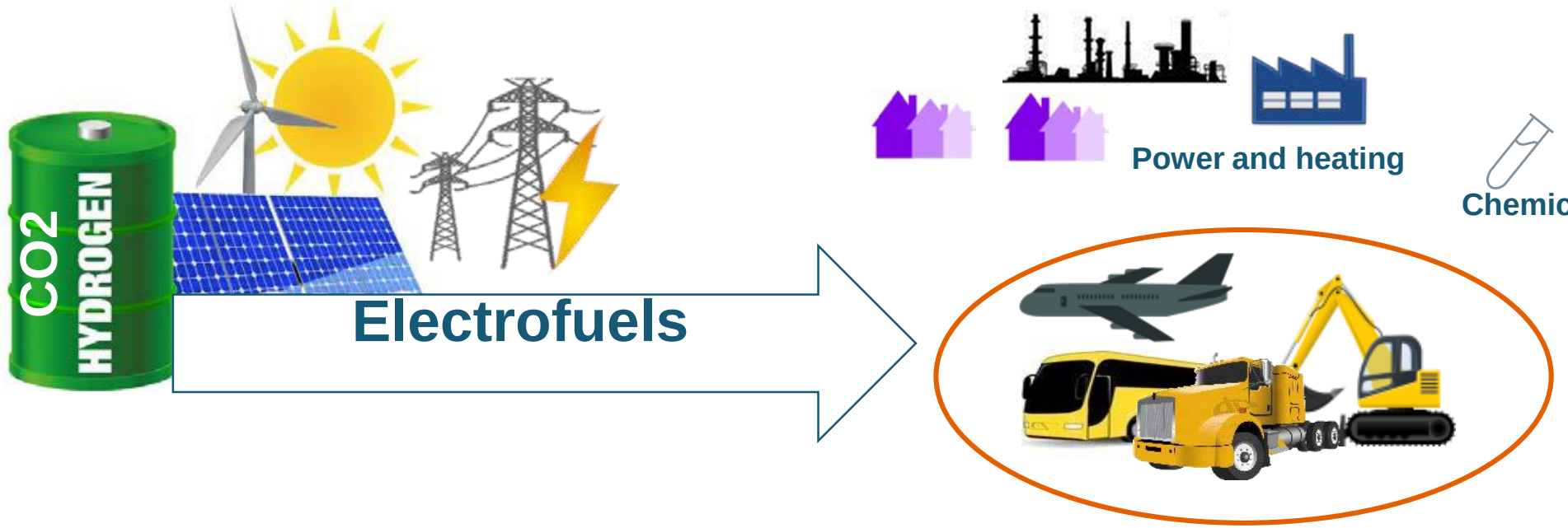
4. Työpaja Sähköajoneuvot (EV), liikenne

1. Aakko- Saksa Päivi- VTT
2. Alhonen Jukka- Deal Comp Oy
3. Anttila Hannu- Moprim
4. Erkkilä Jari- Tamlink
5. Hallikainen Jyrki- UROS
6. Heino Immo- VTT
7. Hämäläinen Jarmo, Pirjo Venäläinen- Metsäteho
8. Immonen Riku- Jyväskylän yliopisto
9. Jokinen Karoliina- FMI, University of Oulu, University of Lapland
10. Koskimies Mika- L7 Drive Oy
11. Krause Carl- G-Boats Oy
12. Rauma Eemil- Korkia
13. Pyrhönen Juha- LUT
14. Suoheimo Mari- University of Lapland
15. Toiskallio Kalle- Enterlot

Renewable electro-fuels for combustion engines in 2030, REL-FUEL

 paivi.aakko-saksa@vtt.fi



- *Idea:* Electricity and CO_2 can be converted to many type of e-fuels. **We evaluate the most suitable e-fuels for transport sectors that are difficult to electrify by batteries.** Focus in e-fuels for gas, diesel and alcohol engines, and their emission control. Hydrogen blended in methane (hytane) is included.
- *Impact:* **Reduce climate burden of transportation**. Markets for electrification, also by e-fuels, are exponentially growing with ambitious climate targets.

Consortium: VTT, FMI, TAU and Aalto with possible companies, e.g. energy companies and manufacturers of engines, exhaust cleaning systems and measurement instruments (still in idea phase).

Deal Comp Oy

Deal Comp Oy has 25 years of experience in creating dependable IT-hardware solutions for challenging conditions.

These products are designed for Nordic environmental conditions, demanding field use and vehicle use.

DEAL
DEAL COMP OY

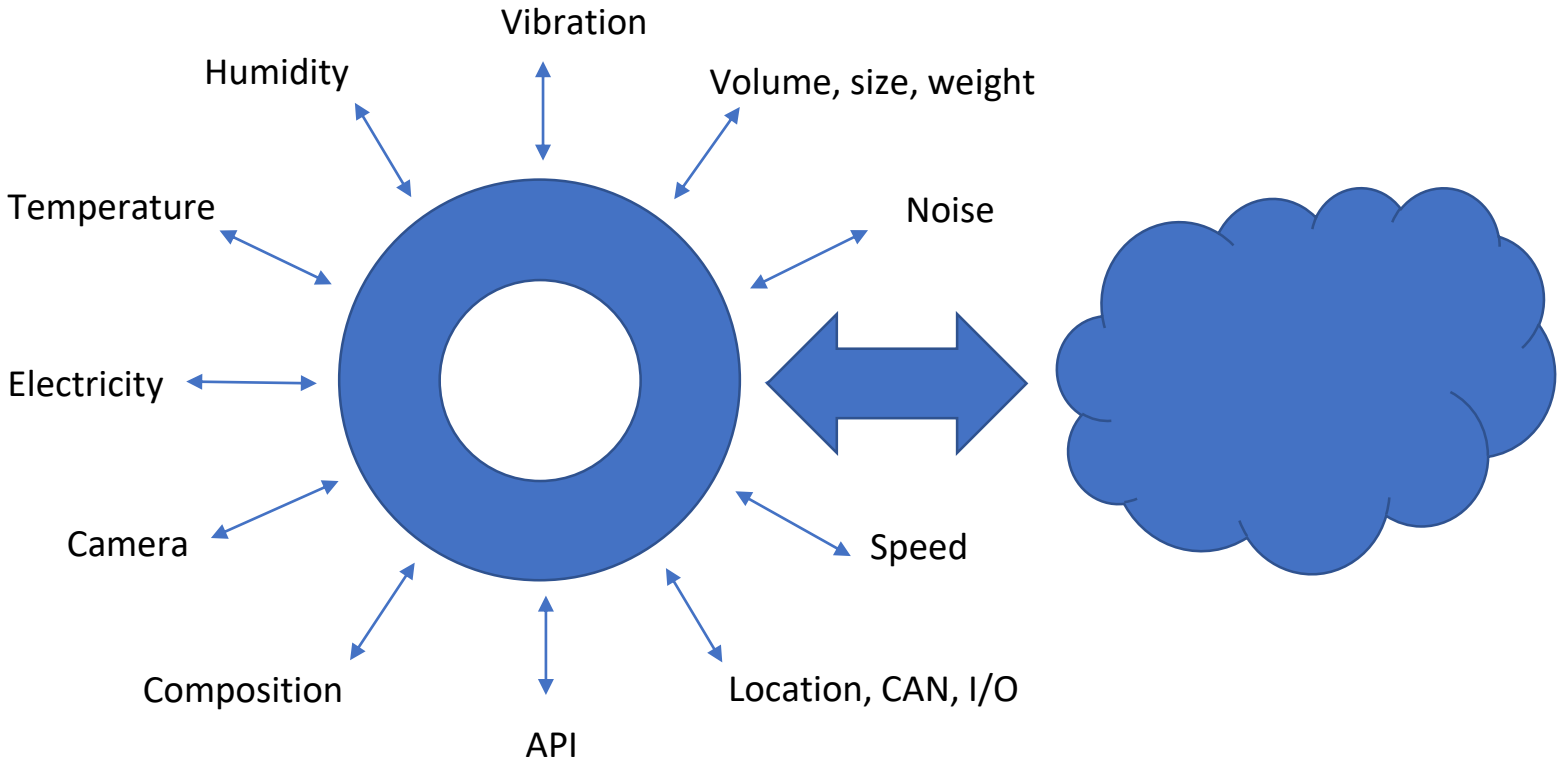
Open data solution for logistics

Traditionally, there are many computer + modem solutions installed in vehicles to provide information and services to the logistics business. Most solutions are proprietary, providing limited info and are difficult to connect to open data ecosystems.

