

## **Hackathon Moonshot 5 (resilient infrastructure)**

**Quay walls workflow and hinterland  
congestion**

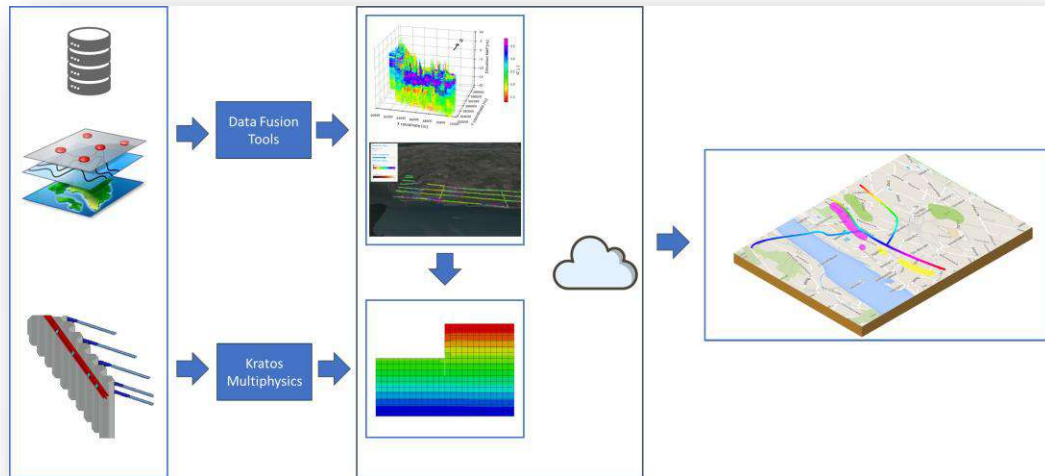
# Summary

- Participants: Port of Rotterdam, TU Delft, Rijkswaterstaat, Geodan, Victor.ai, Deltares
- Organized in the context of: Moonshot + Enabling Technologies
- Duration: 3 days
- Location: Deltares ID lab

