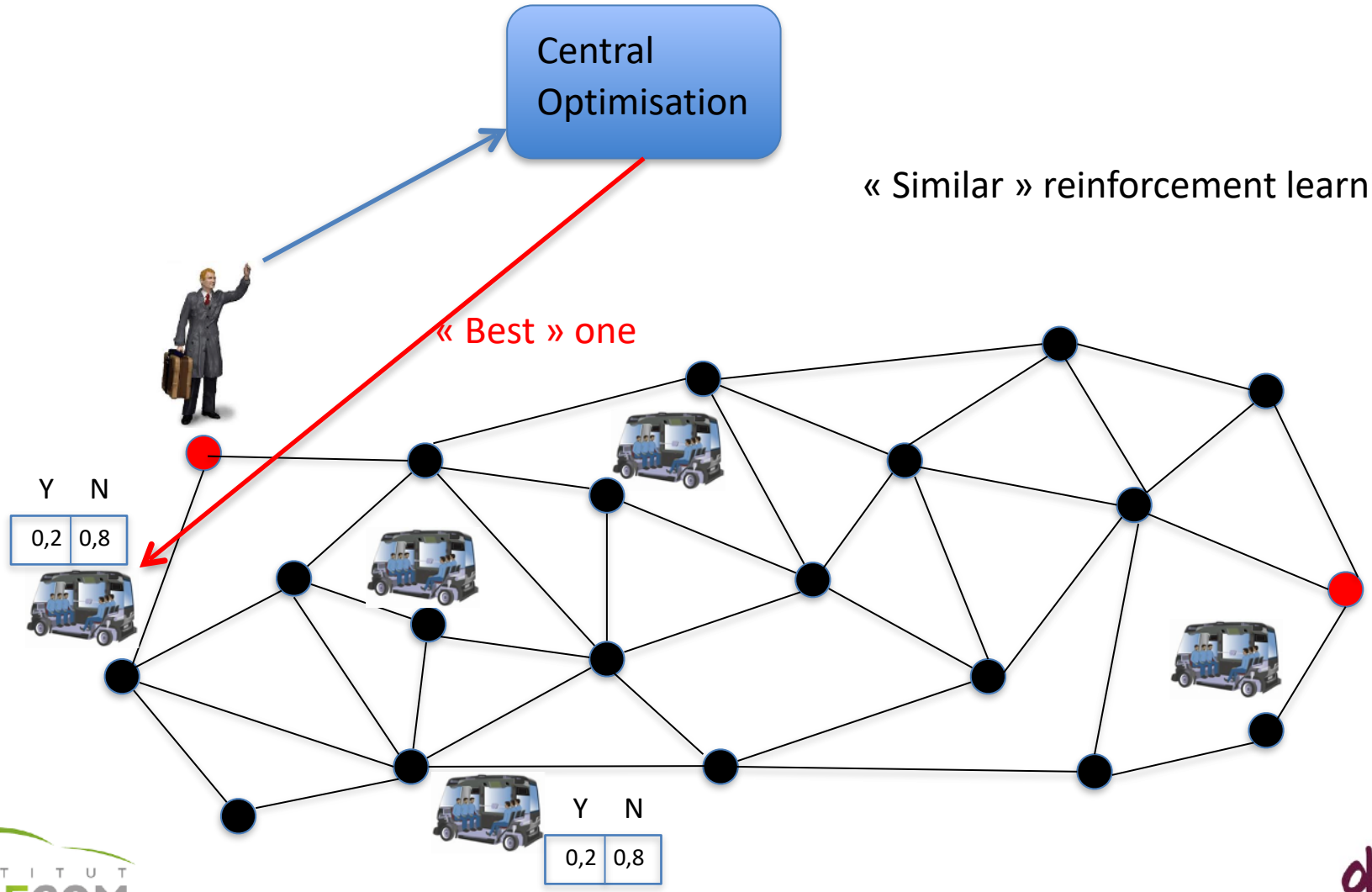
