



# MIRANDA – Project Overview

## Securing Interconnected Digital Services



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# MIRANDA at a glance

- Title: **MIRANDA**  
Monitoring, Investigation and Response to cyber-attacks with an Adaptive digital twiN moDel for Agile services over the computing continuum
- Grant Agreement No.: 101168144
- HORIZON-IA Call: HORIZON-CL3-2023-CS-01-01
- Coordinator: **CNR-IMATI**  
Technical Coordinator: **SPACE HELLAS**
- 14 partners, 7 countries (IT, EL, PT, DE, PL, AT, CT)
- **Three use cases** to demonstrate the project results, to setup the MIRANDA framework:  
Wolfsburg Digital, Inclusive Genoa, Safe Athens



<https://www.mirandaproject.eu/>





# MIRANDA Goals

- Define and implement a Cybersecurity Digital Twin (CDT)
- Deploy proactive, adapted and automated detection and mitigation of cyber-threats
- Design and implement a privacy-aware zero-trust architecture for data collection
- Integration of MIRANDA platform in two with industry-grade SIEM/SOAR products.
- Release of an integrated free opensource platform (Community Edition)
- Deployment and operation in three service chains for Smart Cities
  - Wolfsburg, Genoa, Athens

SIEM - Security Information and Event Management

SOAR - Security Orchestration and Automated Response





# Digital Service Chains

- Smart cities infrastructures heavily rely on Digital Service Chains (DSC)
  - Heterogeneous interconnected third-party providers
- Designing a new service in the smart city domain involves:
  - Inventory of resources needed
  - Select providers
  - Get, configure and interconnect resources

*This results in a service chain*





# The risks of digital service interconnection

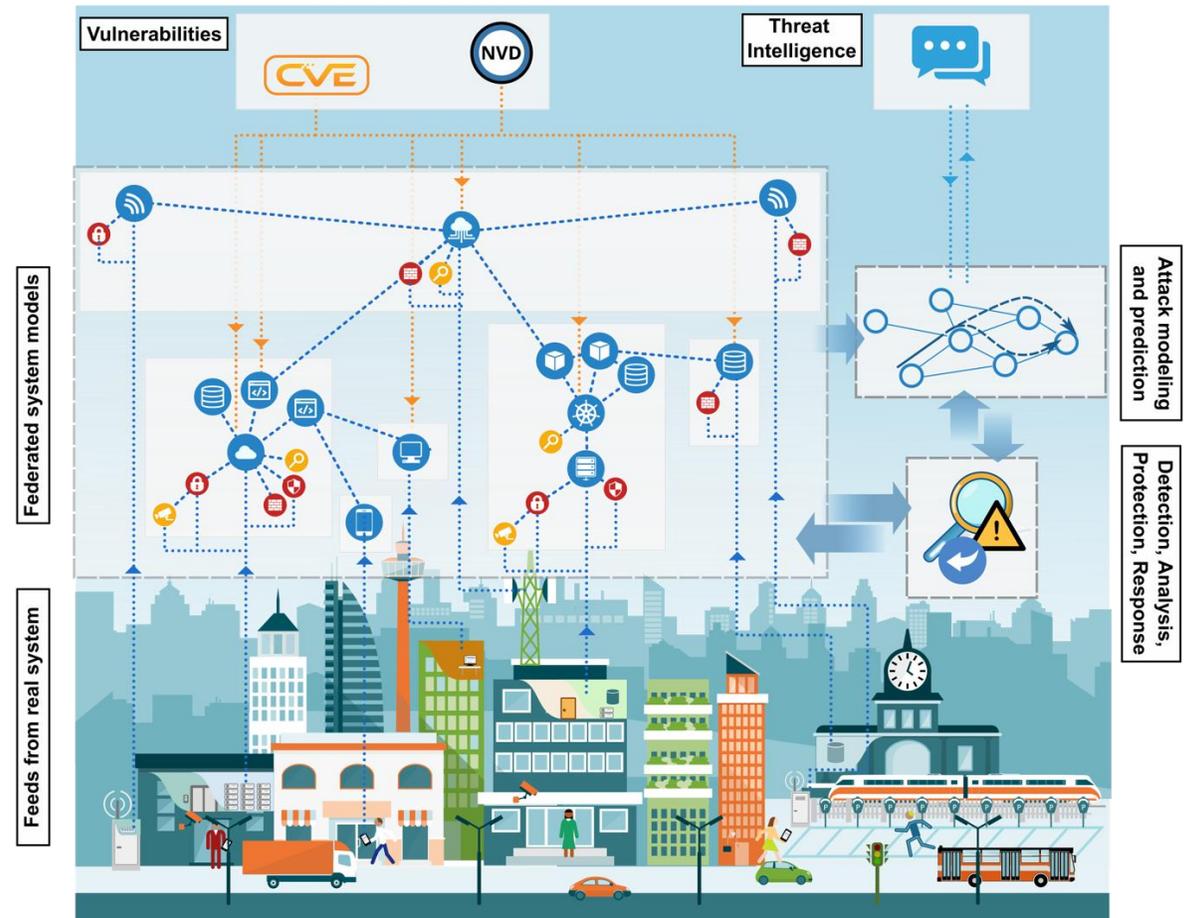
- Service providers deploy security tools individually.  
However, they are planned and deployed in isolation
- Individual providers are not aware (or care) with attacks against other domains  
This leads to fragmentation of cybersecurity operations





