

# How to Develop a User-Friendly Interface for SWAT-Based Solutions?

Yurii Ahafonov, Yevhenii Matviienko

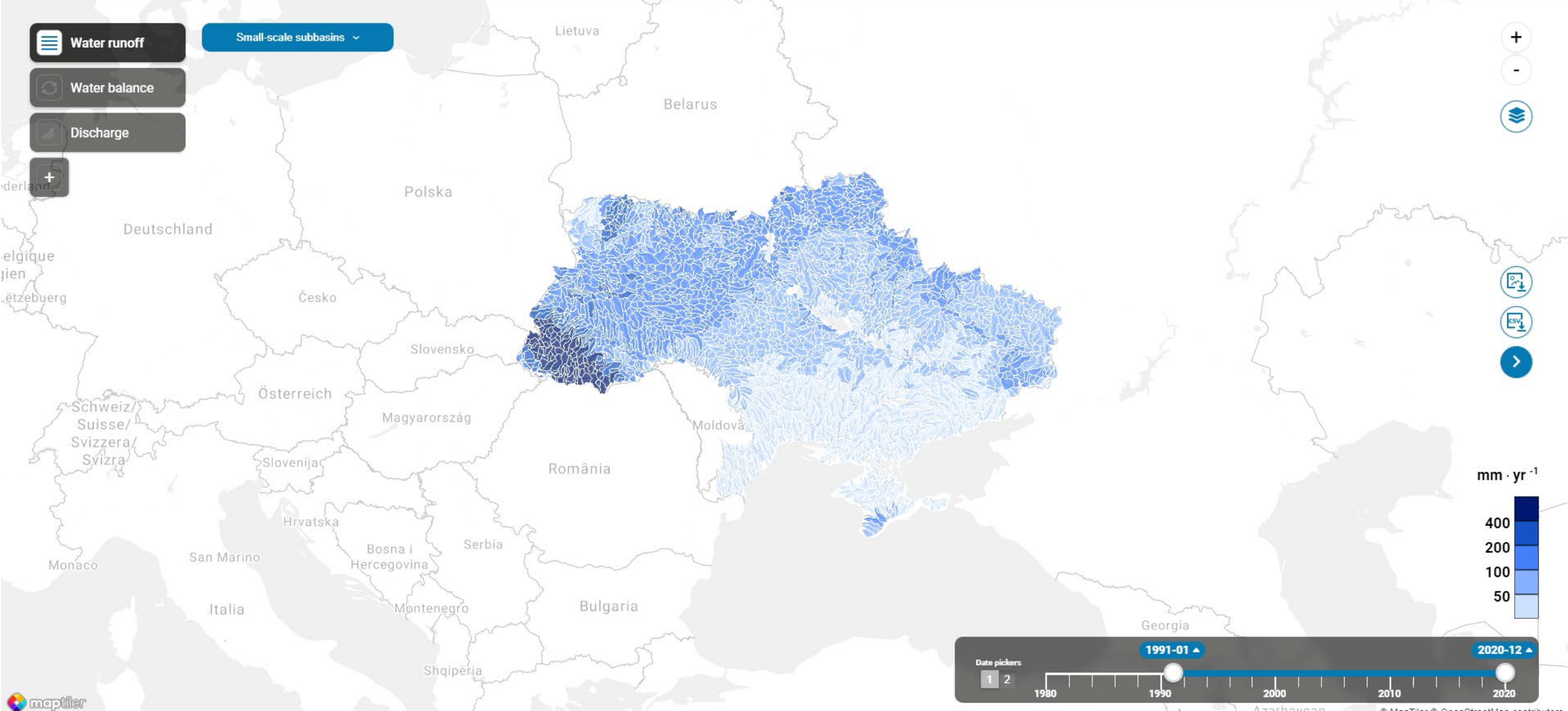
Team: Valeriy Osypov, Yurii Ahafonov, Yevhenii Matviienko, Herman Mossur, Nataliia Nikitenko.