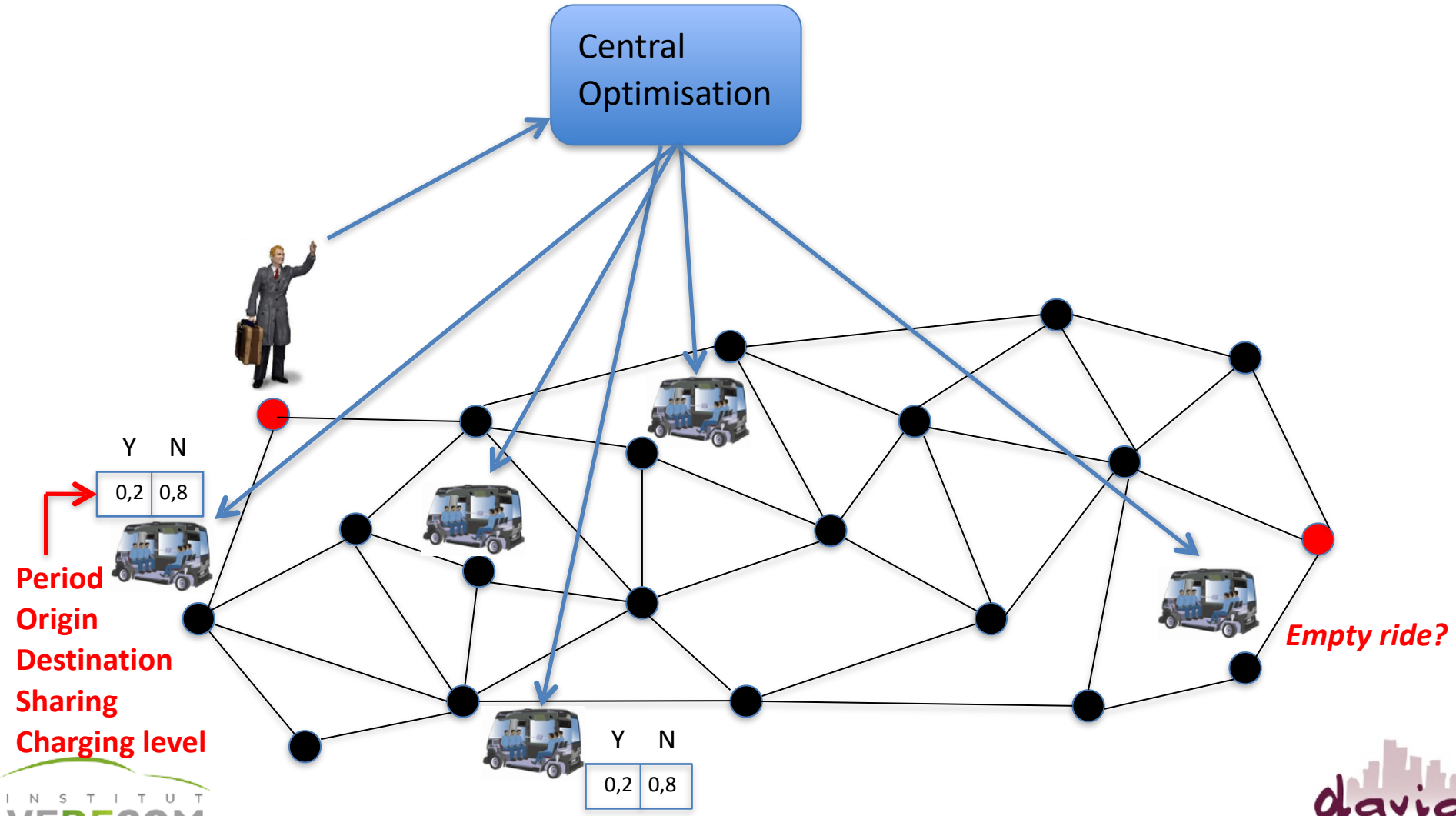