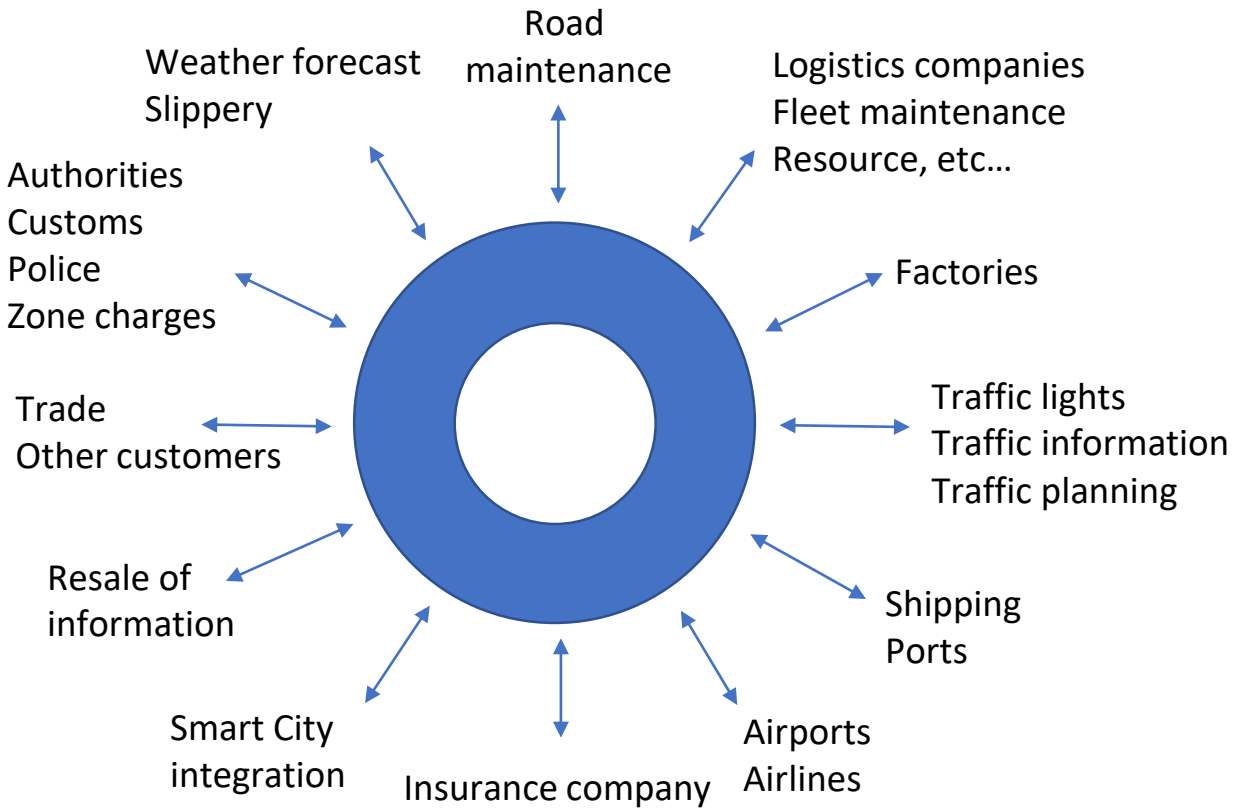
Our solution consists of a powerful computer including multichannel router function, that can handle all IT-services in the vehicle. With an open architecture system vendors will find it easier to install their solutions and share open data.

DEAL
DEAL COMP OY

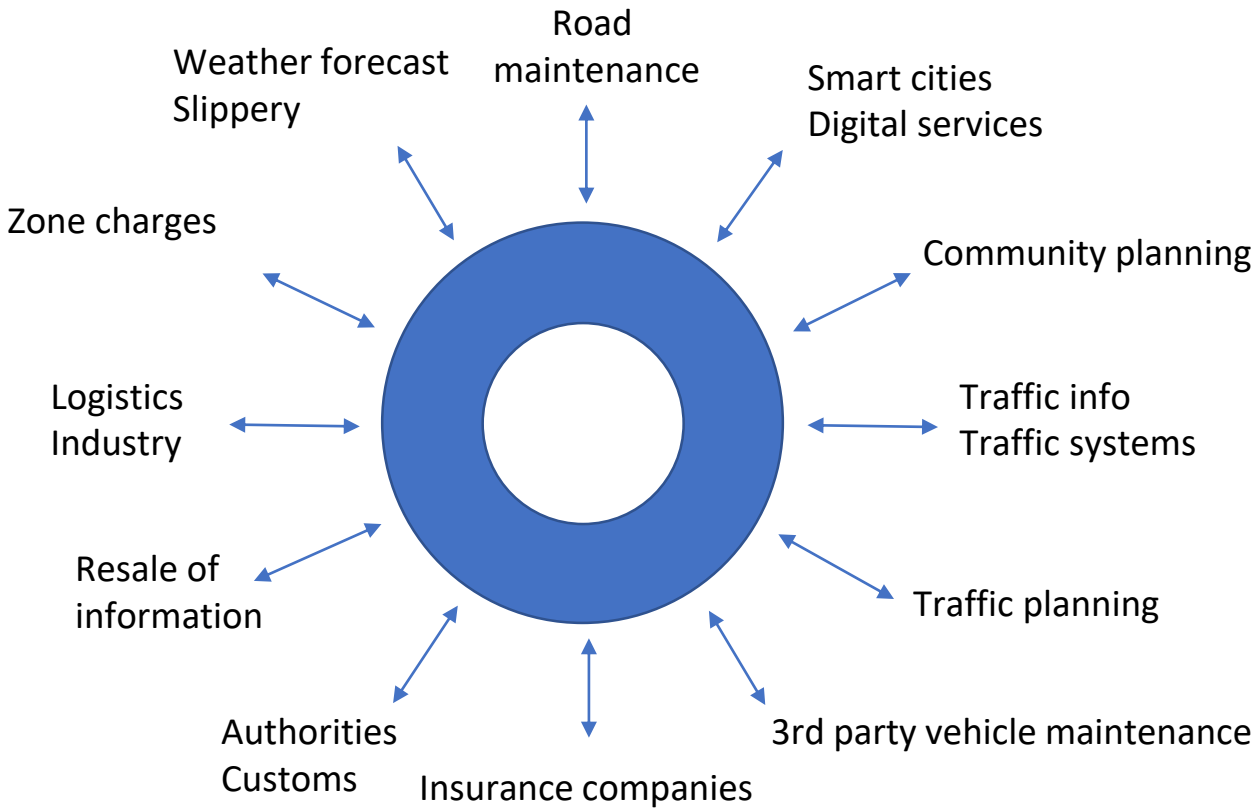
Open data – vehicle data collection



Open data – users



Open data – buyers



Open data - benefits

Utilizing the collected data will enhance your own business.

Linking open data to the business environment enhances the performance of all parties involved.

The resale of open data compensates for investments.

A centralized, durable vehicle computer is easier to manage, fewer interruptions and maintenance needs, less lifecycle cost and longer system life.

ITxPT - Open IT architecture for Public Transport

ITxPT is cost-effective and open system for building a standartized IT environment for public transport vehicles. Additionally, connectivity to smart city and other open interfaces is standard..

Deal Comp Oy will produce energy efficient ITxPT hardware for harsh Nordic environment.

The system's **stand-by power saving is 20%** and **operational mode 50% lower than traditional systems.**

This is **extremely important** for **electric buses in winter.**

Deal Comp Oy

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Puh. (09) 47 887 700, www.dealcomp.fi

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MOPRiM

Business Finland Smart Mobility Challenge

May 28, 2019

Confidential

Mobility Footprint

Unique MOPRIM Mobility Data: From individual user data to big data

MOPRIM

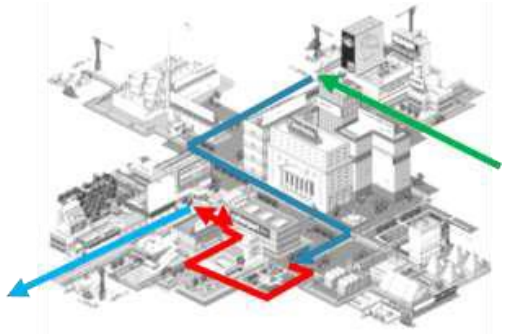
HOW

User's exact mode of transport

Discovered on the smartphone with MOPRIM technology

+

WHEN AND WHERE



User's route

Derived from location data

+

CONTEXT

Additional data sources

Routes and timetables, etc.