Ukrainian  
Hydrometeorological  
Institute



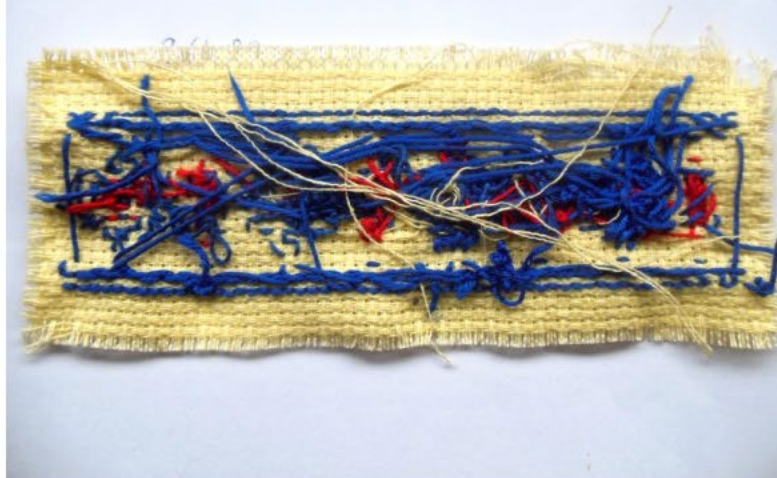
LABORATORY OF THE RIVER  
SYSTEMS MODELING



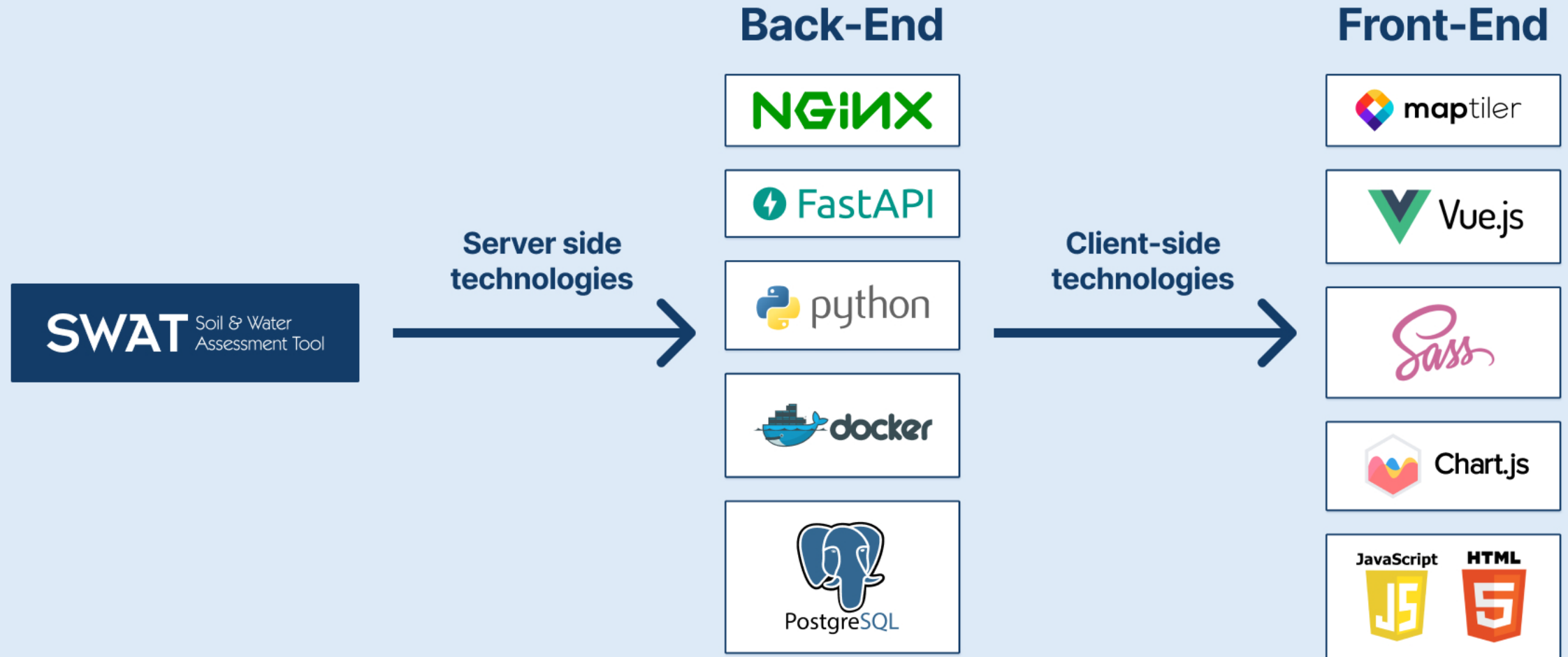
**Frontend**



**Backend**



# Displaying SWAT model outputs on web platforms



