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TECHNOLOGIECAMPUS GENT

Deploying IoT and Cloud Technologies in ICS Environments

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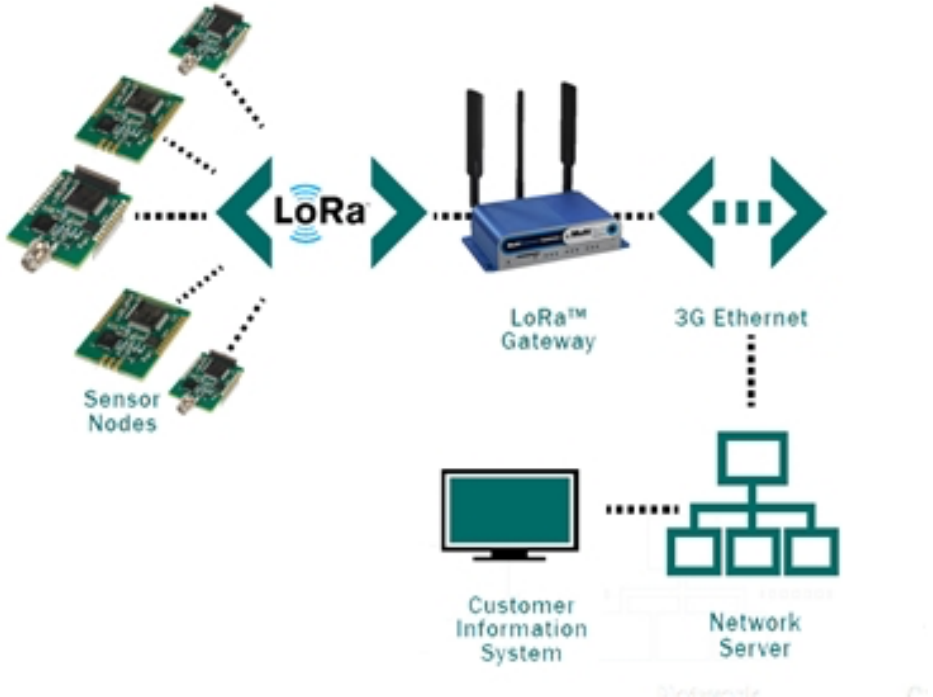
MSEC – KU Leuven

Table of contents

- IoT in ICS environments
- LoRa communication technology
- Demo LoRa
- Data flow analysis methodology

IoT in ICS environments

LoRa communication



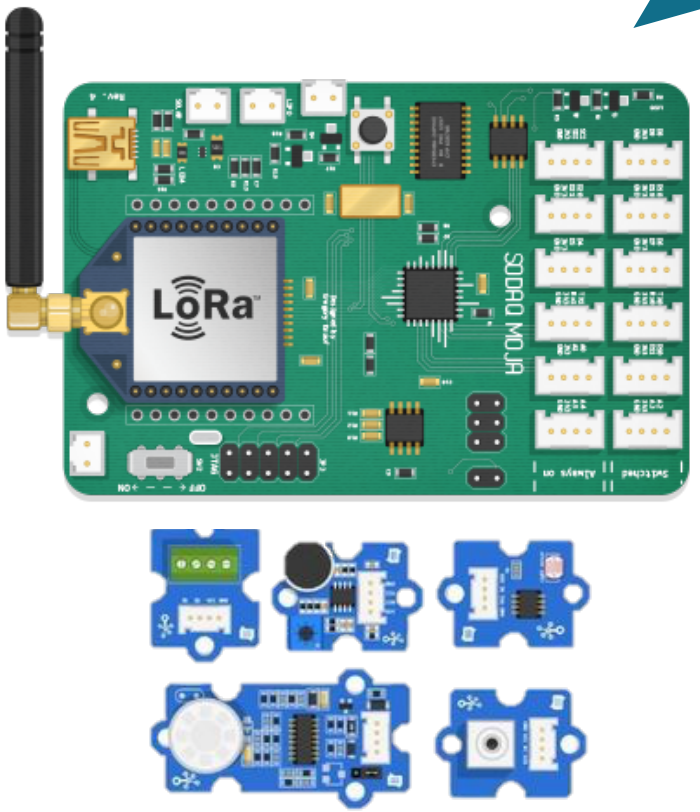
Cheap, small sensors

- Battery life (~5-10 year)
- Distance (~10-20km)
- Bidirectional traffic
- Easy installation

Cheap gateways (~few €100)