Central Optimisation
« Similar » reinforcement learning?
Y N
0,2 0,8
Y N
0,2 0,8



« Similar » reinforcement learning?


Central Optimisation
« Similar » reinforcement learning?
« Best » one
Y N
0,2 0,8
Y N
0,2 0,8

Reinforcement learning for the management of a fleet of autonomous, electric and shared taxis



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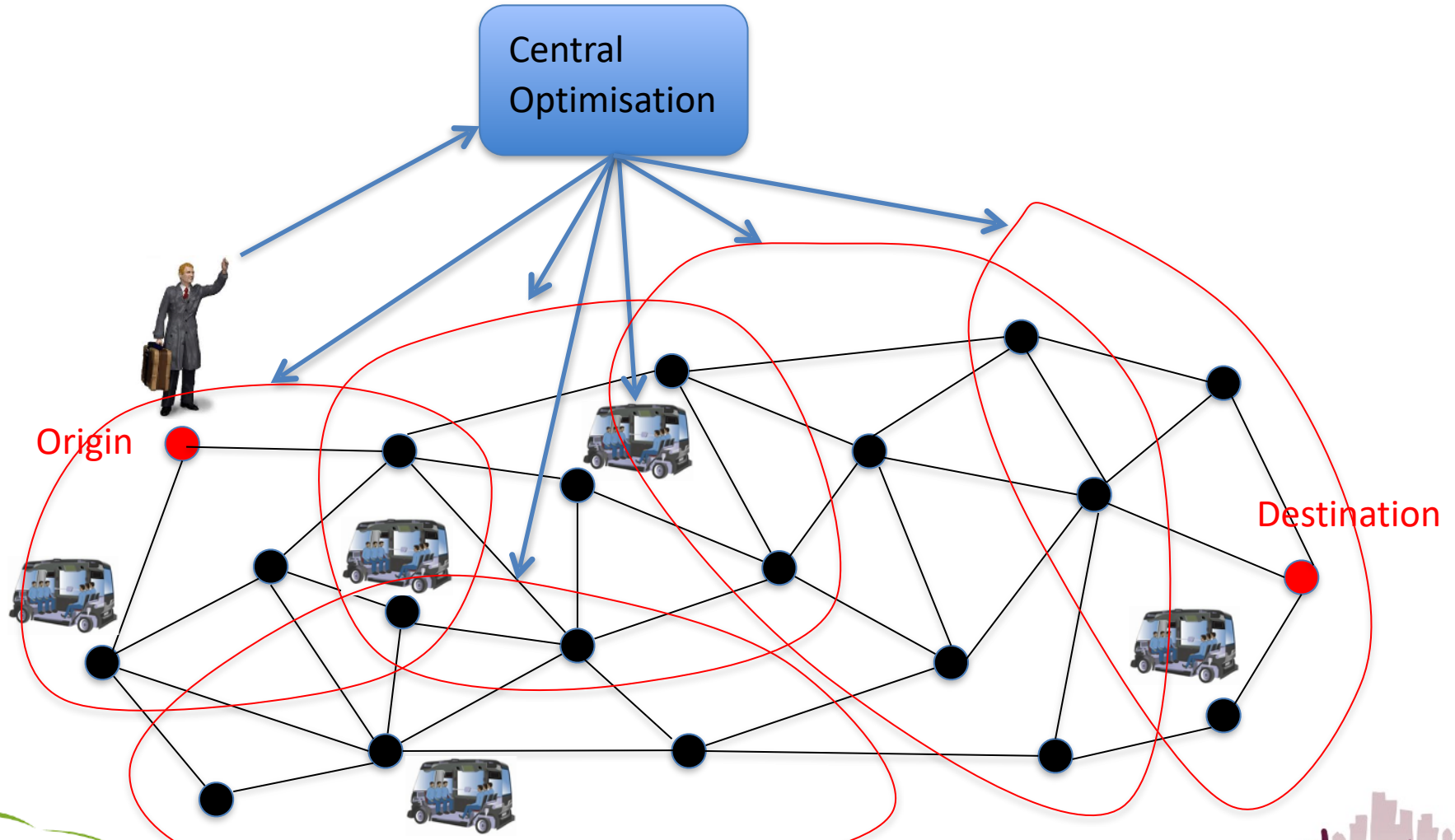
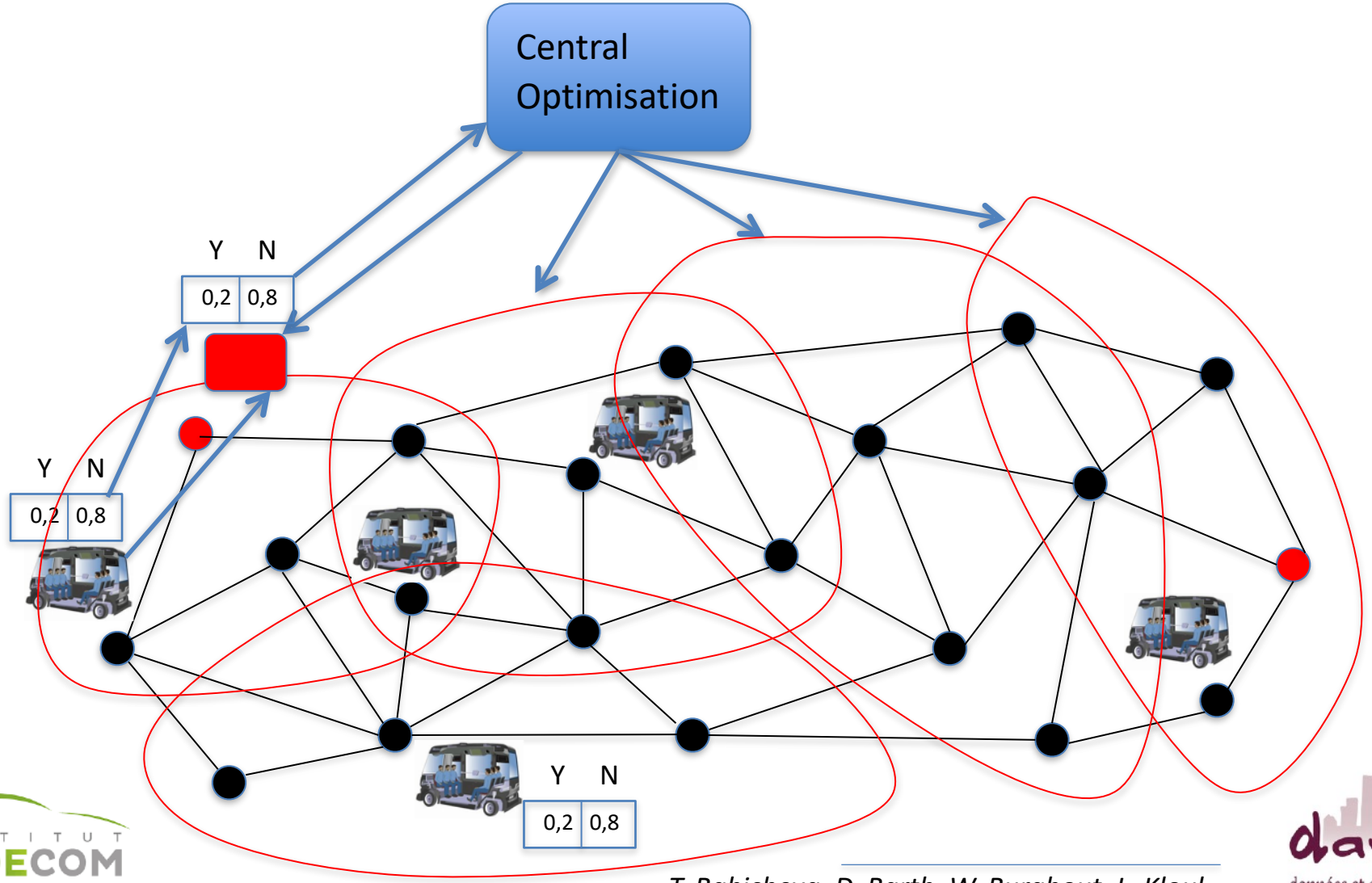
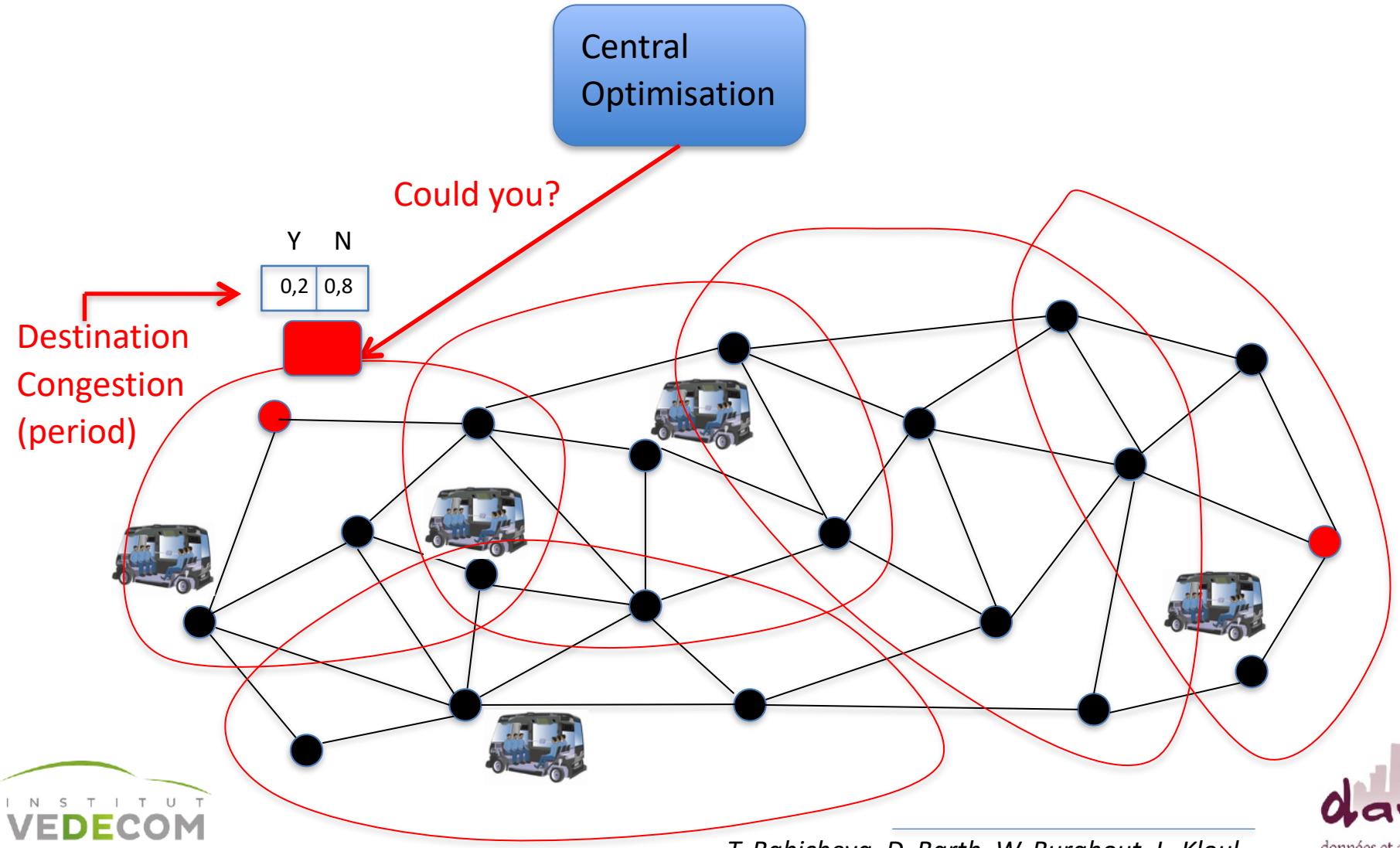