# Requirements for front end



## 1. Menu



## 2. Handling events on the map



## 3. Customizing data layers

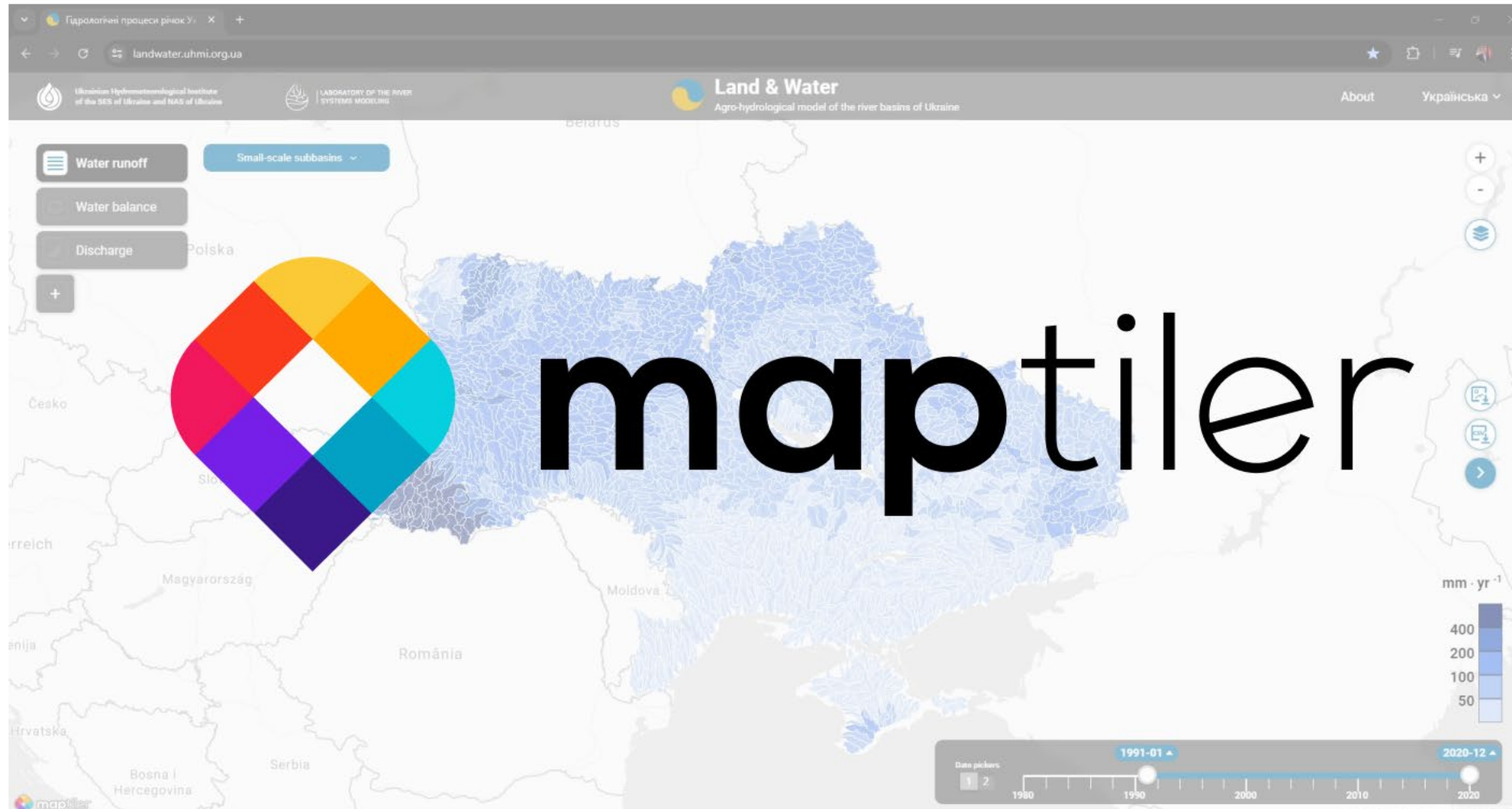


## 4. Support for mobile devices



## 5. Multi-language

# The best solution for interactive