



IoT Week Bilbao 2018

4-7 JUNE 2018, BILBAO (SPAIN)

EUSKALDUNA CONFERENCE CENTRE

EXPERIENCE WITH IoT IN AFRICA



Dr. Mamour DIOP
IoT Week 2018 – Bilbao, Spain
June 6, 2018



◆ There are many opportunities for IoT applications in Africa



Irrigation



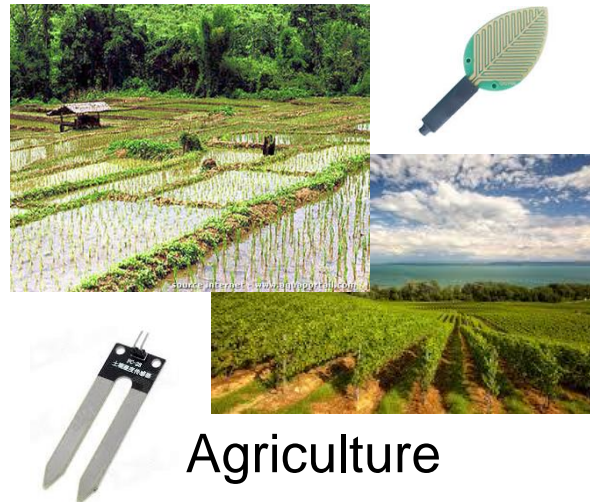
Livestock farming



Fish farming & aquaculture



Storage & logistic



Agriculture



Environment

- ◆ EU and African cooperation action targeting sub-Saharan African countries. It aims to accelerate innovation in Africa through cutting edge IoT cost-effective communication and big data technologies deployed on PaaS and know-how.
- ◆ OPEN SOURCE project addressing the IoT needs and demand of the developing countries and to tailor the IoT and Big-data PaaS platform in the context of Africa in order to offer value-added cost effective, reliable and energy efficient services.
- ◆ Other benefit to African developers who mostly rely on lower entry level innovations.
- ◆ 12 partners coming from 4 African countries (Togo, Ghana, Senegal, Burkina Faso) and as many European countries (France, Germany, Portugal, Italy).



