Project ME1.1.d

mesmart

The living city.

Barcelona, SmartCity Expo 2019

CUP F41I18000230006
CIG contratto SPC L3 7691600D1A
CIG contratto SPC L4 7691623019

Messina

WELCOME TO THE CITY OF MESSINA

Agenda
- The Governance Framework
- The Project Tale
- The Prominent Capabilities

The Governance Framework

Madonna-Port of Messina - By Michele Bassi - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=2640842

The governance Framework

Messina

626.000 people

>70% natural protected areas

>218km sea-coast

Entry Point of Sicily
Eolie vulcanian islands

Project

~ 5,4 M€ Total funding

~ 1,6 M€ Sensors

11 | 2018
12 | 2021 Duration

1 Open and indipendent architecture and system

The Governance Framework

"Project Co-Design to speed up public administration"

Pon Città Metropolitane Funds management

Città Metropolitana Funds beneficiary

Adhesion to National Contract Framework

IT Solution procured through National Framework contract
Sensor and devices procured through tenders
Partnerhsip, sperimentations

The Approach

Stakeholder consultation

↳ **Design Thinking** Approach

Provide Support and collaboration

↳ **Administration Departments**
and Multiutilities (AMAM) Commitment

Updates and involvement of external stakeholders

↳ **Communication** with **Regional departments**
and other interested **agency**

Agile approach to development
Looking forward to the future

↳ **Solid IOT Big Data solution** to enable **new features** and
integrations, new application

Tunna Traditional Fishing -By Shifegu - Own work, CC0,
https://commons.wikimedia.org/w/index.php?curid=61334899

The Project Tale

Revealed Needs

> **I can image an adaptive City, where Administration can take decisions helping City Users in their life**
> *(Jo vogghiu 'na città chi rispunni a chiddu chi dimannu)*

> **I would like to know what my City do to preserve and improve its health, that is mine too**
> *(Jo m'immagginu una città chi mi cunta di so mancanze)*

> **I believe in a City where technology lives in symbiosis with the urban skin**
> *(Jo vurria n'avanzamentu ca scurri n'te vini da me città)*

«*MEsM@RT* is an *ecosytem*

of infrastructures,

sensors, IT solution and Open application

environment as enabler for
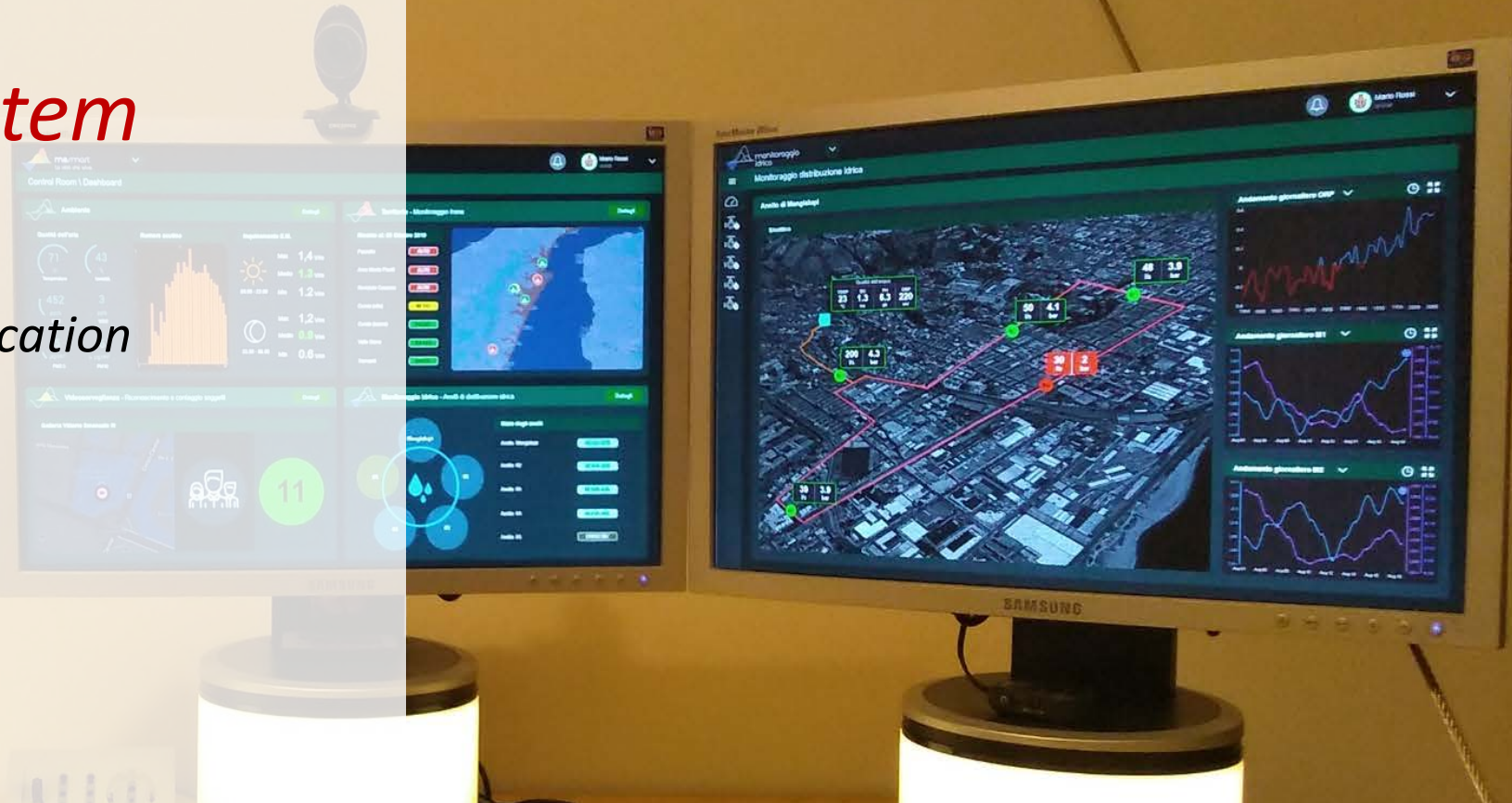
Urban resilience»