Mobility Footprint ecosystem proposal

PARTNER APPS with MORPIM SDK

or MOBILITY FOOTPRINT APP

MOPRIM mobility data from all users

Open and proprietary data

MOBILITY FOOTPRINT CREATION

MOPRIM creates new mobility data, fuses it with other data sources and builds the personal Mobility Footprint

MOPRIM Mobility Footprint data

PARTNERS

- Mobility Service Providers
- Public Transport Operators
- Transport and Urban Planners
- Research Institutions
- Local governments

Thank You!

Hannu Anttila
VP Sales & Business Development
e. hannu@moprim.com
t. +358 50 385 5515

www.moprim.com

@MOPRIMLtd

@moprim_ltd

MOPRIM Ltd


Faster-2
Zero

CHALLENGE

Solutions to cut CO2 emissions exist, but they are not taken in use widely (several reasons).

New, innovative solutions are and must be developed.

E.g. EV:s will be one part of the solution, but 100% penetration will easily take a decade.

How we can speed up the zero emission transformation?

How we can turn this opportunity into successful export business?

London, Leicester Square, April, 2019

Responsible & systemic thinking in urban delivery & service traffic

Speeding up CO2 minimization concretization through business benefits

Join us !

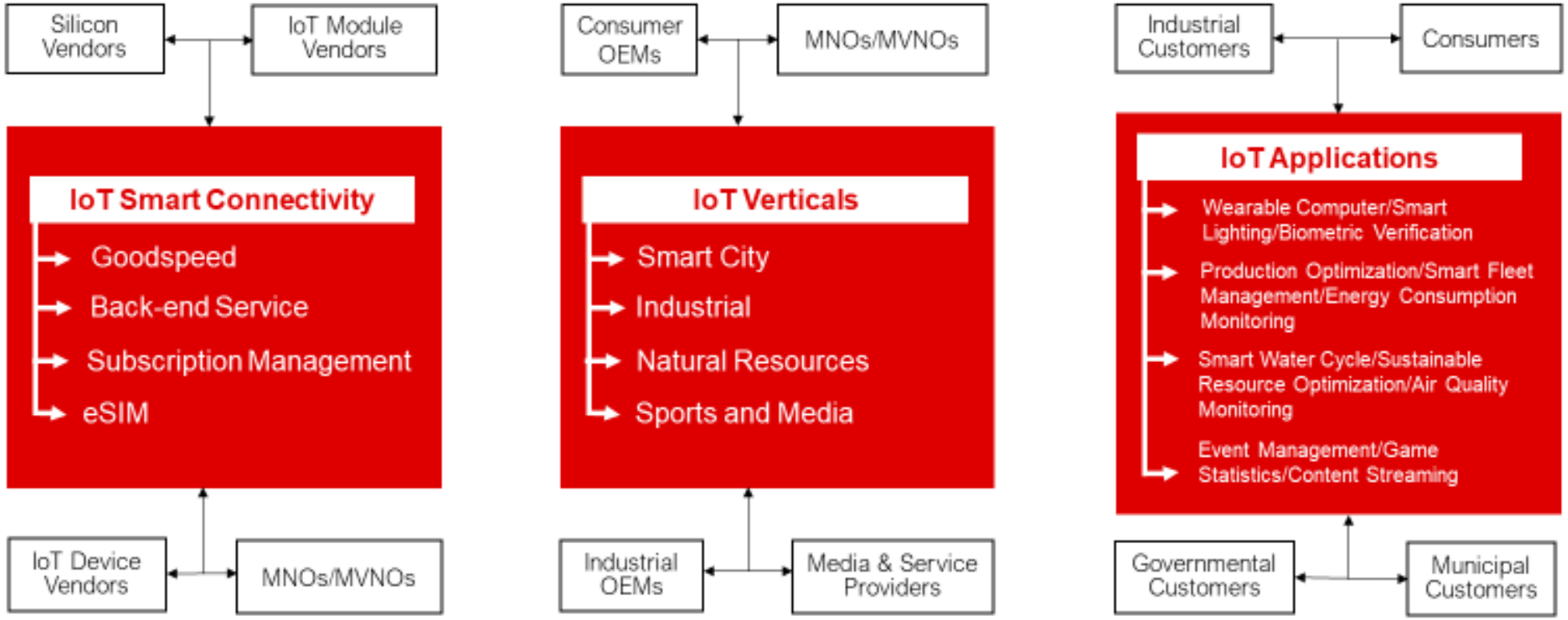
Contacts:
Jari Erkkilä, Tamlink; jari.erkkila@tamlink.fi, p. 0405136917
Jari Kaikkonen, VTT; jari.kaikkonen@vtt.fi, p. 0405472024