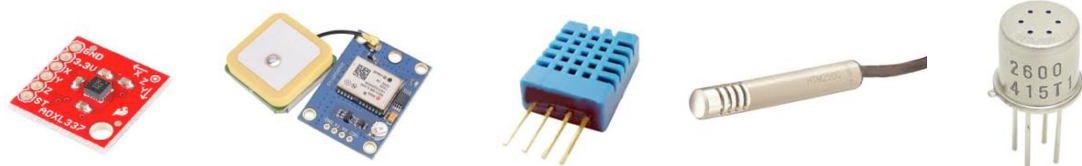
READY-TO-USE-TEMPLATES



Physical
sensor

Physical
sensor

Physical
sensor



Arduino Pro Mini @3.3V

Physical
sensor
mgmt

**VERY
IMPORTANT**

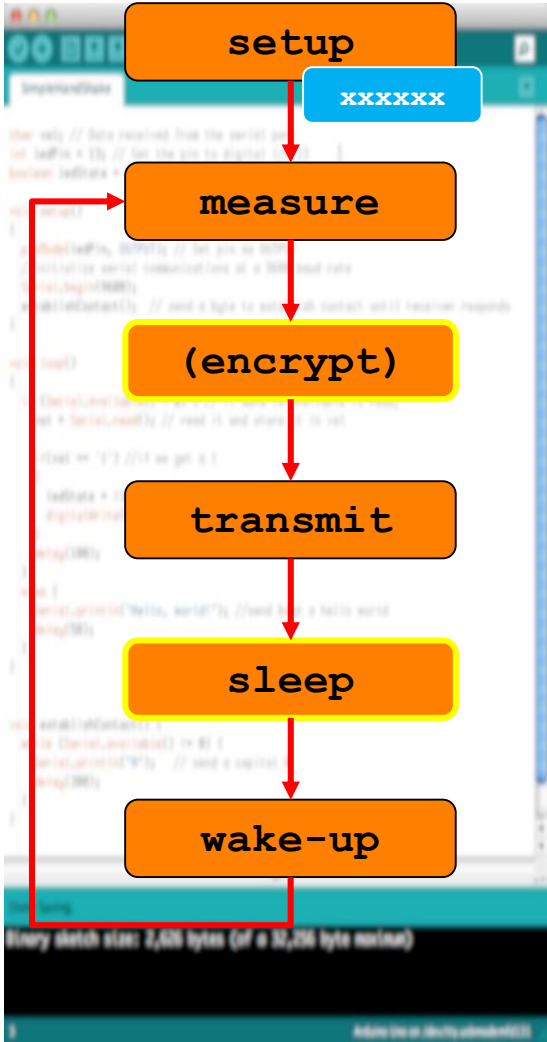
Activity
duty-cycle,
low power

**VERY
IMPORTANT**
AES
encryption

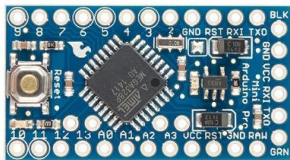
Long-range
transmission



Logical
sensor
mgmt



LOW-COST INTEGRATION

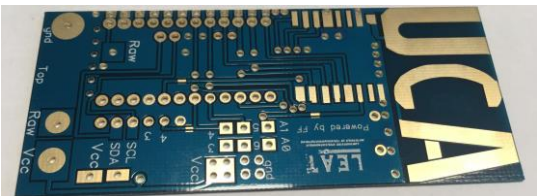


1.5€

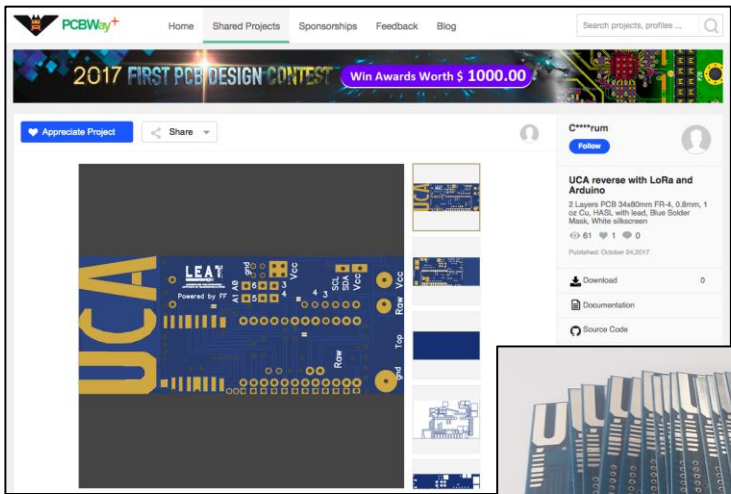
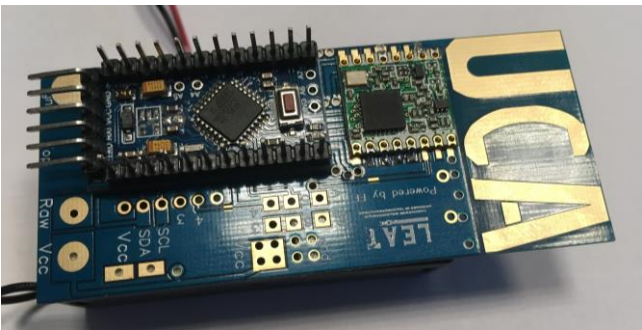
https://github.com/FabienFerrero/UCA_Board



