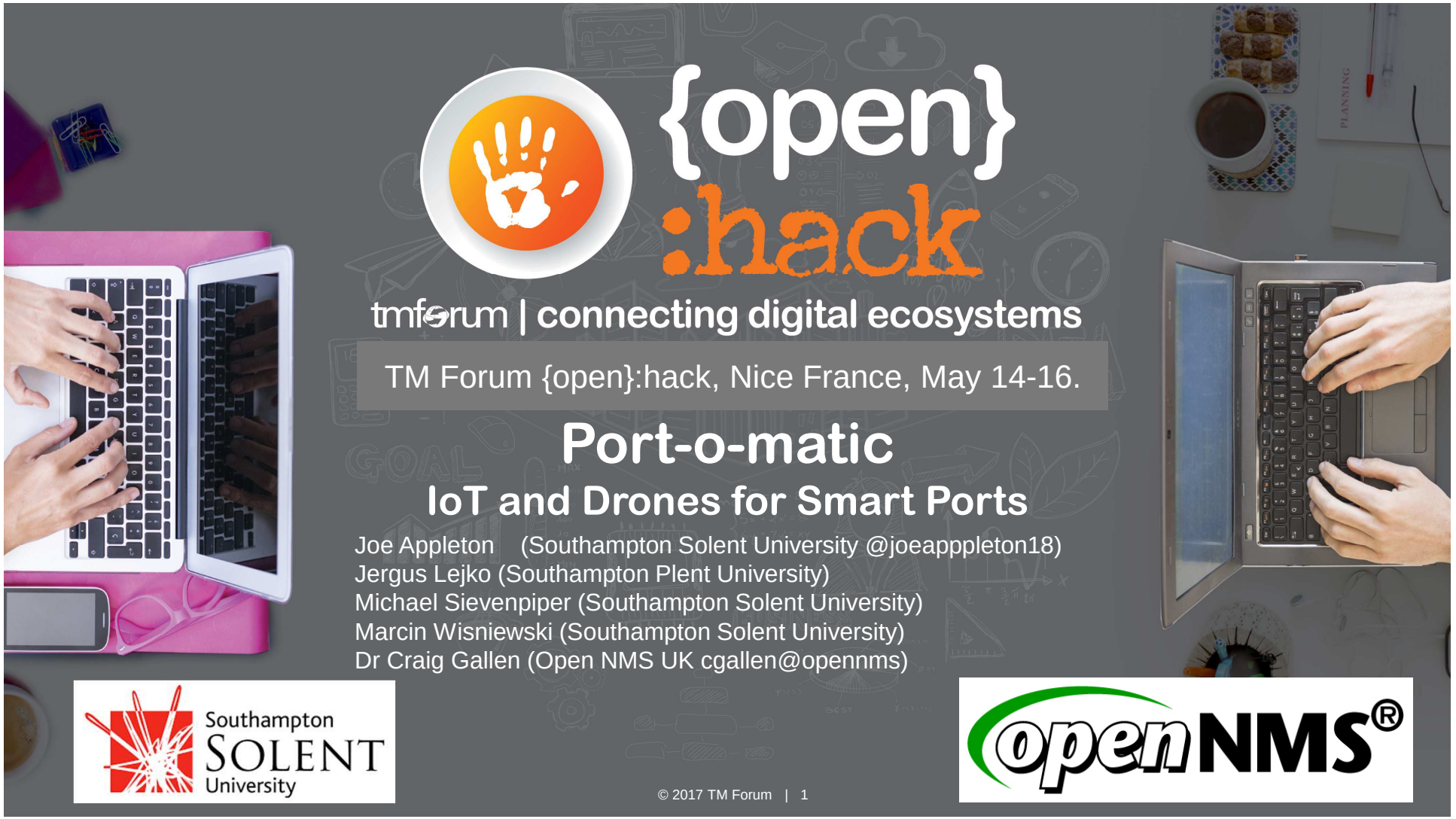

{open}
:hack
tmforum | connecting digital ecosystems
TM Forum {open}:hack, Nice France, May 14-16.
Port-o-matic
IoT and Drones for Smart Ports
Joe Appleton (Southampton Solent University @joeappleton18)
Jergus Lejko (Southampton Plent University)
Michael Sievenpiper (Southampton Solent University)
Marcin Wisniewski (Southampton Solent University)
Dr Craig Gallen (Open NMS UK cgallen@opennms)
Southampton
SOLENT
University
openNMS®