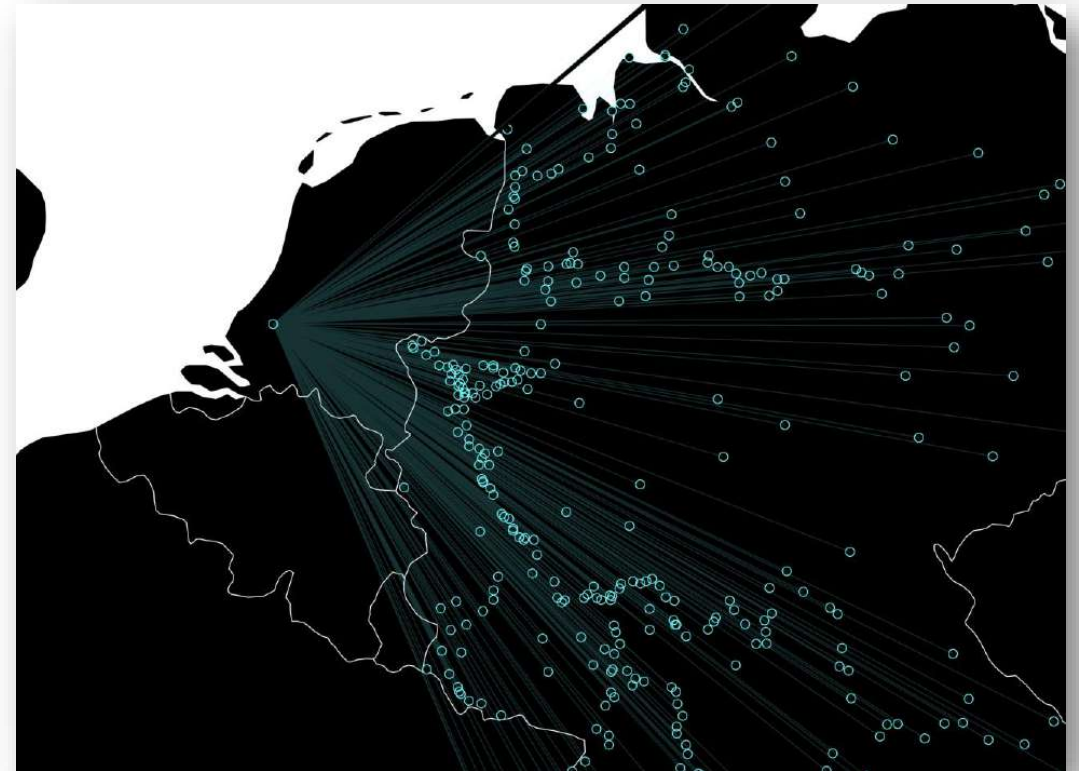


# Two tracks

## Quay walls

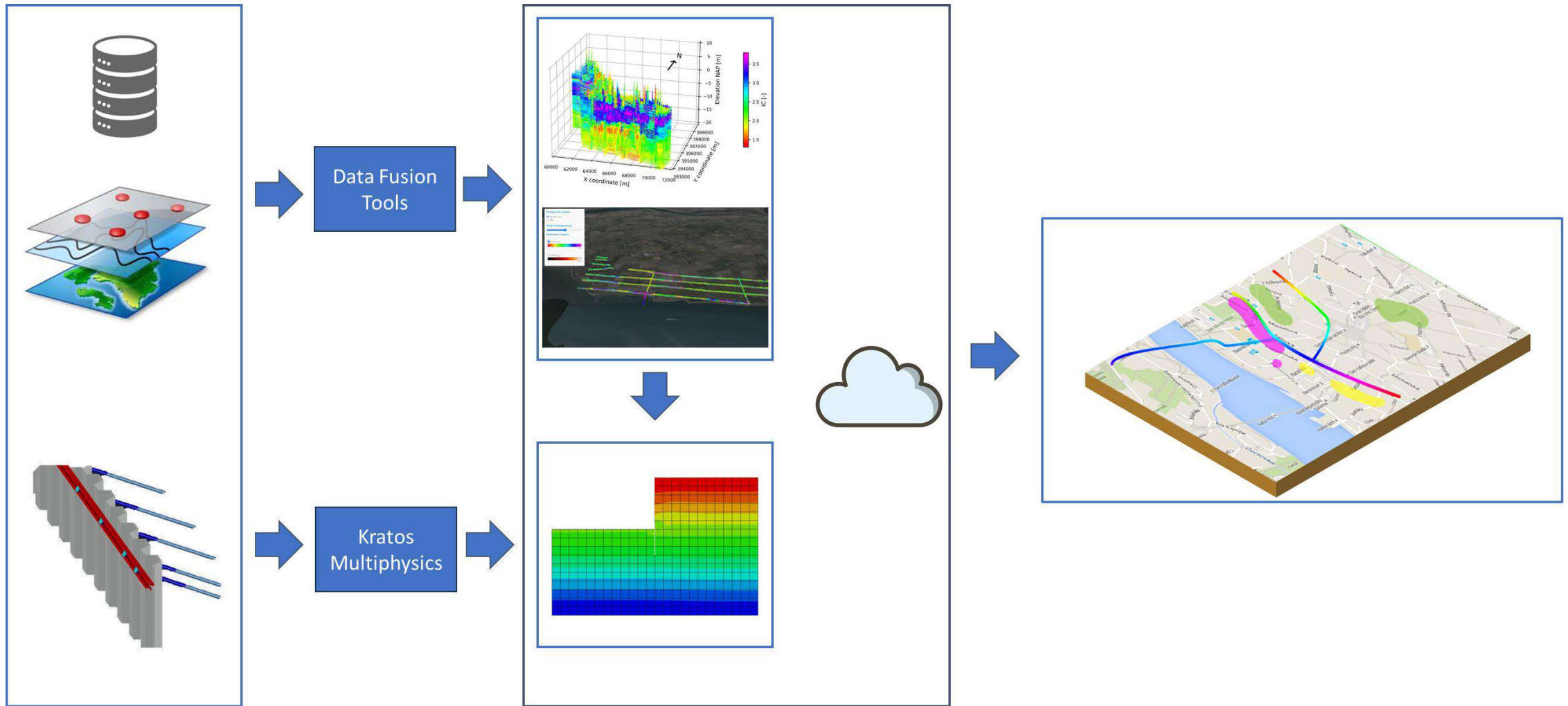


## Hinterland



# Quay walls

# Goal of the hackathon



Deltares

# Datasets

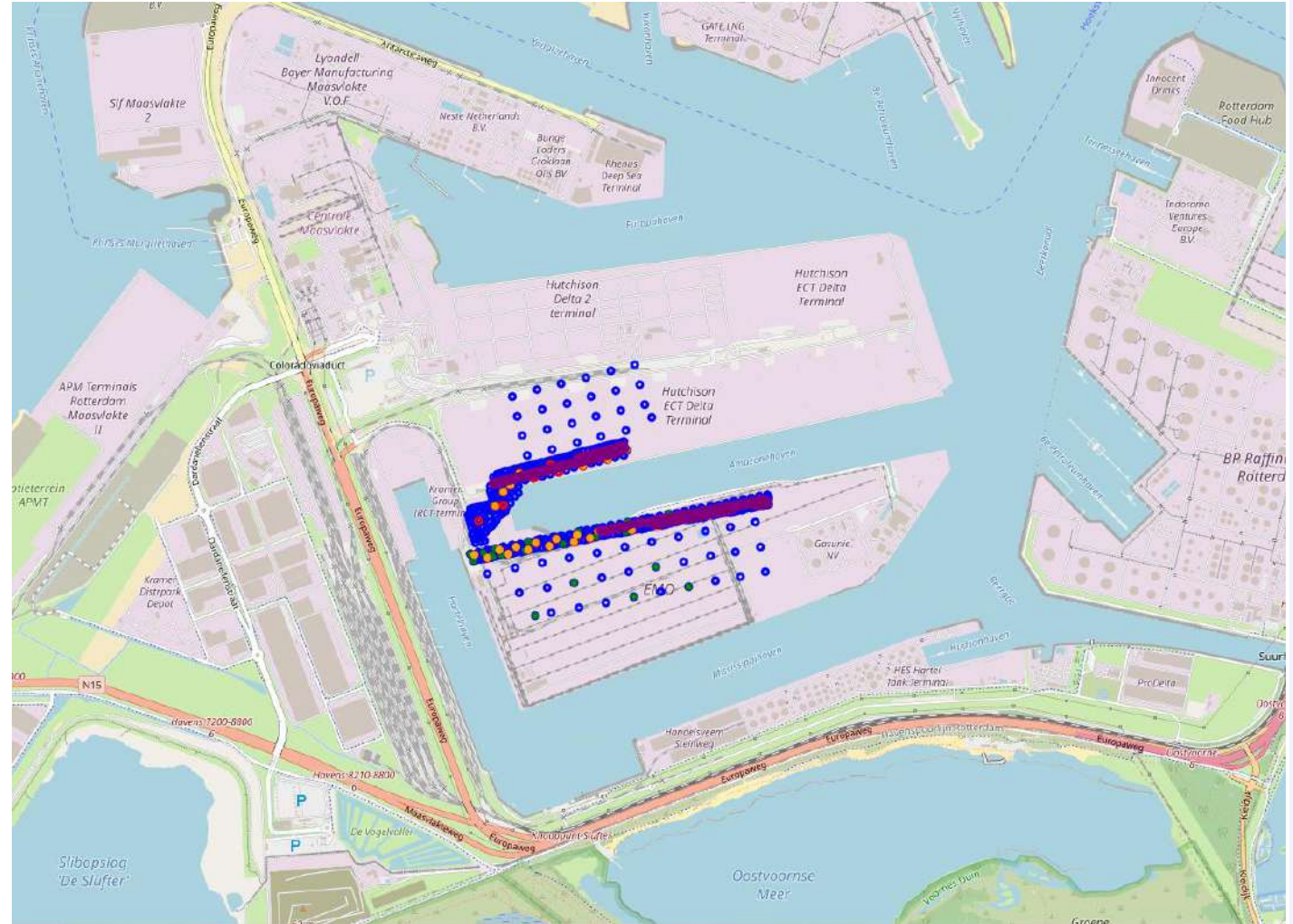
## SQL data base

Data anonymized

- Random noise
- Different location

## Datasets

- CPT
- Boreholes
- Lab tests
- Sheet pile data
  - Type
  - Installation details



# Quay wall strength estimates

## Zo bouw je een kademuur

De haven van Rotterdam heeft zo'n tachtig kilometer kademuur. En er komen er nog steeds bij; voor de vestiging van een nieuw bedrijf op Maasvlakte 2 wordt een nieuwe kademuur gebouwd. In tegenstelling tot wat je misschien verwacht, wordt een kademuur gebouwd 'in den droge'. Hier zie je hoe.

De bouw van een kademuur begint dus 'in den droge'. Hoe? Met het heien van 38 meter lange buispalen (holle stalen palen) waartussen damwanden worden geplaatst.

NAP

1

Daarna worden diagonale funderingspalen in de ondergrond aangebracht die de druk- en trekkrachten opnemen, die in de eindsituatie op de kade worden uitgeoefend.

2

Bovenop de funderingspalen wordt een 7 meter hoge L-vormige betonconstructie geplaatst. Hierna wordt de kademuur aangevuld met zand.

3

Als de hele constructie gereed is, wordt de grond voor de kademuur weggebaggerd. Op de Maasvlakte gebeurt dat tot een diepte van -24 m NAP. De kade is klaar!