5€

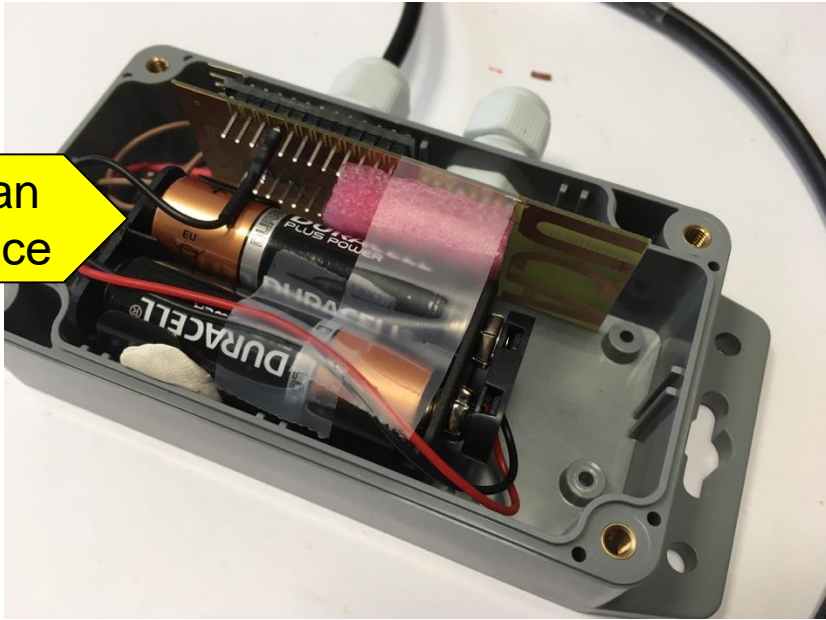


1€



1-click order

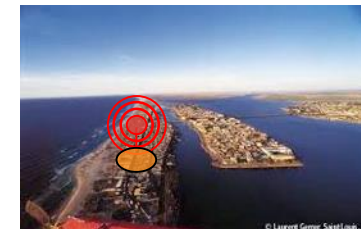
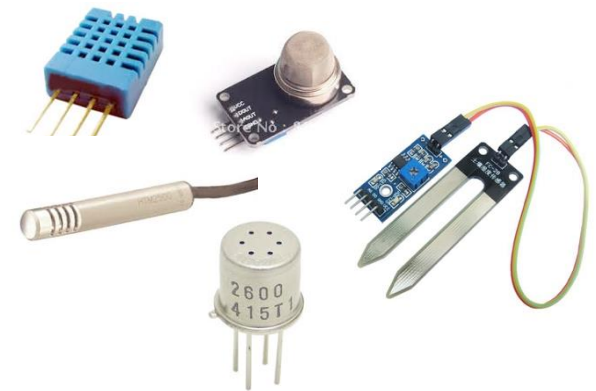
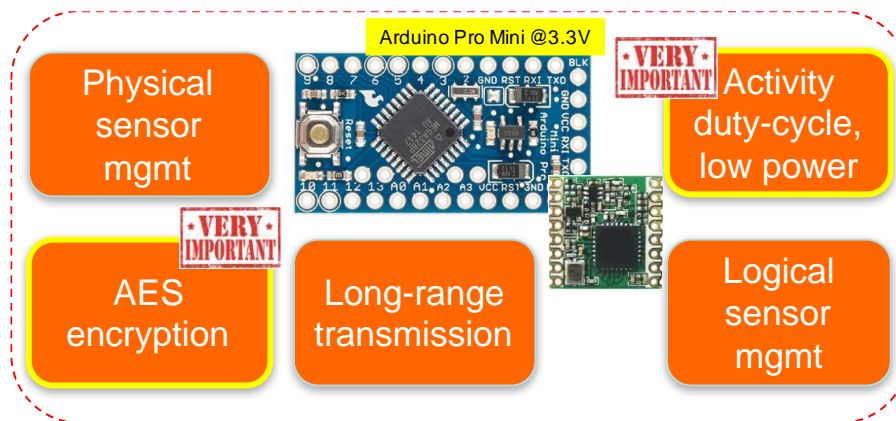
Less than 10€/device



https://github.com/FabienFerrero/UCA_Board

GENERIC SENSOR IoT DEVICE

- ◆ Build low-cost, low-power, Long-range enabled generic platform
- ◆ Methodology for low-cost platform design
- ◆ Technology transfers to user communities, economic actors, stakeholders,...