map

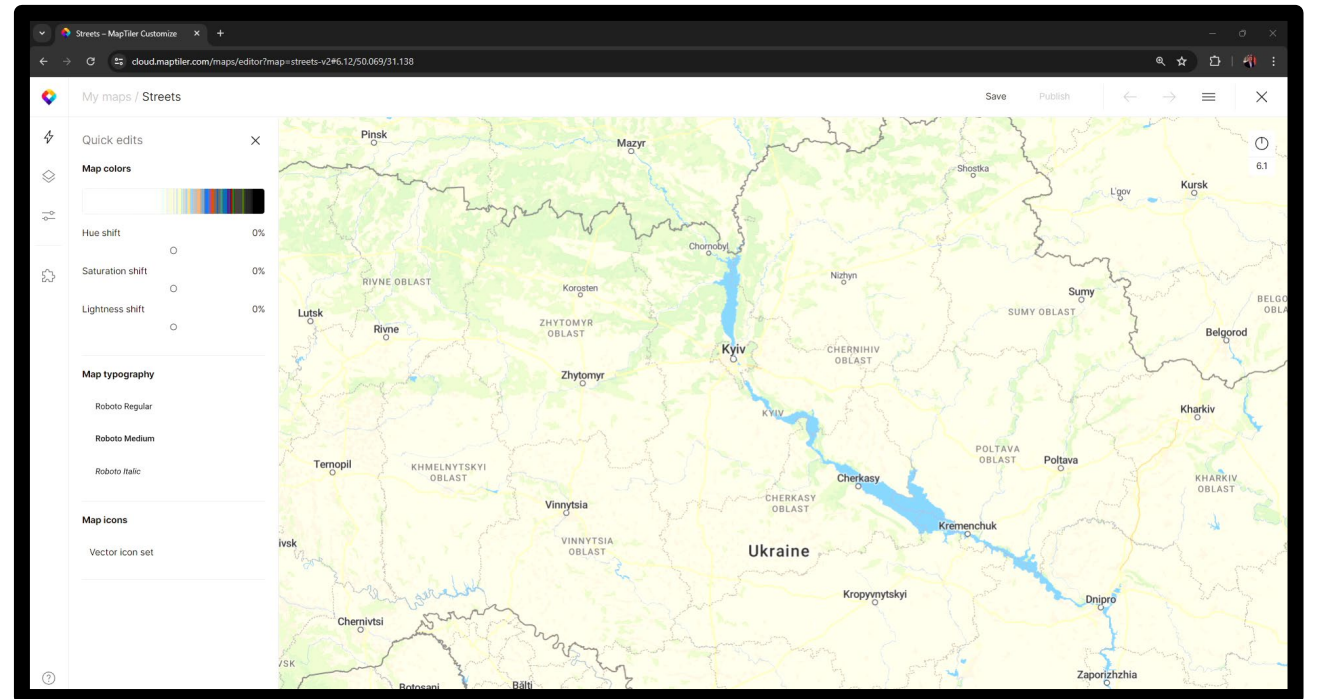




# Base map customization interface in Maptiler

## Main features Maptiler:

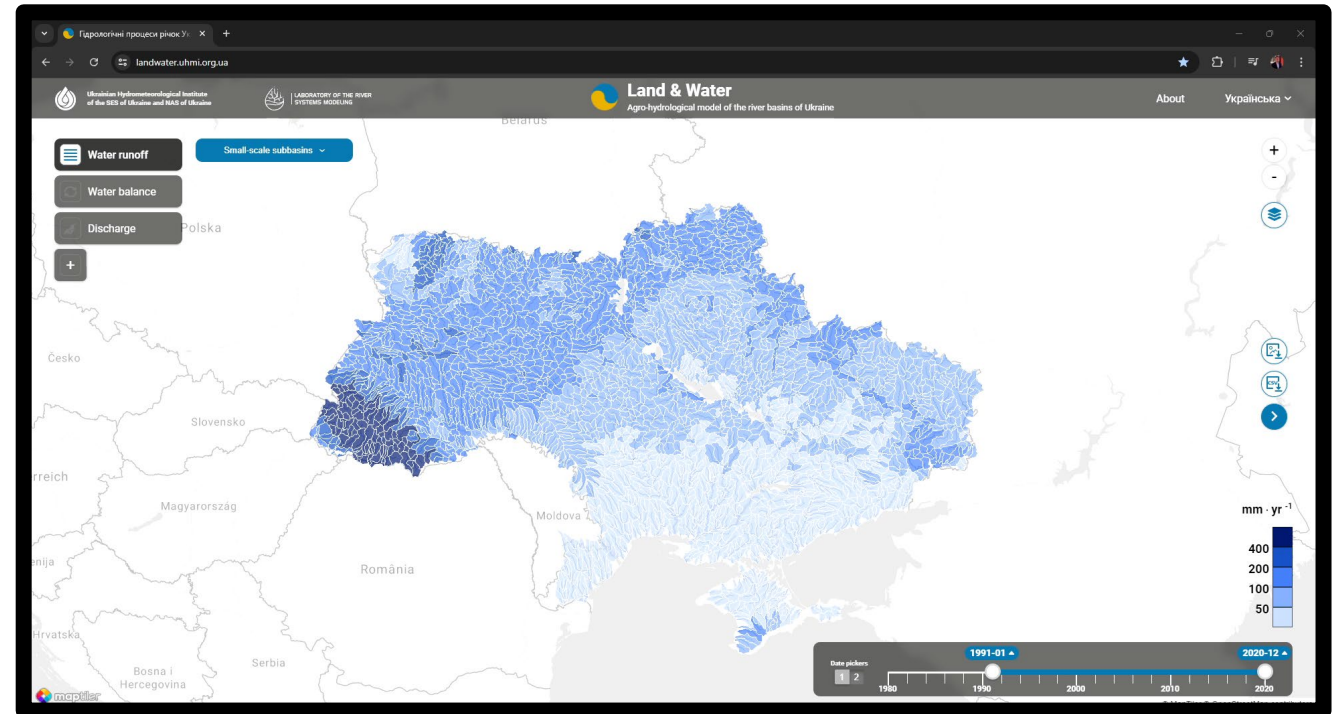
1. Selection of colors
2. Data filtering
3. Manage layers
4. Customize map labels





