Co-funded by the
Erasmus+ Programme
of the European Union

SPECIAL MOBILITY STRAND

SMART City GIS - IoT integration and data infrastructure

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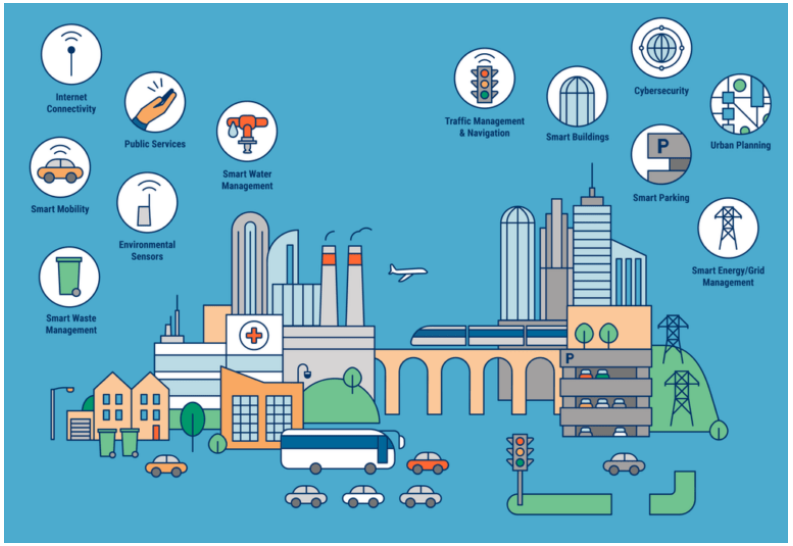
- The Smart City is a commonly used phrase.
- It could be considered as:
  - context model for data *collecting*
  - model of data *usage* in urban and suburban areas.



The basic features of IoT systems are:

- Everything communicates: smart things have the ability to communicate wirelessly between themselves and between interconnected objects within an ad-hoc network;

- Everything reacts: smart things can interact with the local environment through readings and activations of existing opportunities.

SMART CITY

- A smart city is a city that **uses technology to provide services and solve city problems**.

- Ancient Roman cities used technology to make life easier.

SMART CITY

- Main goal of a Smart City is to **improve well being of its citizens by use of smart technology**.

- “smart” refer to a tool (ICT) that are used in achieving the goal

- It involves **citizen participation**.

SMART CITY

"Smart City" context model includes data collected from citizens, devices and property that is processed and analyzed to monitor and manage:

- *urban climate,*
- *traffic and transportation systems,*
- *power plants,*
- *water supply networks,*
- *police,*
- *information systems,*
- *schools,*
- *hospitals...*

SMART CITY

- With information generated from collected data, experts and decision makers can **act immediately to solve nearly any problem**.

- Necessity for internet

SMART CITY - IOT

- To be „smart“ in the process of data collection it is necessary to be ***connected*** to super storage or to a super computer.

IoT

- ***taking all the things in the world and <u>connecting</u> them to the internet***

- extending the power of the internet beyond computers and smartphones to a whole range of other things, processes and environments.

- Those “connected” things are used to ***gather information***, ***send information back***, or ***both***.

SMART CITY – IOT IN DRM

- decision support systems in the area of risk analysis with catastrophic consequences depend on multidimensional spatial and spatial based data.

- The sources of such data are heterogeneous and often anachronistic.

- Data formats are based on different standards: ISO, OGC, Industrial, National, Traditional, Informally agreed, or even no standards or arrangements.

- An integration platform for data acquisition and usage is required.
- *Spatio-temporal review of data is required.*
- In this way, the application of IoT concept combined with GIS relates to the use of several devices connected to a server in order to obtain a lot of data to be used to feed the information system or to use data in real time and spatial context.

- When talking about IoT and GIS, we are talking consequently about interconnectivity among devices and bringing data into a spatial context.

- In the context of the phenomenon of IoT and GIS brings a new interpretation of data GoT **Geography of Things**.

- It support multidimensional spatial and spatial based data.