CIMEL FARM, SENEGAL

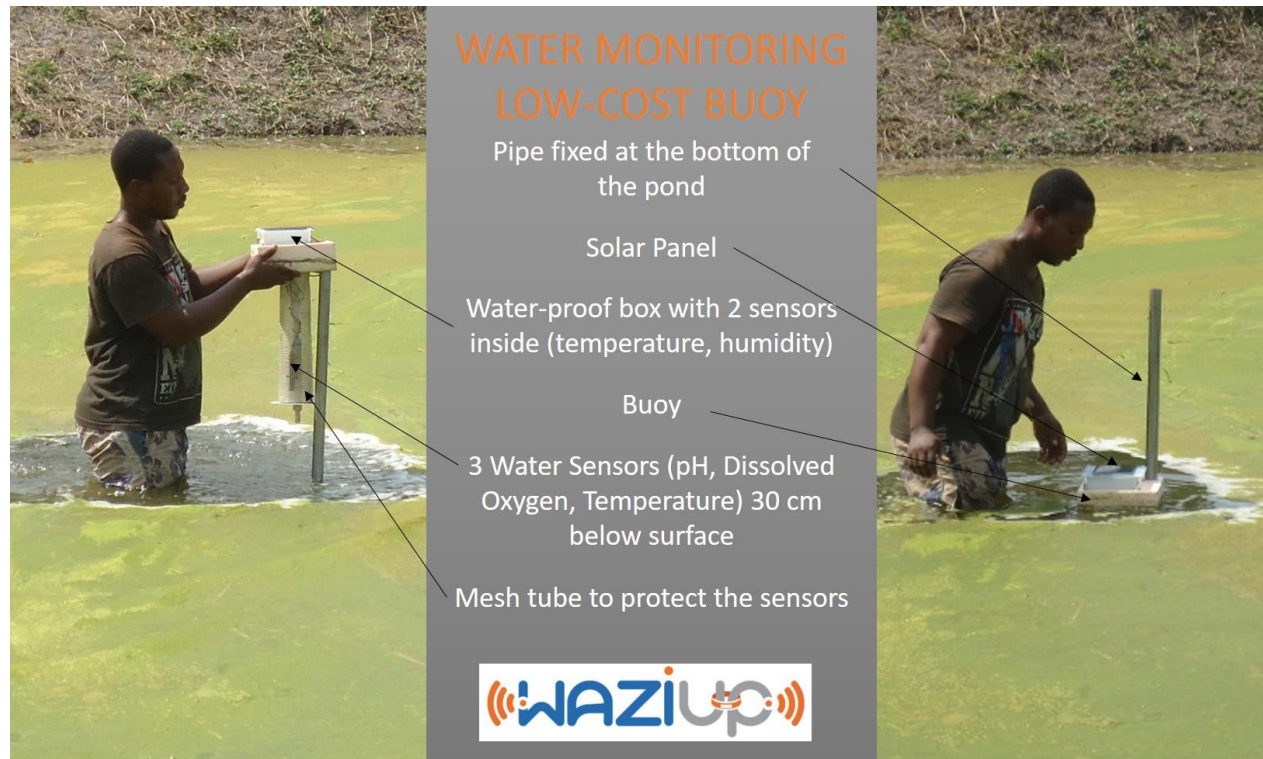


A web interface displays the position of the gateway those of the remote GPS devices

In Africa, the practice of animal husbandry has always been and still remain farmers' livelihood and incomes

Their main problem in this activity remain the cattle rustling and some families are put in dramatic situation after a theft (reported 2 billions CFA losses)