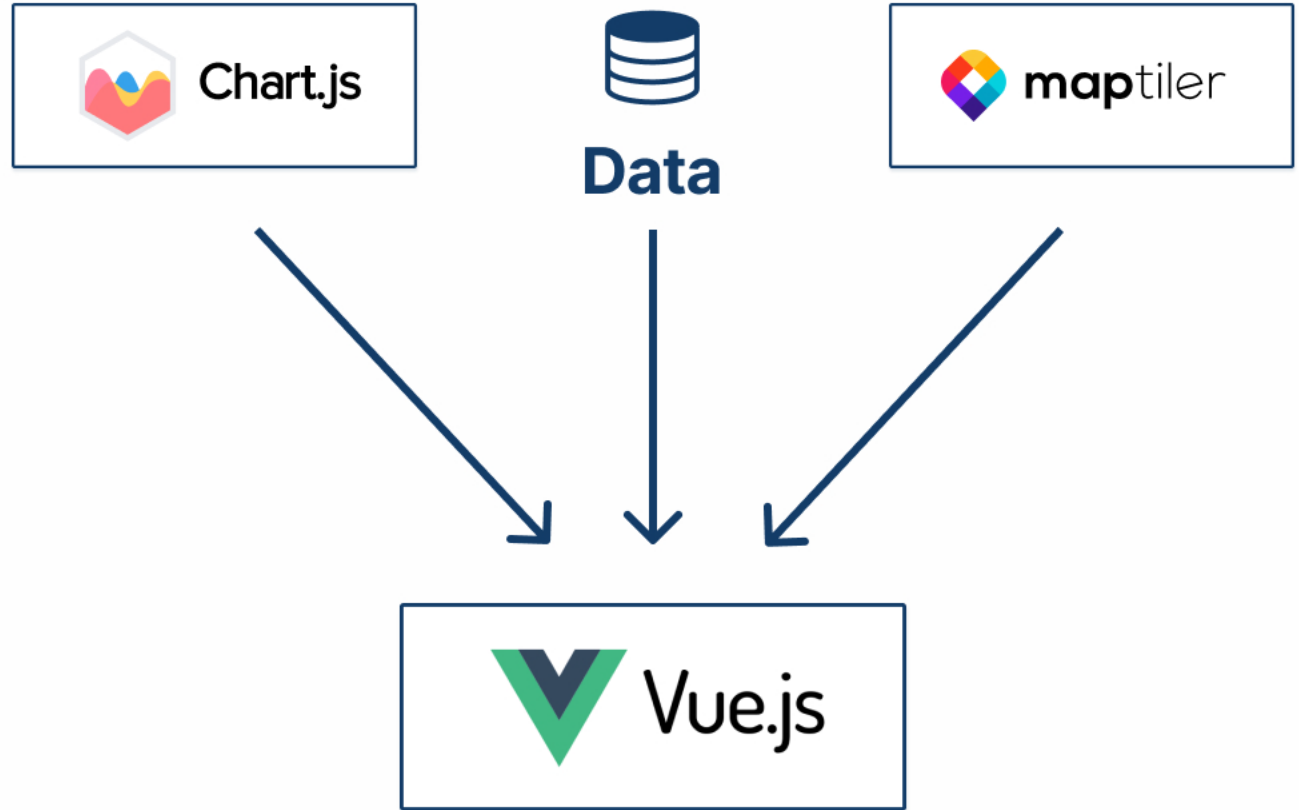
# The solution for chart is Chart.js

1. Click on the polygon
2. Chart.js graphic opening
3. Control the chart





**Vue as the  
binding agent  
for interface/  
front-end/etc**

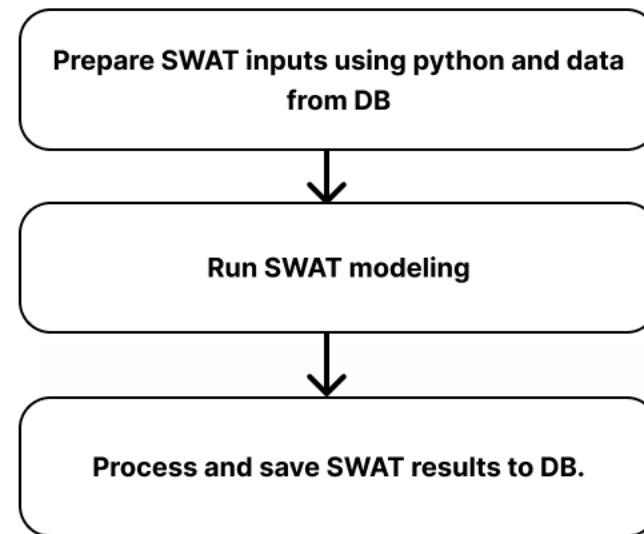


**BackEnd**

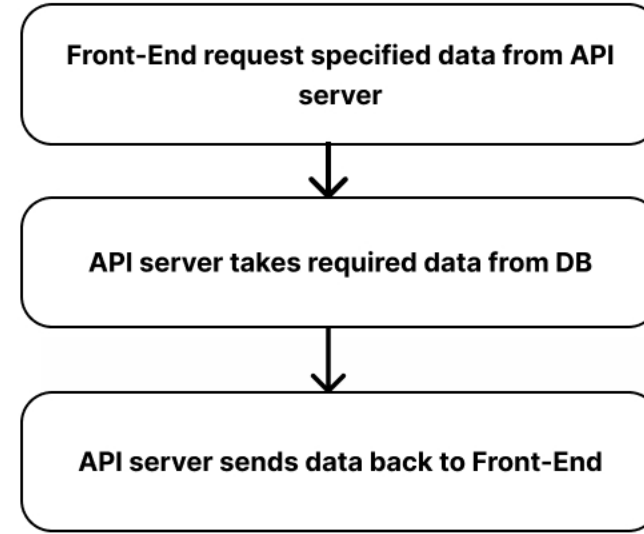