- Use existing infrastructure
  - E.g. Proximus
- Deploy private gateways

AllThingsTalk LoRa Rapid Development Kit



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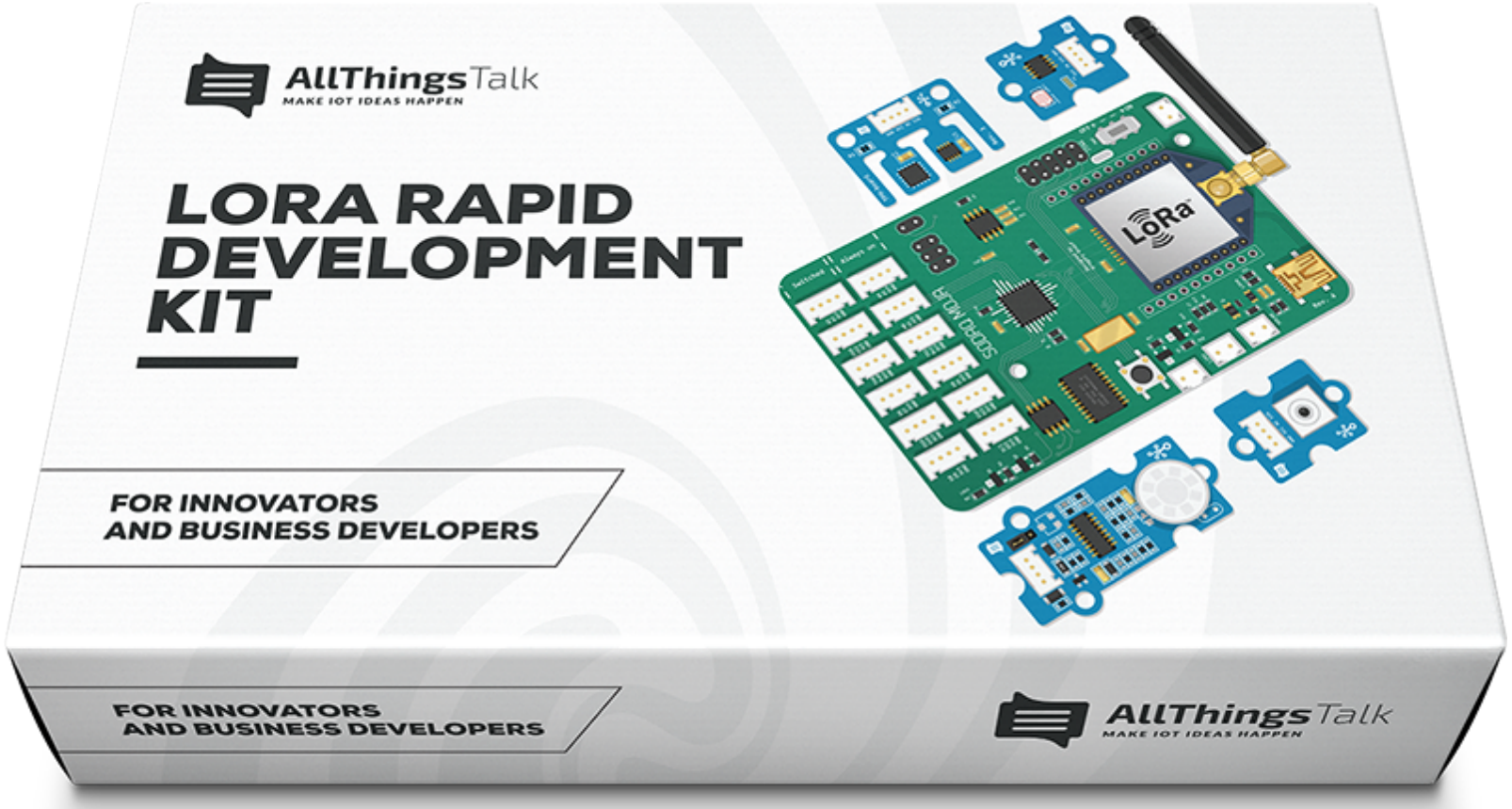
AllThingsTalk LoRa Rapid Development Kit



- Arduino + LoRa module
- 10 sensors
  - Temperature
  - Pressure
  - Humidity
  - Light
  - Sound
  - GPS Location
  - Accelerometer
  - …

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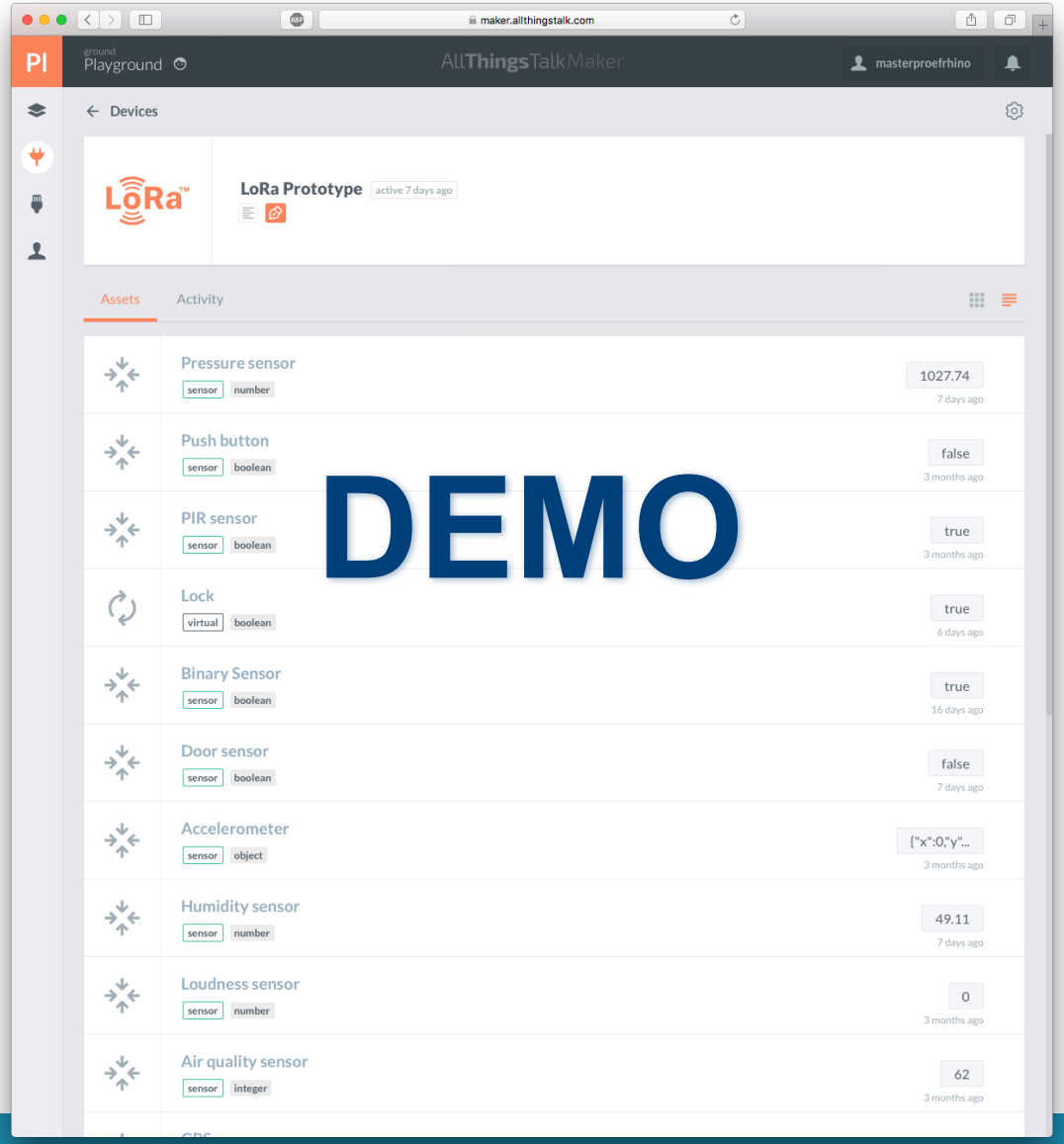
AllThingsTalk LoRa Rapid Development Kit - Cloud



