



This project receives funding from the European Union's Horizon 2020 research and innovation Programme under grant agreement No. 883286



Institut Mines-Télécom



IMPETUS



# PLATFORM FOR SECURING CITIES – THE EUROPEAN IMPETUS PROJECT

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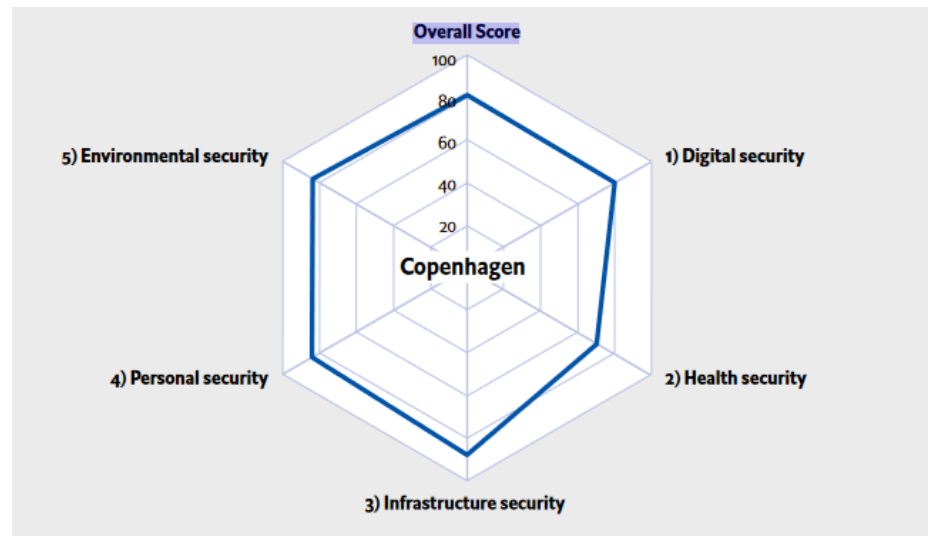
1. BACKGROUND
2. PRIVACY & CYBERSECURITY
3. BIOLOGICAL RISK DETECTION TOOLS

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## 1. BACKGROUND

*“a city can be intended as smart when social, economic and environmental factors are adequately balanced and linked via processes to more efficiently manage key assets, resources, and urban flow for real-time processes” (Yeh, 2017; Ismagilova et al. 2020).*

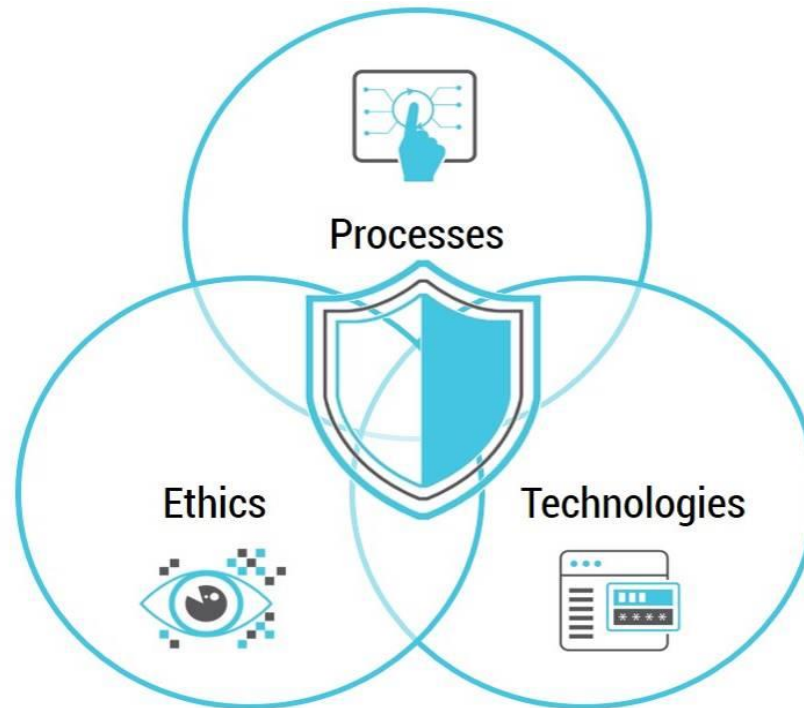
➔ The need for data to consider the operating parameters of the city



