Service-oriented Architecture Lab

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Objectives

- Build and maintain a working ecosystem of microservices.
- Integrate micro-services using an Event-driven Architecture.
- Deliver and deploy a reproducible environment with Docker.
- Plan for and implement future requirements and features around your architecture.
- Identify the (very-)Minimal Viable Product that fulfills the requirements.

Project Vision: Smartrix Grid - Shifting the energy paradigm

Electric power is everywhere present in unlimited quantities and can drive the world's machinery without the need of coal, oil, gas, or any other of the common fuels. - Nikola Tesla

The third millennia is filled with radical transformations, faster than ever. Consumption and production models in every sector are shifting, the way people and individuals interact with systems at scale has changed. The world is becoming more and more decentralized. Think *AirBnb*, *Uber*, and even *Amazon* to a lesser extent, these companies do not own flats, taxis, or goods, but they are leaders in their industries no matter what.
The energy domain is missing out for now, which is where Smartrix Grid comes into play. It is time for the people and variously sized businesses to join the game against and with the mastodons which used to rule the *centralized* energy world.
The grid, which interconnects every single device no matter its size needs to be stable, production must match consumption at any time, and it is up to energy supplies to match and adapt to the demand. Obviously, there are many challenges down the road, a complex system like the grid that most humans living on this planet depend on so heavily is not easily handled.
Streamlining the processes and modelizing the grid and all of the actors involved is key. A wise man once said that *Simplicity is the ultimate complexity* (Leonardo Da Vinci), organizing your system into different services, while making this whole orchestra sound like a symphony is a challenge, it is *your* challenge. Smartrix Grid: *Shifting the energy paradigm.*

Expected work (groups of 5)

Your role is to define, implement the *Minimal and Viable Product* (MVP) associated with the Smartrix Grid ambitions. The ambitions are going to be defined by a set of user stories. It is your duty to **identify the services** to expose in order to support these scenarios and to **properly integrate** them altogether in a viable way (e.g., persistent data, automated acceptance scenarios, controllable).

It is absolutely essential to maintain during the entire course of the project a **working** set of services, and which can prove that your entire system is functional: **you cannot afford the grid going dark**. We will extend the supported features with new user stories, it should be part of the plan, while not overengineering your current implementation.
We insist, but keep in mind that the expected delivery is small in terms of business coverage and algorithmic logic, but it requires a non-negligible effort to **deliver it properly** (e.g., justified API and choices, persistence layer, turn-key containers).

Deliverables

- A single github project named *soa-21-22-team-x* (*x* being your team identifier) into the Polytech organisation. For the very first iteration, no particular structure is demanded, as we just want to have a glimpse on what will be a very-very-MVP. You will be the ones showing the instructors your scenarios, and you will just need to prove that your system supports the stories.
  INITIAL DUE DATE: 27th of September.
- The requirements will later be way more strict, and you will need to provide into your repository some scripts to install and run your project. More on that later, focus on building your first set of services and integrate them altogether smoothly.
- A demonstrably working project needs to be ready to be shown each week.

Personas

- **Nikola**, the Chief Operating Officer responsible of the grid stability from an Energy Supplier
- **Charles,** the CEO of Smartrix Grid
- **Pierre & Marie**, technological-driven family house owners, Smartrix Grid customers
- **Elon**, the Chief Technological Officer of a newgen electric vehicle company

User stories

1. As **Pierre & Marie**, I want to see the electricity consumption of my household, in order to have a better understanding of what is consuming most of my energy and when.
2. As **Nikola**, I need to guarantee that the production is equal to the consumption on the whole grid in order for the grid to not go dark.
3. As **Charles**, I want to have an overview of my clients' usage of energy, in order to assess their potential needs and adapt my commercial propositions.

Added 28/09:

4. As **Elon**, I want my vehicles to be able to recharge overnight, so that my customers are able to drive to work each morning.