4

-24 m NAP

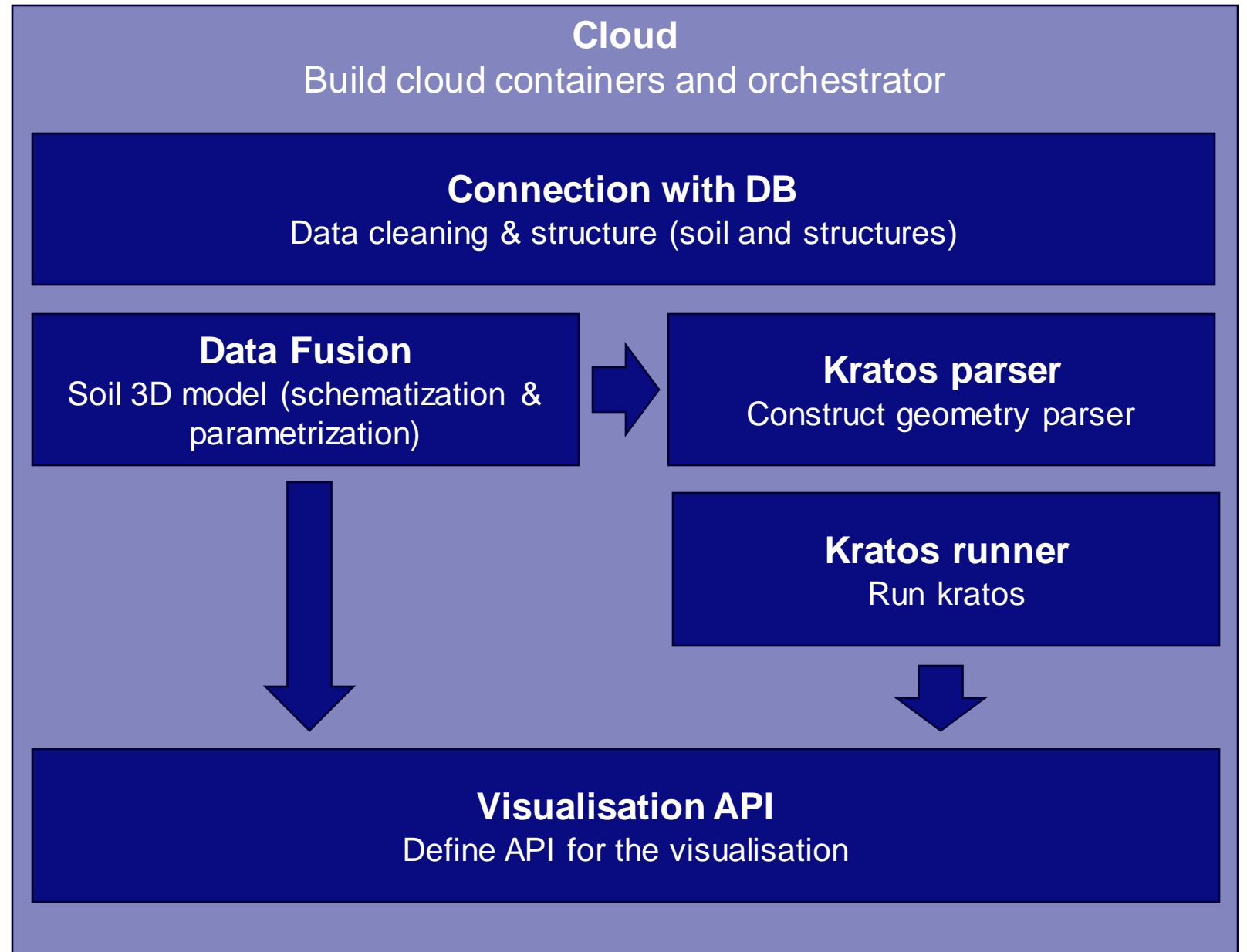
# Workflow

Team 1: Connection with DB

Team 2: Start Data Fusion

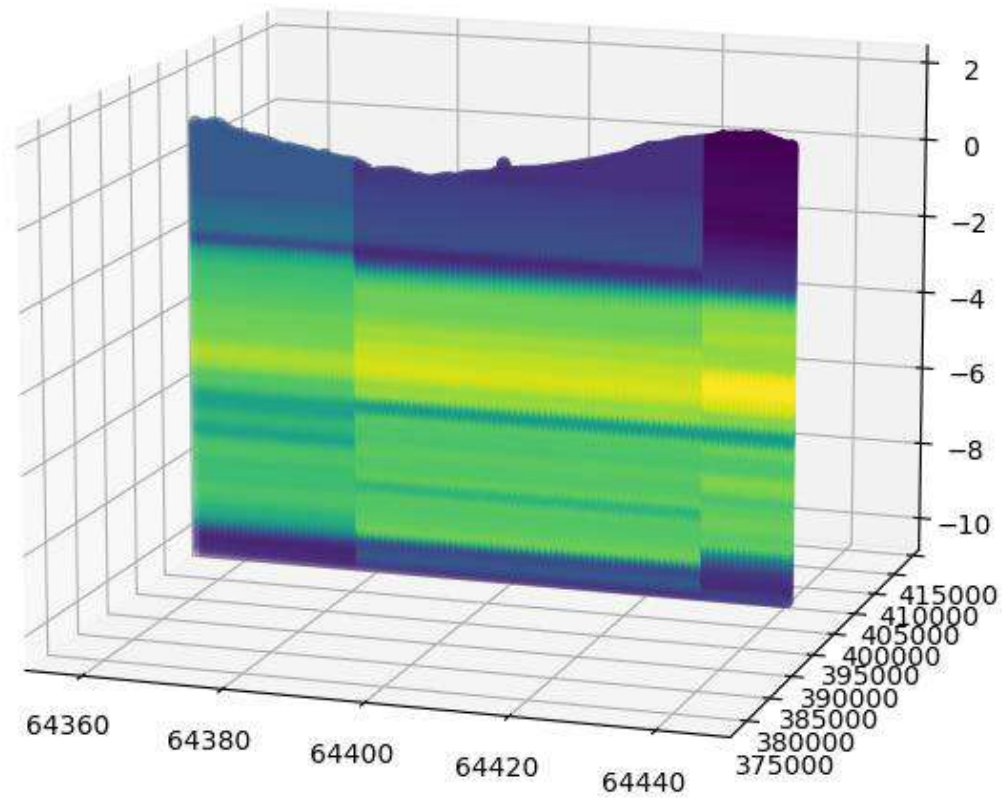
Team 3: Start Kratos parser

Team 4: Start visualization

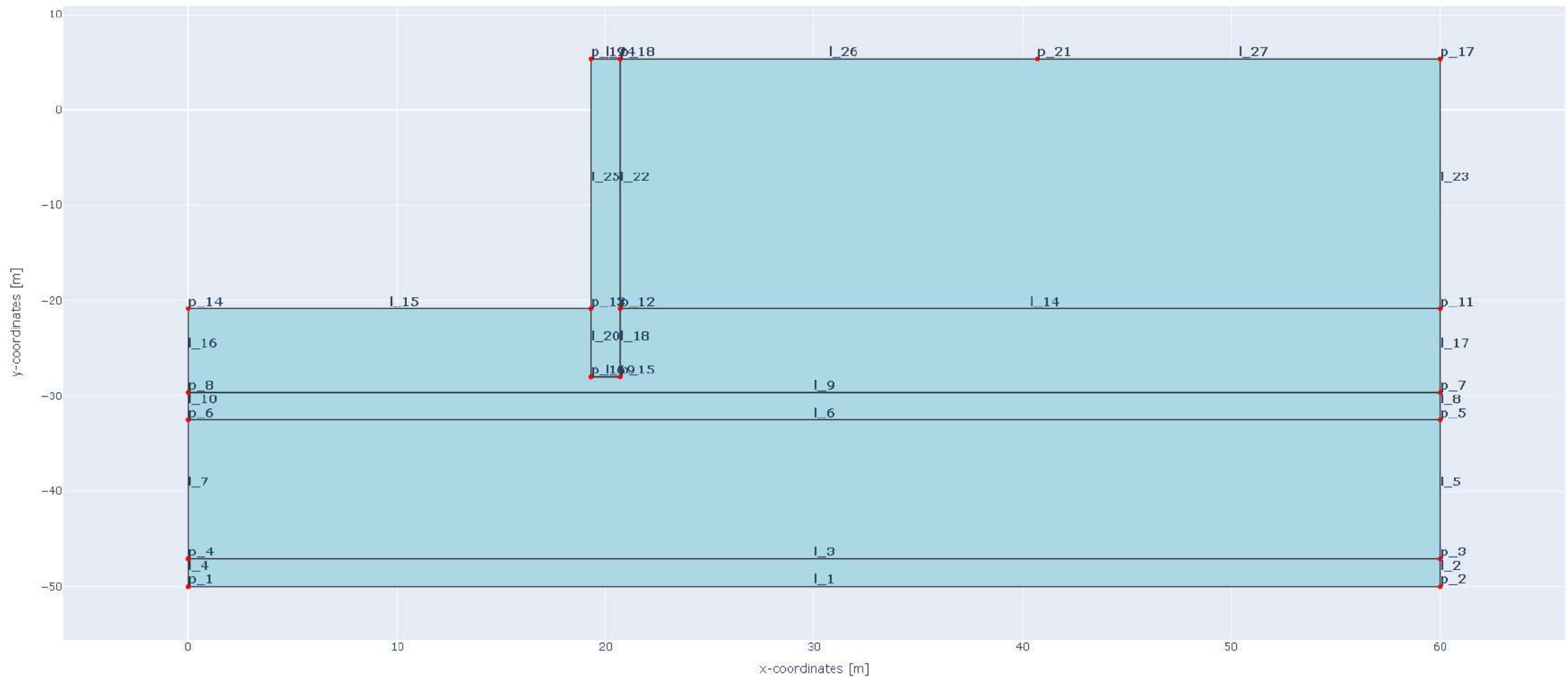