The economist,  
Safe cities index,  
2021

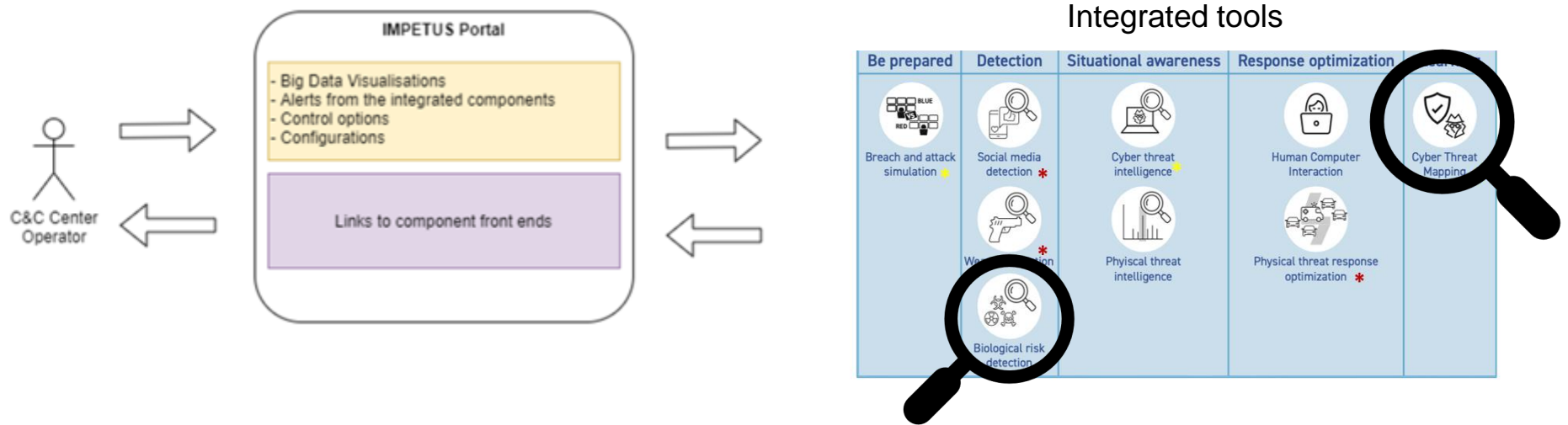
# IMPETUS (Intelligent Management of Processes, Ethics and Technology for Urban Safety)

Ethical digital platform of connected tools for city security



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Ethical digital platform of connected tools for city security