Our Solution

«We have defined 5 Key targets»

1 | Provide **Digital user centred information** about **city deep analysis**

2 | Provide **tools to support** city planning and intervention

3 | Enable a **continous monitoring process**
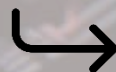
4 | **Increase efficiecy** and **efficacy** of **urban services**

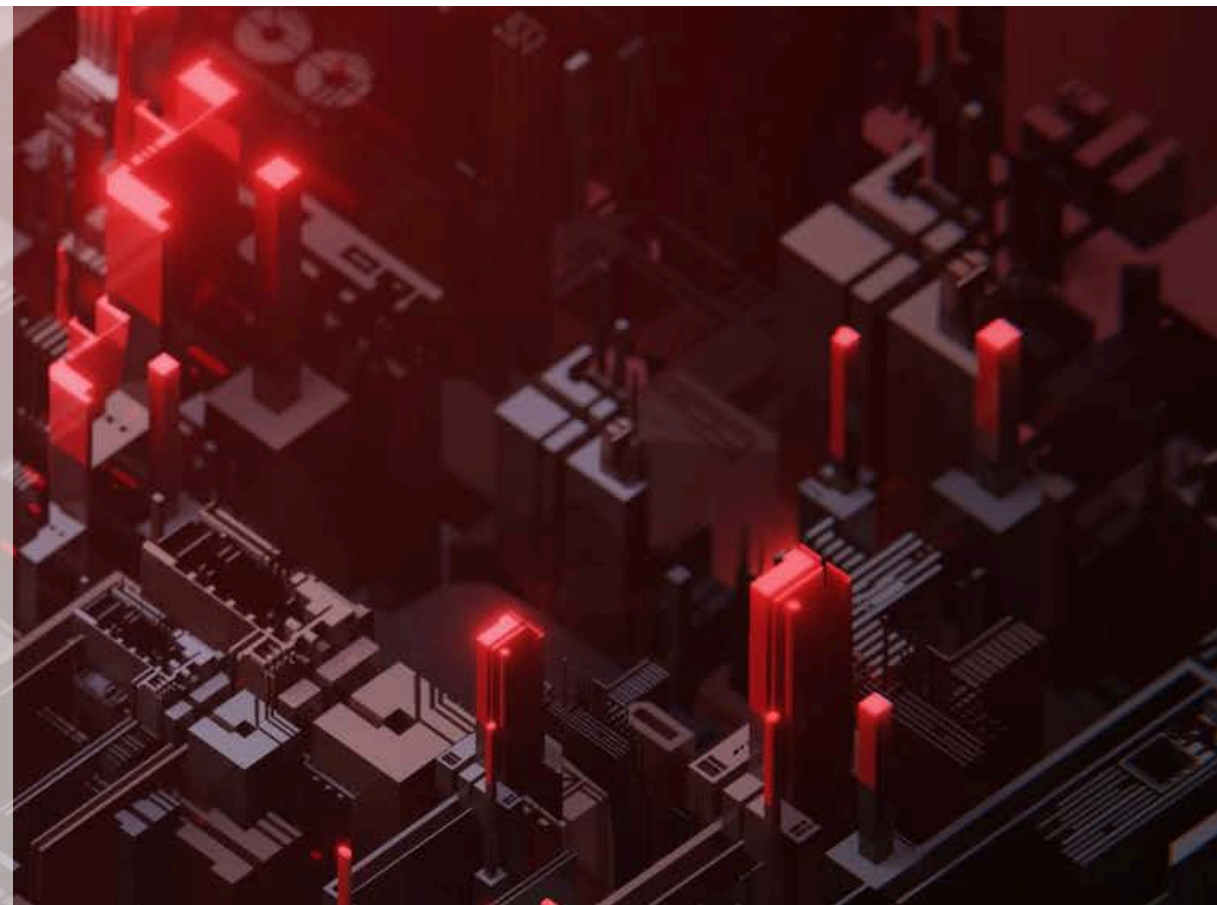**5** | Accelerate the **adoption of new technologies**

The project Tale

How we face the challenge

«Digital is not the solution, it is a foundation part of it»

We face the **project taking care of entire «City Stack»**, applying a **multilayer** approach:

⤷   - Civil Works
- Procurement
- Government Processes
- Fundings
- Stakeholders engagement

«and We need a multidomain perspective»

Territory

Monitoring

→
- Urban Landslide
- Hydrological phoenomena

Urban Services

Monitoring

→
- Intelligent Videosurveillance
- Hydric Distribution pipe monitoring

Environment

Monitoring

→
- Eletromagnetic Pollution
- Air Pollution
- Acoustic pollution

Sciara di Fuoco-Stromboli typical eruption

Attended Results

1 **Sensor distribution for urban data collection and communication infrastructure enforcement**

2 **1 Control Room** as communication system of events and alerts among interested actors, data analys and prediction based on what if analysis

3 **4 vertical applications to deep monitoring of specialized domains**

4 **Web portal /App/Bot** to publish reports and send coherent information to the City Users

5 **Urban safety&security application** through adoption of AI algorithms on videocameras

6 **Integration with new GIS System** of Messina Municipality and generally in Messina IT environme nt

Overall Architecture
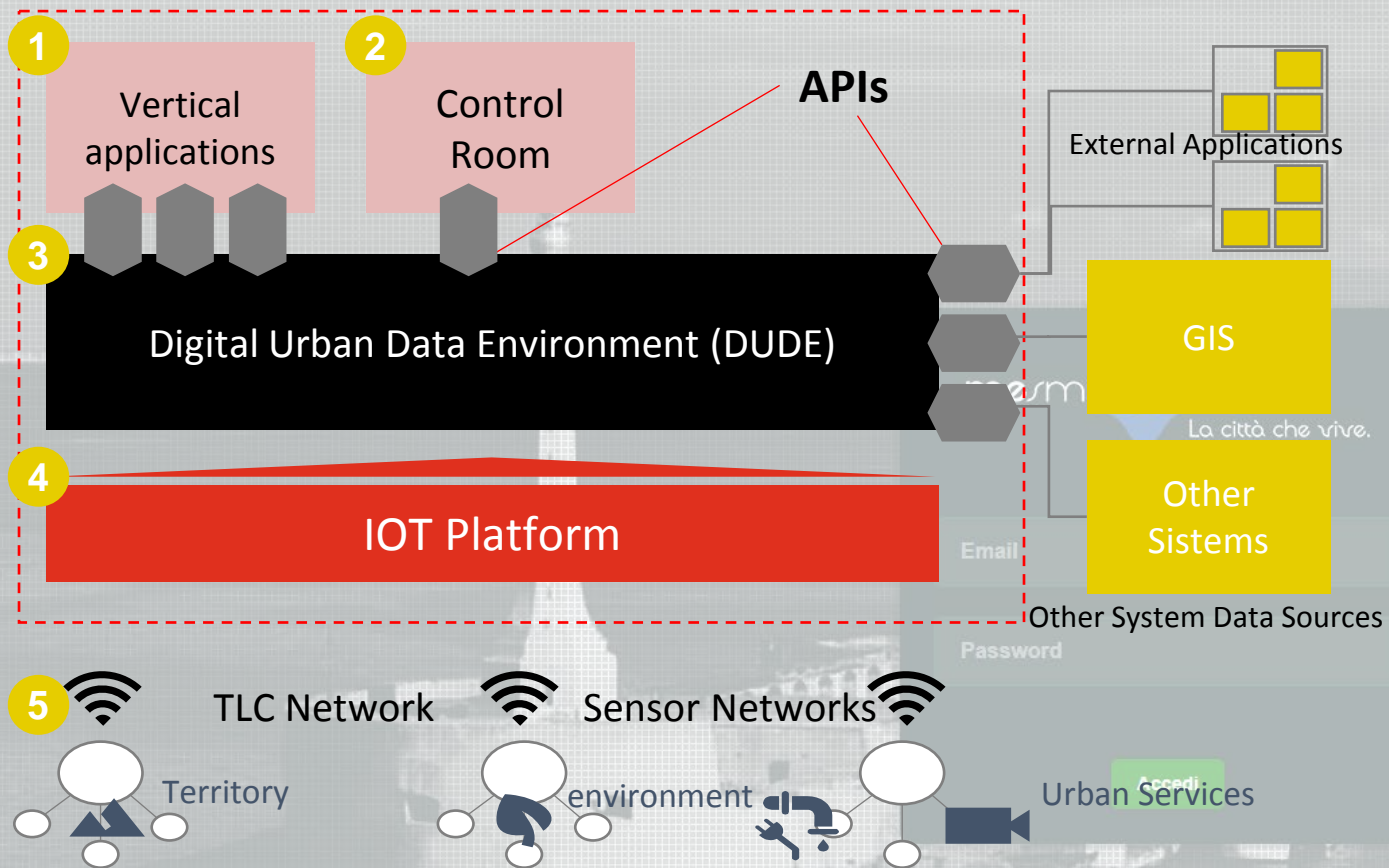
1. **Vertical Application:** systems covering Project Use Case. They are completely decoupled with Data and interface with API.