# The role of Cybersecurity Digital Twins

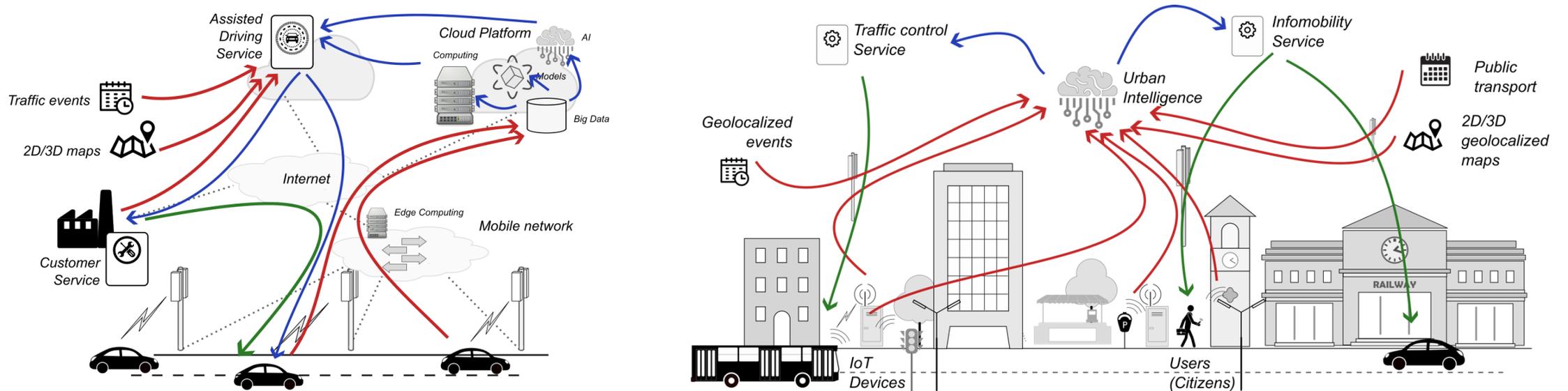
- Digital Twins provide a virtual model and emulation/simulation of objects, systems, and processes
- Can be applied in multiple sectors
- Enable analysis and protection of physical systems while minimizing impacts on production systems
- Current Digital Service Chains (DSC) connect multiple devices and services heterogeneously
- Multi-provider scenarios can open the B5G/6G environment to vulnerabilities and attacks





# The MIRANDA CDT approach

- Addresses the complexity of interconnected systems with Service Context Graphs (SCG)
- Addresses the relationships between multiple providers
- Designs and Implements
- Identifies root causes of attacks and predicts their propagation
- Suggest actions to mitigate threats