Biological Risk Detection

IMT Mines-Ales

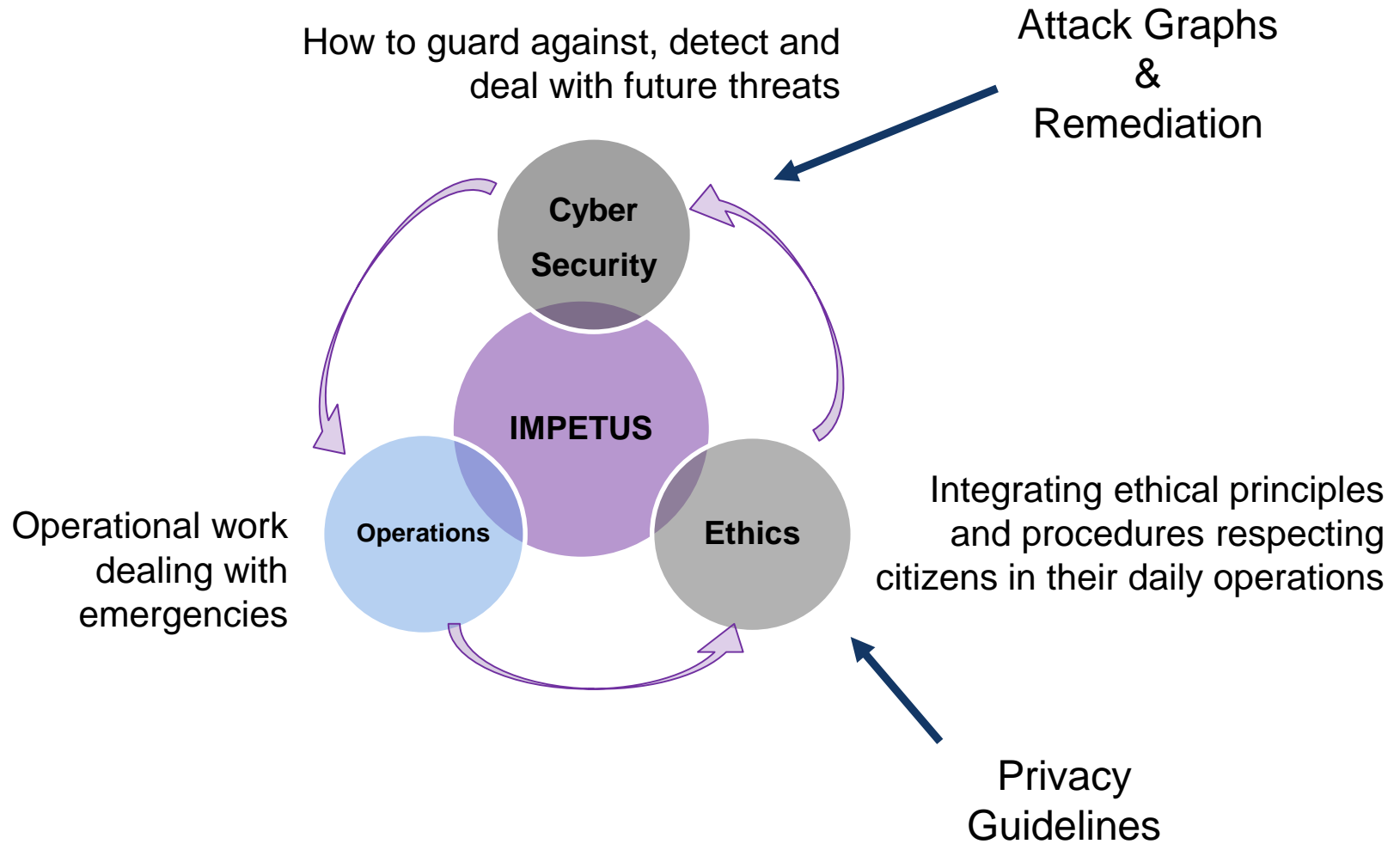
CTM  
Telecom  
SudParis