2. **Control Room:** Coordinating System fulle operative 24h/7D for sercurity, safety, and alerts

3. **DUDE:** Data Analytics and monintoring platform

4. **IoT platform: managing, collecting and processing data from on sensor field**

5. **Reti TLC e di Sensori:** Wireless sensors networks ans sensros, communicating each other and able to reveal environment changes

The project Tale

Where are We now
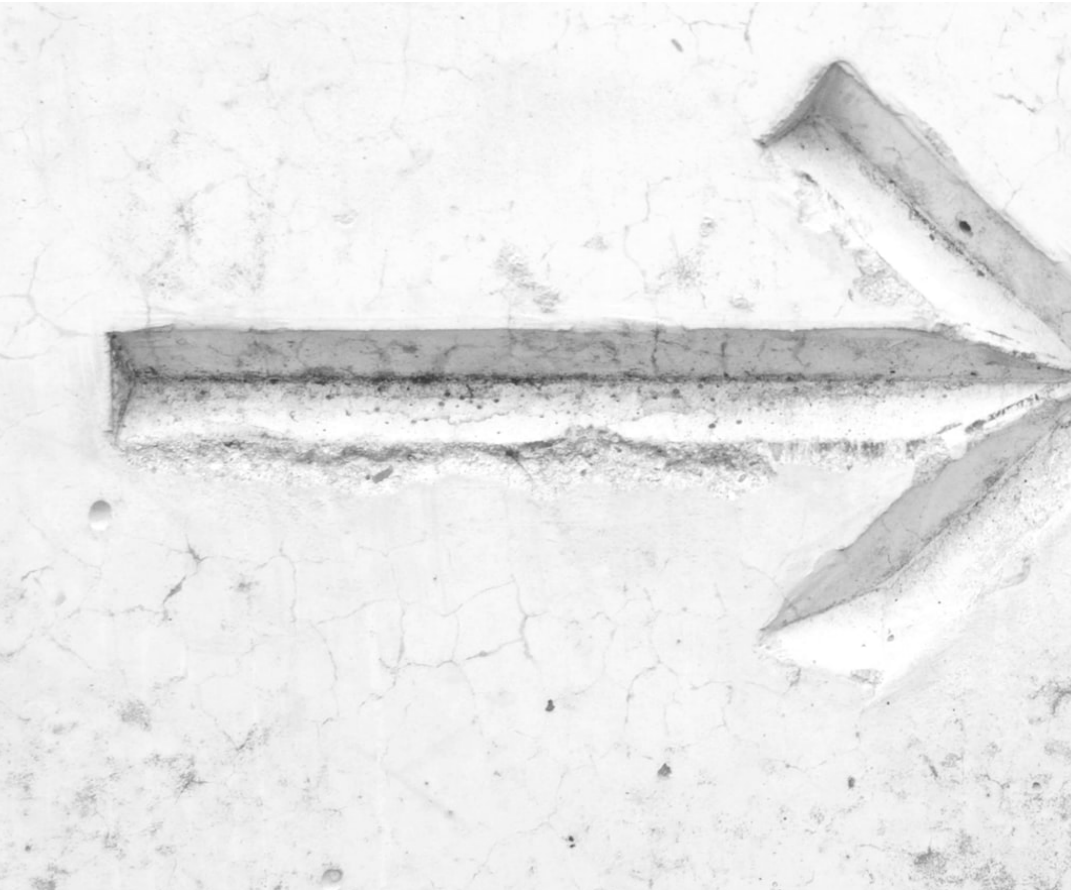
- Procurement of **5** environment monitoring station (acoustic, e.m. air pollution)

- **IoT and DUDE** (Digital Urban Data Environment) Infrastructure installation and Vertical application **POC** implementation

- Procurement of **5** monitoring station for Hydric distribution pipe monitoring

- In closing procurement of on-field Wireless sensor Network to monitor **5** critical landslide
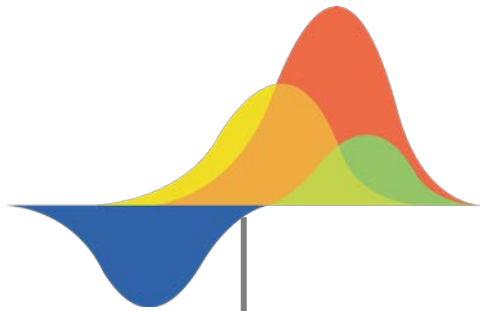
- **5G and Optical Fiber** provider- dialogue for connectiviy sperimentation

Prominent Capabilities

Traditional event- la Vara By Effems - Own work, CC BY-SA 4.0,
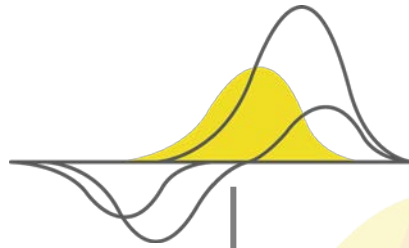https://commons.wikimedia.org/w/index.php?curid=81863342

Four main vertical applications coordinated by a central control room
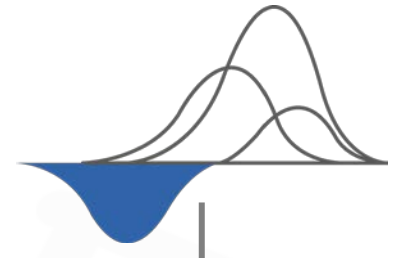
Control Room

