



CitiSim - IoT Platform for Monitoring and Management of the City

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Short biography

Sachian Mari-Anais:

- ❖ Graduated University Politehnica of Bucharest, Applied Electronics departement in German Language in 2018
- ❖ Studying Master of Micro and Nanoelectronics at University Politehnica of Bucharest
- ❖ Working at BEIA CONSULT INTERNATIONAL since June 2017 as TeleCommunication and R&D Engineer



Company profile



6th Smart Cities Conference, 2018 (Bucharest)

- Experience since 1991 in over 5,000 turnkey projects for telephone and advanced communications solutions.
- Ongoing projects: **H2020 - Horizon 2020** is the EU's largest research and innovation program with nearly € 80 billion available over 7 years (2014-2020).
- **CitiSim** – The general purpose - design and implementation of a new generation platform for the Smart City ecosystem.
- **WINS@HI** – Offers an ad-hoc, agile and reliable communication solution for both condition monitoring of the operations and safety of the workers in hazardous 'Industry 4.0' work environments.
- **3DSafeguard** – A solution for enabling the situational awareness by introducing an integrated operation workflow.

12/13/2018

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Partnerships

- ❖ Partners in Romanian R&D:
- ❖ *University “Politehnica” of Bucharest* (www.upb.ro)
 - ❖ Romanian Space Agency (www.rosa.ro)
 - ❖ National Institute for Research and Development in Electrical Engineering (www.icpe-ca.ro)
 - ❖ National Institute of Aerospace Research “ELIE CARAFOLI” (www.incas.ro)
- ❖ Member in the Directory Council of the German-Romanian Chamber of Industry and Commerce (AHK-Deutsch-Rumaenische Industrie - und Handelskammer) and other Chambers of Commerce and Clusters
- ❖ Leader of NEM Romanian Mirror Group (www.nem-pt.ro)
- ❖ Member of Romanian Association for Electronic and Software Industry (ARIES)