TAMLINK TUOTEKEHITYS OY

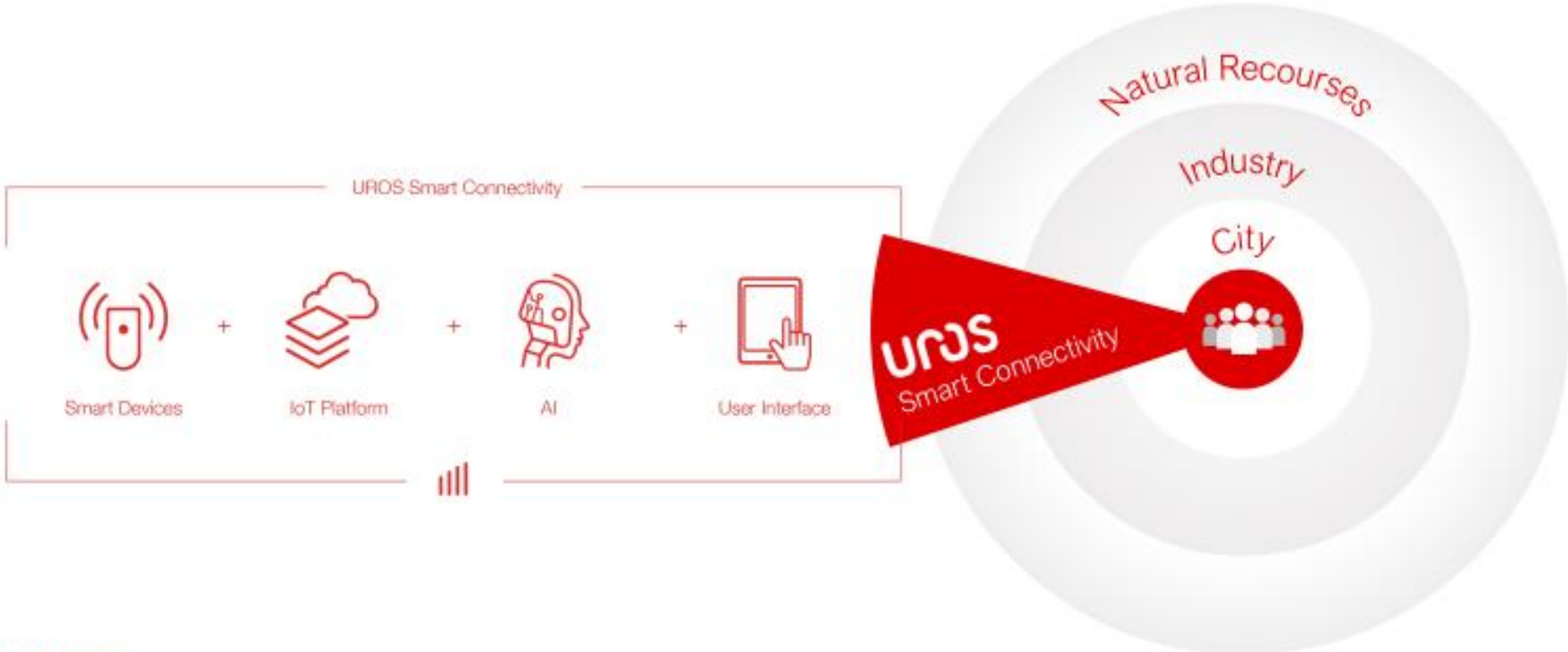
VTT

UROS

UROS Unique Global Network – Products & Customer Segments



Smart Connectivity from Universal Level to One Person



uros

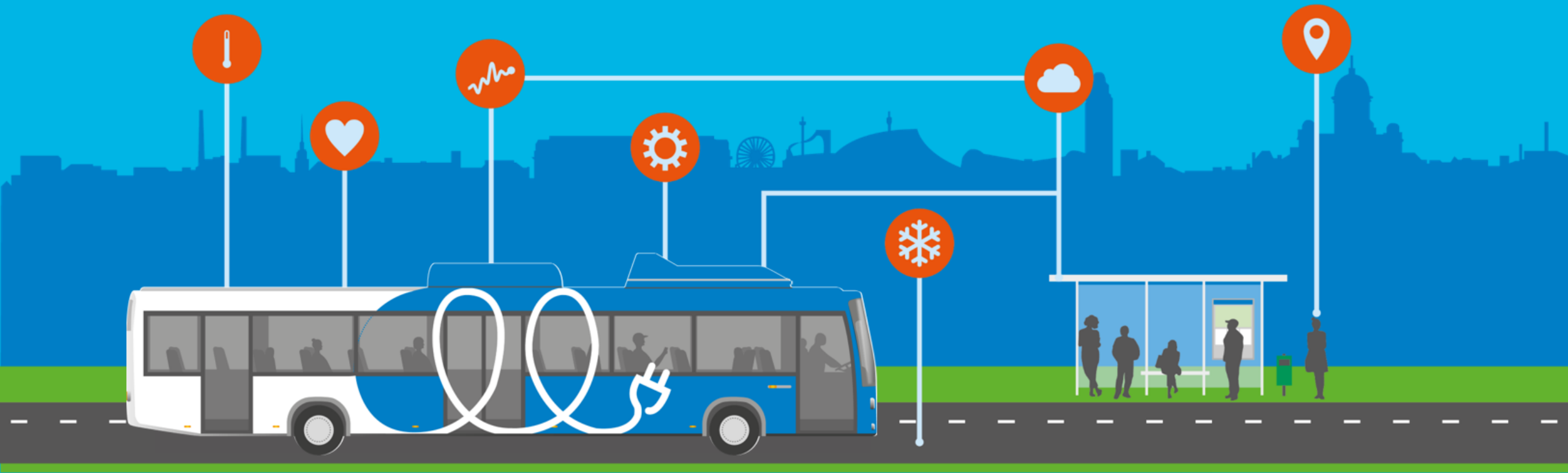
We are passionate about making the impossible possible.

Mr. Jyrki Hallikainen
Founder, Chairman of the Board, UROS

Edge Computing - Vehicles@SmartCity

Smart Mobility Challenge Competition- workshop

Immo Heino/VTT 28.5.2019



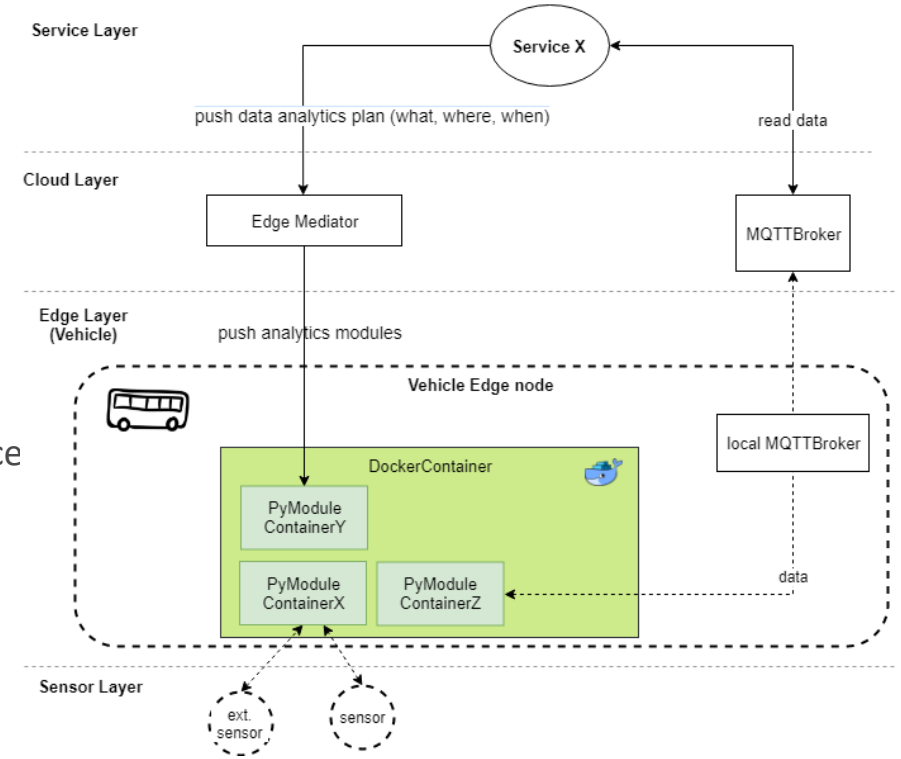
Vehicle EDGE Cases

- **Living Lab Busses act as ”mobile edge nodes”**
  - Amount of sensor per bus high -> lot of data to be analysed and conveyed to cloud -> not always possible
    - E.g. acceleration measured 1ms intervals -> data pre-processing in node
  - Latency constraints in some scenarios
    - Driving assistant systems (automatic positioning for battery charging etc.)
    - for local decision making data needs to processed in node

- **IOT/EDGE scenarios**
  - Autonomous vehicles cases (Lidar, acceleration, bearing, position)
  - Camera data (object detection from traffic, passenger detection)
  - Road / driving conditions (slippery detection, “pothole” detection, …)
  - Weather / Air quality (CO2, temperature, air pressure moisture, …)
  - Environmental sensors (ground salinity, bus stop dust,…)
  - Vehicle condition (temperature, humidity, CO2,

Research topics of EDGE Cases

- HW abstraction with Lightweight virtualization
  - Automatic service deployment to edge nodes (elasticity of deployments, live migrations)
  - Different HW profiles of nodes
- Multi-tenancy
  - Resource sharing/Access to vehicle resources (network, …)
  - QoS vs. resource utilization(CPU, Memory, disk space
- Privacy and security
  - Data protection, hacking prevention,…
  - Authenticity and validity (Id management / trust)