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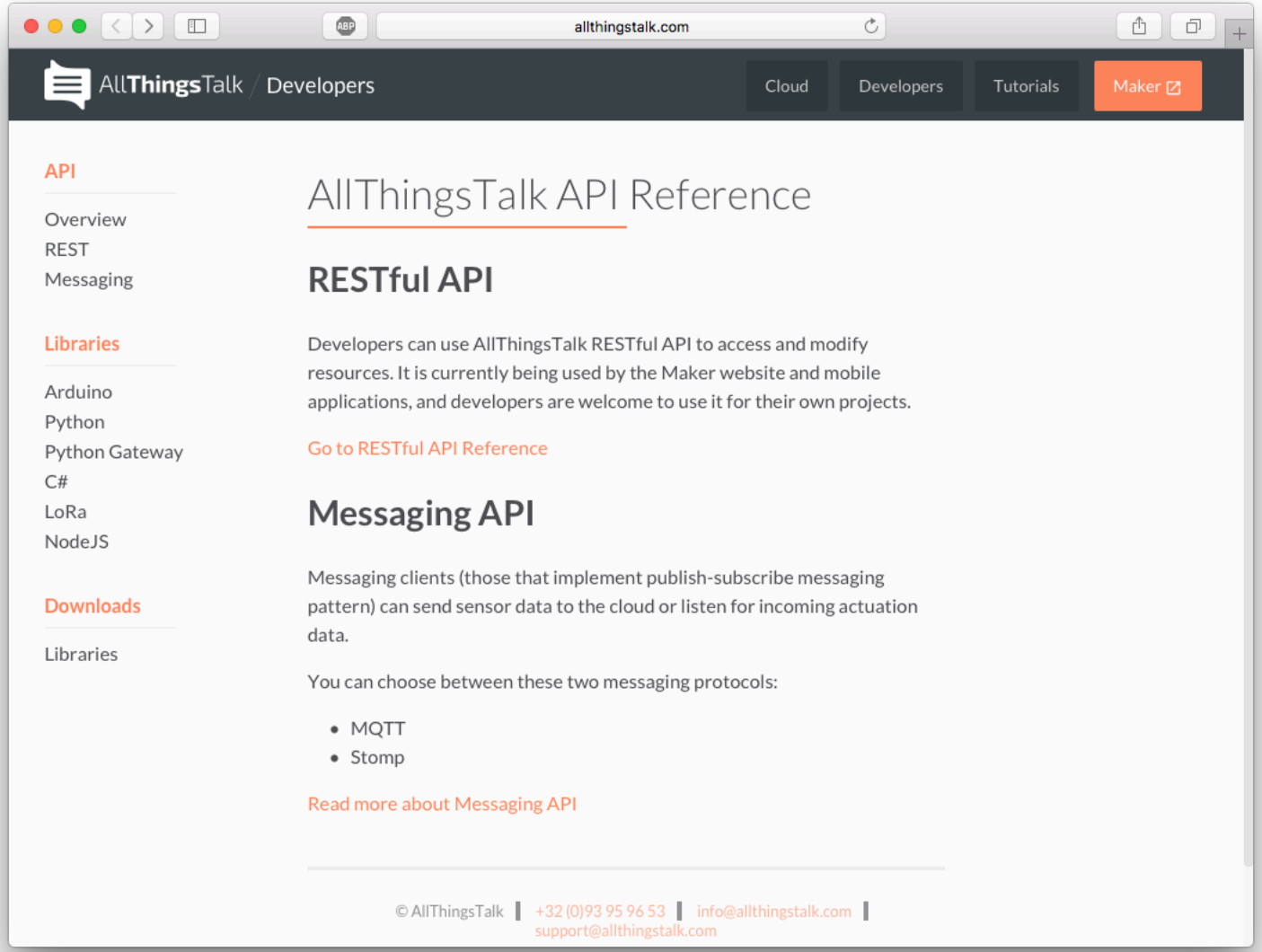
AllThingsTalk LoRa Rapid Development Kit - Cloud



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Ongoing work – master thesis

- Design Android plugin
  - High-level API to communicate with the AllThingsTalk cloud
  - Quick and easy integration of new functionality in existing applications
- Develop demonstration applications