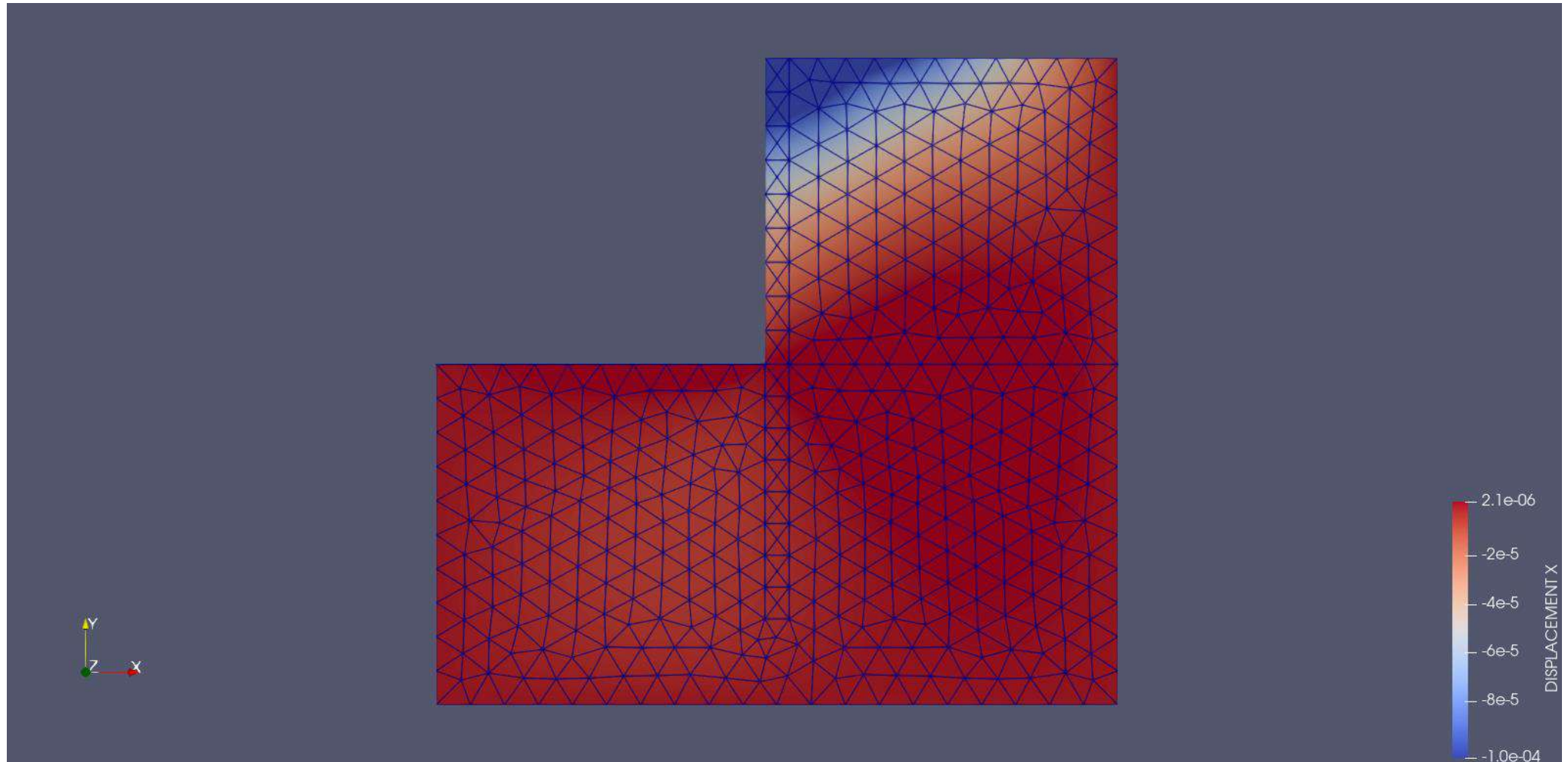
# Results



# Results



# Results



Deltares

# Steps forward

## Open challenges

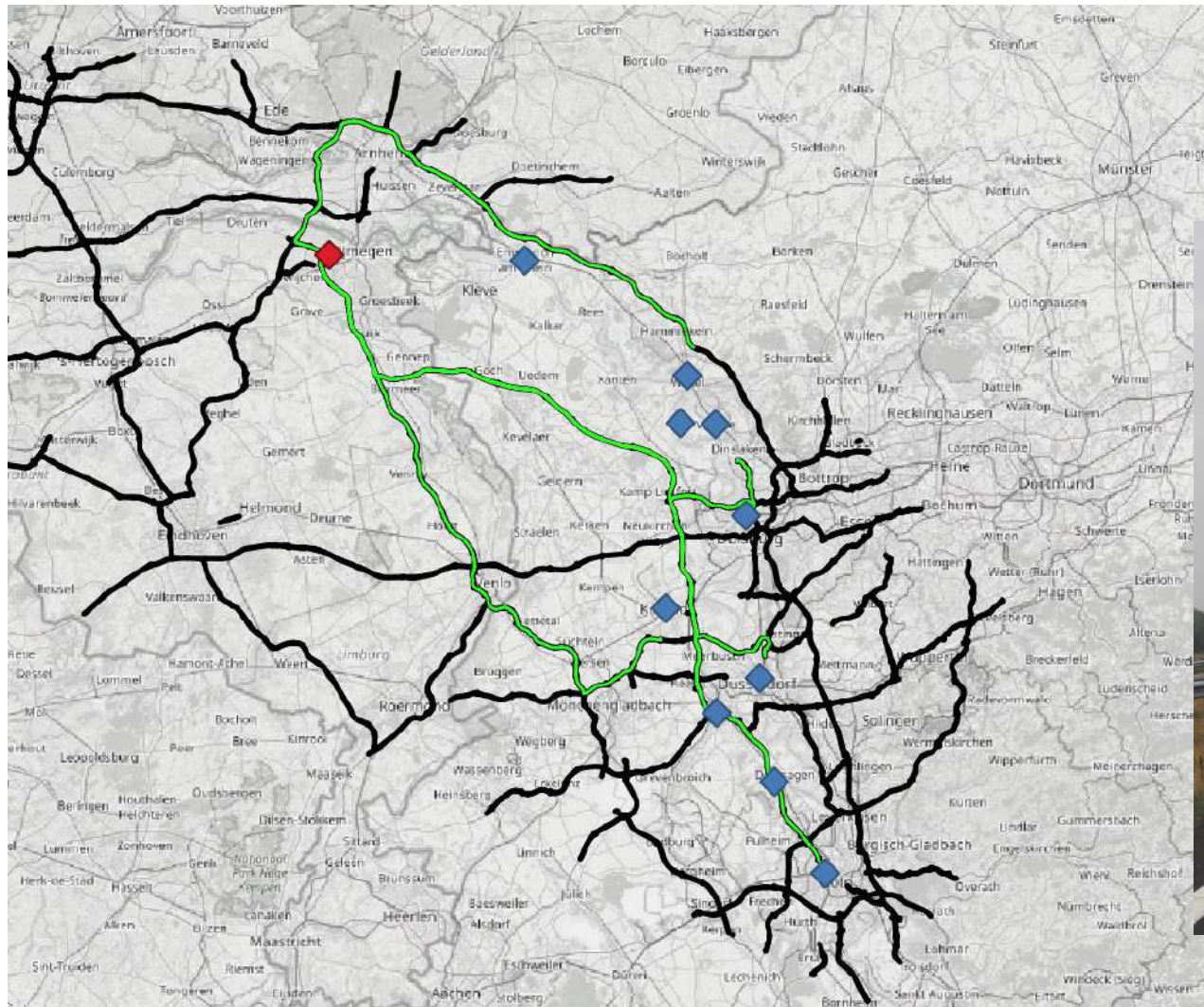
- Integration in the cloud
- Incorporation of GANs for subsoil schematisations
- Refinements on the numerical model