Gravel Roads & Road Data

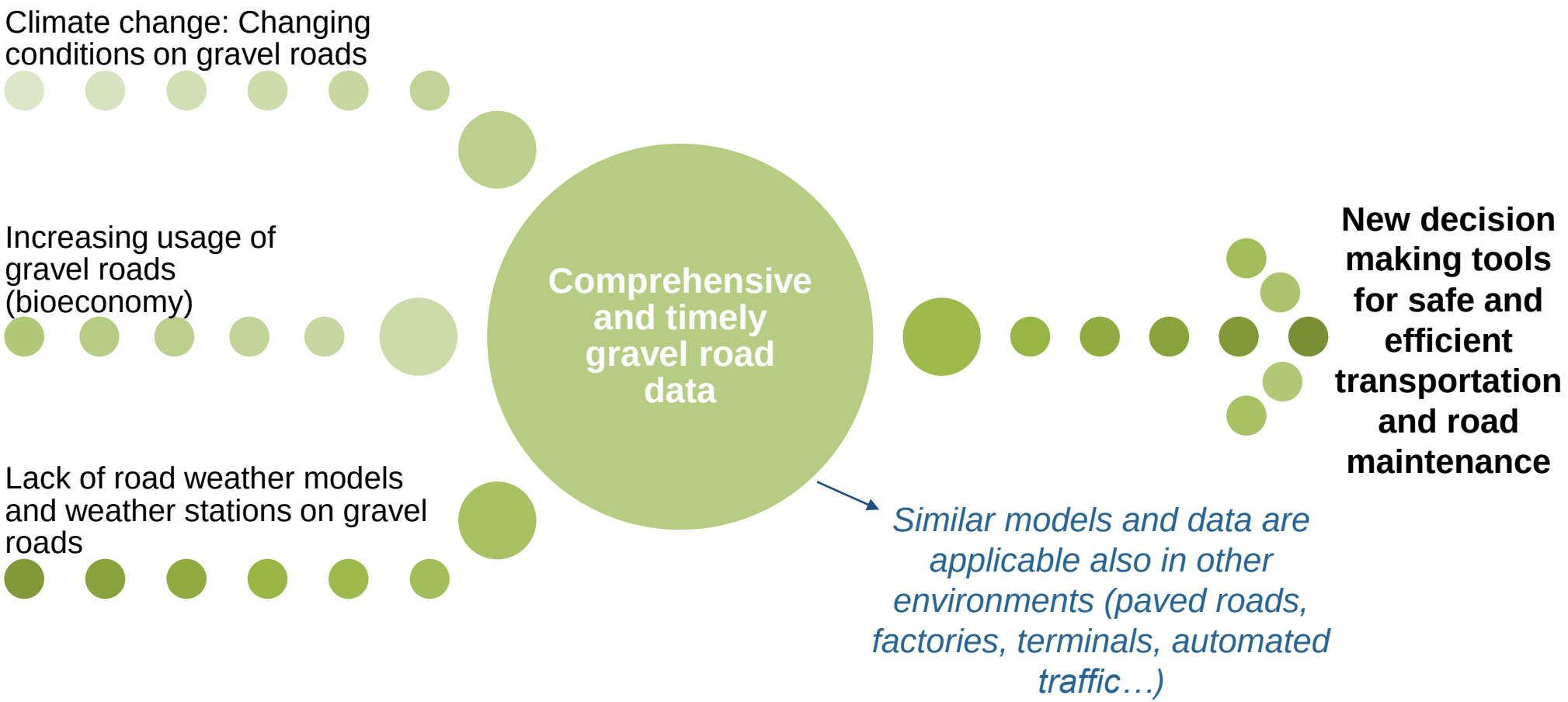
Jarmo Hämäläinen, Pirjo Venäläinen

28.5.2019

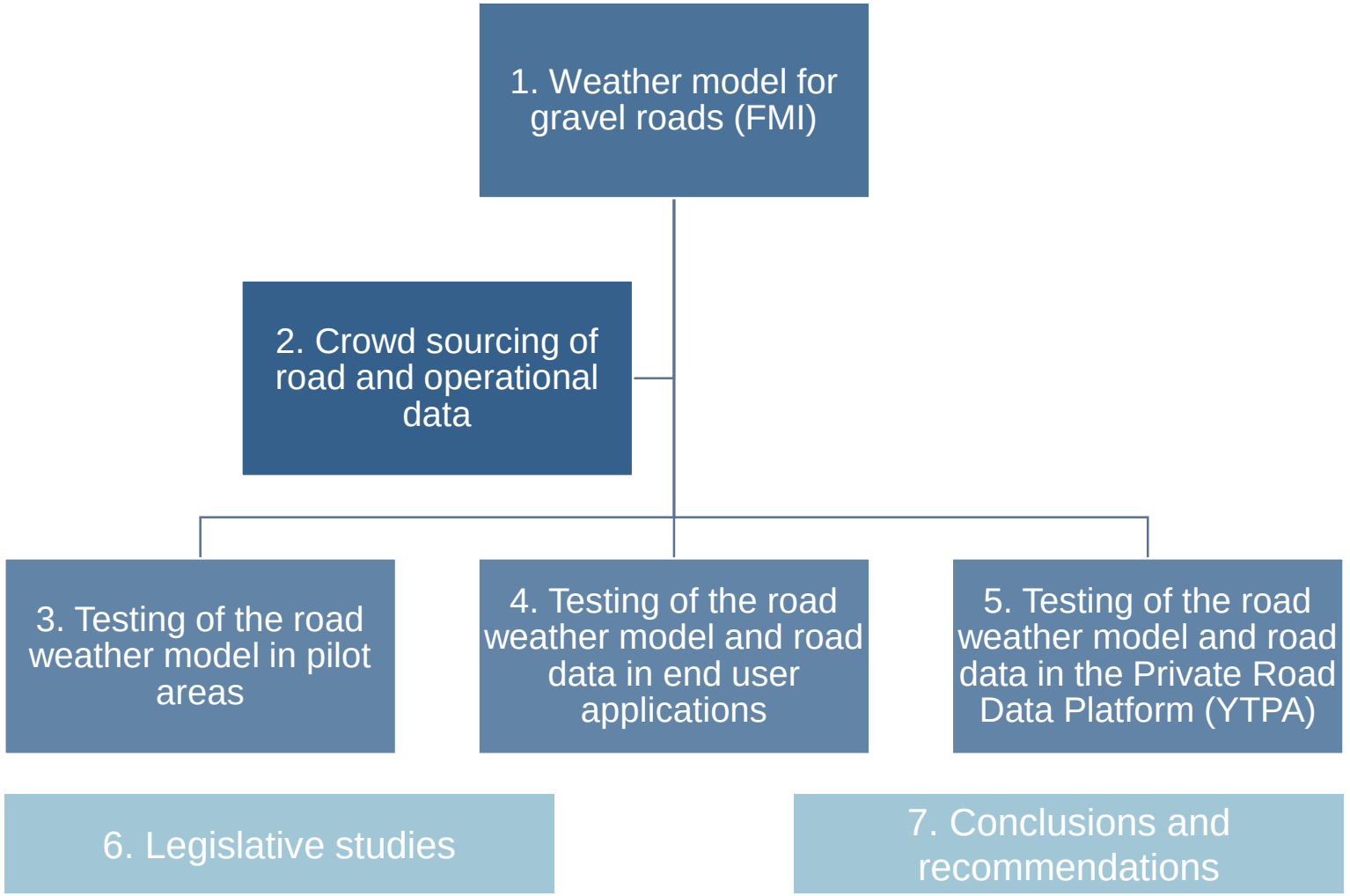
Smart Mobility Challenge

Metsäteho

Background and Objectives



Stages


1. Weather model for gravel roads (FMI)
2. Crowd sourcing of road and operational data
3. Testing of the road weather model in pilot areas
4. Testing of the road weather model and road data in end user applications
5. Testing of the road weather model and road data in the Private Road Data Platform (YTPA)
6. Legislative studies
7. Conclusions and recommendations

Benefits

- Impacts of new road data services
  - Improved efficiency of transportation and road maintenance
  - Less road condition inventory costs, less damage to roads, and better traffic safety
- Market potential for new road data services
  - Gravel roads (appr.): Finland 370 000 km, Norway 18 000 km, Sweden 160 000 km, Canada 630 000 km, and United States 2 200 000 km
  - Potential users: Consignors and transportation companies (forestry and agriculture, heating oil, mail…), gravel road owners, road maintenance service providers, energy network maintenance, emergency services, private persons, other (insurance companies).
  - Aim: > 50 MEUR annual turnover in the above mentioned countries

Partners (preliminary)

- Coordination (Metsäteho Oy)
- Development of road weather models (Finnish Meteorological Institute)
- Solution providers for crowd sourcing of road and operational data (RoadCloud, RoadsML, Vaisala)
- Users of road and weather data (Väylä, Destia, Metsä Group, Metsähallitus Metsätalous, Stora Enso, UPM-Kymmene, Versowood)
- Providers of end user applications (Arbonaut, Trimble Forestry)
- Development of the Private Road Data Platfrom (YTPA) (Forest Centre)