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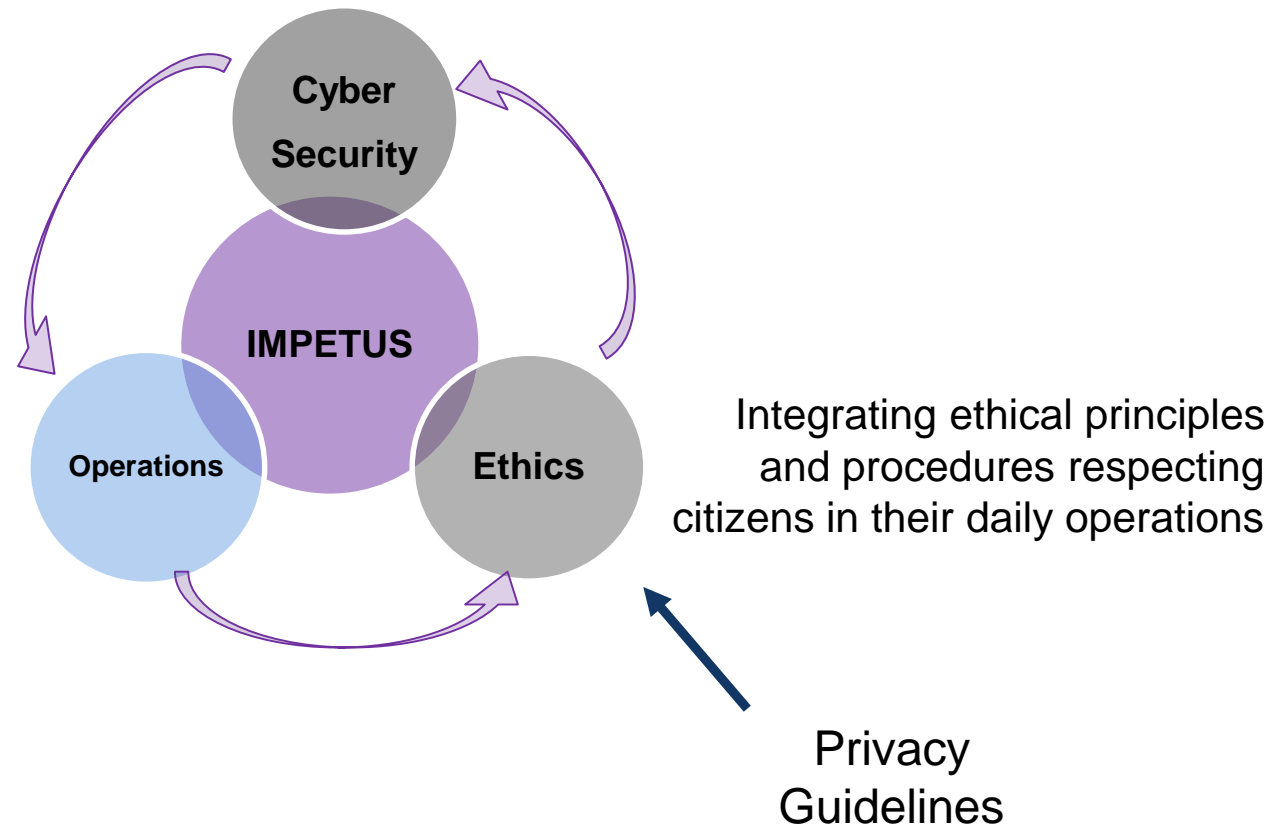
1. BACKGROUND