Aspects of integrated risk management

- *An event with catastrophic consequences occurred.*
- *The person in charge should have "everything needed to make decision".*
- *The chosen methodology should be based on standards.*
- *Situation of interest should be present in 2D and 3D.*
- *Implementation has follow relevant directives.*

- *Spatio-temporal review of data is required.*
- *If we bring relevant data in to the context at the right time,data becomes information.*
- *In this case, decision-making and management can occur.*

IoT- GIS INTEGRATION - WAHASTRAT CASE STUDY

WAHASTRAT

WATER SHORTAGE HAZARD AND ADAPTIVE WATER MANAGEMENT STRATEGIES

The WAHASTRAT project has developed a network of 8 automated monitoring stations to provide information about environmental variables:

soil moisture,
speed and wind direction,
air temperature,
air humidity and
atmospheric precipitation.

The data from these monitoring stations are collected and analyzed to provide information about ***water shortage***, ***drought conditions*** and especially for ***urban climate***.

IoT- GIS INTEGRATION - WAHASTRAT CASE STUDY

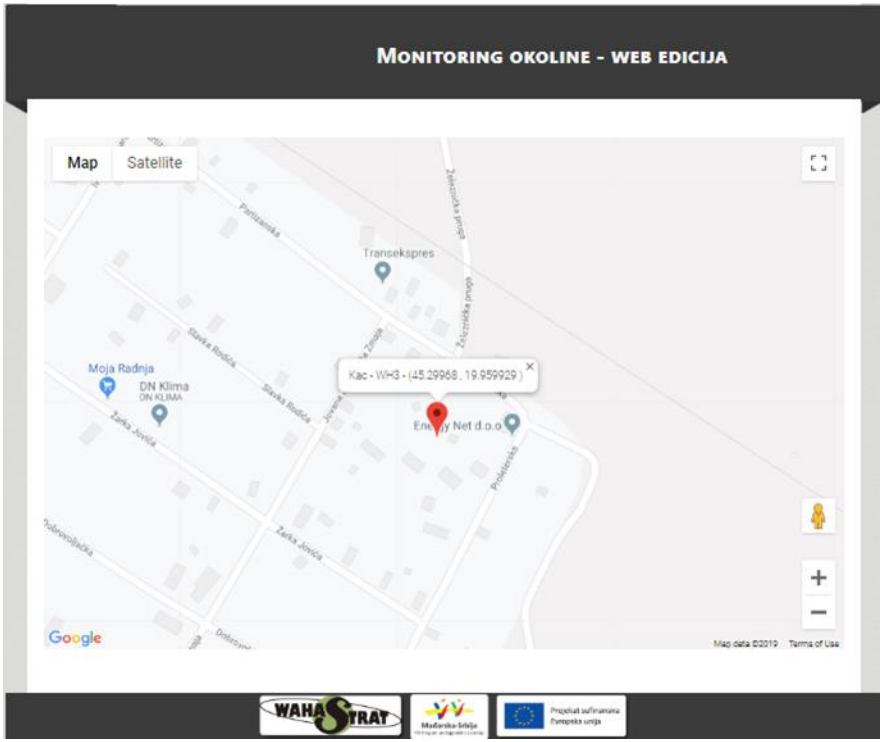
We collect climatological and soil data for the purpose of monitoring urban climate and agriculture based variables.

IoT- GIS INTEGRATION - WAHASTRAT CASE STUDY

The data being sent from the sensor station is defined as a raw data structure.

The server application validates, formats, and stores the data in the database.

In WAHASTRAT system we implement IoT concept combined with GIS to feed the information system or to use data in real time and spatial context, WAHASTRAT GoT.



IoT- GIS INTEGRATION - WAHASTRAT CASE STUDY

GoT implement for WAHASTRAT currently is used primarily *to assess the risk to agricultural production*.

It may be used to make decisions about:
irrigation during drought periods, or
capability of soil to absorb excess water during the prolonged periods of rain.

All those data is used mainly in off-line regime.

All these assessments are also used to make business decisions in various businesses, for example about:
type of plants appropriate for given location,
insurance premium for crop insurance.

IoT- GIS INTEGRATION - WAHASTRAT CASE STUDY

All this data is used after the acquisition, with more or less delay.

Our idea is that by inserting new ad-hoc climatological stations without a known location in advance, and interpreting the results in real time, we can achieve an extension of the functionality of the already installed system.