Landslides monitoring

Video surveillance

Environmental control

Water distribution cycle management

Prominent Capabilities
Control Room

Target

A central Control Room would support the Civil Protection to monitor all the four verticals, and the platform will assure the acquisition (and export) of data to other existing services for a better control of the city

Stakeholder

Civil Protection department, Urban and Mobility department, Local Police

Prominent Capabilities

- Central place to control the evolution of the four different phenomena's
- Different KPIs, alerting and warning signals
- Integration with existing monitoring services for an integrated and advanced platform
- Data Analytics functionalities and predictive algorithms to prevent events evolution

Next Milestone

- Integration with additional services, both existing ones (e.g. Civil Protection assets) and new ones (based on funding availability)

Prominent Capabilities
Landslide and Territory Monitoring

Target

A full control of the whole Municipality of Messina regarding the landslides phenomenon (thanks to Cosmo-SkyMed image analysis), and in depth analysis of 5 specific areas introducing different types of IoT sensors to complement satellite images with on-field equipment's

Stakeholder

Civil Protection department, Urban and Mobility department

Prominent Capabilities

- 110 km^2 of observed area
- 3D visualization, live navigation and automatic alarm detection capabilities
- SAR risk evaluation through Cosmo-SkyMed image analysis
- Integration with on-field sensors for in-depth analysis
- Integration with existing Civil Protection sensors and infrastructural assets (e.g. rain network sensors, TLC network, etc.) for model evaluation of risk escalation

Next Milestone

- Procurement of field sensors for on site monitoring of 5 dangerous sites (expected live from February 2020)
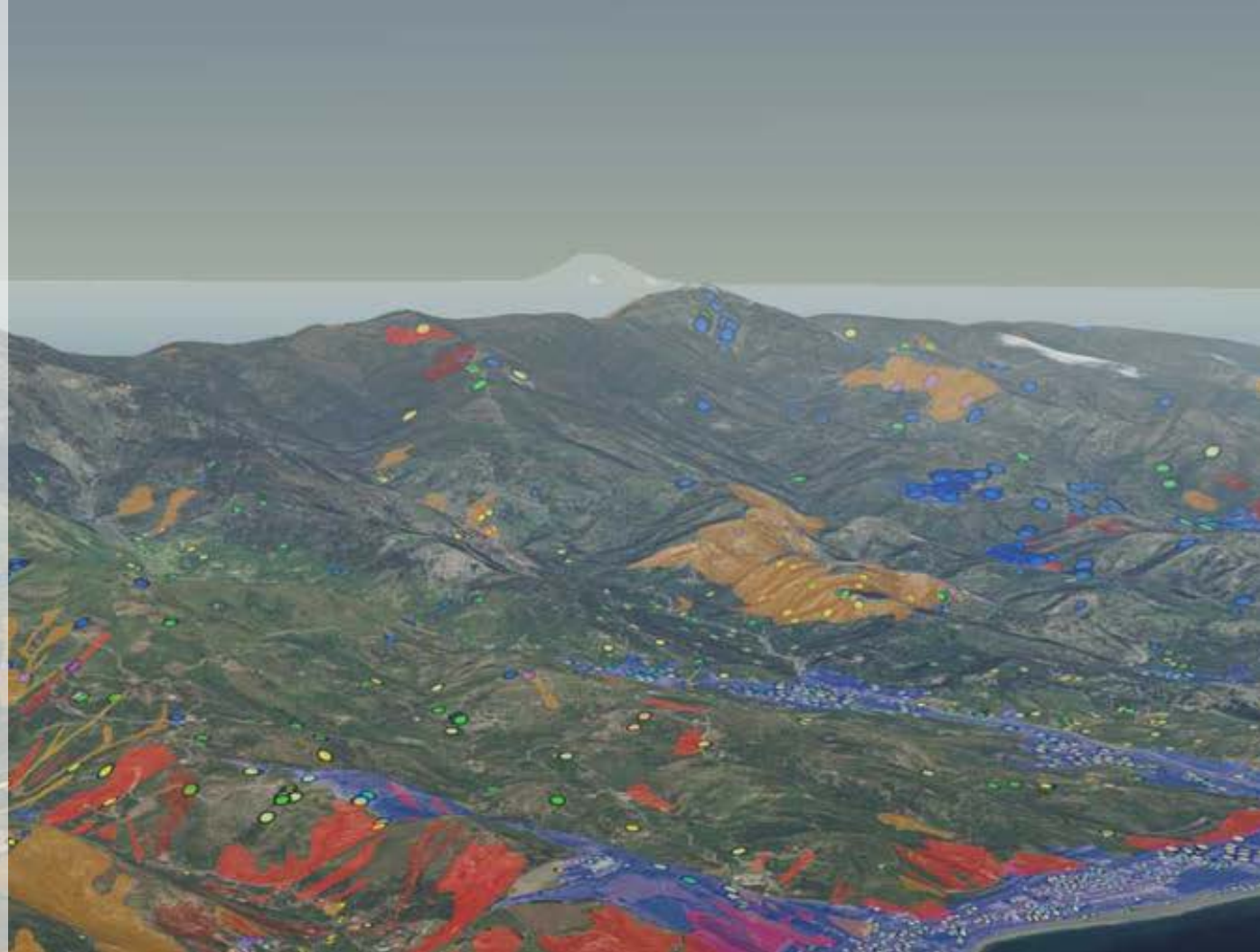
Prominent Capabilities
Environment Monitoring