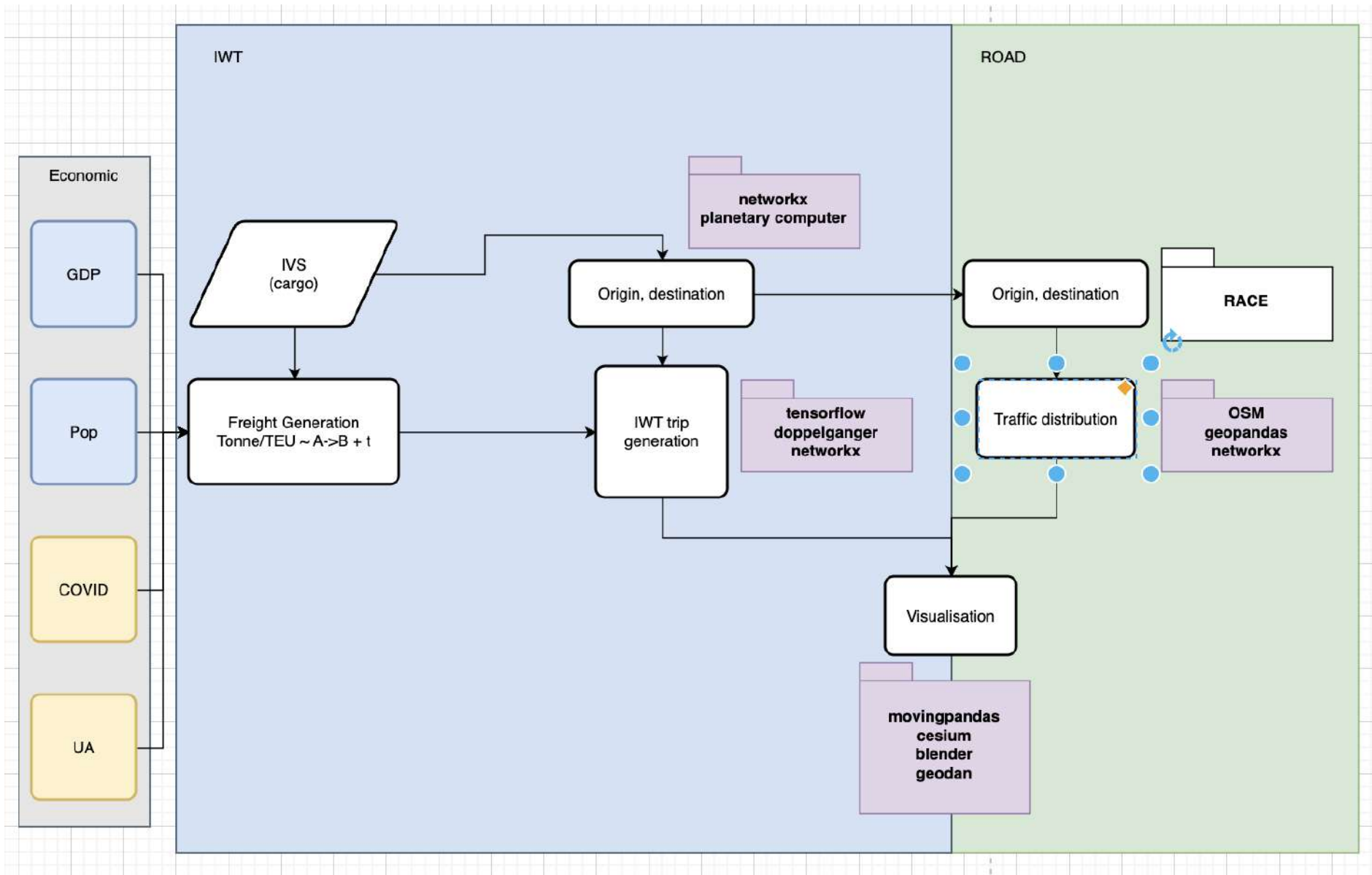
## Reflections

- Good energy
- Lots of progress
- Too ambitious

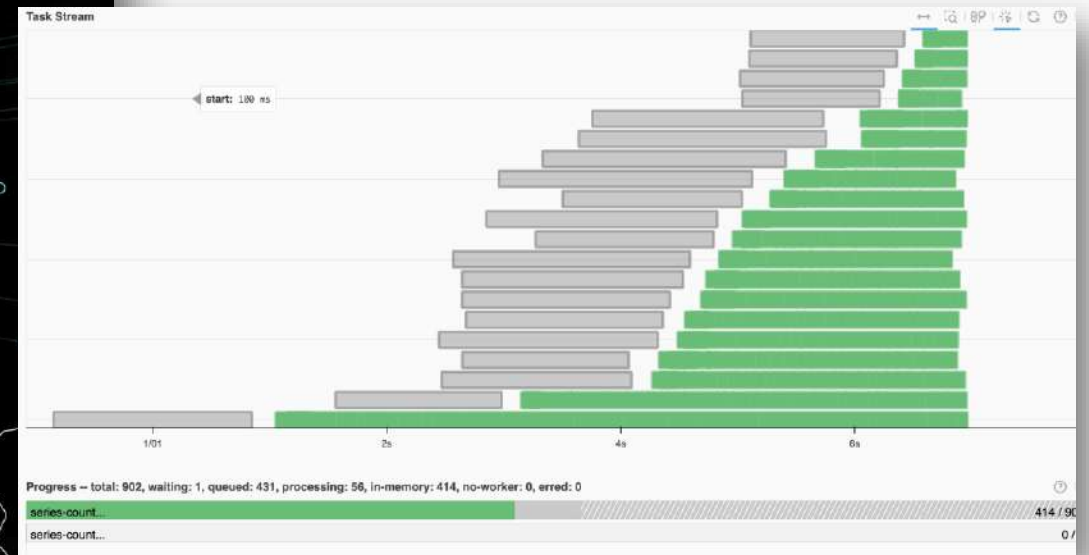
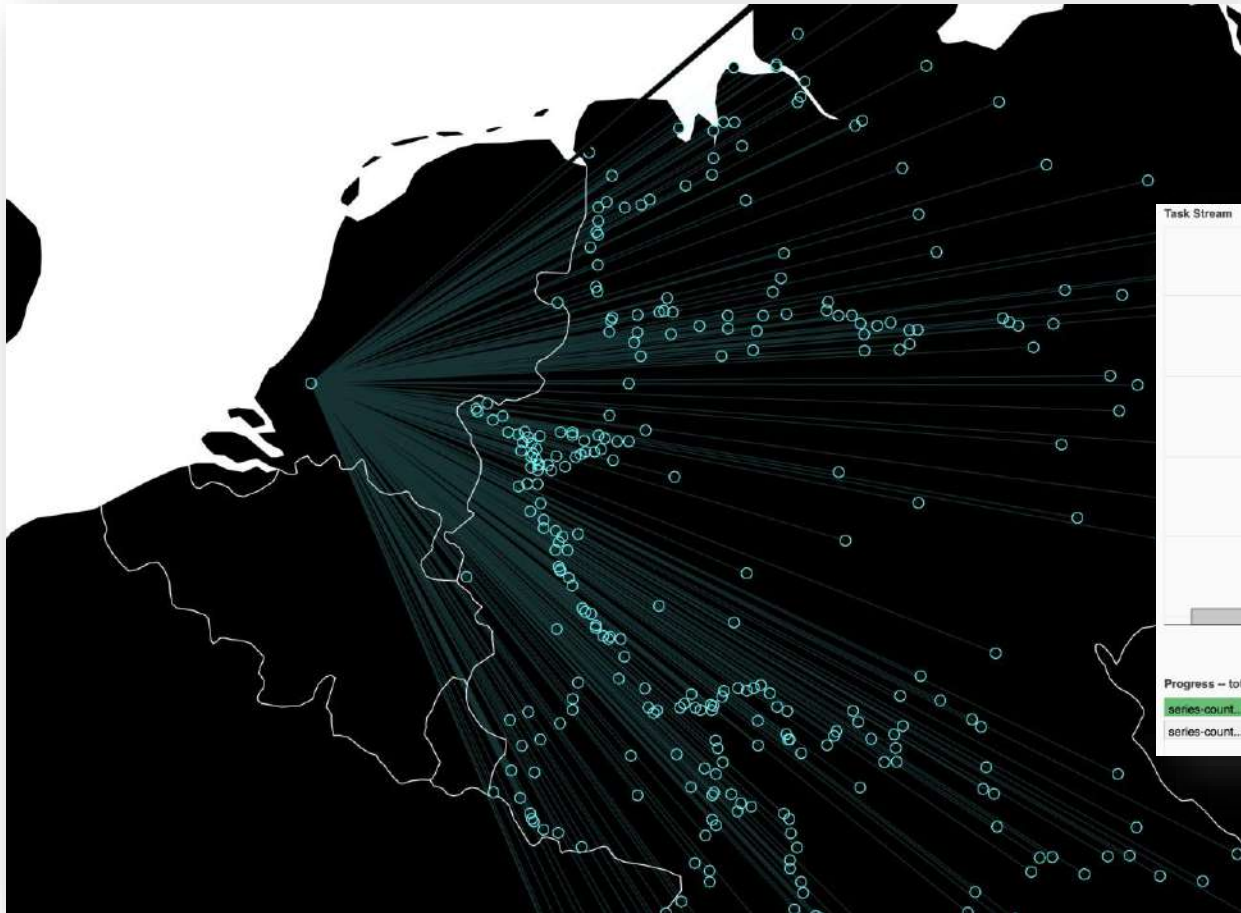
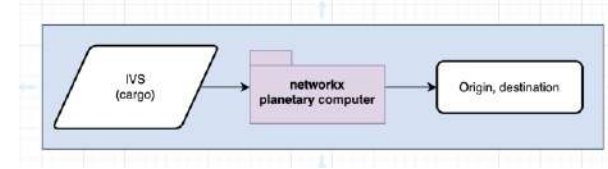
**Hinterland**