Introduction

Cities

- core of the society
- will need to embrace and support the evolution

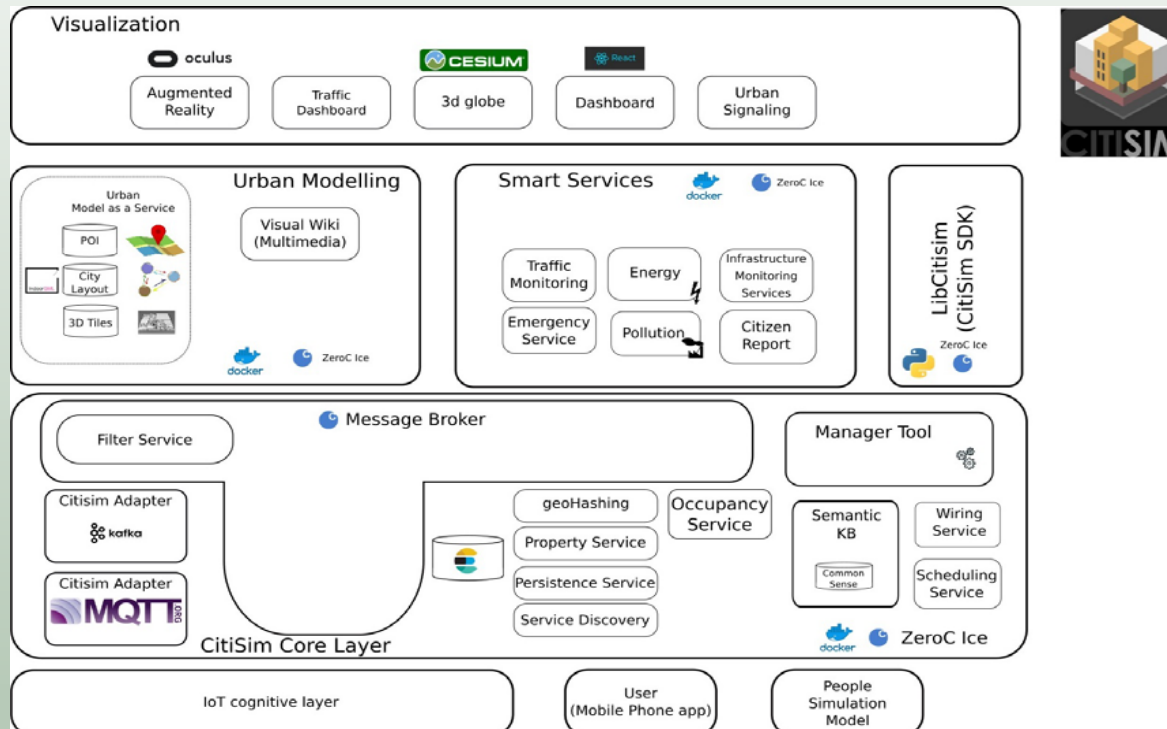
Smart cities

- sustainable in time
- ensure a high standard of living

CitiSim

- 3D visualization tool created for smart city control of the infrastructure and powerful monitoring
- main objective devoted to implementation of a new generation platform for ecosystems in smart cities

CitiSim proposed system architecture



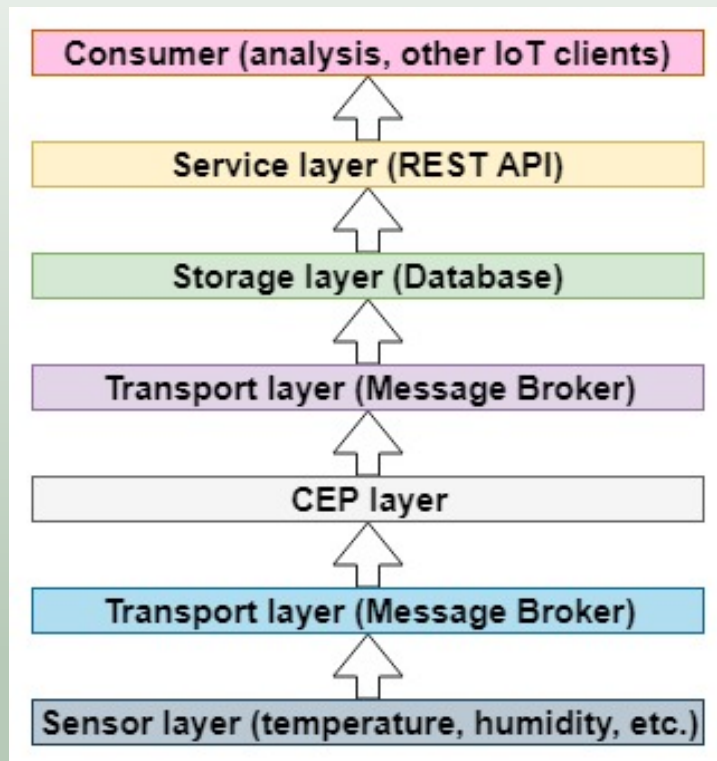
- ❖ Flexible enough to support different operating systems and different programming environments.
- ❖ REST APIs used for access to services of CitiSim from third parties
- ❖ Internal middleware used in core service implementation efficient enough to support scalability, security issues, flexibility, etc.