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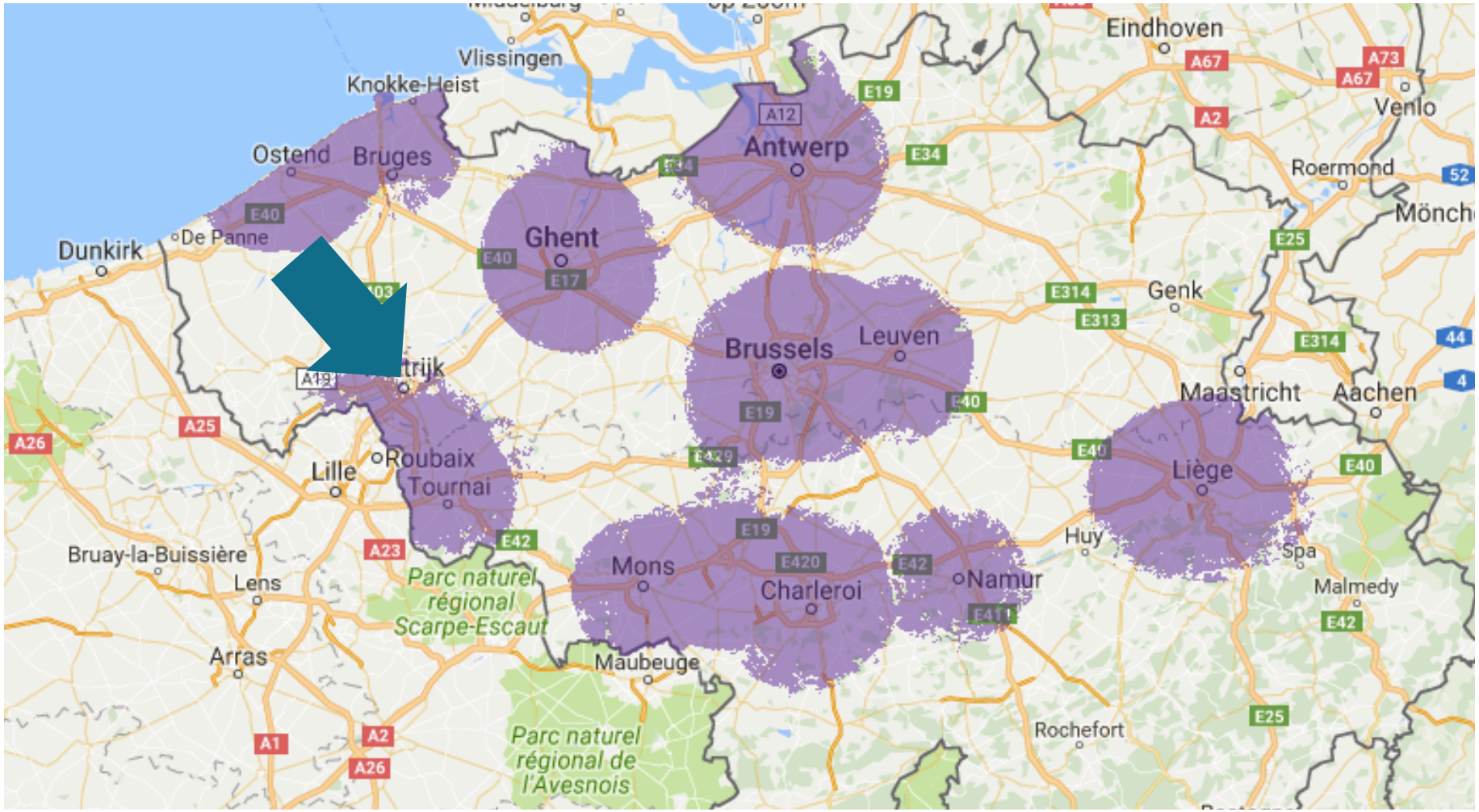
Before we start the demo…