Winners TM Forum Open Hack Nice 2017

Joann O Brien (TM Forum), Dr Craig Gallen (Open NMS UK), Michael Sievenpiper (3rd yr. Student) , Joe Appleton (Lecturer Solent Uni) , Marcin Wisniewski(2nd yr. Student) , Jergus Lejko (1st yr. Student)

Southampton Port-o-matic Smart Port Platform

{open}:hack
tmforum | connecting digital ecosystems

- Southampton Port is the second largest in the UK
  - **52,000** ships a year
  - The UK's number one cruise port, which welcomes 1.7m passengers
  - Each cruise ship up to **6,000** passenger and crew
  - Contributes **£1.23 billion** to the UK economy
- Port-o-matic
  - Is a platform bringing together shipping companies and ports
- API's provided by:

HUAWEI openNMS® Vodafone tmforum

Our Platform Solution

{open}:hack
tmforum | connecting digital ecosystems

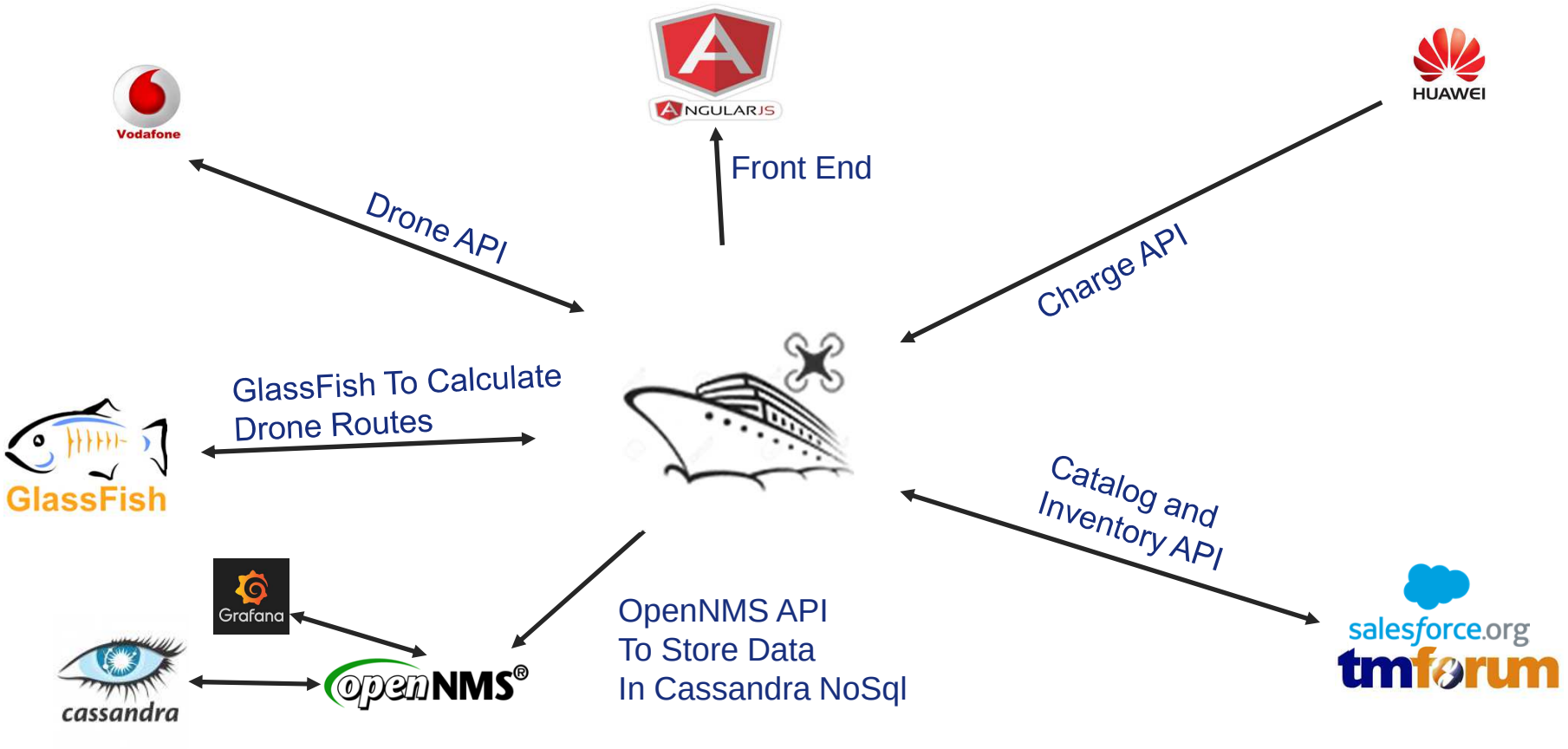
Single point for ordering and accessing port services

