



G1

# FINAL WORKSHOP

## Implementación de internet de las cosas (Gpo 531)

TEC

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ITA

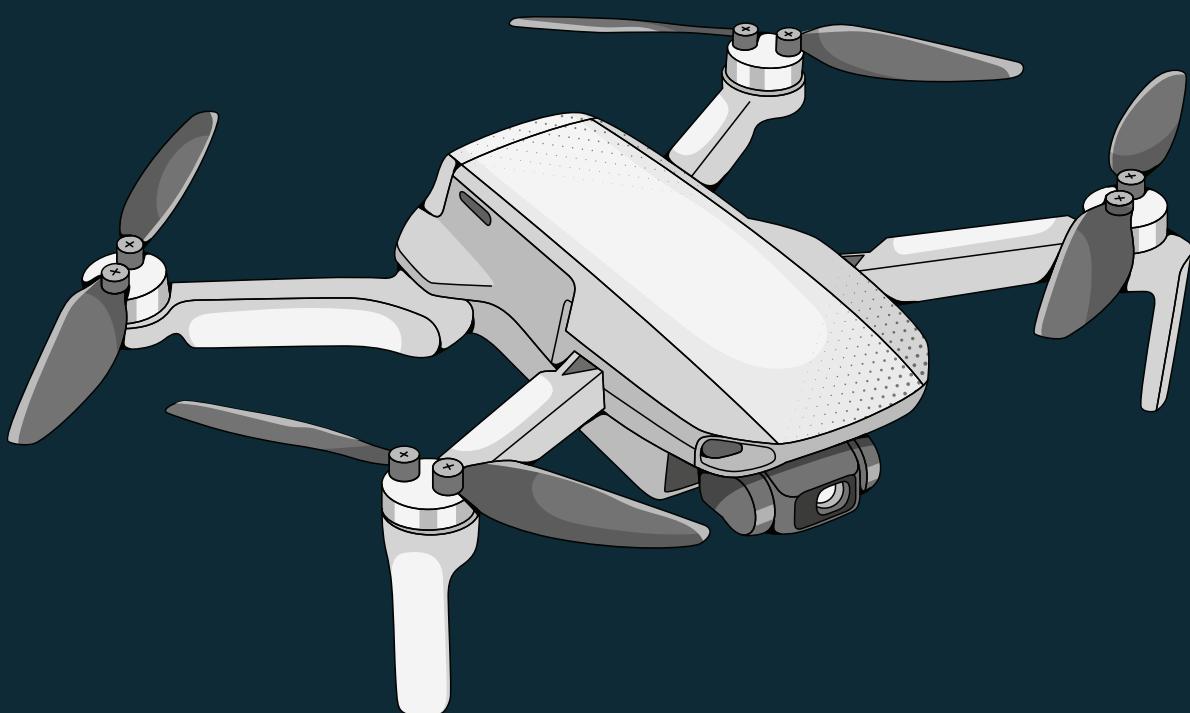
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# PART 1

Definition of the problem

# PROBLEM DESCRIPTION

According to USGS, with increasing global surface temperatures the possibility of more droughts and increased intensity of storms will likely occur. As more water vapor is evaporated into the atmosphere it becomes fuel for more powerful storms to develop.



In this project, we developed an app that has the capacity of connect to an Internet connection provided by a drone. This app aims to establish a momentary internet signal in case a natural disaster occurs and you are left incommunicated.

# PROBLEM DESCRIPTION

The screenshot shows a web page from the USGS website. At the top is the USGS logo and a navigation bar with links for SCIENCE, PRODUCTS, NEWS, CONNECT, and ABOUT. Below the navigation is a breadcrumb trail with links for FREQUENTLY ASKED QUESTIONS and CLIMATE. The main title is "How can climate change affect natural disasters?". The text below the title discusses how increasing global surface temperatures lead to more droughts and more intense storms due to increased water vapor in the atmosphere. It also mentions how warmer oceans contribute to higher wind speeds in tropical storms and rising sea levels exposing higher locations to coastal erosion. A section titled "Related Content" includes a link to "Does an increase in the 100-year flood estimate originate from climate or land-use change?", accompanied by a photograph of a "FLOOD PEAK" sign.

<https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters#:~:text=With%20increasing%20global%20surface%20temperatures,more%20powerful%20storms%20to%20develop.>

# ANALYSIS OF REQUIREMENTS

## User Stories

- "As a flood survivor, I want the system to be able to pinpoint my location and severity of my situation and send a message to the Crisis Management Center - CMC, so that the help team can send the team that can help me and the ones around me accordingly."
- "As an operator, I want to be able to see a dashboard containing all of the messages sent by the survivors, their locations, and severity levels, so that I can plan for the rescue operations in an effective way."
- "As a flood survivor, I want the system to be able to determine which course of action is best for my situation, sending the appropriate resources depending on the type of damages that occurred."