Thank you

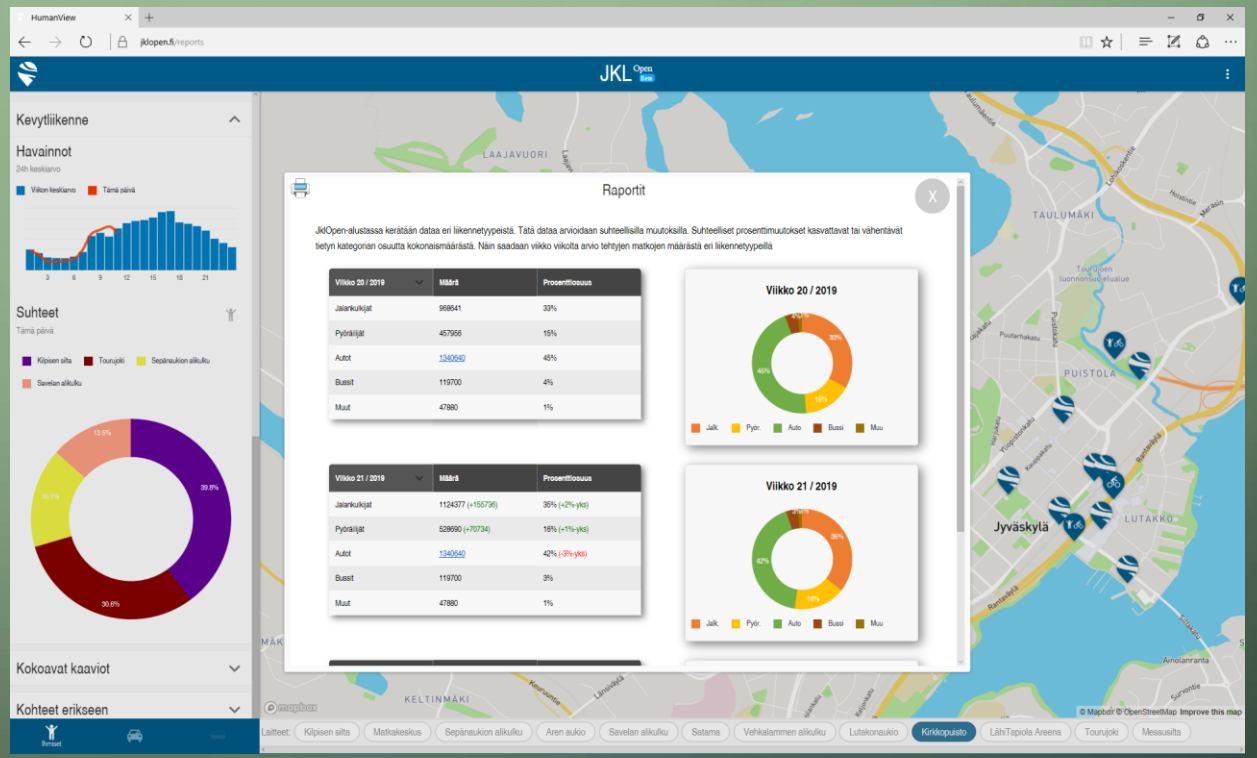
LIIKKEESTÄ LIIKETOIMINTAA

(…TRAFFIC FLOWS INTO CASH FLOW…)

SMART MOBILITY CHALLENGE

CURRENT PLATFORM- JKLOPEN.FI

- Open data from different sources
  - WiFi counter
  - EcoCounter
  - Traffic lights
  - Parking garages
- Graphs that show the flow of traffic
- Reports on week by week comparison
  - Cars
  - Walkers
  - Cyclists
  - Busses



BENEFITS

- Resources can be used more efficiently in transport planning in cities
  - Real time activity rate of the city
  - Overall knowledge of the traffic state
- Better resource distribution in companies and traffic forecasting
  - More sale personnel during potential rush hours
  - Better timing on sales
  - Forecasting tomorrow's cash flows

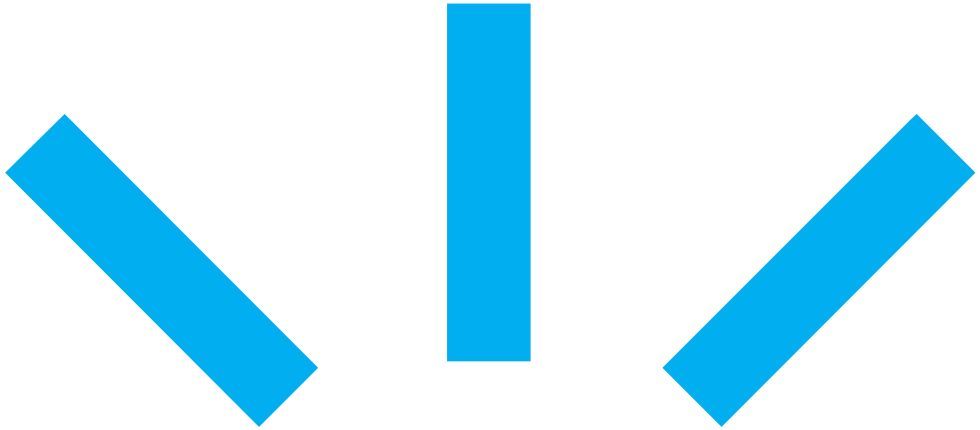
TECHNOLOGIES TESTED

- WiFi join message counter
  - Counts WiFi devices in the proximity of the device that aren't stationary for a long time
  - LoRaWAN network
- Sidewalk counter, EcoCounter
  - Counts passing cyclists and walkers
- Traffic light monitoring, Dynnig Oy
  - Inbound and outbound traffic from the city
- Parking garage usage, Jyväs-Park
  - Available parking spaces in parking garages
- Microwave radar counter

BUSINESS OPPORTUNITIES

- Research of new technologies to count traffic
  - More accurate and real time data from traffic
    - Better image on how the flow of people is distributed in cities
- Seeking new business and technology partners
  - To the development of counting products
  - To implement IoT functionalities into current counting products
  - To the development of AI algorithms which can be used with traffic data

THANKS



WEATHER vs LOGISTICS OPTIMIZATION (WeLO) – Technological Solution & Business Opportunities -

BUSINESS FINLAND, SMART MOBILITY

University of Oulu, The Finnish Meteorological Institute (FMI) and University of Lapland

Karoliina Jokinen
AUTOMOTIVE AND MOBILE MACHINERY RESEARCH GROUP
University of Oulu

WeLO: PROJECT IDEA

SMART MOBILITY: Weather and traffic data fusion with vehicle sensor data

CHALLENGE & ITS IMPACT

The challenge that arctic weather causes on the business in **logistics are huge**: business losses due to technical, scheduling and safety issues are remarkable.

The impact of our solution includes all the arctic areas but **is scalable also worldwide** to the areas struggling with other hazard weather conditions or human-made challenges such as traffic jams.

SOLUTION & TECHNOLOGY

Intelligent technology offers new, great ways of solving the challenge: **fusion of weather and traffic data with vehicle sensor** data provides a **new platform for intelligent services and ecosystems**.

The possibilities range wide: intelligent planning of logistics by real-time conditions and further by predicted conditions **employing AI** is the key for lifting logistics' resource efficiency to a new level.

RESULTS

The technological intelligence and know-how for building the **ecosystem** presented in Smart Mobility project idea TTL – Titan Time Logistics.

Altogether, WeLO & TTL provide **an ecosystem & intelligent platform for improving the existing business and for creating new business** based on services optimizing goods transport in arctic weather – a system that's **scalable** for solving other traffic/conditions related problems too, **worldwide**!

THANK YOU!

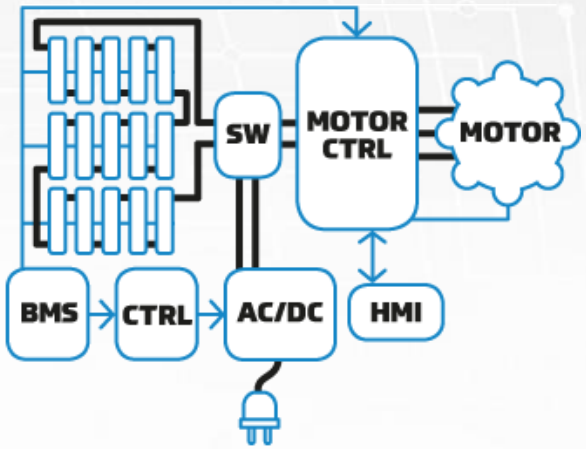
UNIVERSITY OF OULU

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND
For the North – For the World

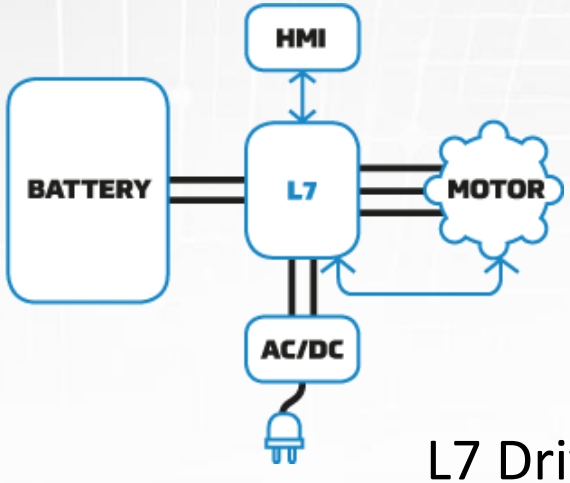
L7DRIVE
Electric Drive Made Simple

The first one cell **powertrain system** in the world



Traditional series connection

- Full capacity always dependent on the weakest individual cell
- BMS required to keep the pack in balance
- Low quality BMS causes premature capacity loss of the pack
- Motor controller most efficient only on full power
- Requires intelligent charger/BMS communication