Target

An enhanced environmental monitoring, with new equipment's able to control the near deployment of 5G base stations in the city (in terms of potential electromagnetic pollution), the cover of new zones in the city with respect to acoustic noise, and a new monitoring of the Air Quality condition to complement the current activities performed by law by the National Agency "ARPA"

Stakeholder

Department of Territorial and Urban Services, division of "Monitoring of traffic noise and electromagnetic pollution" (*)

Prominent Capabilities

- Real time acquisition of data regarding acoustic noise, electromagnetic pollution and air quality
- Different KPIs and indicators to monitor the environment, with prompt alerting functionalities in case of unexpected or suspected values
- Alignment with European and Italian standards in terms of official indicators
- Availability of historical data to compare results and find patterns

Next Milestone

- Architectural assessment for air quality sensors, and procurement of the necessary equipment's to control the whole council
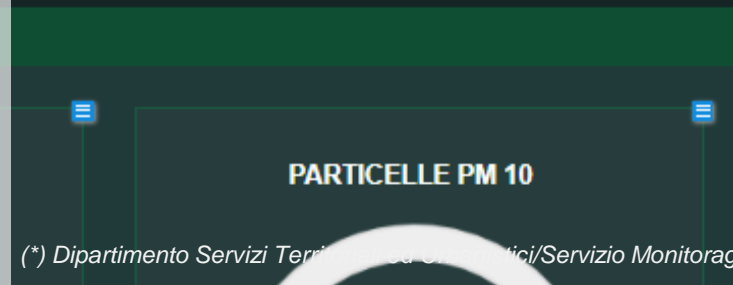
(*) Dipartimento Servizi Territoriali ed urbanistici/Servizio Monitoraggio dell'inquinamento acustico da traffico ed elettromagnetico

Prominent Capabilities
Active Video Surveillance

Target
Enhance the video surveillance of the city, covering in particular new areas, concentrate all the video flows to a central Control Room, and to introduce an innovative 5G-based video surveillance in some areas where the fiber connection is not yet available

Stakeholder
Local Police and eventually State Police, Carabinieri, Urban and Mobility department

Prominent Capabilities

- Adoption of last generation multi-sensors cameras
- Video metadata treatment for auto alerting events
- Introduction of distinctive AI features for complex scenario detection (object recognition, crowd recognition, vandalism, target pursuit
- Share and availability of new and existing cameras coming from different departments for a common knowledge base and control activities
- Improved Operations' maintenance

Next Milestone

- Procurement of camera and deployment (expected live from June 2020)

DOME Vitt. Emanuele III

Numero soggetti in tempo reale

14 / 11 /2019 09:01:34

Dettagli telecamera

Competenza: VVUU Messina

Modelllo: Hikvision Dome 4K
Risoluzione: 1280x720 px
Frame al secondo : 25

1

Prominent Capabilities
Water Distribution Pipe Monitoring

Target

Support the local water distribution company to detect leakages and to prevent and assure that all the citizens can receive water at the right quality level (thanks to different IoT sensors that will be installed in specific measurements points) and without interruptions (thanks to predictive analysis that can monitor how long the tanks can distribute water without natural supply)

Stakeholder

AMAM (*), the local water distribution company   *(*) Azienda Meridionale Acque Messina*
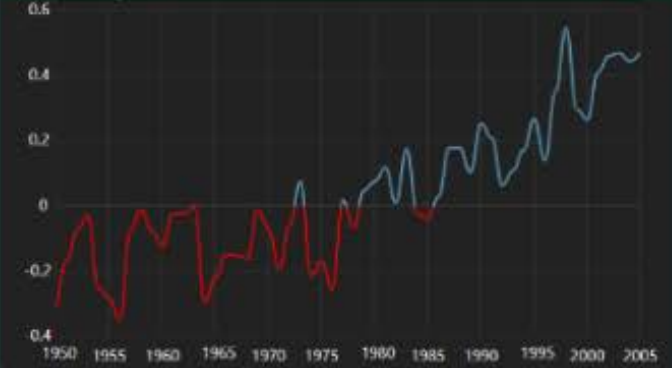
Prominent Capabilities

- Introduce sensors for continuous water quality monitoring (rather than periodic samples)
- Introduction of flow and pressure sensor to detect leakages and to have targeted interventions to minimize supply interruptions and costs
- Support AMAM on the introduction of actuators to remotely control the water distribution cycles
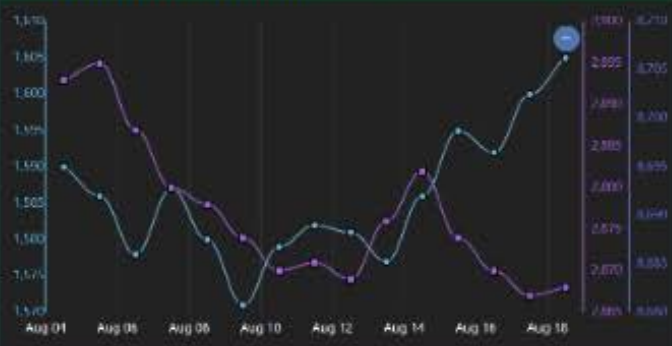
Next Milestone