The background features a dark blue gradient with abstract, wavy patterns in shades of blue and purple. A prominent feature is a grid of small, light blue dots that forms a shape resembling a stylized letter 'L' or a similar geometric form, set against a darker blue background.

# Back-End parts of SWAT-based solution

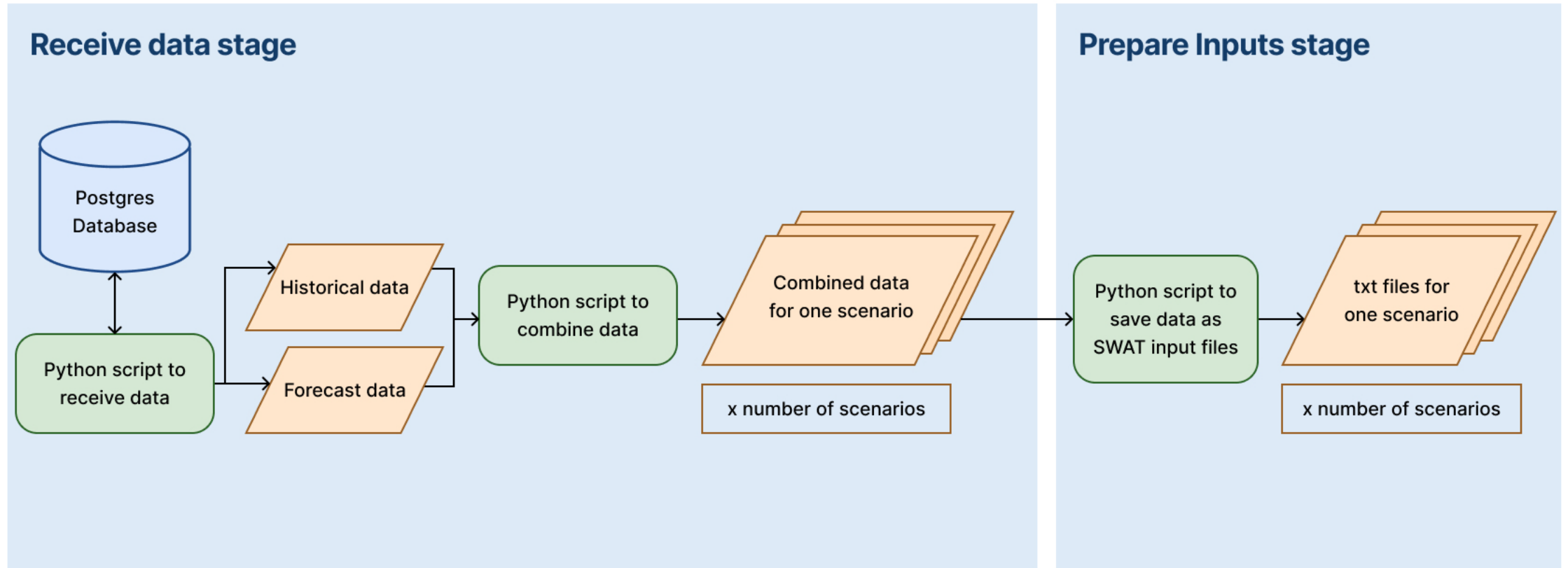
## SWAT data update:



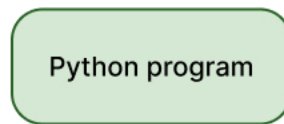
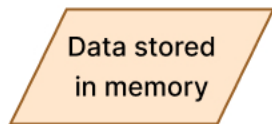
## BackEnd process:



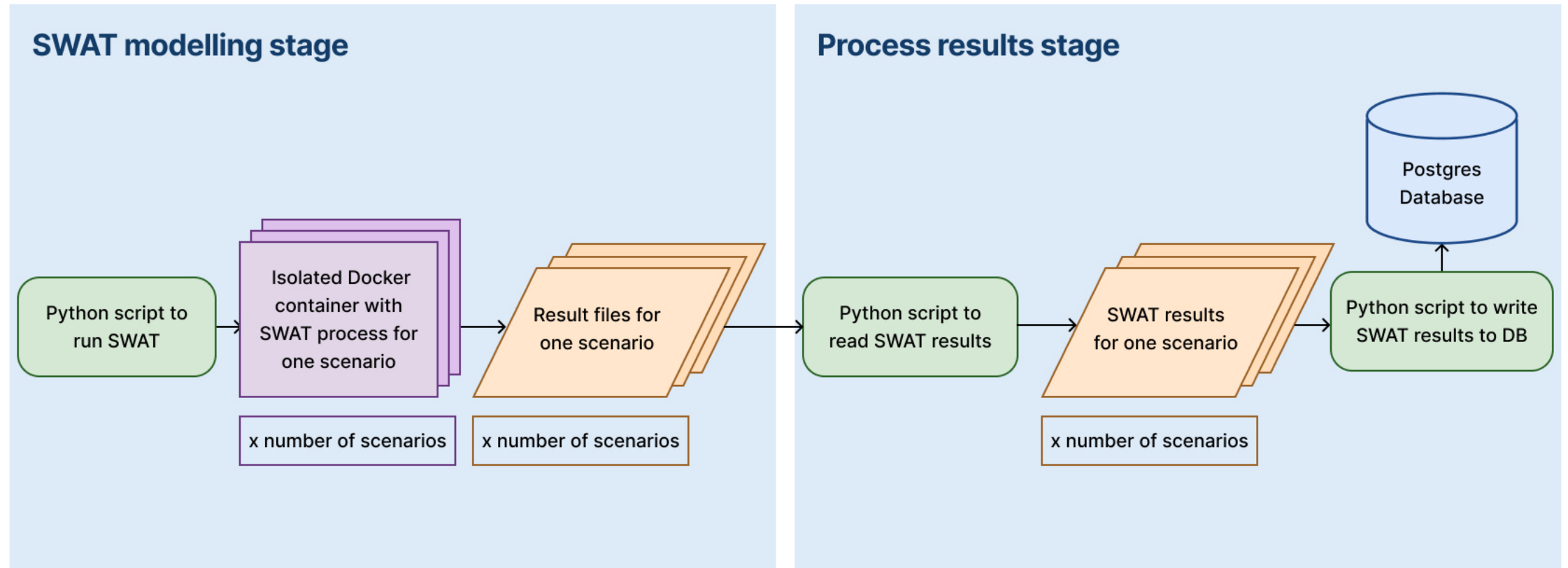
# Preparing SWAT inputs



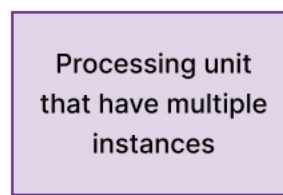
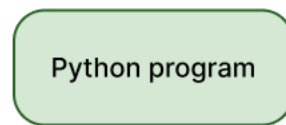
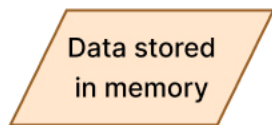
## Legend



