1. **Introduzione: parla della nascita del progetto e che cos’è l’elaborato della tesi**

My thesis paper talks about a prototype of an industrial web application. This project was created with the support of algoWatt, that is the company where I’m employed, after the conclusion of a project in the same context.

1. **Architettura: spiegare i macrogruppi con breve descrizione**

The architecture of this prototype is the one in the figure. It can be divedied in few main-groups, each of them composed by some components.

* 1. The Input Flow group contains the components dedicated to the communication with the IOT devices.
  2. The Data Management group allow a user to configure and maintain a registry of all the IOT devices employed in the system.
  3. The UI group expose the dedicated web pages to a user in order to perform the actions offered by the Data Management group.
  4. The Auth and user profiling group is the sub-system in charge to verify if the interacting user is allowed to navigate and perform action in the system
  5. The Monitoring group gives a complete overview of the health status of the whole envrionment and give views to display data produced by the system

1. **Tecnologie core: K8s e Helm per il deploy dell’applicazione**

To release and handle the deployment of the application are used two foundamental technologies:

* 1. **K8s: descrivere brevemente le risorse usate su ogni componente**

wich is a container orchestartor, it provides many resources to deploy components. For example: a Deployment describe how to create a Pod and wich policy use to maintain a consistent state for the application in case of failures. A Service is used to instruct K8s create a DNS address to allow a Pod to recieve requests from others.

* 1. **Soffermarsi sugli operator K8s**

an Important resource of K8s is the Operator wich is an application-specific controller that can help you package, deploy, and manage a Kubernetes application.

* 1. Helm is a Package Manager for Kubernetes that helps a developer to release a K8s application in a faster way

1. **Kafka:**

the basic technology employed to create the application is Apache Kafka.

* 1. **spiega cos’è e perché è impiegata**

it is a event-driven streming bus with very high performaces, it is used to distribute messages through the whole system with very low latency.

* 1. **vantaggi usati**

Kafka main functionaliy is the usage of topic to distinguish the context of a message, Kafka goal is to dispatch these messages from the producers to the consumers. A Producer is an actor that has the right to send messages in a chosen topic. The Consumer is a different actor that waits to recieve any message from a specific topic. A Consumer Group identify more Consumer that wait for messages in the same topic with the same group-id, Kafka will distribute this message to a single consumer inside the group using a policy like round robin.

* 1. **tecnologie di contorno**

Kafka works with Zookeper and JMX, Zookeeper is used by Kafka brokers to determine which broker is the leader of a given partition and topic and perform leader elections, JMX is a Java extension library that exports statistics about Kafka performances and resource consumption.

1. **Input Flow:**
   1. **Python perché è usato**
   2. **Simulatore di termometro, anemometro, e solarimetri**
   3. **Spiega cosa sostituisce il simulatore**
   4. **Parla del manager**
2. **Data Management:**
   1. **Base dati Mysql vantaggi**
   2. **Spring Boot vantaggi**
      1. **Perché divisione dei microservizi**
      2. **Scopi dei microrservizi**
3. **UI: perché React, vantaggi**
4. **Authentication:**
   1. **Keycloack: cos’è e com’è usato**
   2. **Gateway:**
      1. **Spring Boot router ignorate**
      2. **funzionalità usate per SSO**
5. **Monitoring:**
   1. **Influx: vantaggi e uso**
   2. **Telegraf: funzionalità e uso**
   3. **CAdvisor: scopo**
   4. **NodeExporter: scopo**
   5. **JMXExporter: scopo**
   6. **Prometheus: scopo**
   7. **Grafana: scopo e uso**
6. **Test: Cypress, cos’è**
7. **Pipeline CI/CD: scopi, test e release**