**2. PRIVACY & CYBERSECURITY**

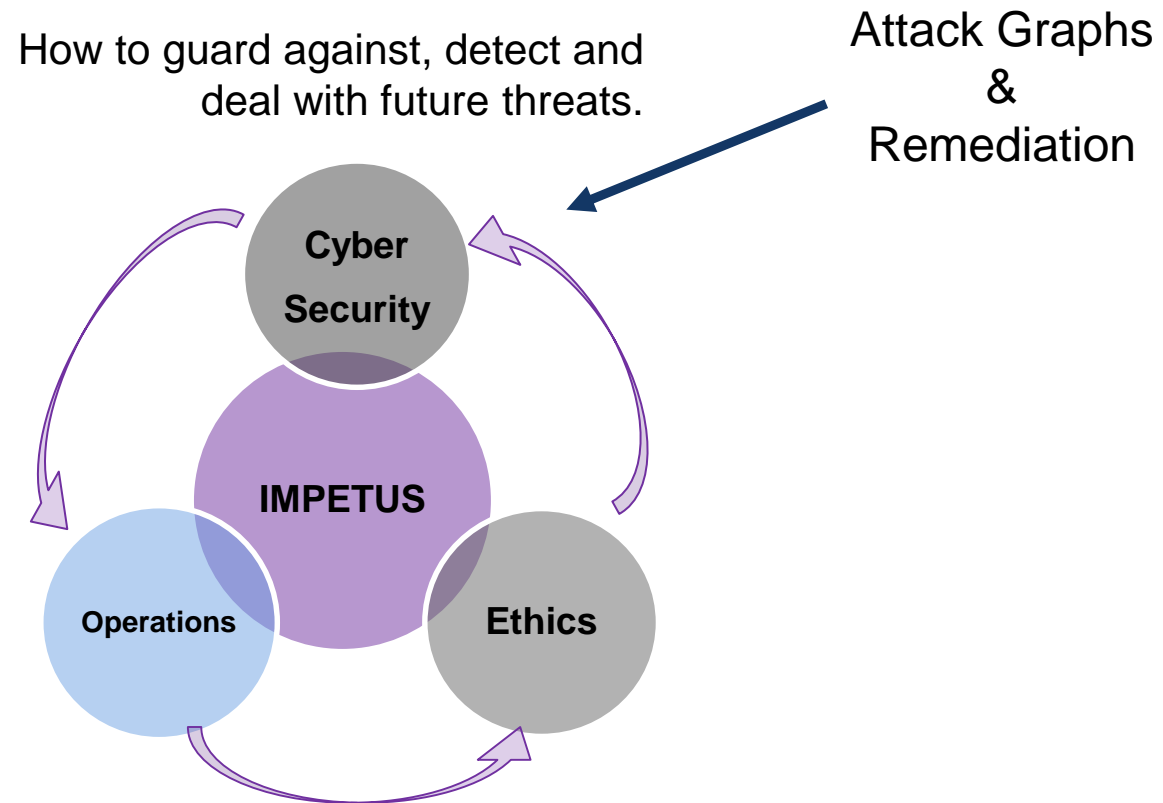
3. BIOLOGICAL RISK DETECTION  
TOOLS

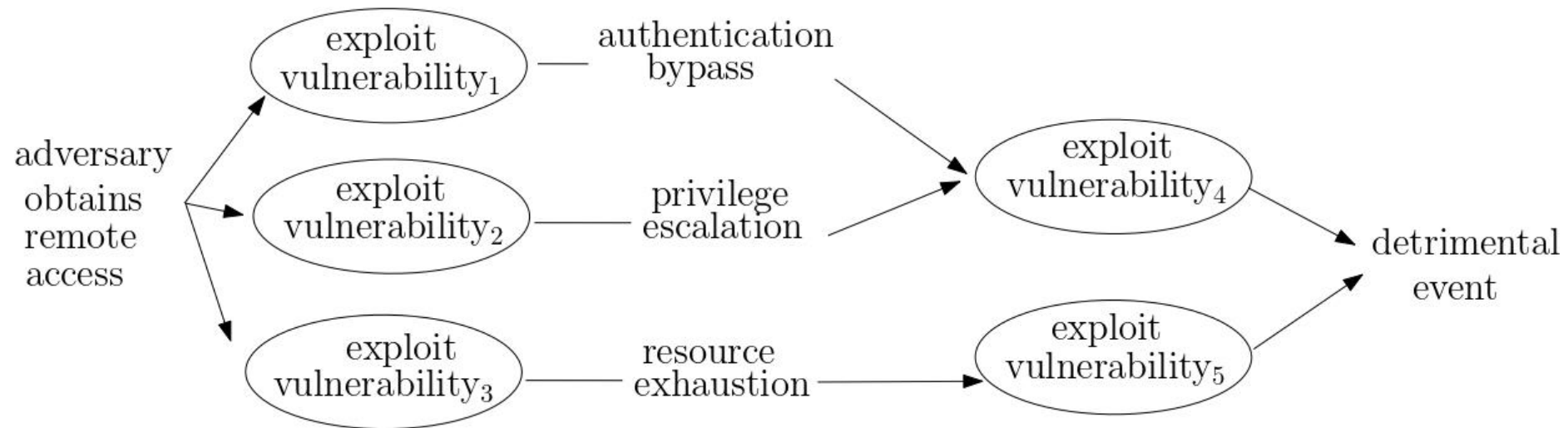






- **Privacy preserving auditing tools**
  - Transparency & auditing concerns
  - Address requirements by recent regulations
    - *Example: Provenance, informed consent & transactional privacy in blockchain*
- **Privacy preserving data collection**
  - Massive collection of sensitive data, e.g., due to AI-based systems
  - Impose privacy preserving data collection processes
    - *Example: use of homomorphic encryption to balance privacy & efficiency*
- **Privacy sensitive processing for ubiquitous environments**
  - Use of lightweight primitives adapted to resource-constrained devices
    - *Example: Intel-SGX based solutions for pervasive/ubiquitous applications*