# SWAT modeling for different scenarios

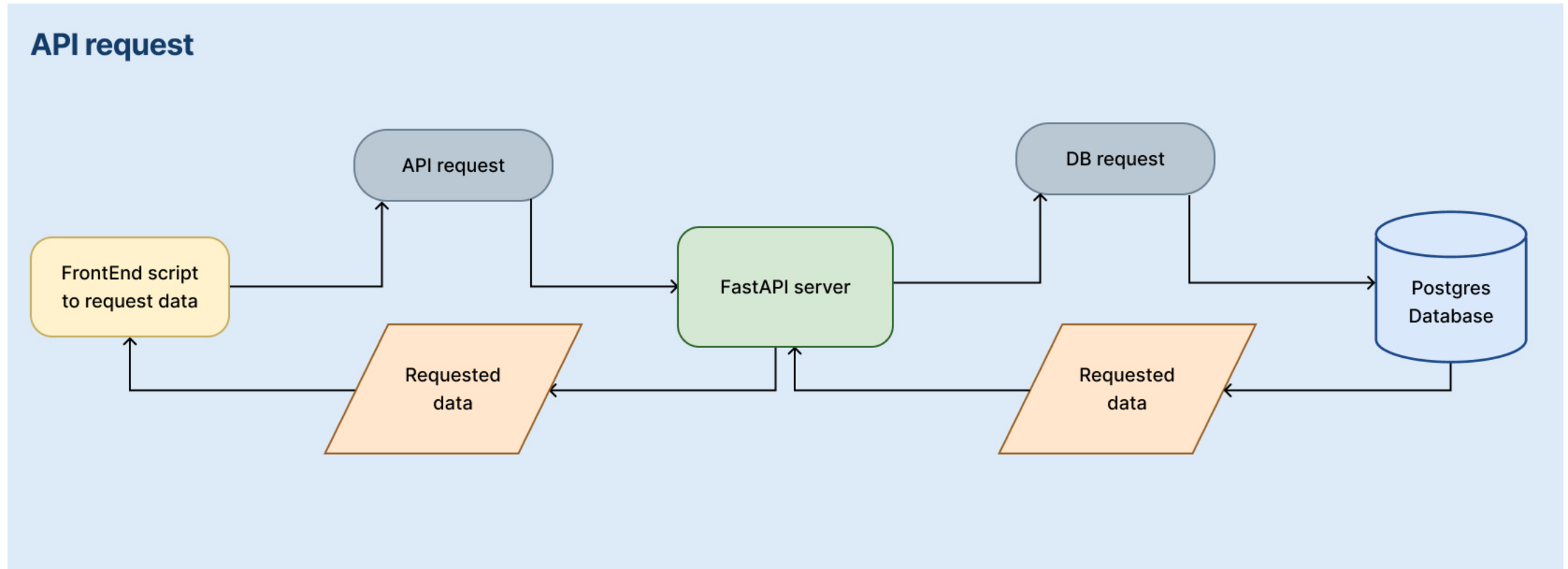


## Legend



# Preparing SWAT inputs

12



# Why the final product need designer



## 1. User Research



## 2. Information Architecture



## 3. Wireframing and Prototyping



## 4. UI Design



## 5. Testing and Analysis

# Conclusions:

## FrontEnd:

1. **Data path from the SWAT model to the user: receiving, saving, sending.**
2. **Advantages of Maptiler: convenient map editing, storage on servers, customization options.**
3. **Using Chart.js to display graphs when you click on map polygons.**
4. **Advantages of using Vue 3: simplified architecture and application state management.**

## BackEnd:

### SWAT data updating process:

- a. **Update data from different sources**
  - b. **Run SWAT modeling is separate containers**
  - c. **Save result to database**
2. **API workflow: Front-End request data from API server, API server request data from database, API server return data to Front-End**
  3. **Why designer: Research, architecture, prototyping, UI design, testing**



**Any questions?**

The background is a solid dark blue color. Overlaid on this is a complex, abstract pattern of small, light blue dots. These dots are arranged in a grid that has been distorted into a series of concentric, wavy, and curved lines, creating a sense of depth and movement. The pattern is most dense and prominent on the right side of the image, where it forms a large, curved shape that resembles a stylized letter 'L' or a similar abstract form. The overall effect is a modern, digital, and artistic aesthetic.