L7 Drive system

- Parallel connected cells only, the whole pack is always in balance
- No BMS required
- Bi-directional, can also charge the battery 5 – 48V and directly from solar panel
- Capable on constant power through the speed range
- Efficient on the whole power range
- Longer lifetime for the battery
- All in one solution 250W – 15kW

SMART BOATING REVOLUTION

CLOUD YACHT OS

ASSISTIVE ROBOTIC NAVIGATION

- AI assisted boat handling
- Enables unprecedented intuitive usability

SHAREABILITY BY CLOUD YACHT OS™

- The world's first boat optimised for urban water areas
- With Cloud Yacht™ digital mobile platform sharing is made easy

CLEAN YACHTING MODEL

- Cloud Yacht™ hull is 3D printed with no oil used
- All electric propulsion: no carbon dioxide emissions
- Lean manufacturing and logistics

BY BOATS

CLOUD YACHT MAAS

CLOUD YACHT OS

CLOUD YACHT OS™

- The world's first boat operating system optimised for urban boat sharing
- Cloud Yacht™ digital mobile platform is suitable for managing just one or a fleet of yachts

USERS

- Cloud Yacht™ digital mobile platform allows several ownership models from 100% owner or part owner who shares to a yacht renting member

PROTOTYPING PHASE

CLOUD YACHT FLEET

- The world's first boat optimised for urban water areas
- Assistive AI brings safe handling
- Easiness of use opens boating for all

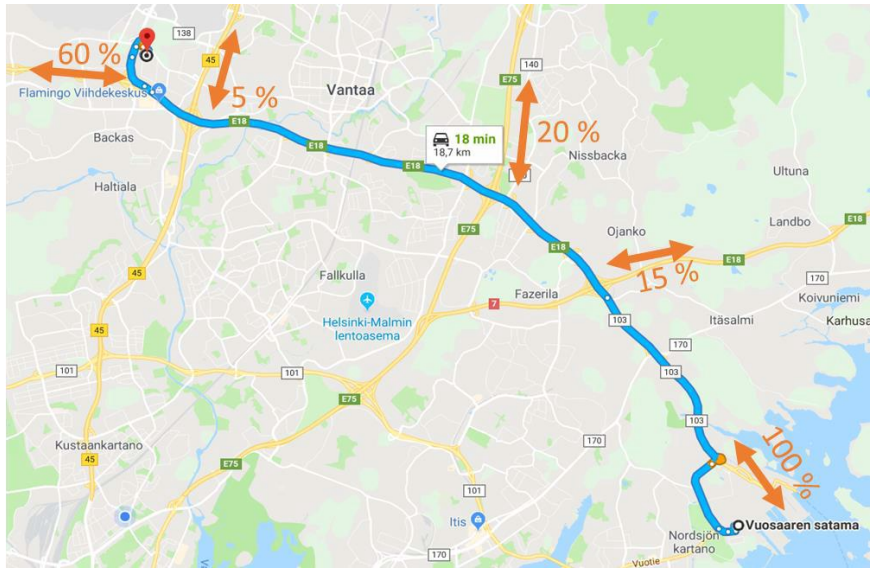
BY BOATS

Satamasta asiakkaalle sähköllä – Logistiikkaketjun sähköistäminen 100 %:n hiilineutraaliuuden varmistamiseksi

Soveltavan yhteistutkimuksen avulla selvitetään ja todennetaan konkreettisesti logistiikan palveluketjun sähköistämisen mahdollisuudet, vaatimukset ja kustannukset PK-seudulla

korkia

Vuosaaren satamasta lähtee ja saapuu viikoittain 14 000 rekkaa, joista 60 % ajaa Aviapoliksen kautta. Vuosaaren sataman ja Aviapoliksen alueen väliä ajavan dieselrekan korvaaminen sähkörekalla vähentää vuodessa päästöjä viiden keskivertosuomalaisen CO2-päästöjen verran.



Kumppaniverkosto koostuu potentiaalisesti seuraavista toimijoista:

SIEMENS · VTT · KALMAR · DIRTA · PORT OF HELSINKI · VEHO · fortum · VERNE · STEVECO · NIINIVIRTA European Cargo Oy · Vantaan Energia

Haaste

Raskaan- ja jakeluliikenteen päästöjen vähentäminen kustannustehokkaasti ja ympäristöystävällisesti samalla tukien suomalaista yritysosaamista ja vientiä.

Ratkaisu

Suomalaista sähköisen liikenteen, energia-alan ja logistiikan osaamista hyödyntäen määritetään sähköistettävä logistiikan palveluketju ja demonstroidaan konkreettinen ratkaisu.

Edut

Yhdistämällä eri toimijoiden erikoisosaamisalueita mahdollistetaan logistiikan päästöjen kustannustehokas vähennys, luodaan uutta liiketoimintaa ja todennetaan ratkaisun edut ja haasteet.

Toiminta-malli

Sähköisen logistiikan palveluketju kehitetään yhteistyössä alan johtavien toimijoiden kanssa, joilla jokaisella on osaamista ja kokemusta osasta palveluketjua. Toimijat tapaavat säännöllisesti hankkeen aikana Korkian toimiessa hankkeen fasilitaattorina.

Koko ja kesto

Hankkeen kesto on noin 10kk, henkilöstökulut 134 000€, ulkopuoliset ostot 106 000€ ja demonstraatiokulut 150 000€.

LUT
University

LUT RANGE EXTENDER

We shall enable smart and wide electromobil
by using innovative micro-gas-turbine techno

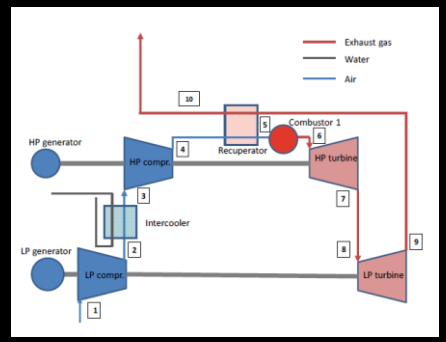
LUT – Range Extender – Motivation

- Motoring emissions have to be removed but full electric vehicles do not offer a sustainable solution
- Manufacturing batteries produces intolerable CO_2 emissions (c. 150 kg/kWh)
- There is scarcity of battery raw materials (Li, Co, Cu, Graphite)
- Batteries provide only a limited range and demand heavy fast-charging systems
- Electricity should be climate neutral! In Finland 164 g CO_2/kWh in average! In many countries much higher. With brown coal 1200 g/kWh
- An electro-motoring family needs two cars in Finland because of the low range of battery vehicles
- We have the key technology to enable wide and smart electromobility

- **The solution is based on an energy- and material-efficient high-efficiency and compact range extender utilizing chemical energy storage e.g. methane!**

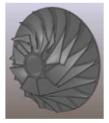
LUT – Range Extender – Solution

- Is a compact high-speed converter based on wide expertise of LUT
- Is based on ground-breaking and proven twin-spool gas-turbine process
- Conversion efficiency up to 50 % in small size
- Enables new family car concept:
  - Electric drive train
  - 50 km range with battery
  - 20…25 kW range extender is powerful enough
    - Provides 1000 km range and heating in addition!
  - Half of motoring on grid electricity (In Finland 5 TWh/a)
  - The other half e.g. with biogas (Gasum: Biogas potential in Finland 10 TWh)
  - Total motoring energy consumption drops to one third of present 42 TWh

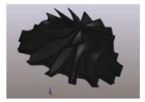


LUT – Range Extender – Schematics

Preliminary Dimensions



Compressor 1: Comp. wheel ext. diam. 58 mm, mass 40 g
Compressor 2: Comp. wheel ext. diam. 43 mm, mass 16 g



Turbine 1: Turb. wheel ext. diam. 61 mm, mass 135 g
Turbine 2: Turb. wheel ext. diam. 48 mm, mass 113 g

Intercooler: 2 litres, mass 4 kg

Recuperator: 7 litres, Diam. 200 mm, length 250 mm, mass 18 kg

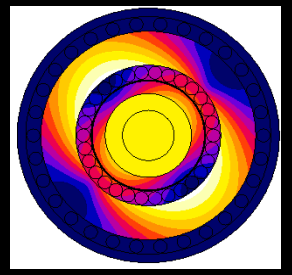
Generator 1 and 2: L100 mm, D60 mm, mass á 2 kg

Power electronics: L150 mm, W100 mm, H100 mm, mass 2 kg

Tubing, burning chamber: common mass 15 kg

50 kg, 100 l, max

Gen speed 140 krpm



LUT  University

TITAN TIME LOGISTICS (TTL)

LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND
Pohjoisen puolesta – maailmaa varten

OULUN YLIOPISTO

ILMATIETEEN LAITOS

University of Lapland, Faculty of Arts and Design
Service Design Research Group "Co-Stars"
Professor Satu Miettinen, Junior Researcher Mari Suoheimo

What if we got a service that could tell the exact time when products arrive into destination?