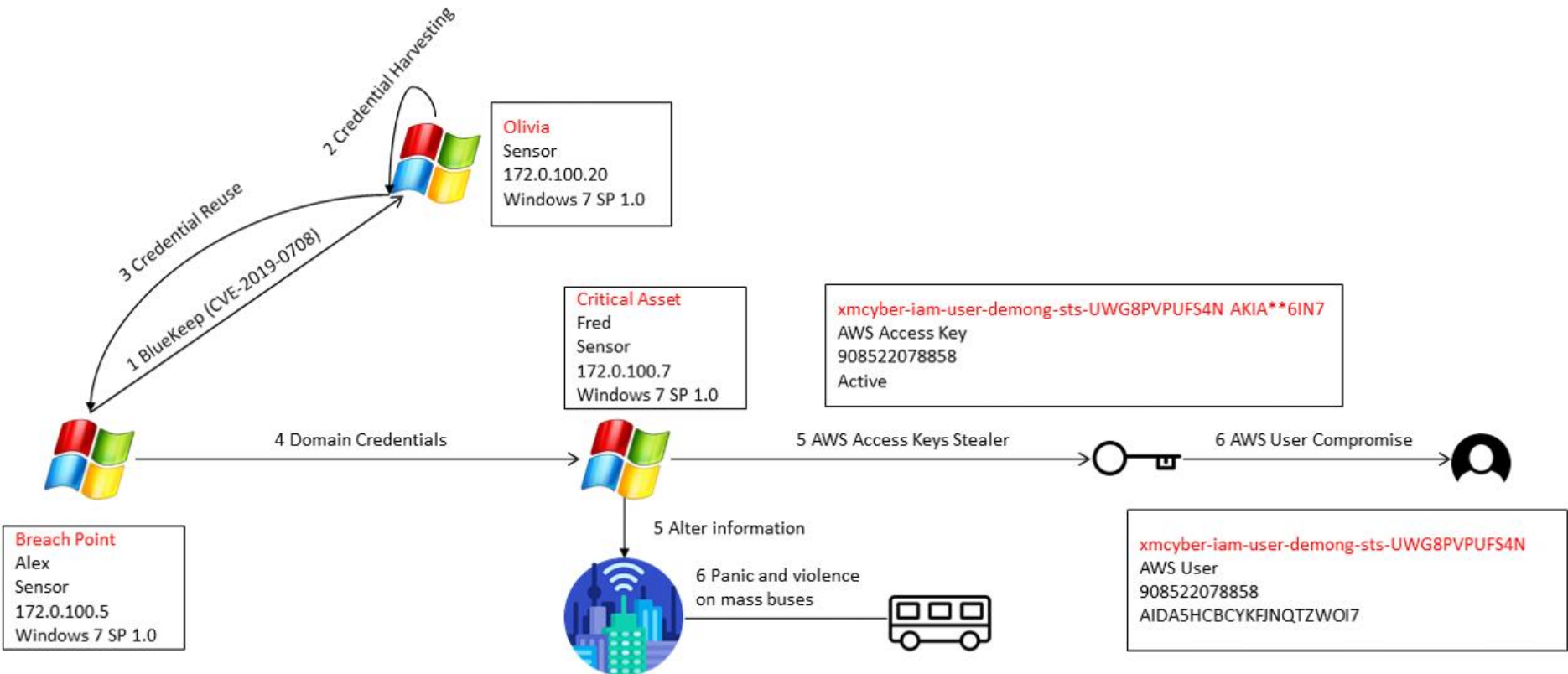


# Types de graphes d'attaque

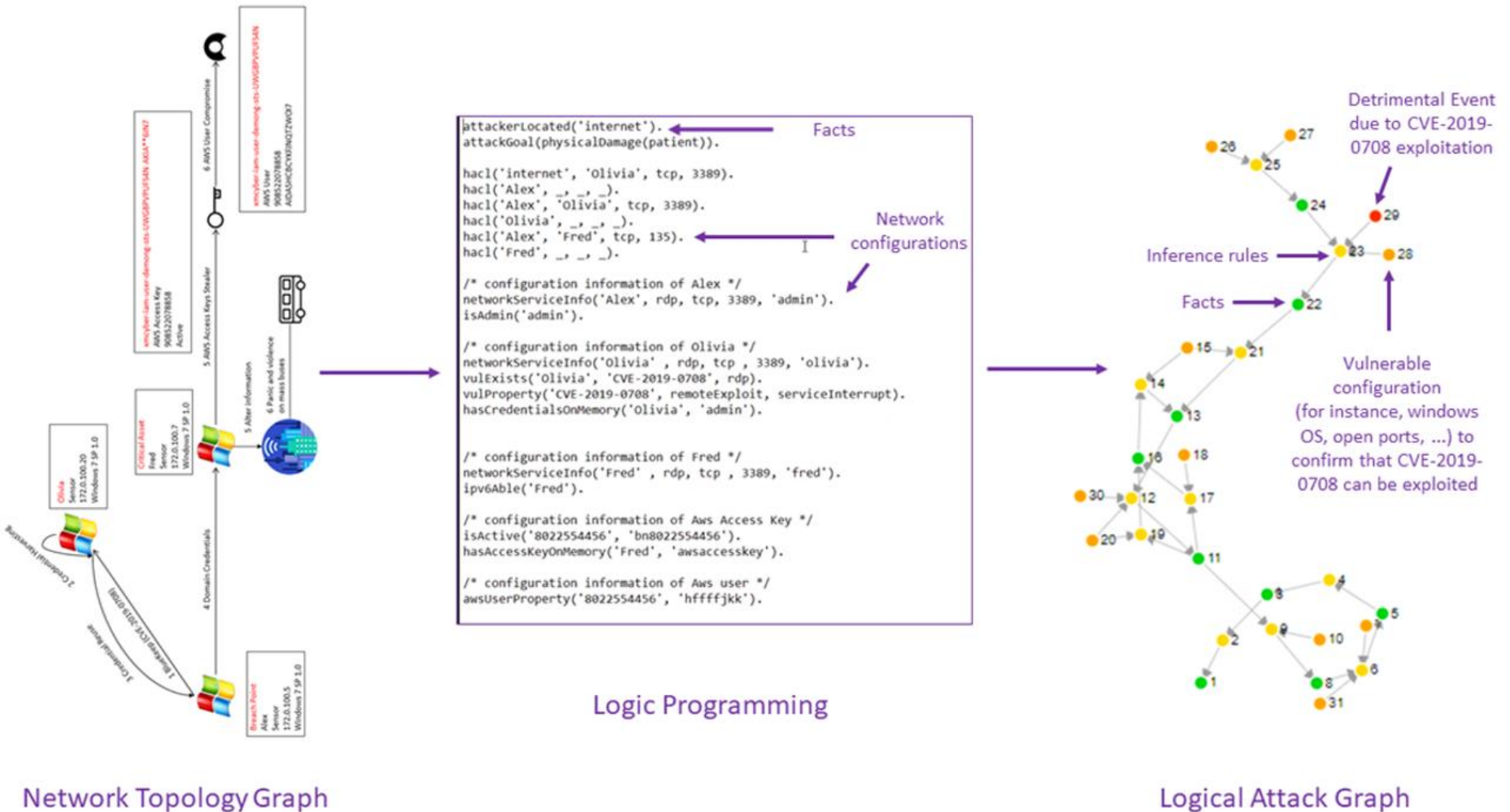
Graphes d'attaque logiques

Graphes d'attaque topologiques

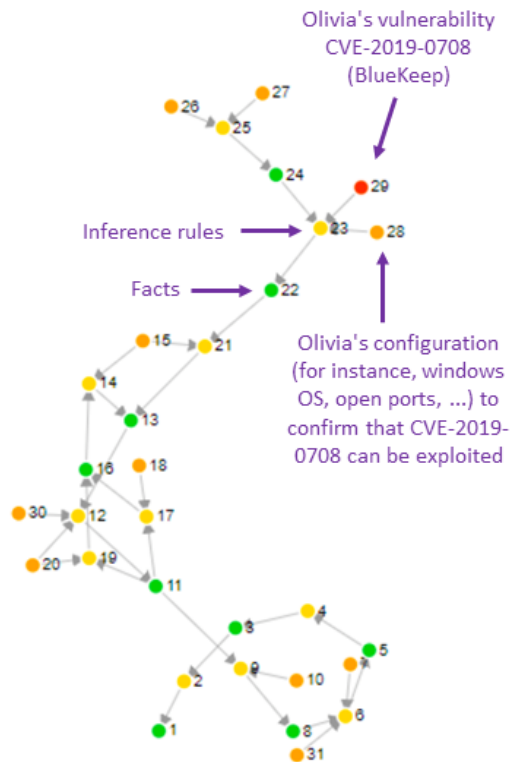
Graphes d'attaque Bayésiens



\* Saint-Hilaire et al. (2021). Ontology-based Attack Graph Enrichment, TIEMS 2021 Annual Conference, 18 pages, Dec. 2021.



Now, from proactive to reactive graphs ...



Logical Proactive  
Attack Graph

## + LOGS

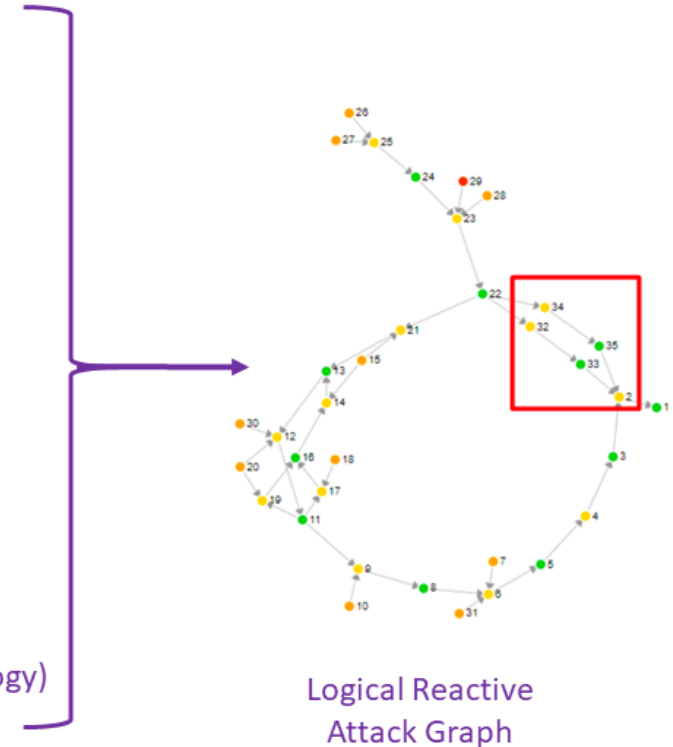
(from city devices, using  
rsyslog daemon installed at  
their premises)

## + ALERTS

(installation of  
PRELUDE-ELK + sensors  
such as Suricata)

## + NIST's VDO

(Vulnerability Description Ontology)



Logical Reactive  
Attack Graph



- Déterminer les meilleures contremesures à appliquer
- Description des patchs à appliquer pour ramener le système à son état d'avant l'attaque
- Prise en compte des coûts dans la sélection des contremesures
- Enrichissement de l'ontologie de vulnérabilité grâce au traitement automatique de langue naturelle

# CONTENTS

1. BACKGROUND
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EUREQUA:

Management of air  
quality and risk  
assessment

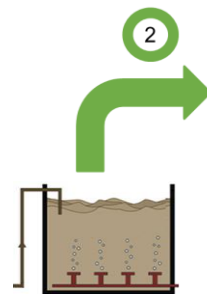
LSR : Laboratory for the  
Science of Risks