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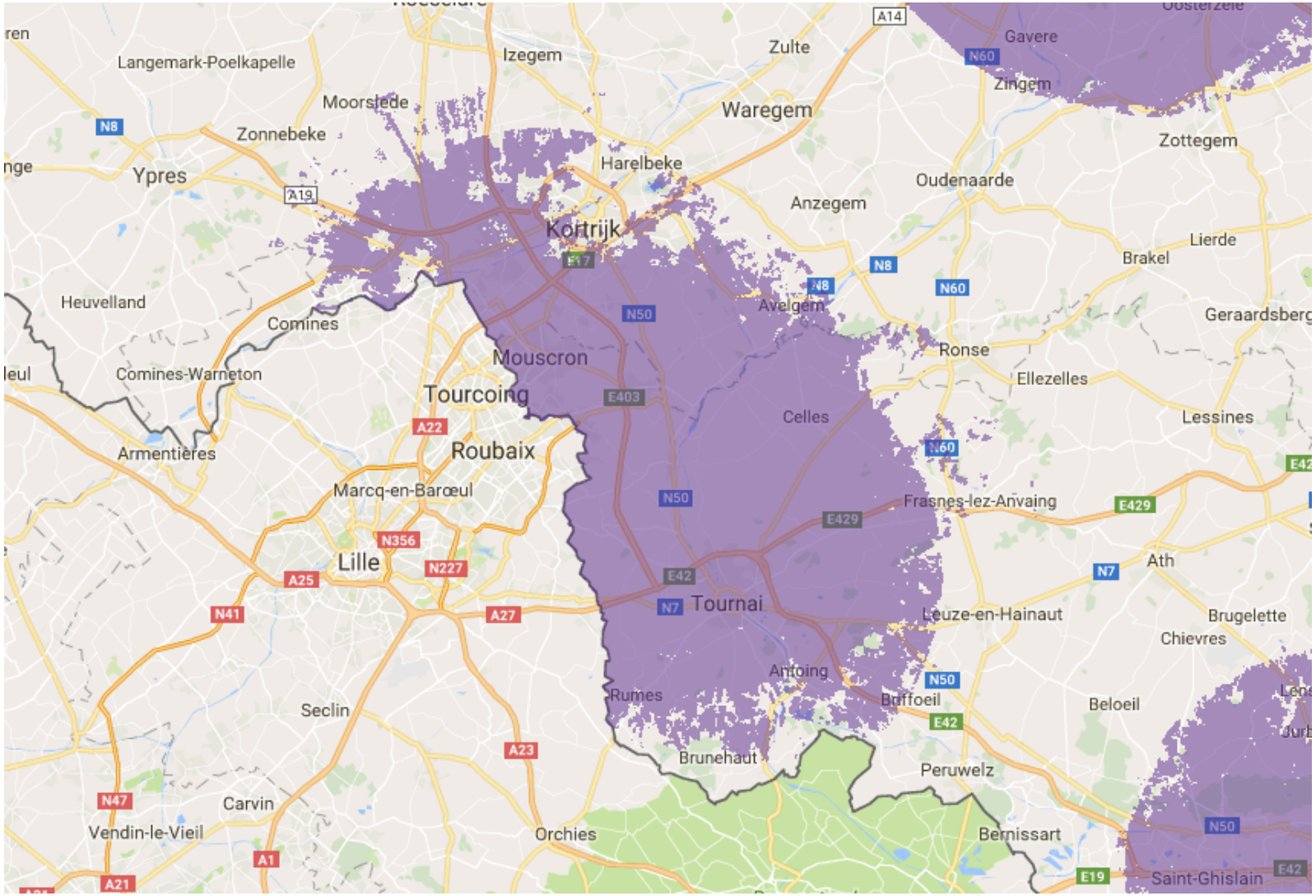
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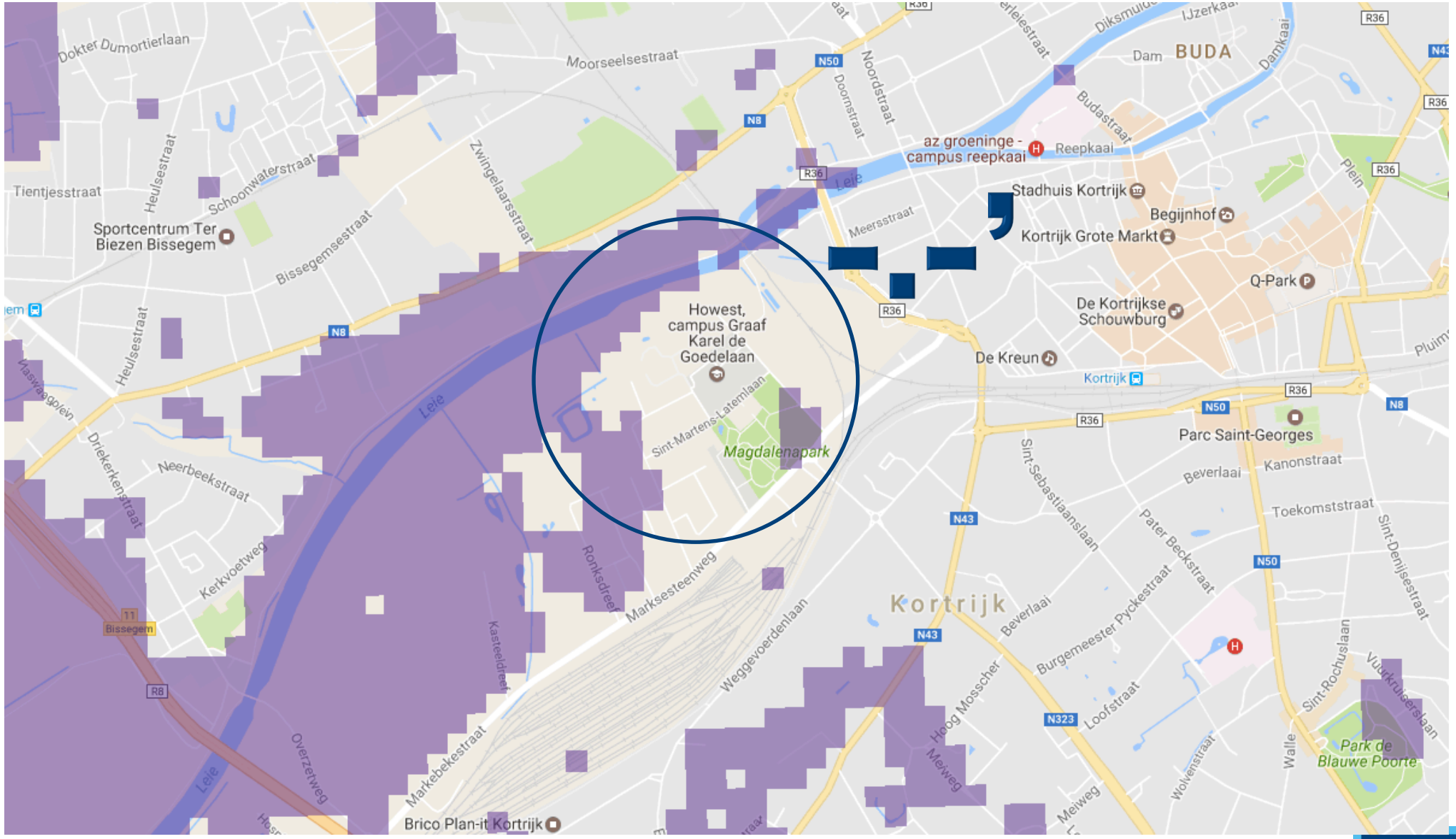
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Overzetweg
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Reepkaai
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De Kortrijkse Schouwburg
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Pater Beckstraat
Burgemeester Pyckestraat
Loofstraat
Hoog Mosscher
Meiweg
Wolvenstraat
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Vuurkruiserslaan
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Sint-Denijsestraat
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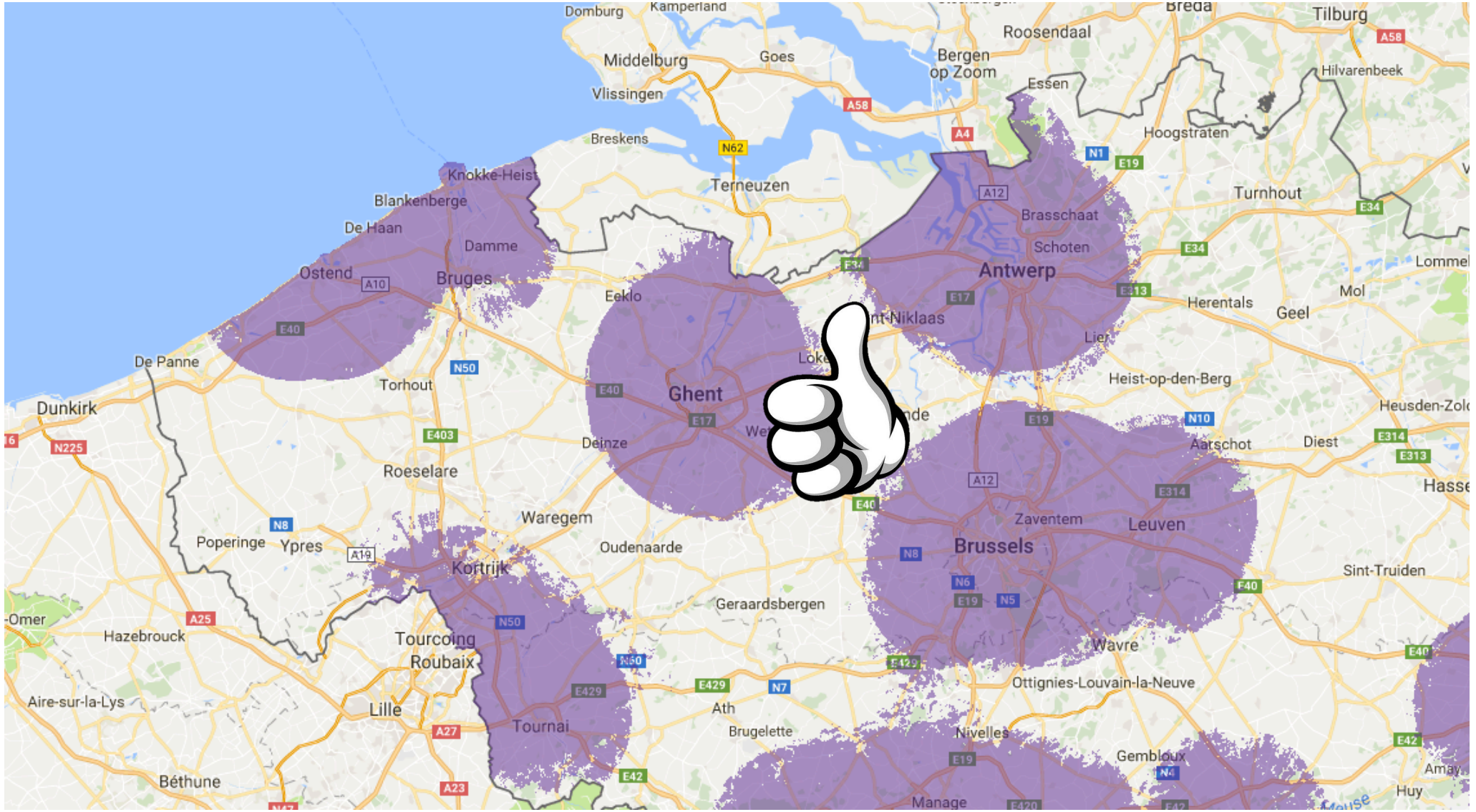
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Huy
Manage