LOW-COST BUOY FOR FISH FARMING



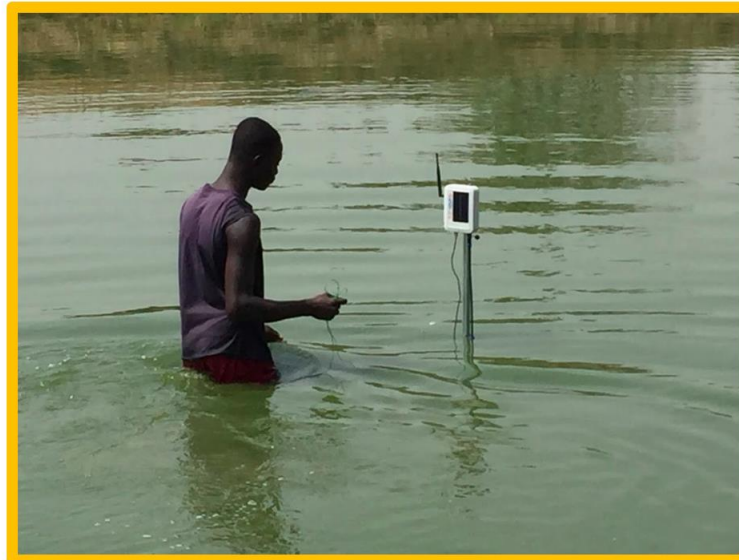
In Sub-Saharan Africa, the volume of natural captured fish doesn't meet half of the population demand

Increasing production of aquaculture will help reduce the quantity of imported fishes in Africa

The aim is to monitor in real-time different parameters to control water quality and prevent some diseases that could affect fish in order to improve the quality and quantity of the production

KUMAH FARM, GHANA

- ❑ The Kwame Nkrumah University of Science and Technology (KNUST)
- ❑ Located on the campus of the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana.
- ❑ The farm comprises 30 constructed fish ponds, a farm house, a recirculating aquaculture system (RAS) laboratory and store houses.



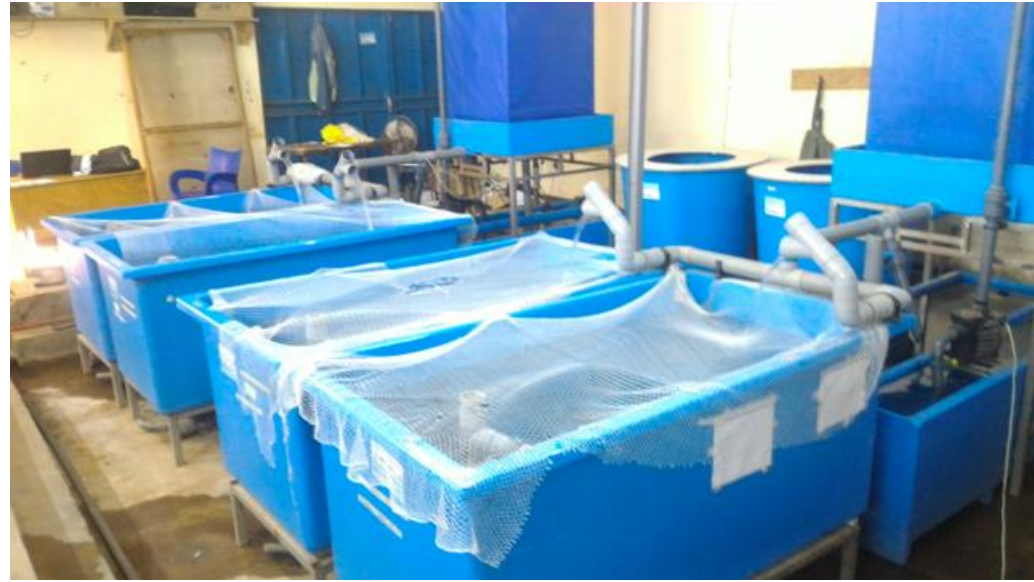
SANAR FARM, SENEGAL

- ❑ Farm located at less than 2 km from UGB.
- ❑ One pond is dedicated for the Waziup application : 50x25m, average depth of 0.5 meters, populated by 4000 individuals of saltwater tilapia.
- ❑ The basin is irrigated via a water supply system fed by a river in proximity.
- ❑ The water in the pond is changed every 10 days



HATCHERY EXPERIMENT, BURKINA FASO

- ☐ Laboratory named Laboratoire d'Études des Ressources Naturelles et des Sciences de l'Environnement (LERNSE)
- ☐ NAZI BONI University in a small village of Bobo-Dioulasso city
- ☐ Sensors are placed in a hatchery and the box is placed outside of the building