Métrie

Caractérisation des  
sources /  
Impact sanitaire

Moyens de remédiation

Odor and  
VOCs



Aérosolisation

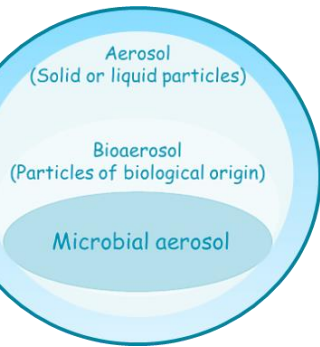


Dispersion



Impact  
sanitaire

## Air quality



Part 1 :  
Automated  
sampling



**Biocollector**

Developped

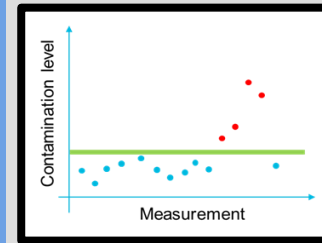
Part 2 :  
Automated  
Measurement



**G'nC'**

Adaptated and  
intergrated

Part 3 :  
Risk assessment



Alert sent to  
the platform

**Risk  
suspected**

**No risk**



**Soc**

**Soc**

Alert type : **No alert**

Sample concentration : **6**

Air Concentration Level : **929**

R0 : **1773**

R1 : **7283**

R2 : **797886**

**ALERT LEVEL**

**DETAILS**



**Soc**

**Soc**

Alert type : **Contamination**

Sample concentration : **4773**

Air Concentration Level : **636434**

R0 : **4055**

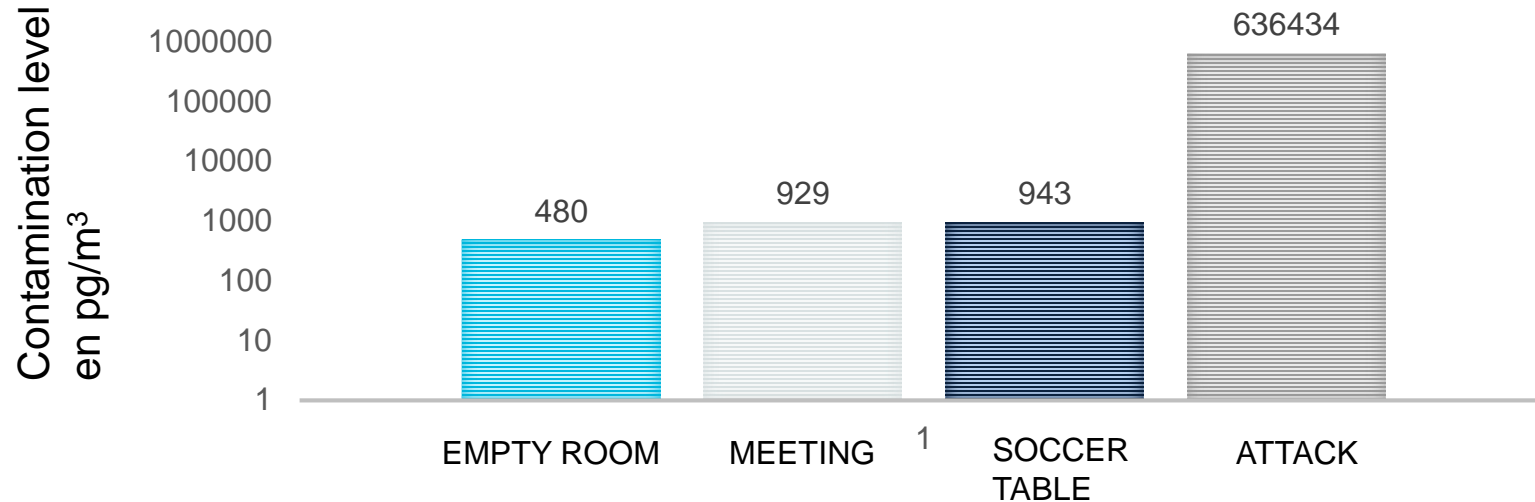
R1 : **8250498**

R2 : **9978132**

**ALERT LEVEL**

**DETAILS**





The concentration of bacteria in the air increases with different simulations  
We need collect data during several day  
A seasonal monitoring in different location

- Tests in different locations to define the threshold for different activities
- BRD was developed to detect bioterrorism attack
- There are other health threats
  - importance of addressing indoor air quality (pandemic/industrial/standards)



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## 17 Partenaires

### RESEARCH



### INDUSTRY & SMEs



### NGOs



### CITIES