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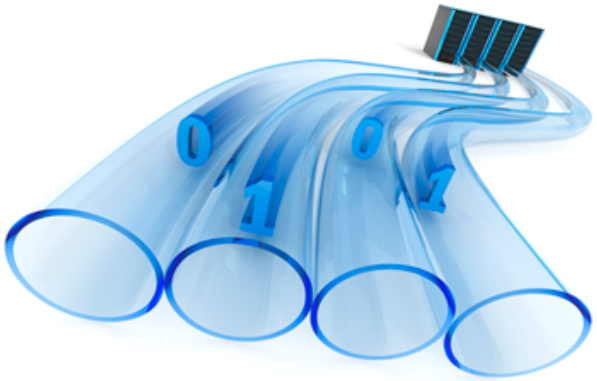
DEMO
DEMO

Data Flow Analysis



Data Leakage

- Company Reputation
  - Lose Customer Trust

- Economic Loss
  - Competitors obtain algorithms, list of clients, …

- Cloud is used increasingly often

Data Flow Analysis

- Goals:
  - Analyse which stakeholders have access to what data
  - Help assessor decide which actors to choose to prevent conflicts
    - Model data preferences and policies of different actors
  - Incorporate FAST-CPS security feedback

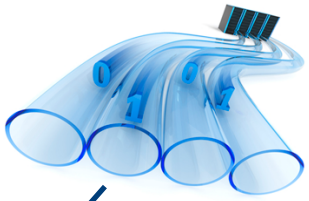
Methodology

Input

Actors &
Data Assets

Preferences &
Policies

Process Flow



Security
Vulnerabilities

Engine

IDP³

Output

Asset Profile

Conflicts

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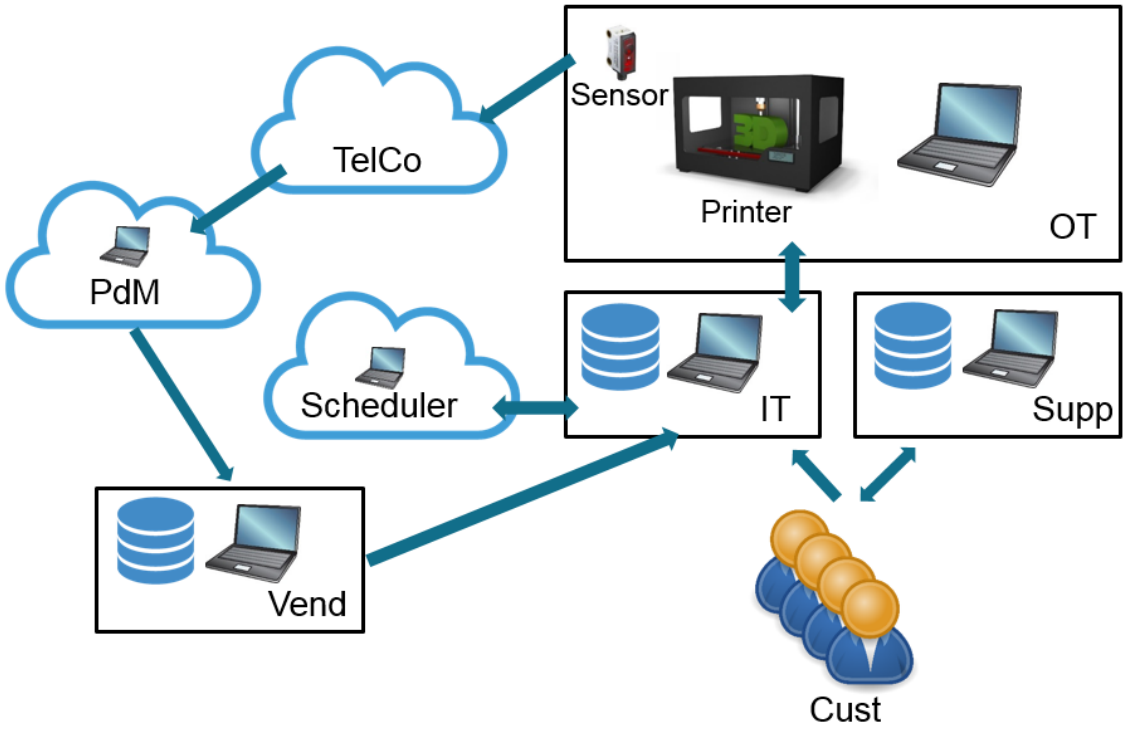
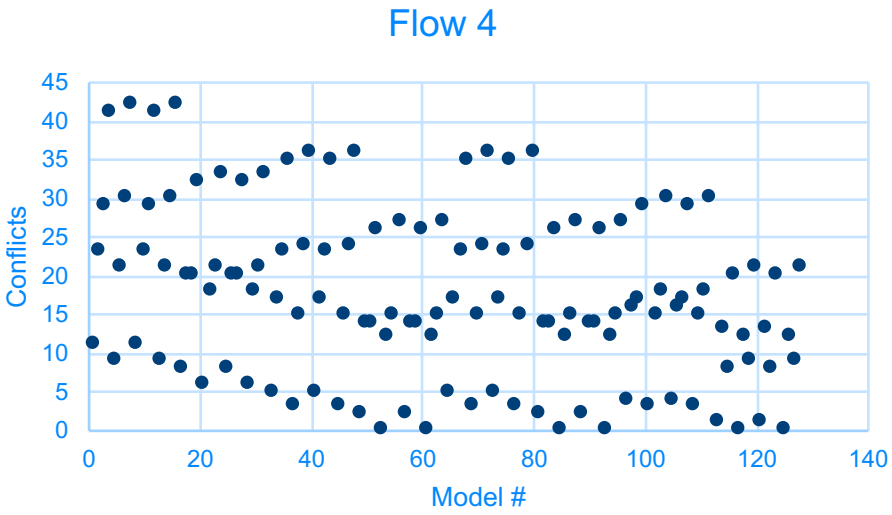
Case Study