- Service Catalogue
  - Easily discoverable services
  - Aggregation of 3rd part offers
  - Port services (Docking charges, Water, Electricity, Waste Water and Data Communications etc.)
  - Pollution charging (for running generators in port)

- Measurements
  - Ship Side IoT devices Measuring Water, Electricity, Waste Water and Data consumption
  - Flying Drones measuring smoke emissions for pollution charging

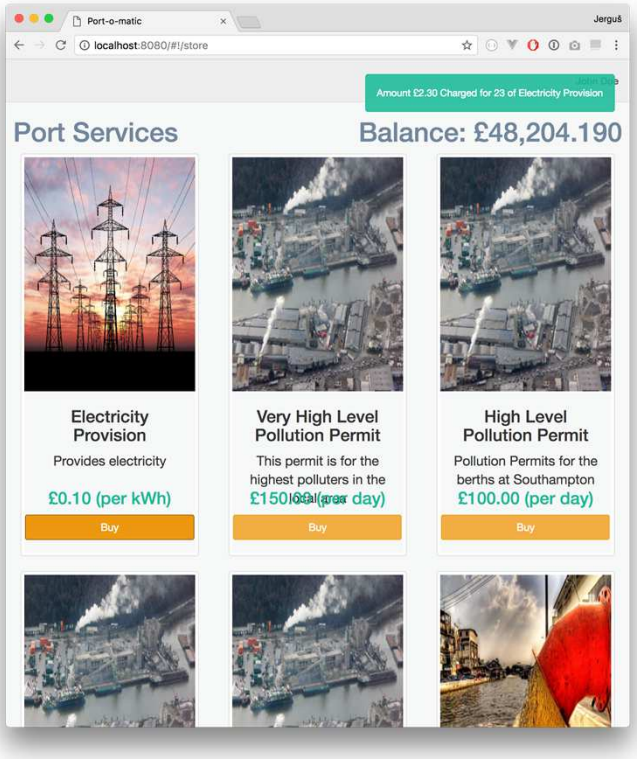
- Presentation
  - User Web Application to view, order and access services