CitiSim proposed system architecture

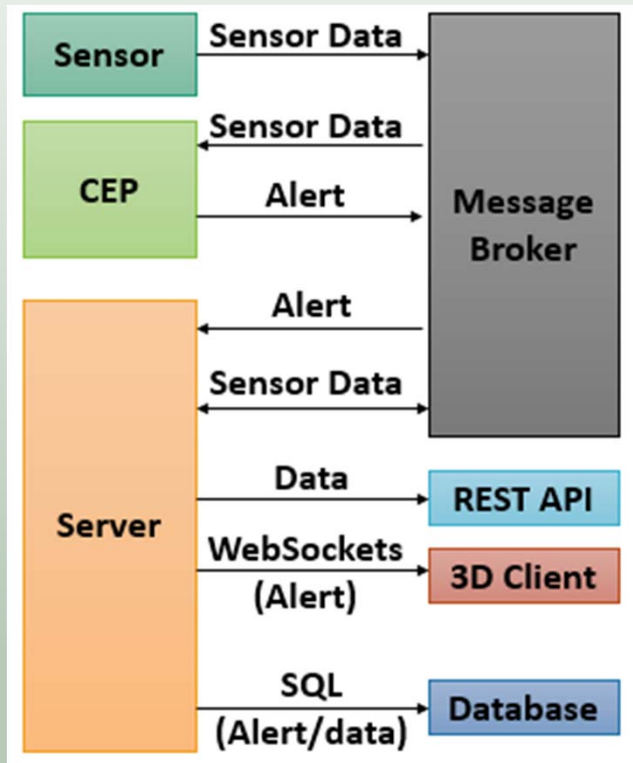
- ❖ **IoT Layer:** the layer where the information is collected from sensors/actuators
- ❖ **Message Broker:** main component of CitiSim system architecture - used for the distribution of information (sensor information, raw data, events, etc.)
- ❖ **Urban modeling layer:** will store structural information about the city
- ❖ **Smart service layer:** will provide services related to the stakeholders of a Smart City
- ❖ **Virtualization layer:** will provide to final users (companies, citizens, mayor, etc.) the information regarding different aspects of the data managed in the CitiSim instance

CitiSim Common Framework

- ❖ **Smart services to be implemented**
 - ❖ *development environment for event processing.*
 - ❖ method of tracking and analysing streams of information about things that happen (events)
 - ❖ deriving a conclusion from them.
 - ❖ *information flows from the bottom layer - sensors generate events*
 - ❖ *to the top layer - information is consumed.*



The flow of information from the sensor layer to the consumer layer



Data flow between components

CitiSim Common Framework



The data flow starts from the sensors



Data received by the complex event processor (CEP)