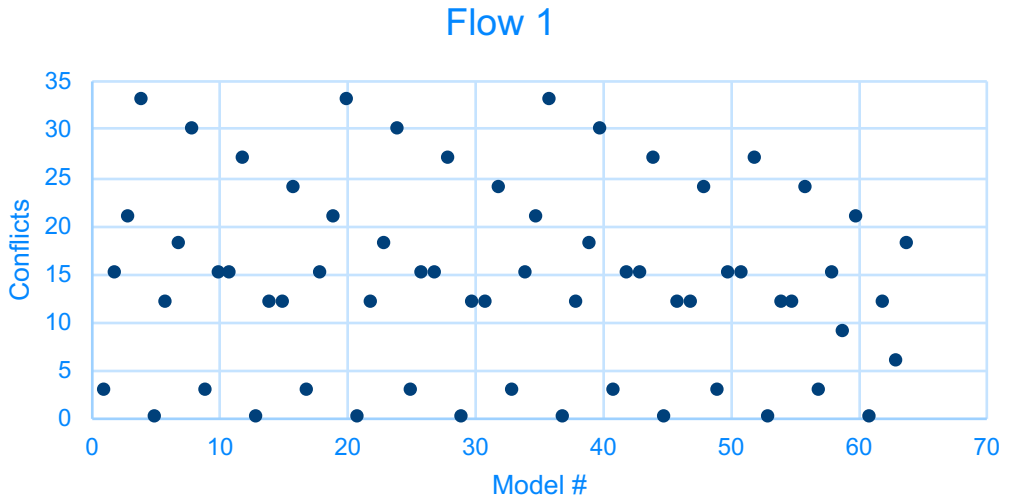
- 3D Printing company



- 384 different case study instances

Results





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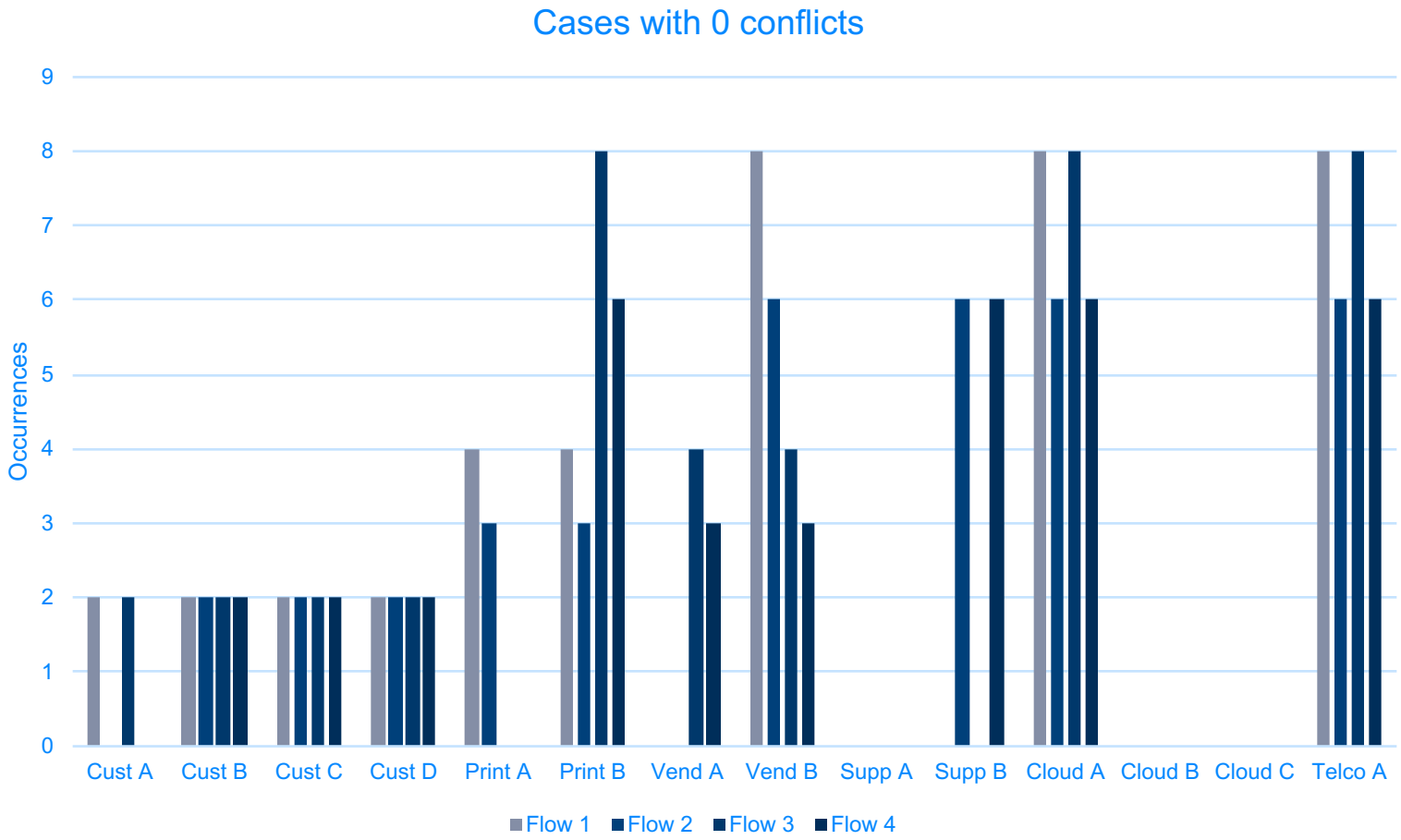
Feedback



