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The LivingFog platform for smart city management

Fog Computing:

a new frontier of technology for Smart Cities in Europe

- Are you a representative of a city, municipality, government agency, public or private company, smart city initiative, living lab, or a non-governmental organisation?
- Are you developing smart city services?
- Are you interested in learning how cutting-edge technology solutions can improve citizens' quality of life or make your city smarter and greener?

If your answer is YES, then you should definitely learn about Fog Computing and the FogGuru project, and get open access to a brand-new software, specifically realized for Smart Cities.

FOG COMPUTING

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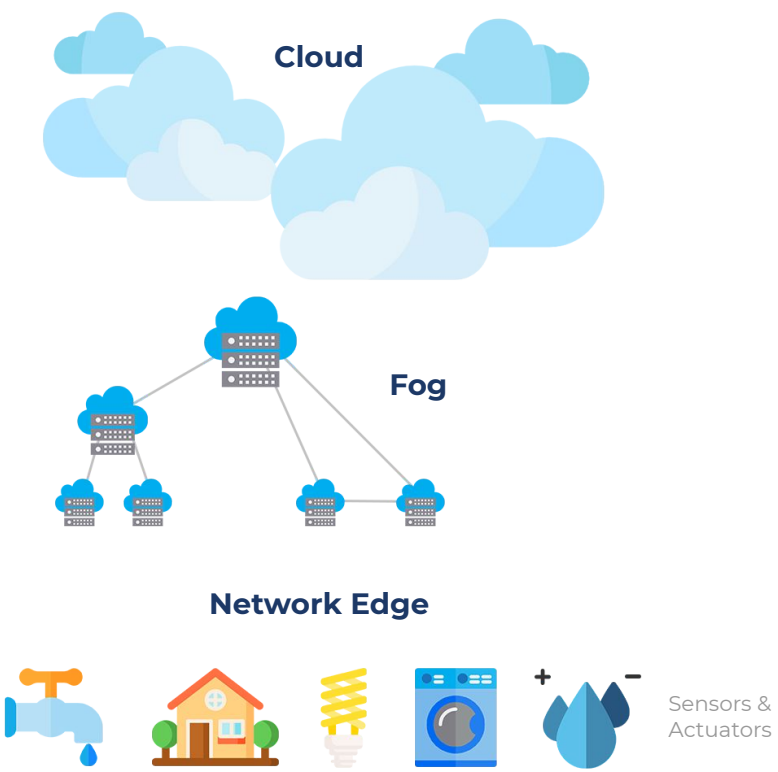
What is Fog Computing?

Smart city services make extensive use of Internet-of-Things (IoT) devices which produce data about different aspects of the city. These data need to be processed to extract meaningful information for city governance.

Traditionally these data would be sent to cloud computing platforms where they get processed. However, the cloud is often located very far, which incurs significant communication costs and may lack reliability. Instead of carrying IoT data to the cloud to be processed there, Fog Computing processes data as close as possible to their source.



What are the benefits from Fog Computing?

1. Lower pressure on the wireless network infrastructure:

- The majority of data is processed where it is generated and/or used
- Less data needs to be sent to the cloud, which reduces the necessary available bandwidth

2. Greater system reliability:

- The system keeps working during long-distance network outages
- Local response that particularly matters in the case of a failure of the network

3. Faster reactions from event detection to reaction

4. Better quality of service for the end users:

- Reduced waiting time and faster responses
- Access to uninterrupted services

5. Fully open computing infrastructure:

- No lock-in with specific equipment vendors
- Full control of the data processing infrastructure
- Better resource management

What is FogGuru?

FogGuru is a European industrial doctoral training project that trains eight PhD students in the domain of Fog Computing. These early-stage researchers develop innovative Fog Computing technologies and apply them to real use-cases.