Central
Optimisation
Origin
Destination


Central Optimisation
Y N
0,2 0,8
Y N
0,2 0,8
Y N
0,2 0,8



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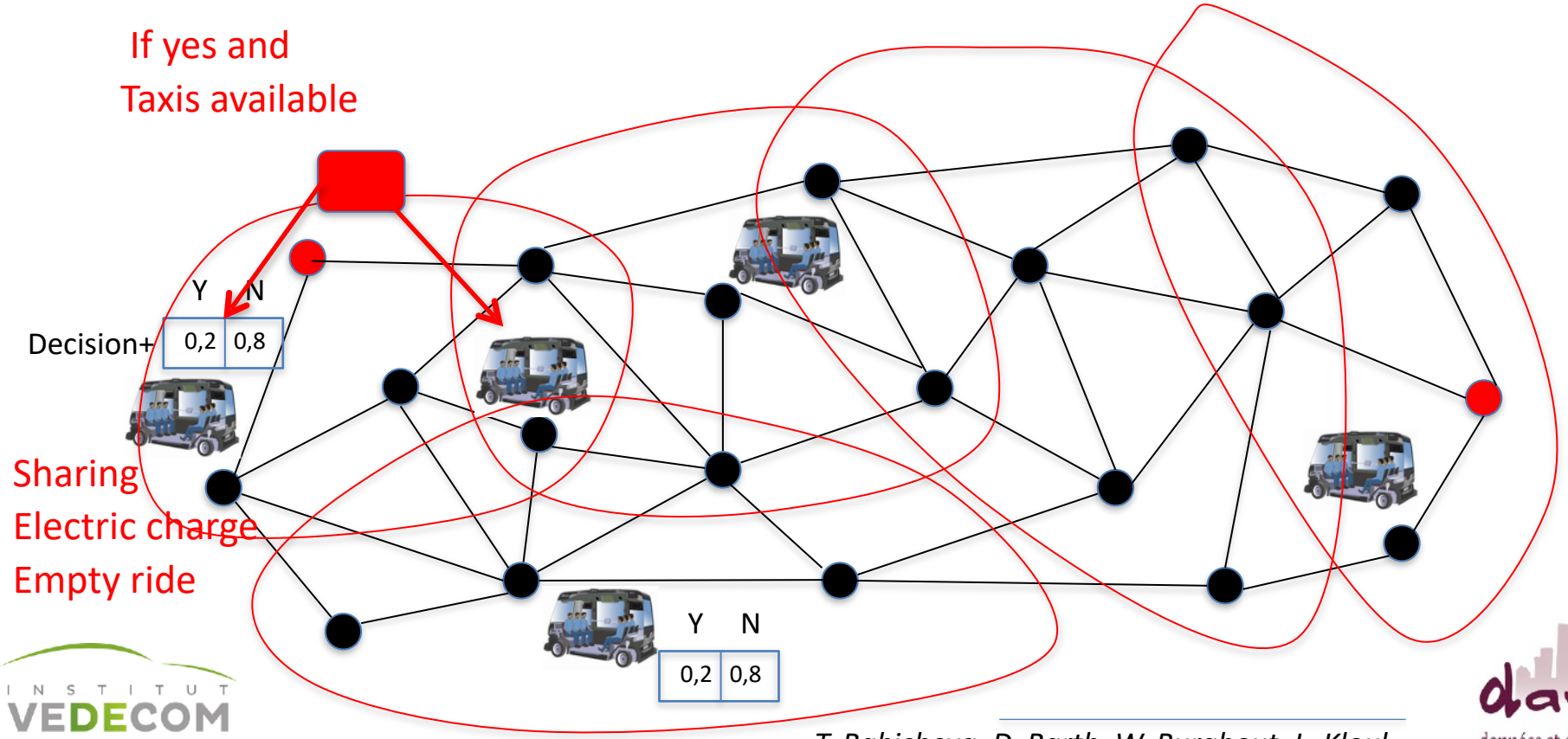
Central Optimisation