# ANALYSIS OF REQUIREMENTS

## Dashboard Requirements

- -"As a flood survivor, I want a system that is efficient and easy to use, that work at 100% when is used"
- -"As a rescuer, I want a system that shows me in a way i can understand the severity of the survivor and their locations."
- -"As an operator, I want the system to have a clear interface that lets me view the current rescue signals, as well as past ones in order to more effectively understand the cause for these disasters."

## Acceptance Criteria

- The system should be able to communicate from the application to the help team, telling the location and severity of the distress call.
- The system should be sent using IoT concepts such as MQTT protocol (mosquitto, central and local brokers)
- The message should contain the severity of the distress call, and the location of the caller with coordinates (latitude, altitude).
- The system should be usable to any Android mobile devices.
- The dashboard will show in a formal and understandable manner all the data recompiled in a database from the android app.

# User Persona



Mateo García

## PSYCHOGRAPHIC:

- Wants family to stay safe.
- Appreciates applications that help automate things.
- Interested in new security systems.
- Has a fear of natural disasters.

AGE:	36 years old	OCCUPATION:	Banker
STATUS:	Married with children	INCOME:	\$40,000 a year
EDUCATION:	Graduated college	LOCATION:	Itajaí, Brazil
		DEVICES:	Owns a smartphone and a laptop

## END GOALS:

Use the app in order to request emergency services, resources, among other things that are necessary whenever a natural disaster occurs.

## SCENARIO:

"Me and my family live in an area that is very prone to natural disasters, be it flooding, hurricanes, among others. If this were to happen where I live, I fear that I will lose all means of communication that are important in order to request for help. I want my family and kids to be safe first and foremost and I would love some form of system that would help me in these kinds of situations by communicating our location and the severity of the disaster and sending the necessary help, in case that something like that happens near my area."

SAYS

THINKS

**"I want to help myself or someone from a disaster"**

- Need to get saved/get helped
- Desire to know/get to their loved ones
- Desire to get to a safe place

**"I need to get help from a disaster"**

**"I need to be prepared for a disaster"**

USER

DOES

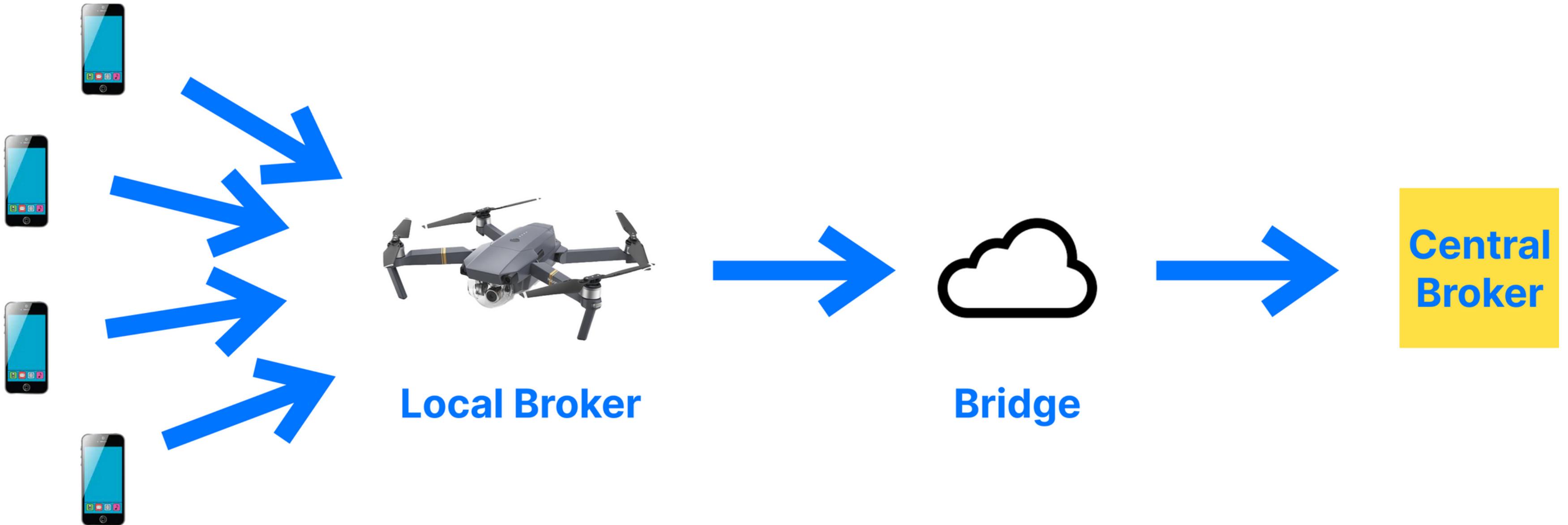
- Opens Python Client
- Inputs IP and Port
- Connects to Mosquitto Broker
- Selects Severity
- Updates Data to SQL/Grafana