System Architecture



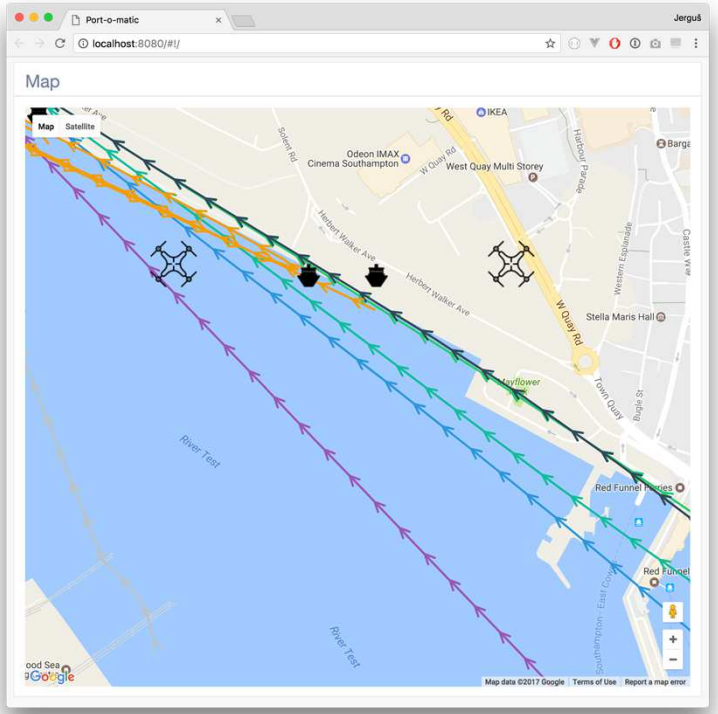
SalesForce & Huawei API integration

- SalesForce Catalog
  - Pulled services
  - Their data/pricing
- Huawei Charging & Balance API
  - Used to charge for services



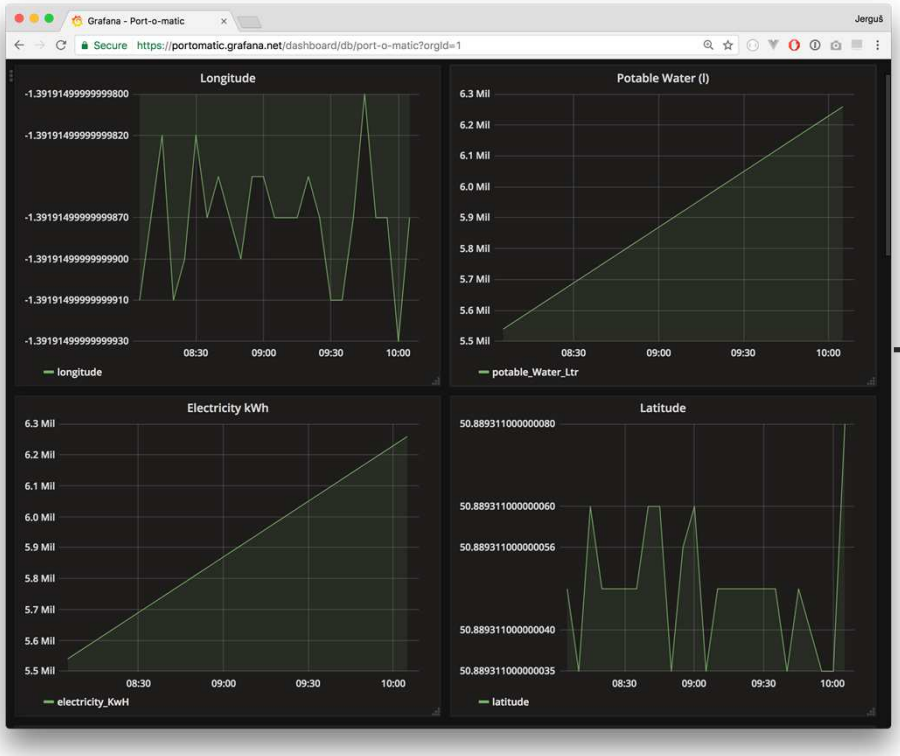
Vodafone Drone API integration

- Real-time data mapping
  - Position, direction
- API’s
  - TMForum Address API
  - Vodafone Drone API
- Flight Control Algorithm
  - Automatic mission handling