If yes and
Taxis available



Sharing
Electric charge
Empty ride

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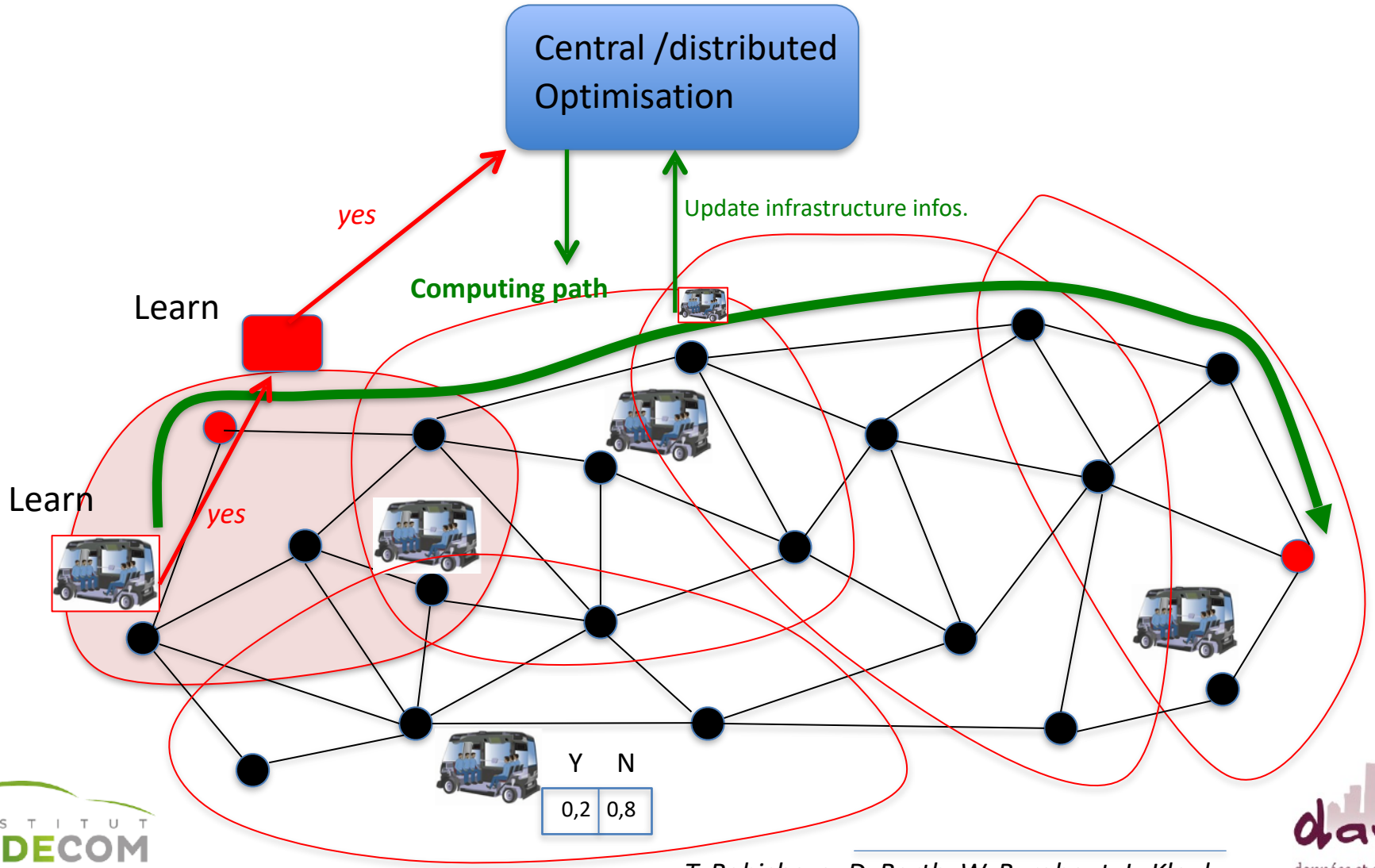
Considering user utilities