You can discover how this looks like in reality by reading the following two success stories taking place in the smart city of València.

www.fogguru.eu

6 European organizations

13 nationalities

8 PhD theses

+20 publications

€ 2 067 625

KEY DATA

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Success story #1

LivingFog: Fog Computing technologies for smart water management

LivingFog:

Fog Computing technologies for smart water management

Potable water is a precious resource in many regions of the world, and particularly in semi-desertic areas such as the South of Spain. Over the previous decade, EMIVASA, a public-private company in charge of water management in the city of València, has been active at the forefront of IoT technologies.

EMIVASA deployed more than 420,000 smart water meters in every household which periodically report their readings to data centres through wireless networking technologies.

The transferred data are then processed in various ways such as detecting water leaks or other incidents leading to abnormal water usage, which in turn brings considerable efficiency improvements to the management of precious water resources. However, this system relies on 15-years-old technologies.

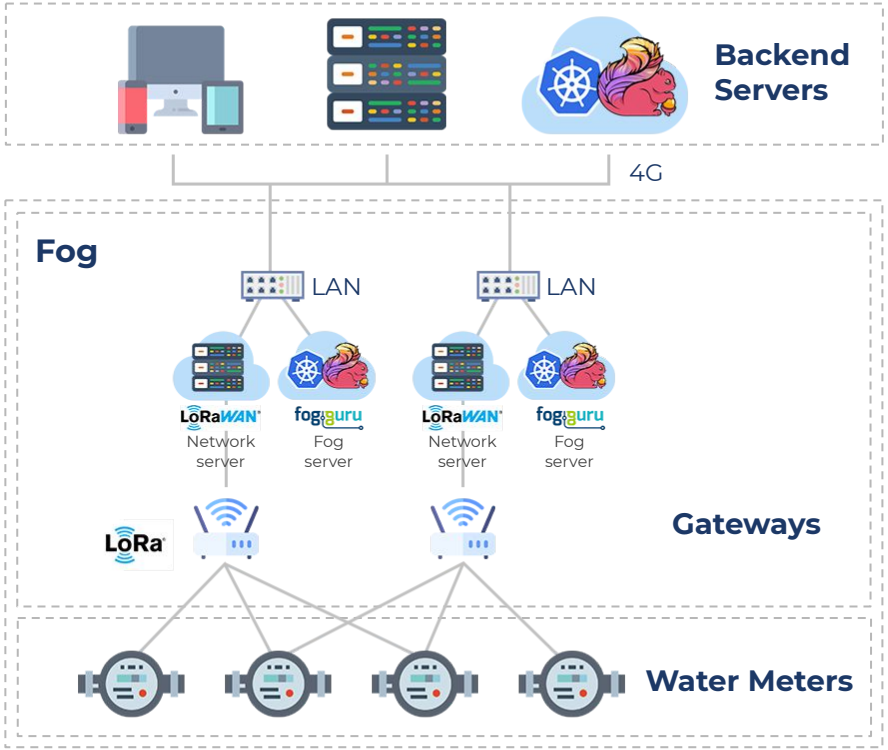
To ensure transition to more modern and open technologies, FogGuru offers a prototype platform which integrates Fog Computing and LoRaWAN software: LivingFog software.

How does this software work?

Owing to LoRa, the smart water meters send collected data to LoRa Gateway.

Each of the LoRa Gateway nodes is equipped with its own dedicated network server which allows the installation of Fog Computing servers in the same location.

LoRa Gateways forward then the data to the Fog servers where they are processed immediately after having been received. These pre-processed results may be sent to cloud servers for a visual interpretation.



What are the benefits?

Optimized water consumption

- Water leaks and abnormal water usage can be detected within minutes instead of days
- Citizens can be made aware of their consumption

Improved water management

An efficient fog computing system allows its users to:

- Be independent of any vendors
- Monitor water consumption of all users in real-time
- Take more accurate management decisions
- Quickly and locally react in case of a leak

Success story #2

IoT FabLab

IoT FabLab

Fog Computing has emerged as a new way for managing and processing data collected by IoT sensors, especially for smart-city environments.

It has brought many benefits in terms of improved analysis efficiency and enhanced data security.