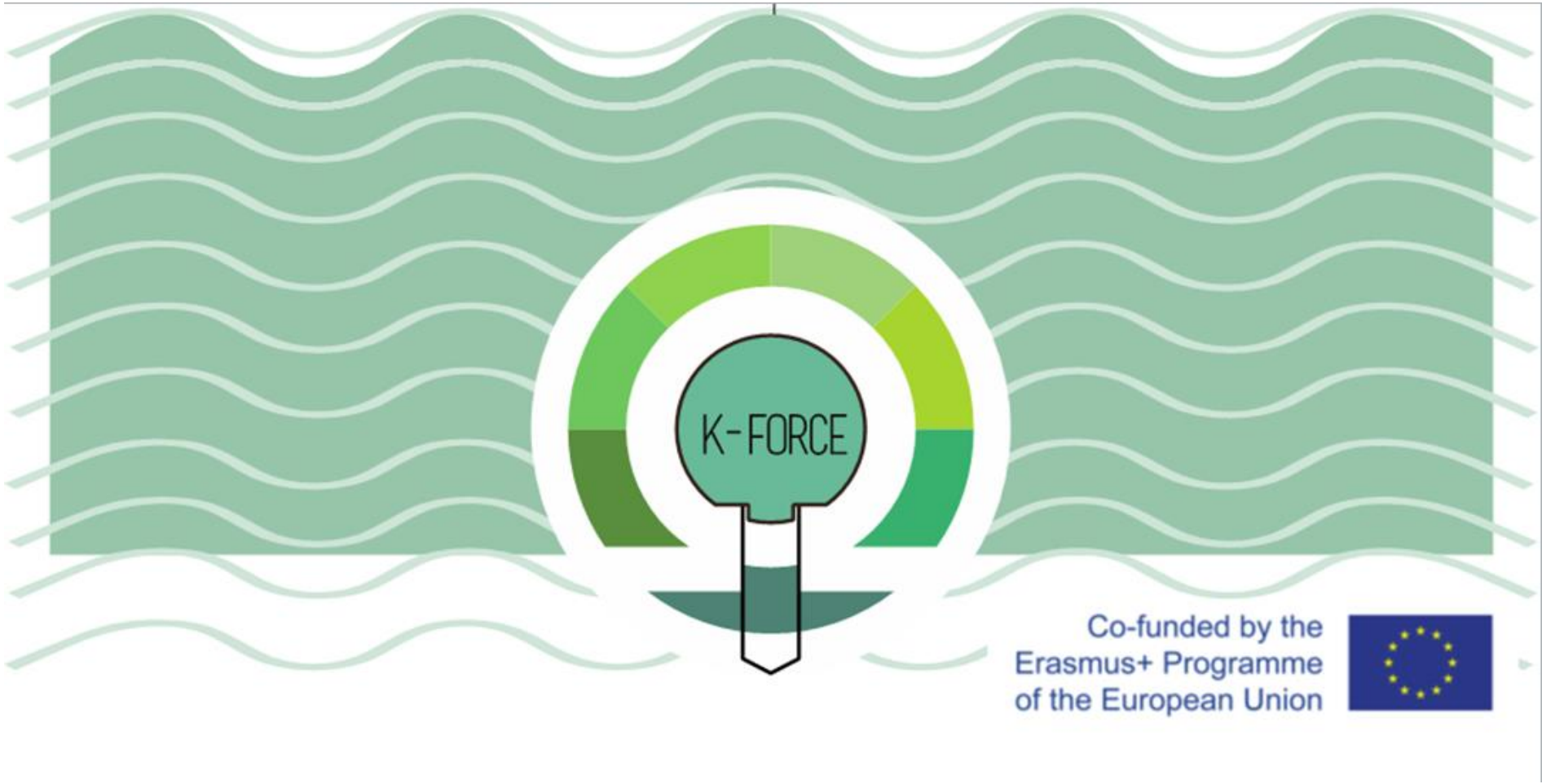
In this way, the application of IoT concept combined with GIS relates to the use of several devices connected to a server in order to obtain a lot of information to feed the information system.

CONCLUSION

- *Urban and suburban zones should be populated with IoT / GoT based sensor systems.*
- *The Internet of Things makes the city a source, consumer and also a provider of information.*
- *With the expansion and growth of cities, making them smart has become crucial to increasing the quality of life for citizens.*

CONCLUSION

- IoT can be applied in various scenarios such as the above-mentioned environmental monitoring, gas concentration, water and air quality, etc.
- A number of related facilities are required to achieve these goals.
- E.g. related ICT industries need to be explored and developed in parallel to promote IoT technologies.



Thank you
for your attention

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