Grafana

Display of real time data from drones and metering devices

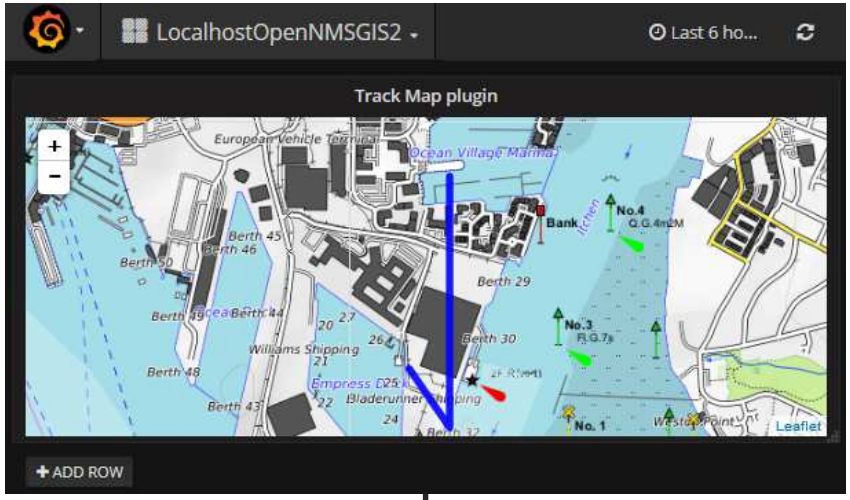


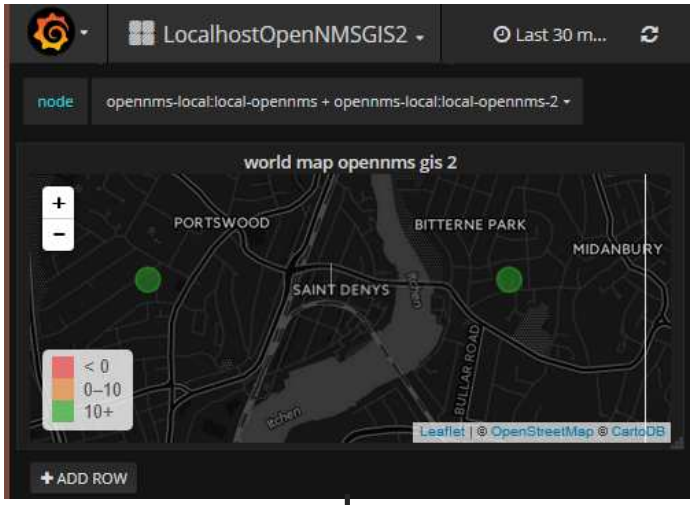
Grafana Measurements API

Grafana – Enhanced GIS Plugins

{open}:hack
tmforum | connecting digital ecosystems

Grafana map plugins to display a path over time or values at coordinates



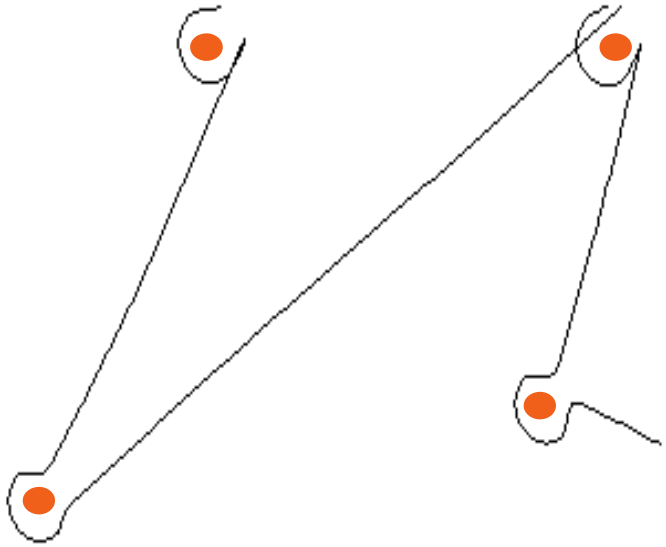


Code for plugins at
https://github.com/gallenc/grafana-track-map
https://github.com/gallenc/worldmap-panel