Old

The online store has now received your order.

Orders are normally shipped within 3-7 business days (excluding holidays).

New

Your online store has now received your order.

Your order can be picked up on Thursday 7.3 at 14:00.

Or

Your order will be brought to your door at 7.3, at 14:00.

The service can be linked to the consumer's own online calendar. The virtual assistant robot (Ai) can schedule the order according the times available.

BIG DATA SERVICE

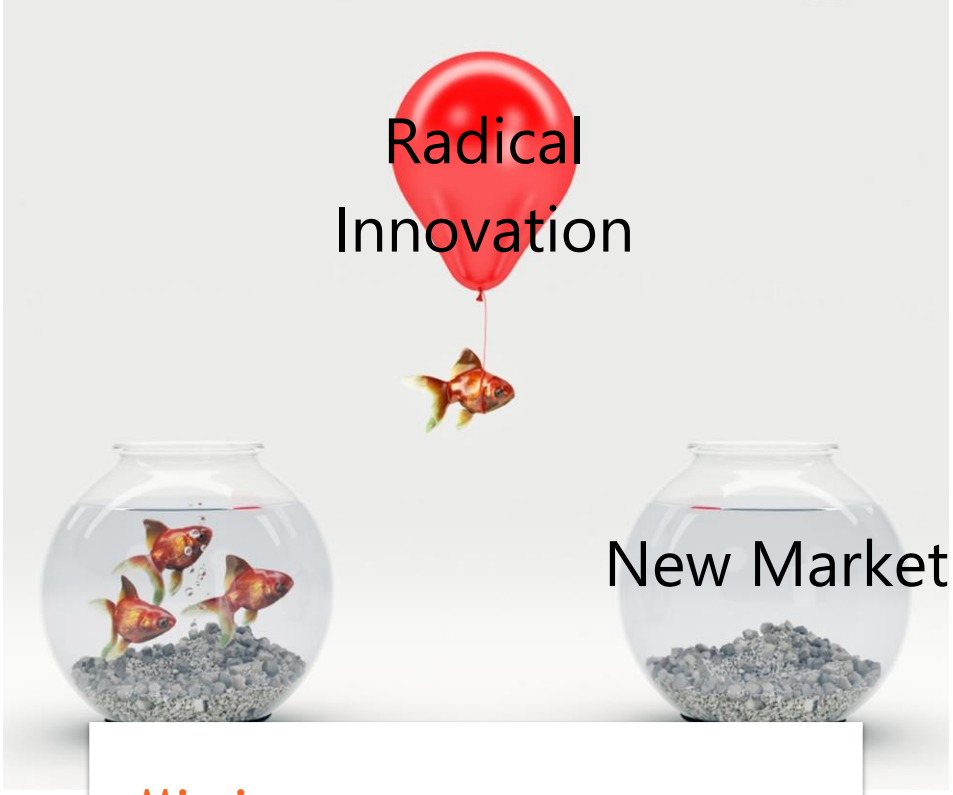
This challenge **can be solved partly** by the use of existing sensors and open source information provided.

The aim is to concentrate on **deep customer understanding** by identifying their needs. They are who will implement the product.

Aim is to create **radical service innovation** by using technology.

Machine learning is at the heart and how it enables learning about the speed and the problems of the routes used.

Automated truck platooning



Mission

As a long-term strategy of the **ecosystem** is to develop a **platform economy** where services are at the center and are customer-driven.

The idea is also to **reduce fossil emissions** through intelligent logistics.

Contact us!

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POHJASET

ENTERLOT

Pre-info of Park&Ride
availability
in The Greater Helsinki

Problem 1

P&R is an expensive investment and revenues are low => not enough spaces and bad info

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Problem 2

Drivers aiming to PT do not know the availability of parking spaces=>

S/he drives from one P&R to another.

And s/he is stressed.

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Solution

*Info of the P&R availability in advance

-real-time

-history/prediction

*Info of other services at the station

We only need

*Existing data or simple sensors

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Division of investment and maintenance costs = partner model

- Local…
- Target…
- Home…

…municipality + commercial station services + state transport authority

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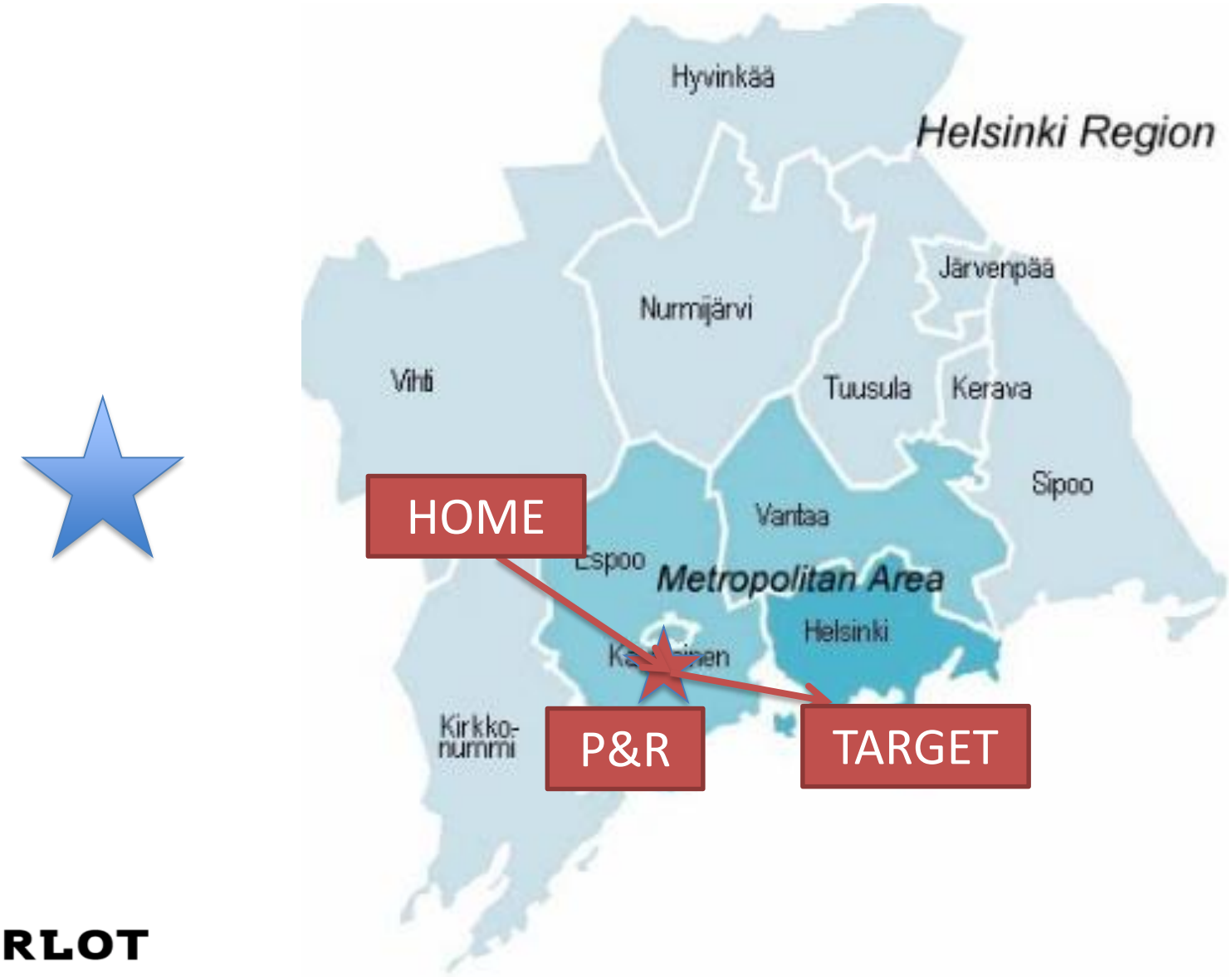
An example from Helsinki Region



ENTERLOT

Thank you!

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