# Use Case - Wolfsburg Digital

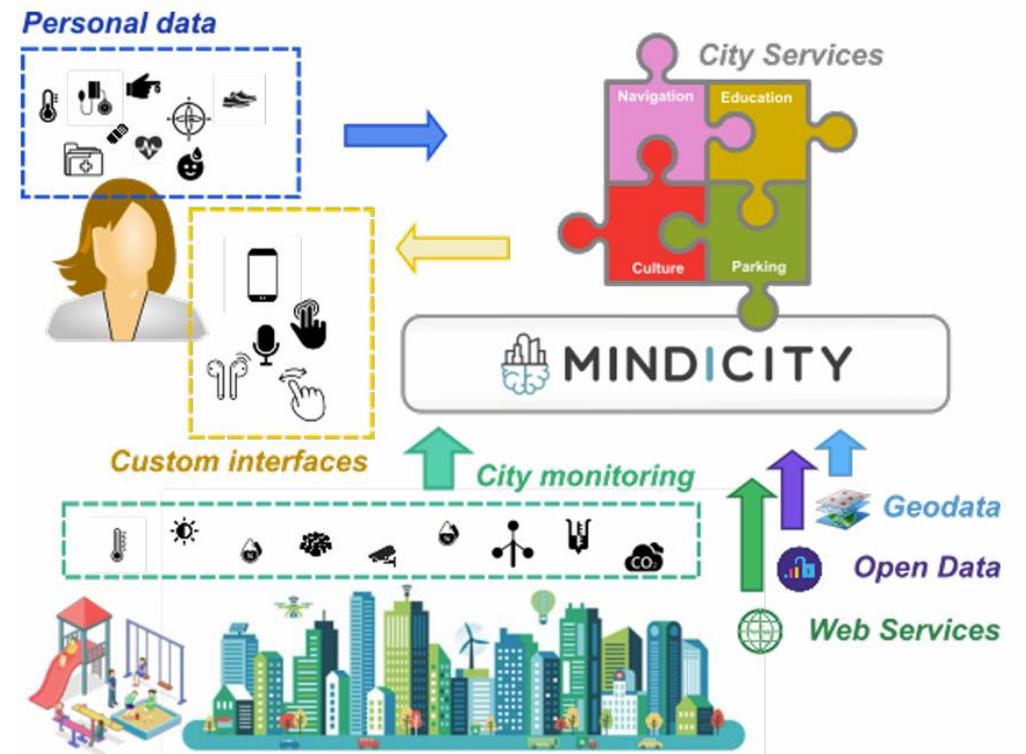
- A service-oriented ecosystem for collection, processing, and sharing of large bulks of data around the City, operated by WOB with GDPR compliance
- Includes several components compliant with FIWARE
- Multiple Smart Cities applications can be built on top of this infrastructure
- Wolfsburg digital services includes:
  - Intelligent traffic lights
  - Urban planning and mobility,
  - Smart parking
  - Electrical charging
  - Bring-your-own-device
  - Open data for businesses and citizens





# Use Case - Inclusive Genoa

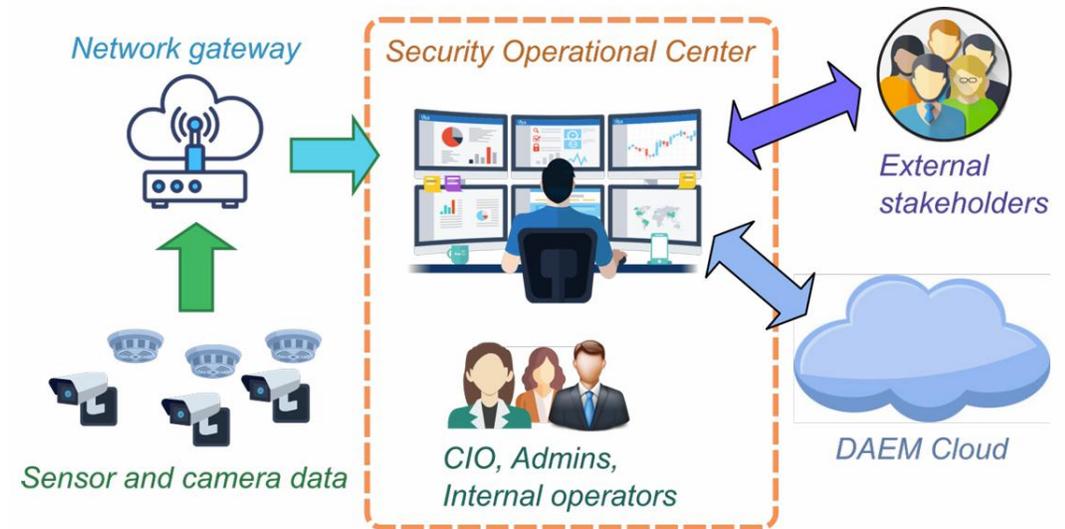
- Genoa pursues a user-centric urban paradigm to improve the life of its citizens
- Implements a smart ecosystem delivering adaptive city services to different citizens' abilities, promoting inclusive engagement
- Based on the Mindicity Framework:
  - An Urban Intelligence platform that mixes Big Data, AI, and City Science
- Includes:
  - IoT devices,
  - External databases,
  - Citizens personal data
  - An Urban Intelligent platform, and several city services.