# Goal: test critical infrastructure



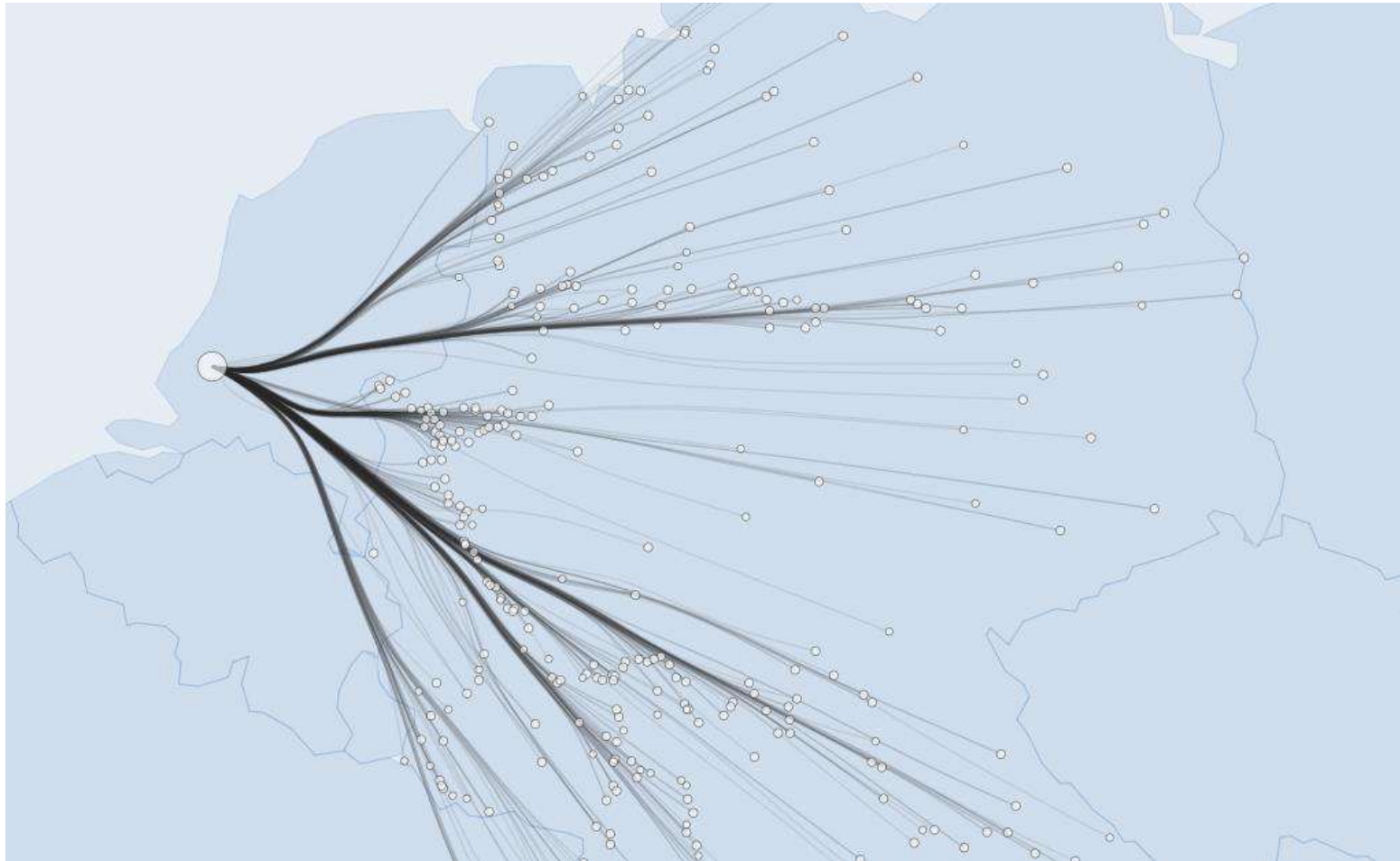
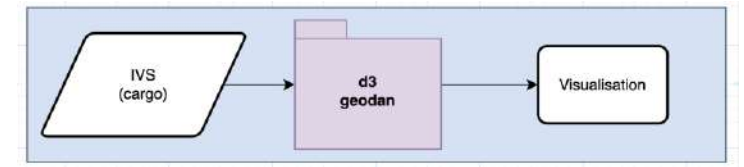