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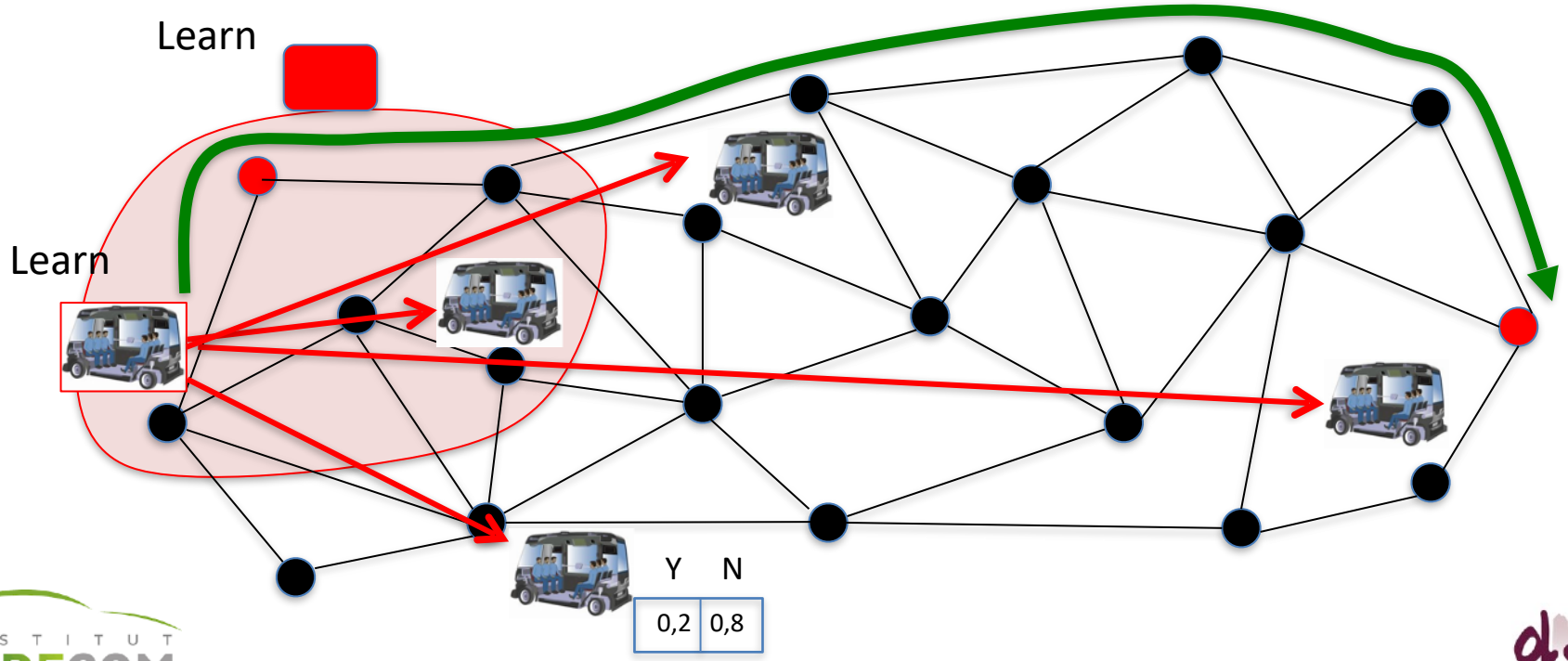
« Service of autonomous shuffles needs learning territory »

Central Optimisation



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Key open question for interdisciplinary about MaaS and autonomy :

- Legal responsability in the event of an accident with an autonomous vehicle mobility services:
- **mobility operator**? Territorial governance? Individuals involved?

- Notion of contract and quality of service, particularly in the case of shared autonomous taxis: departure time and arrival time? Best effort?

- Safe operation of autonomous vehicles? Simulation/scenarios standards? Human expertise?

- Protection of personal data vs personalized service?

- Which public mobility service?

- Authorities and management of Low Emission Zones?

- Which public actors to manage and arbitrate access to roads (streets, parking spaces, charging stations, etc.)

Citizens

Urban Organism

Energy

Materials

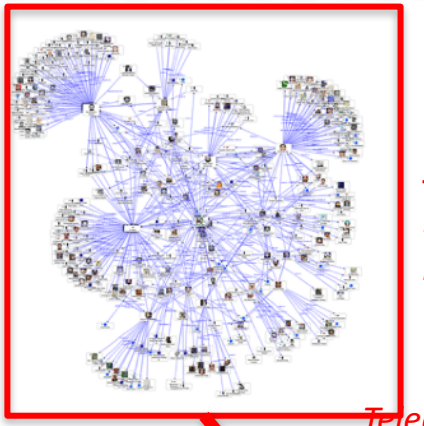
Firsts

Uses

Data

...

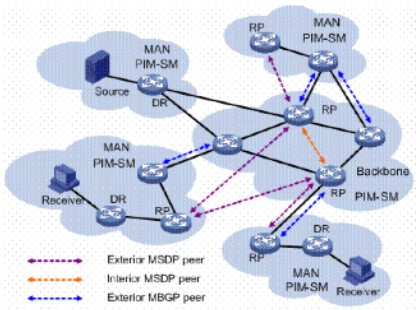
Networks of Urban Paths



Social and Professional networks

Telecom network

Transport network



Waste networks

Energy network

Waste

Activity

Products

Data

Welfare

...