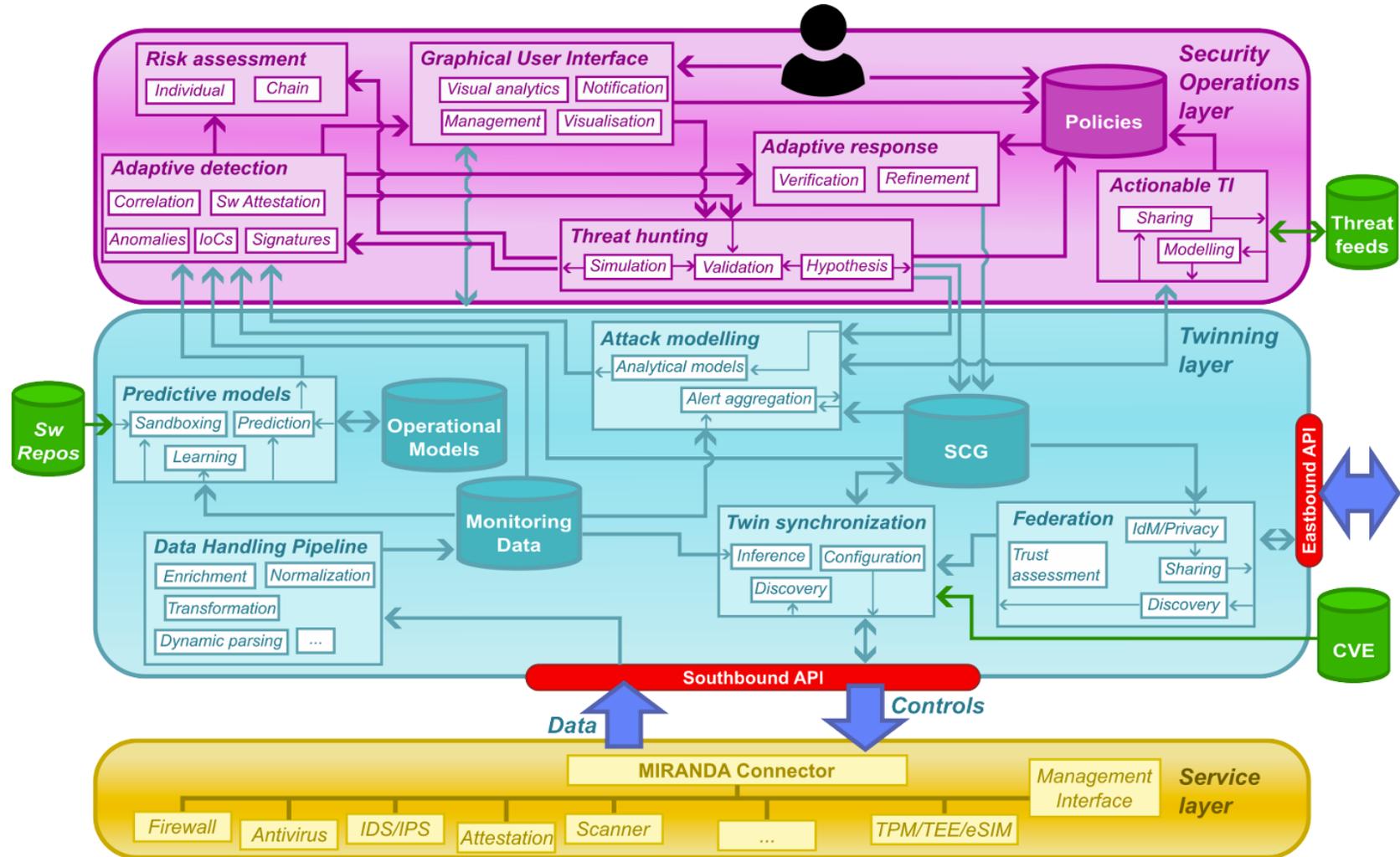
# Use Case - Safe Athens

- Developed by DAEM, the IT Company of the Municipality of Athens
- Includes innovative services for administration the citizens:
  - e-Services
  - Public safety
  - Access to municipal assets
- Includes a public safety hub system, with edge-devices monitoring cases of physical emergency and enforcement agencies alerts
- Connects:
  - Smoke detectors
  - Cameras with face recognition and object detection,
  - Gas sensors





# MIRANDA Architecture





# MIRANDA expected outcomes and impact

- To better context awareness and **improved monitoring, detection, and response**
- Implementation of a DT for cybersecurity operations
- Secure integration of untrusted IoT in trusted environments
- Improve digital infrastructures resilience
  - Dynamically and continuously authenticate and verify the identify and integrity of providers and their digital resources
- **Making Smart City services safer and more trustworthy for citizens**





# Thanks

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