# Trip generation

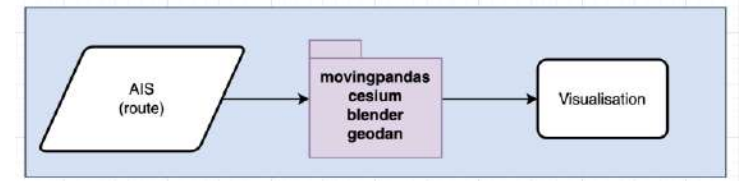




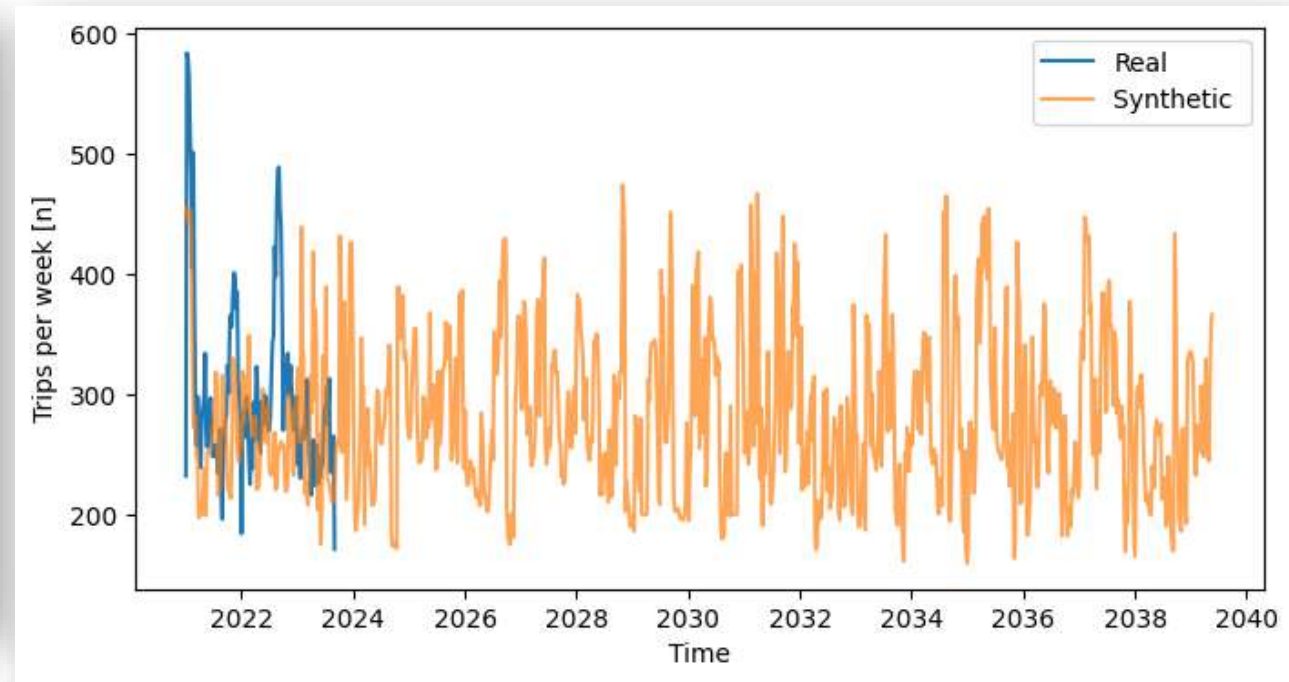
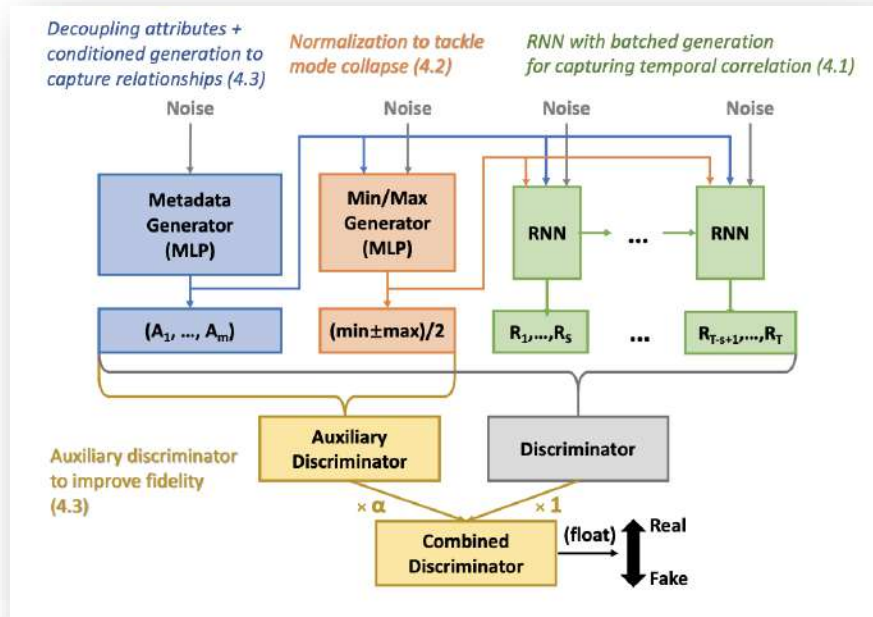
# Visualizing OD matrix



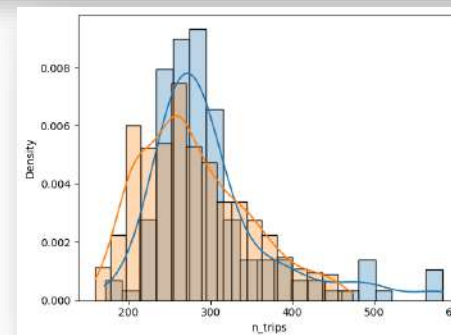
# Visualising AIS tracks in Digital Twins



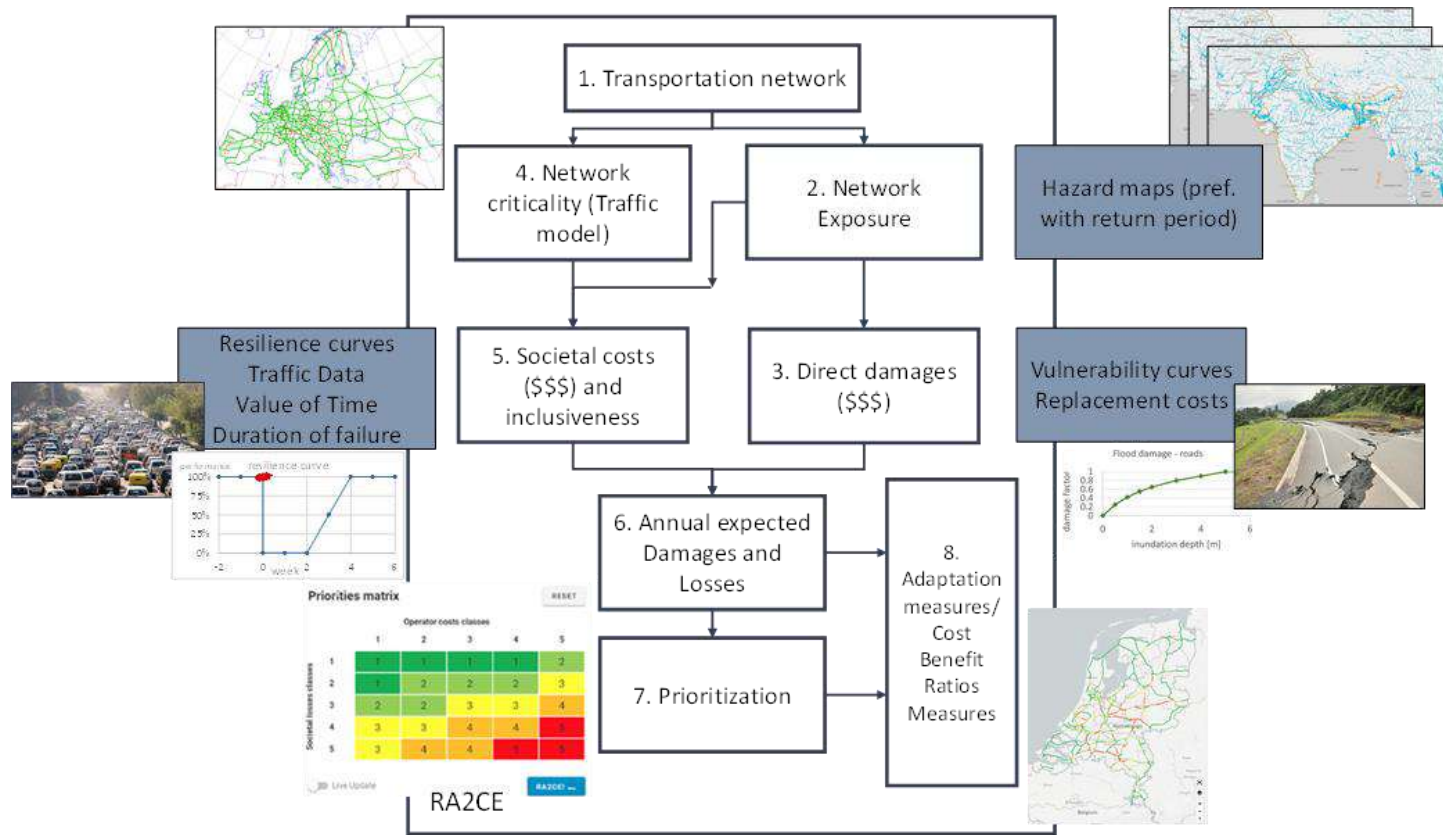
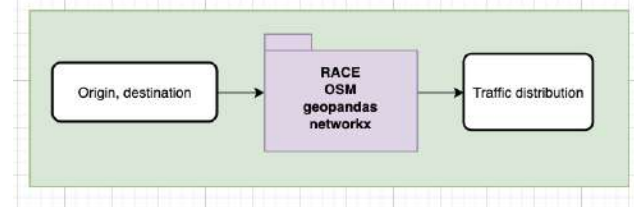
# Generating future transport: GAN