- Go live with a Minimum Valuable Product (February 2020) and then upgrade the system to cover up to 5 different distribution cycles
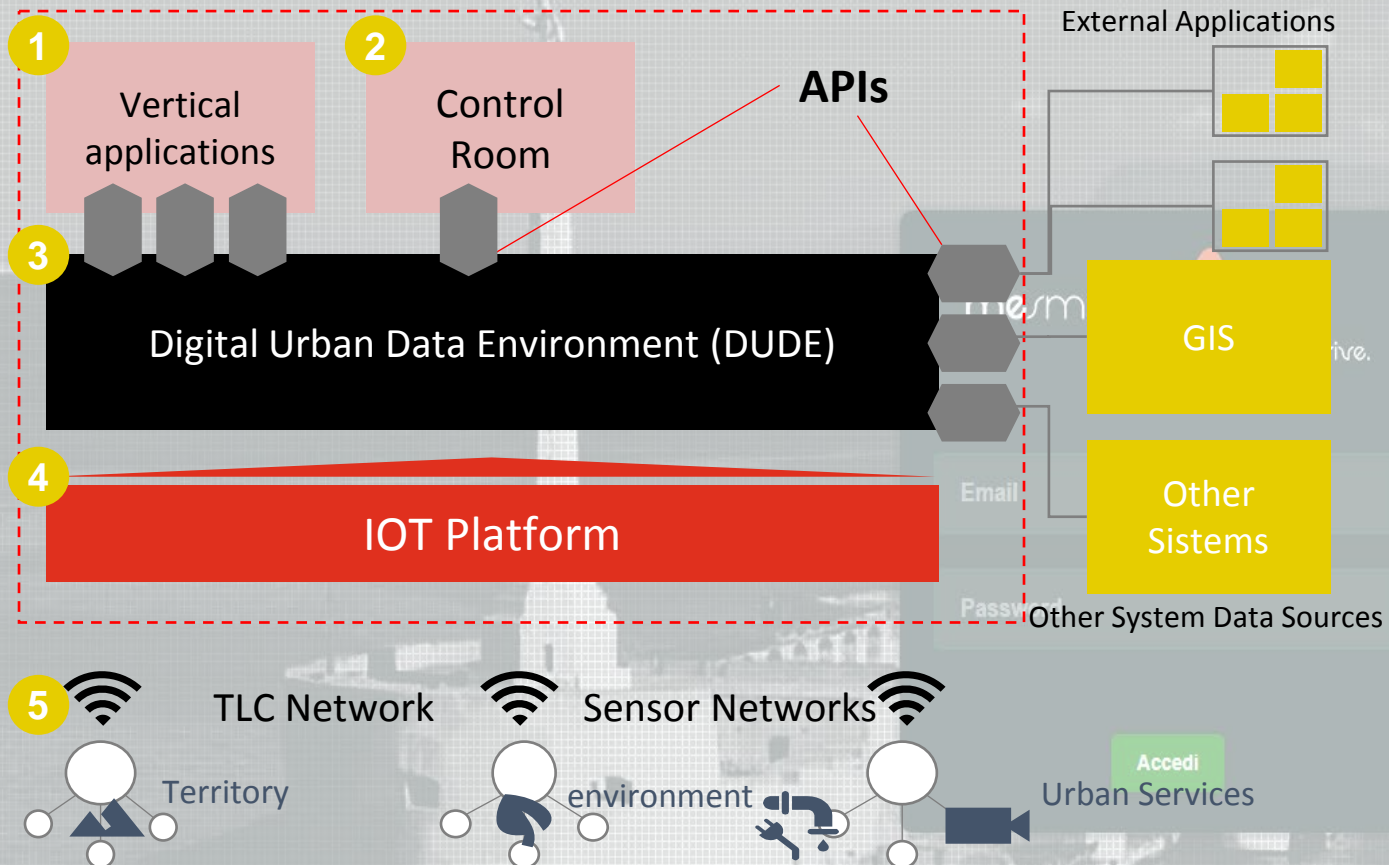
Conceptual architecture

APIs

Vertical applications

Control Room

Digital Urban Data Environment (DUDE)

IOT Platform

External Applications

GIS

Other Sistems

Other System Data Sources

TLC Network

Sensor Networks

Territory

environment

Urban Services

Vertical Application: systems covering Project Use Case. They are completely decoupled with Data and interface with API.