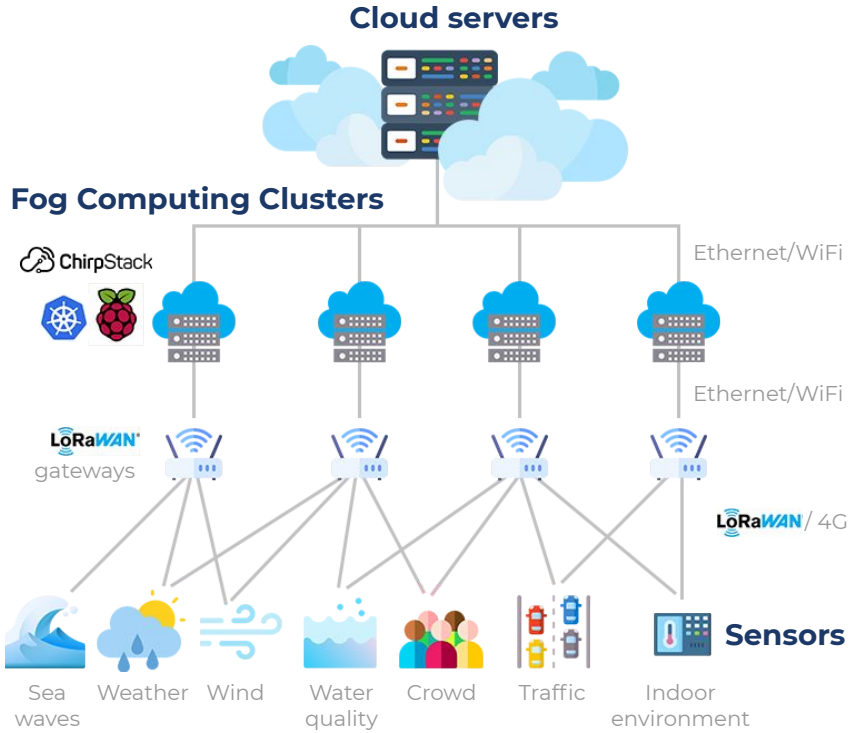
FogGuru has created an IoT Fabrication Laboratory (FabLab) in Las Naves, València, as a place where anyone can invent new ways to manage and utilize smart-city data! How? FogGuru installed a batch of IoT sensors and a complete fog computing infrastructure at La Marina de València collecting a variety of useful data including water quality, weather, height of the sea waves inside the harbour, people and car counters entering and exiting the area, etc.

FABLAB

IoT FabLab

Thanks to the LivingFog software, these different sensors measure various parameters and send the gathered data to several LoRa Gateways, which forward them to Fog Computing clusters where they are immediately processed. Some of the data is sent to cloud servers for further processing, or long-term storage.

To support invention and creativity, FogGuru provides open access to its FabLab in Las Naves in València, and allows creative worldwide users from a variety of backgrounds to experiment and develop futuristic IoT solutions that can make people's lives easier.



What are the benefits?

Data-driven governance

of the managing entity La Marina

Accurate and real-time information

for the visitors of La Marina and citizens of València

Improved experience

of the visitors of La Marina and citizens of València

Futuristic experimentation site

open data access for students, researchers, start-ups and government, etc.

Where can you find more information?

Detailed information and useful videos are available at our Living Lab section

How can you get involved?

You can replicate our successful stories in your own context by using the developed open source software LivingFog or keep up with the latest research in the field of Fog Computing by exploring our scientific papers.

We invite you to get in touch with us to discuss synergies and joint activities if you are involved in a related project in the field (Coordinator: Professor Guillaume Pierre, Université de Rennes 1/IRISA).

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This sounds interesting to you, but you work in another field?

That is not a problem at all!

Fog Computing can be leveraged into many other sectors such as: health care, engineering, natural environment monitoring, events coverage, real estate, military, retail and education.

GET INVOLVED

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The FogGuru project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant 765452.