Lin (2020), DoppelGANger

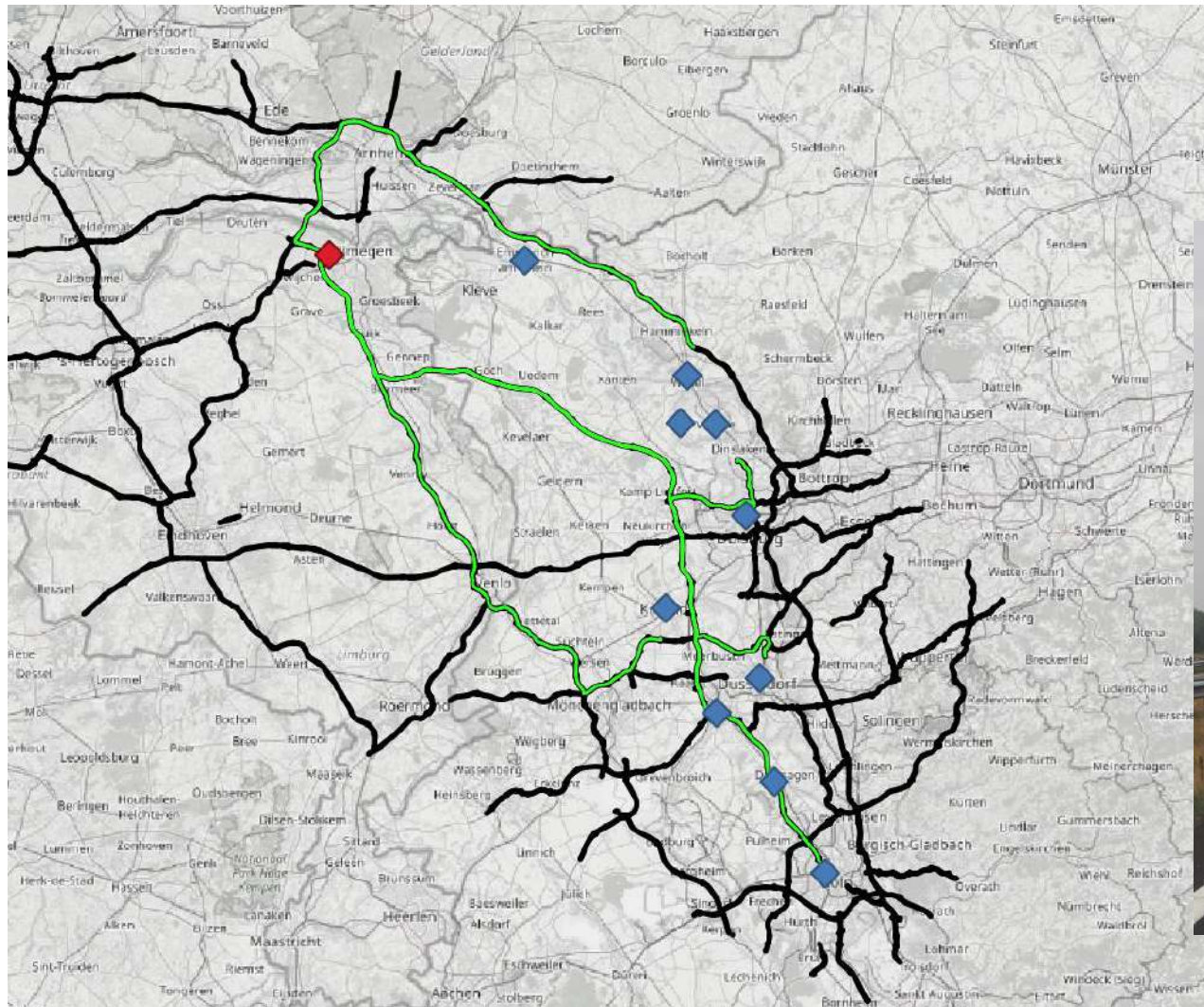


# Road RA2CE

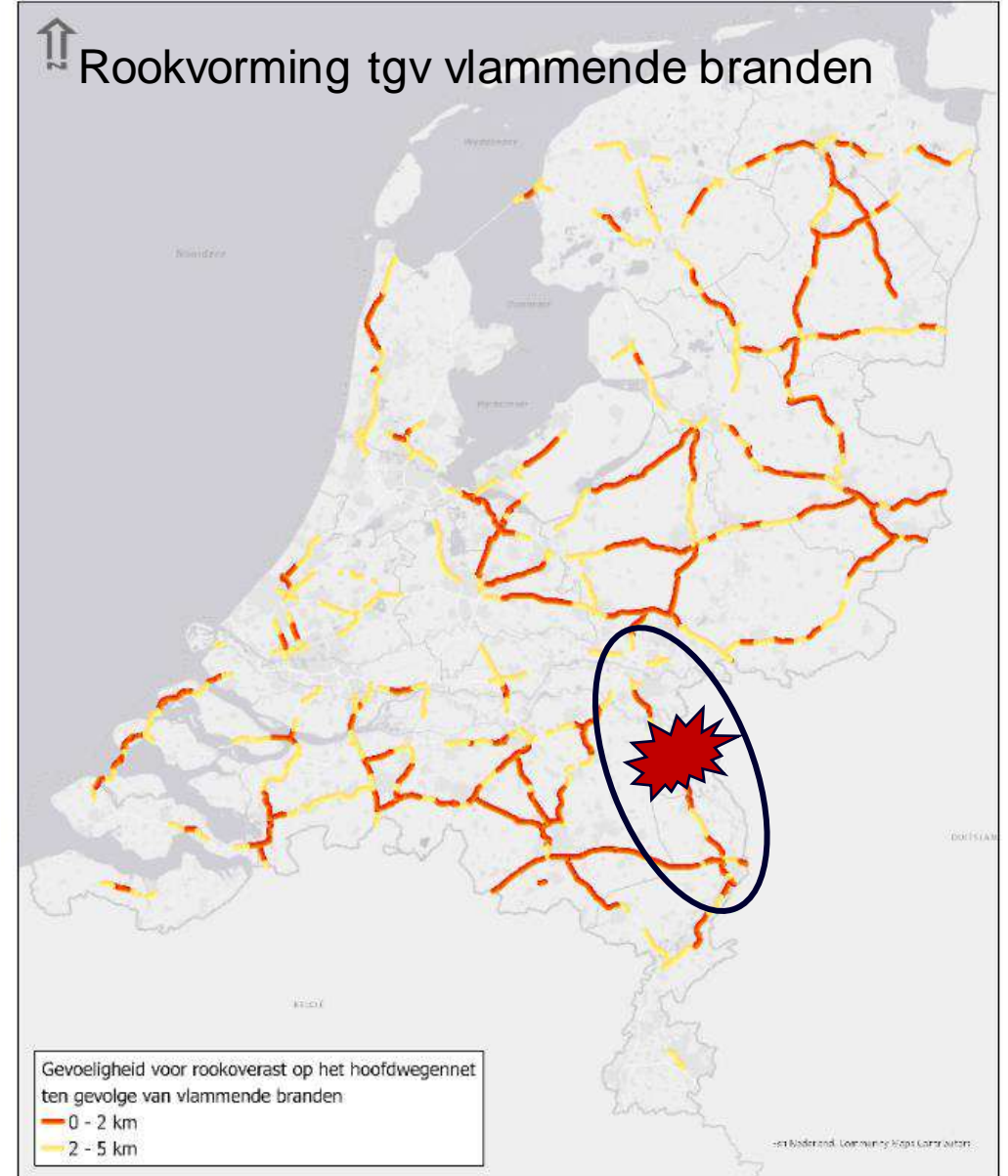


- Needed developments
  - Traffic distribution
  - Capacity induced

# Ideal shortest routes for containers



# Resilience of road network



# Findings

# Steps forward

## Open challenges (quay walls)

- Integration in the cloud
- Incorporation of GANs for subsoil schematisations
- Refinements on the numerical model

## Hinterland

- Hubs & Spokes, Alternative routes (trans2)
- Trip generator -> PhD (RWS)

## Reflections

- Good energy
- Productive cooperation
- Lots of progress
- We found the edge of current capabilities