Control Room: Coordinating System fulle operative 24h/7D for sercurity, safety, and alerts

DUDE: Data Analytics and monintoring platform

IoT platform: managing, collecting and processing data from on sensor field

Reti TLC e di Sensori: Wireless sensors networks ans sensros, communicating each other and able to reveal environment changes

Architecture capabilities

Docker service erogation

Integrated in Messina IT environment (federation, components reuse)

Agnostic from IAAS Open Stack Compliant

Full API Oriented Integrata with AI and Blockchain

Fiware Compliant

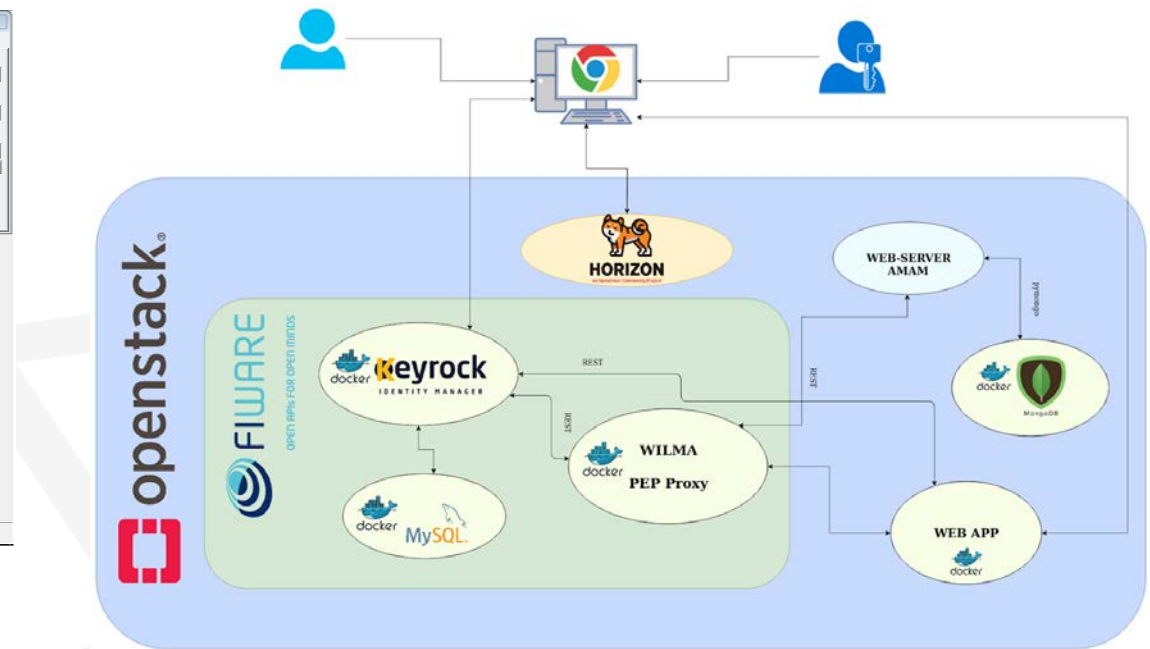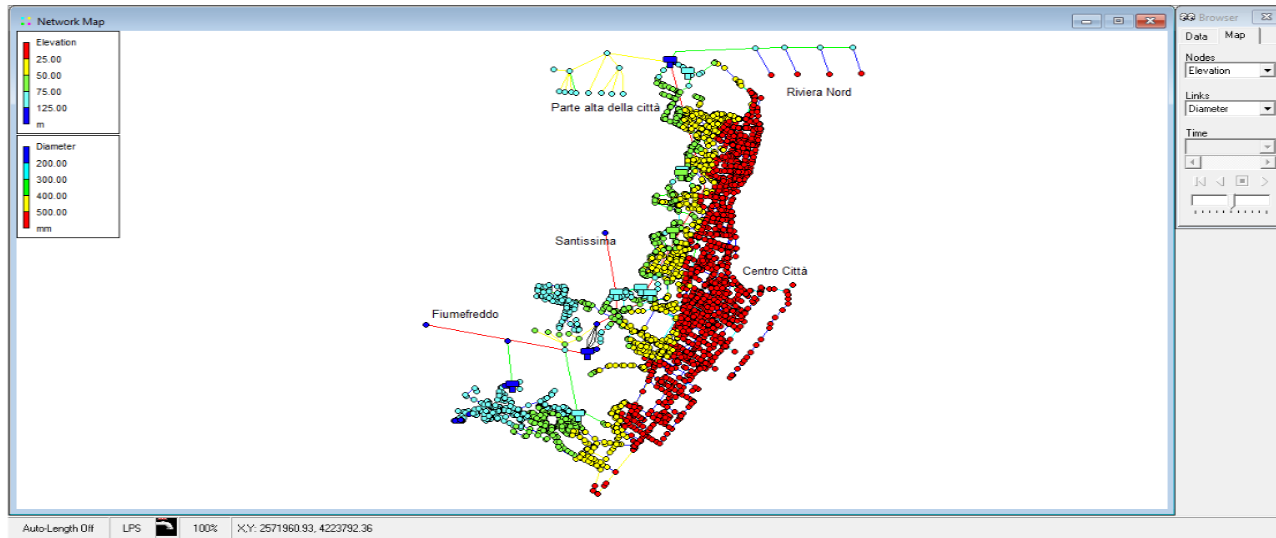**Full Open Source**

Inbuilt horizontal and vertical scalability

Full monitoring of Application, services and devices

Project expose API to accelerate new application development

Thanks for your attention!

Messina