CEP throws alerts



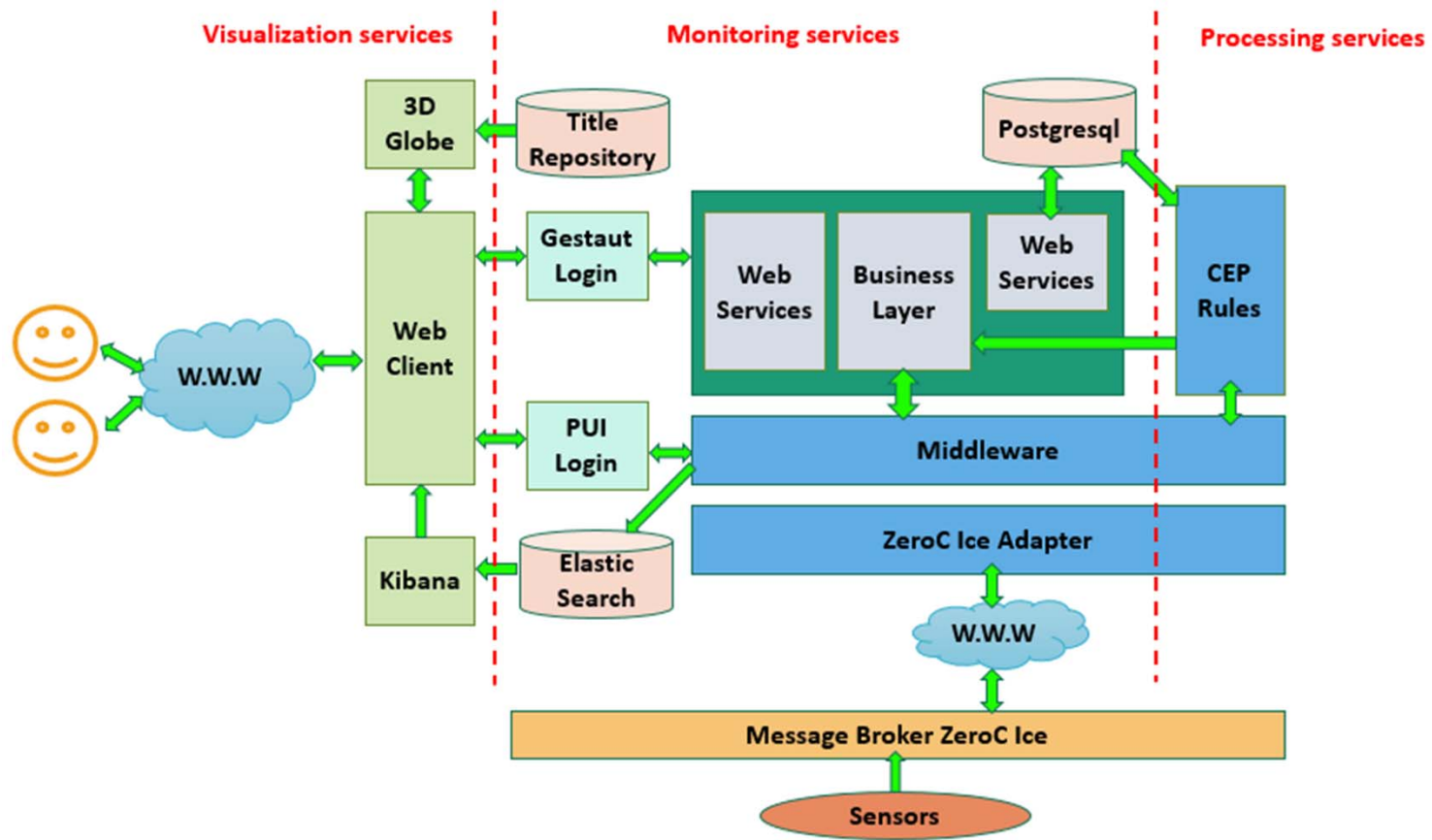
Alerts are received by the server.



Server stores meaningful data and sends the alert to the client via WebSocket's.



REST API will have data available.



Modules of the CitiSim platform

CitiSim Common Framework

- ❖ **Identifying of Development languages and APIs**
 - ❖ *Each developed with a different technology appropriate for it.*
 - ❖ *Modules are grouped by technology:*
 - ❖ **Applications server (Profound UI Server) and Middleware:**
 - ❖ *Mainly developed in Java.*
 - ❖ *Supports interchange formats like JSON, CSV or XML*
 - ❖ *use technologies as JavaEE, Spring and PUI;*
 - ❖ **Complex Event Processing:**
 - ❖ *Developed with WSO2 framework and Siddhi language;*

CitiSim Common Framework

- ❖ Modules are grouped by technology:
 - ❖ **General Database:**
 - ❖ *PostgreSQL database*
 - ❖ *SQL as a consulting language;*
 - ❖ **Web clients:**
 - ❖ *Developed with PUI client technology in JavaScript.*
 - ❖ *Several frameworks or libraries as requirejs, jquery, knockout are used;*
 - ❖ **Message Broker:**
 - ❖ *ZeroC Ice using RPC.*
 - ❖ *supports several languages as C++, C#, Java, JavaScript or Python.*

Conclusions

Major innovation of CitiSim – CitiSim will provide the first Smart City-specific platform to monitor in real time, and in 2D/3D



Comes from combination of Smart City platform supporting development and simulation of smart customized services with an elastic monitoring infrastructure based on a potentially huge number of heterogeneous things deployed over a city.



Benefits of the exploitation of CitiSim project destined both to society (citizens) and to economy (markets value, employment, spin-offs).

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