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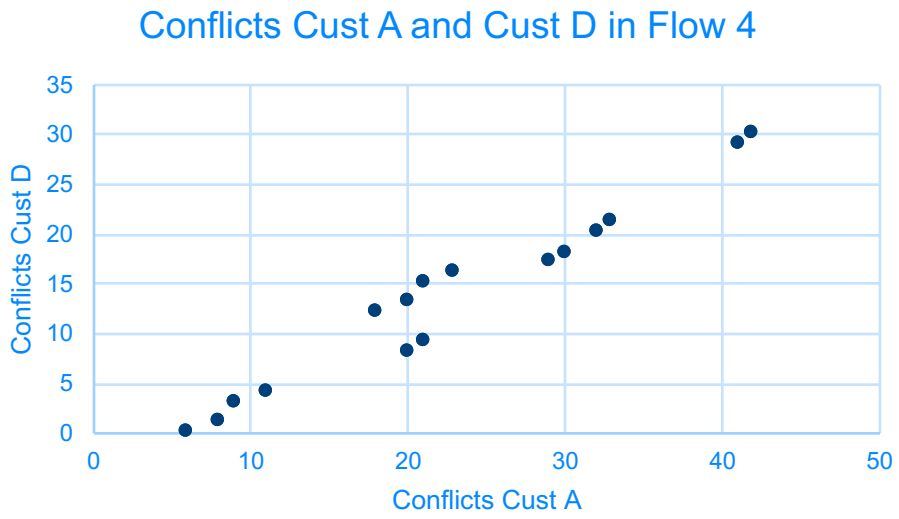
Feedback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5
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20
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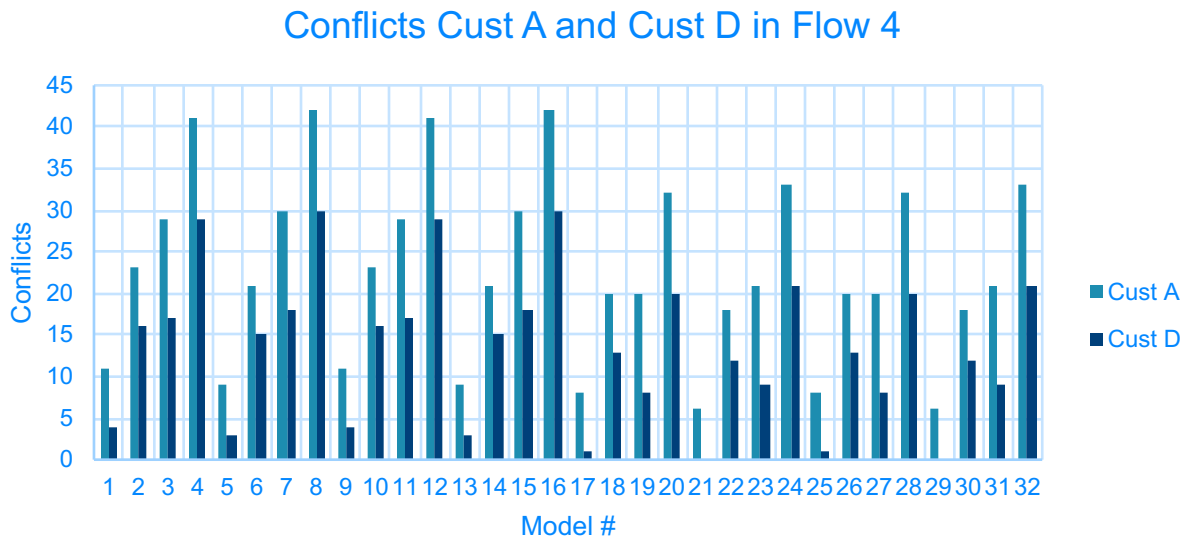
30
35
0
10
20
30
40
50
Conflicts Cust A


Conflicts Cust A and Cust D in Flow 4
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10
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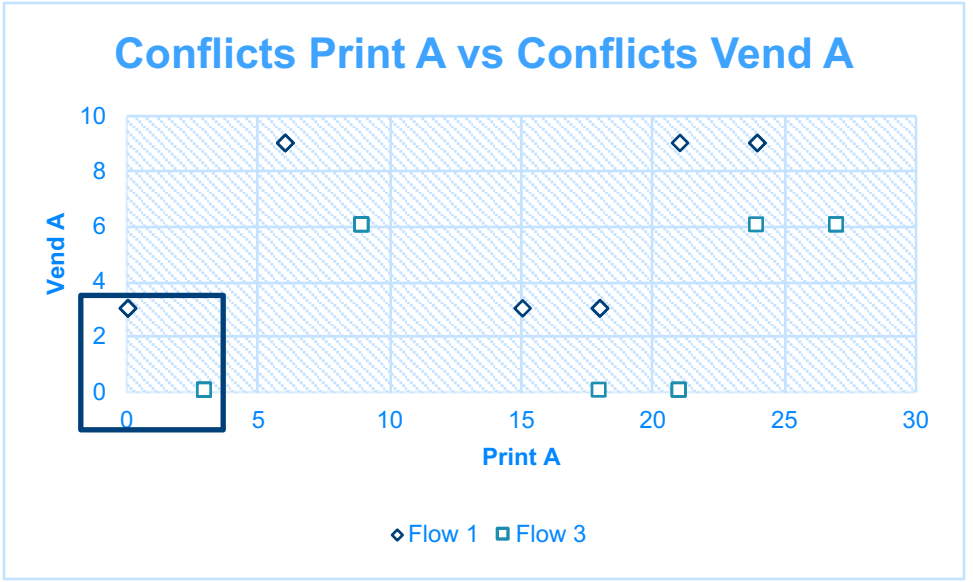
Model #
Cust A
Cust D

Feedback



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Conclusions

- IoT in ICS environments
  - LoRa technology is a viable option for communication with sensors

- Methodology to analyse information flow in ICS
  - Added to the FAST-CPS framework

Questions