FEELS

- Uncertainty
- Desire to help
- Hopefulness
- Impatience
- Despair
- Confusion

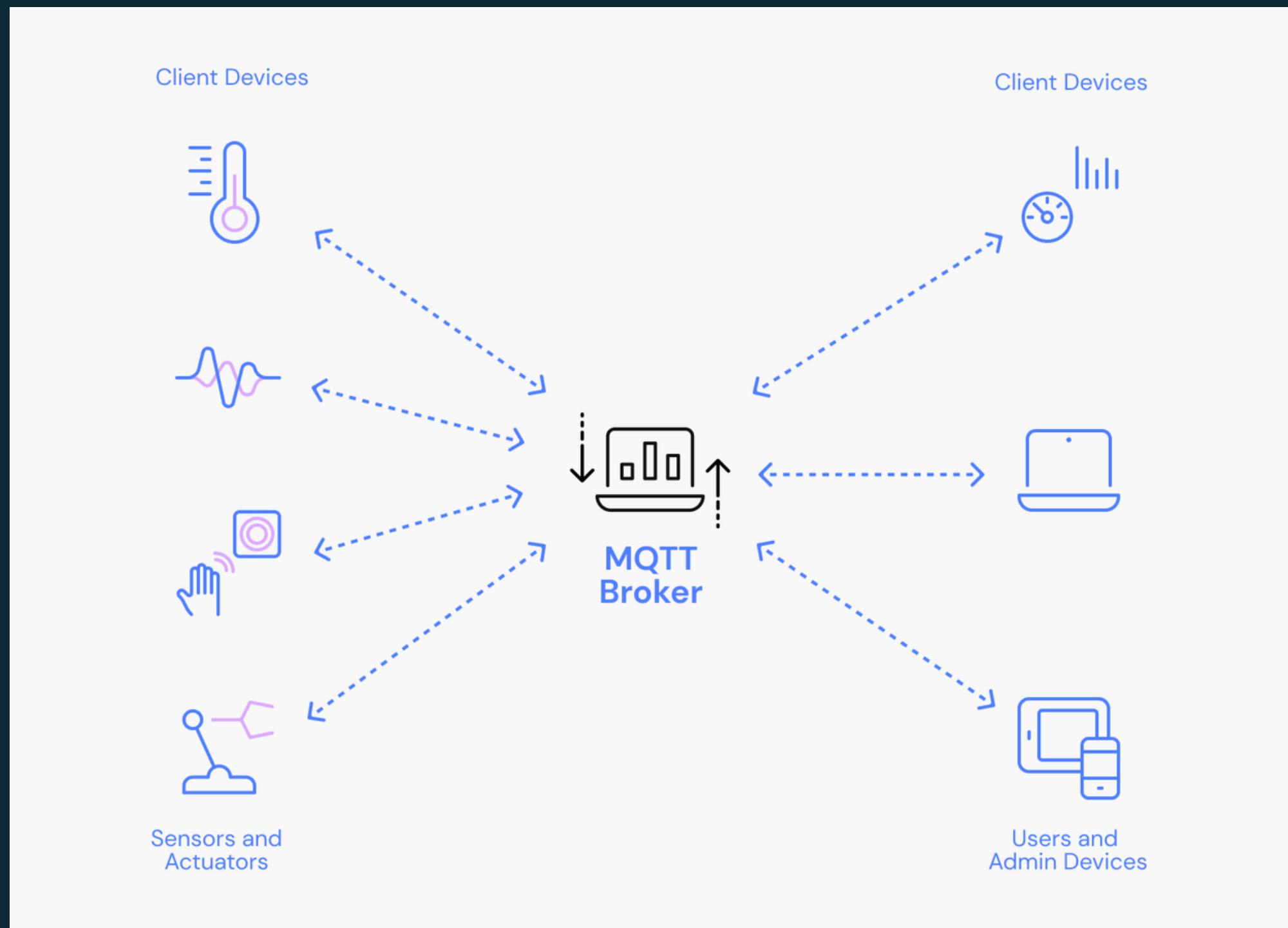
# PART 2

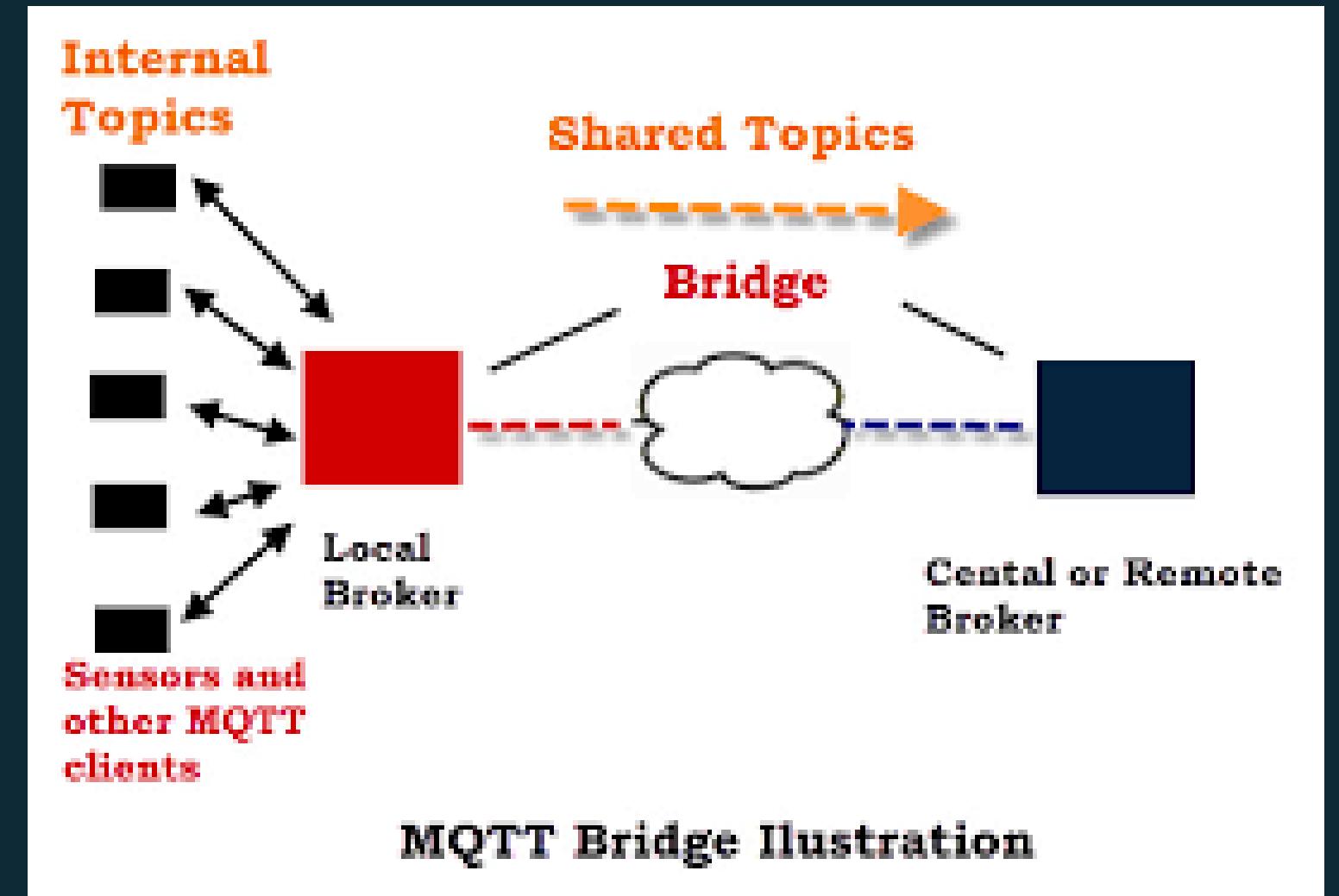
## Technical Architecture



# Client and Edge stage

- mini net
  - emulate drones
  - launch a broker (errors)
- mosquitto
  - central broker and local broker
    - local broker listening port 1884
    - central mosquito - authentication
  - Bridge





# PART 3

Solution Configuration

# Requirements

Must have:

- **Python language installed**
- **Python IDE installed**
  - **Paho Mqtt and Tk Libraries**
- **Virtual machine (Ubuntu) - Azure**
- **Mosquitto installed - Ubuntu**
- **mySQL installed - Ubuntu**
- **Grafana installed - Ubuntu**



# PART 4

System Demo

The background features a dark teal gradient with several large, semi-transparent white circles of varying sizes. Some circles overlap, creating a layered effect. A complex network of thin black lines is drawn over the circles, forming a web-like pattern.

# THANK YOU!

Github:  
[https://github.com/AntonioCedilloA01656823/iot-  
br-mx-g1](https://github.com/AntonioCedilloA01656823/iot-br-mx-g1)