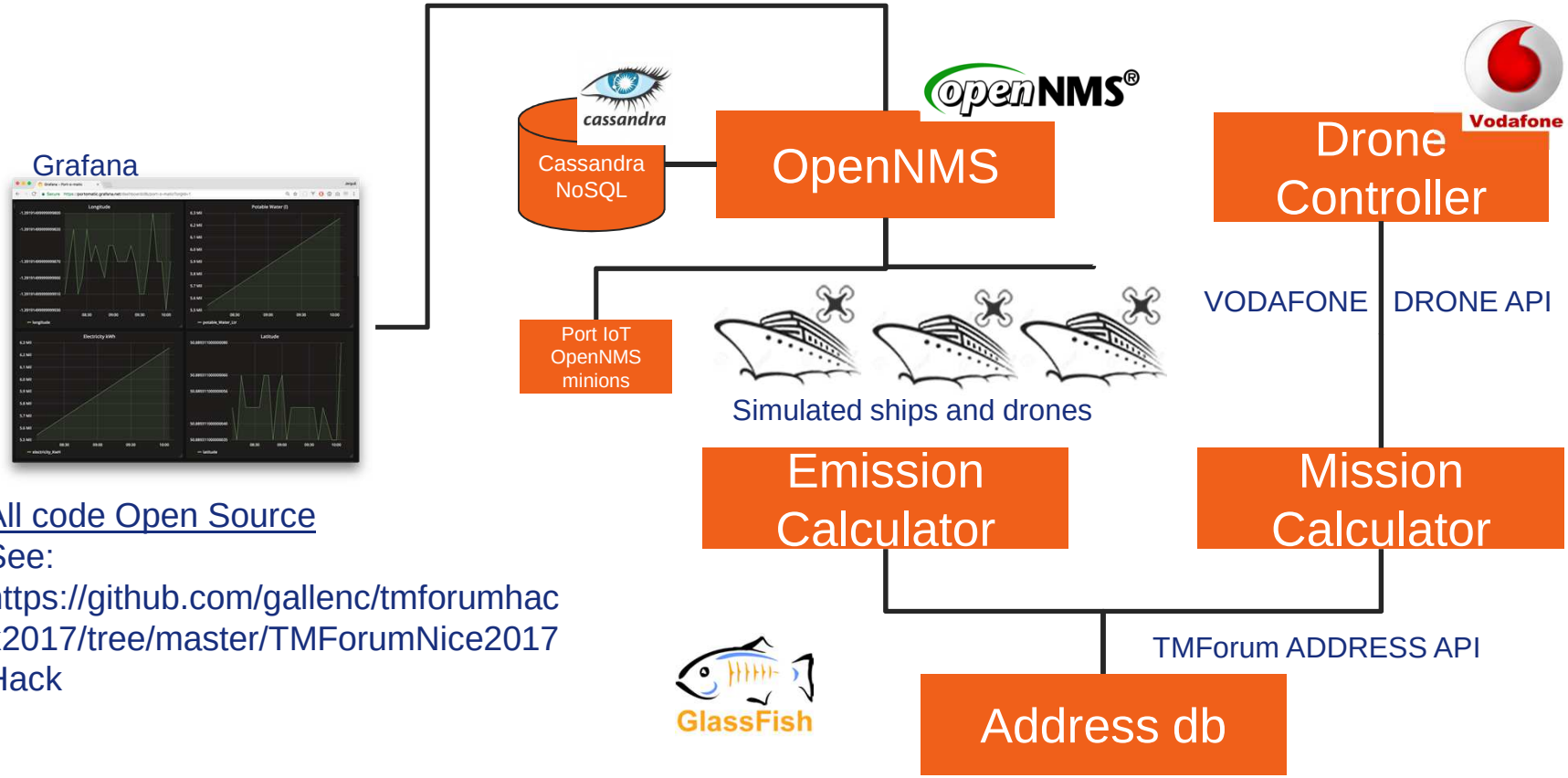
Calculating Measurements

- double measuredCy; is the total measured concentration (µg/m3) at distance Dy;
- double distanceDz; // Dz is the distance from the ship (m) at which concentrations are to be predicted;
- **double predictionCz = ((measuredCy) / (2.7171)) * (-0.5476 * Math.*log(distanceDz)+2.7171);***

calculated drone path



Architecture



All code Open Source
See:
https://github.com/gallenc/tmforumhack2017/tree/master/TMForumNice2017Hack


{open}
:hack
tmforum | connecting digital ecosystems
TM Forum {open}:hack, Nice France, May 14-16.
THANK YOU
QUESTIONS?
Southampton
SOLENT
University
openNMS®