UBG FARM, SENEGAL

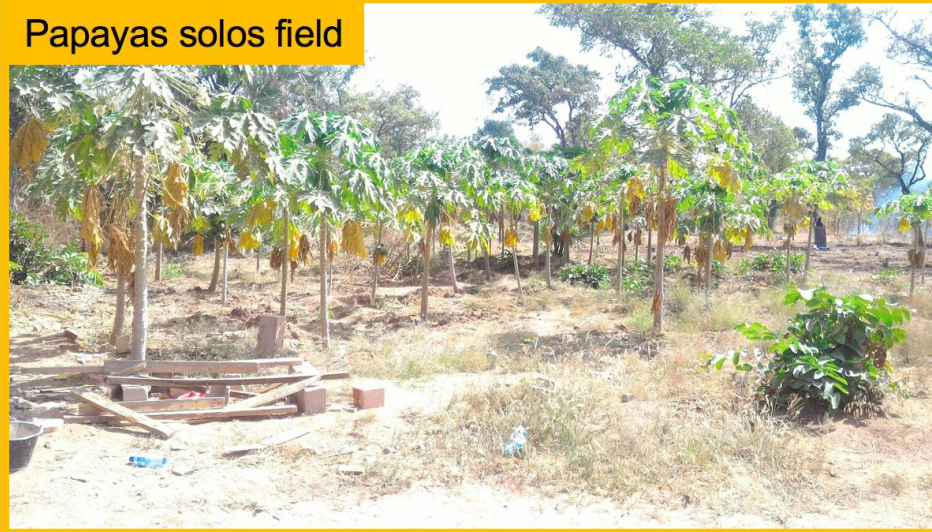


NASSO SITE, BURKINA FASO

Bananas field



Papayas solos field



Banana plant



Papaya tree



URBANNATIC GARDENS, TOGO



LOCAL WEATHER STATION FOR AGRICULTURE

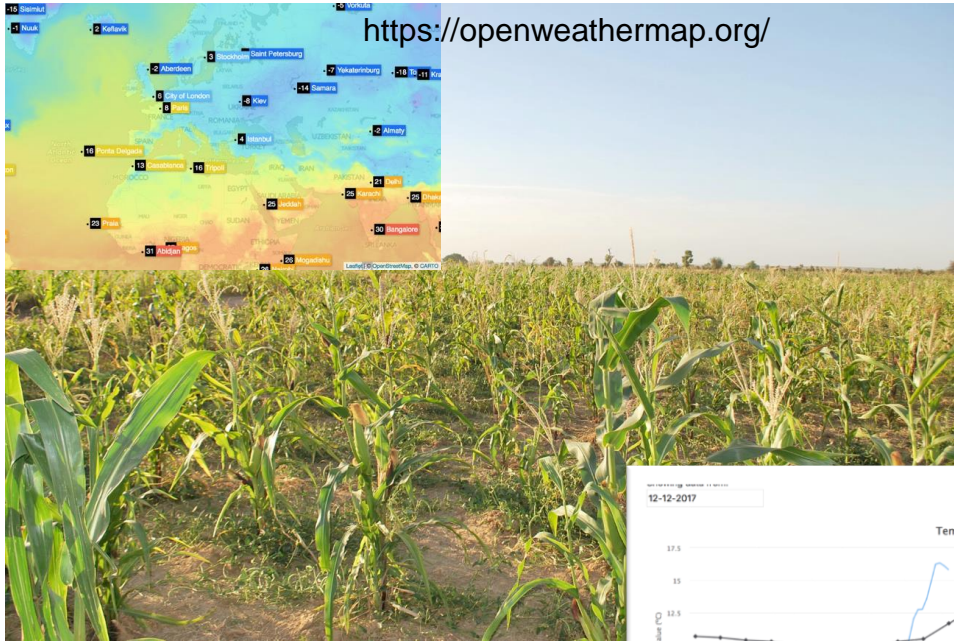
In agriculture, different factors can be monitored. Having the ability to control those factors is the key to increase the productivity.

Agriculture MVP requirements:

Obtain and produce weather related information which will be used to advise the farmers!



Get local weather measurements



Weather Web App

Combine with open weather data to get more accurate predictions



Pilot sites: Senegal, Togo, Ghana, Burkina Faso

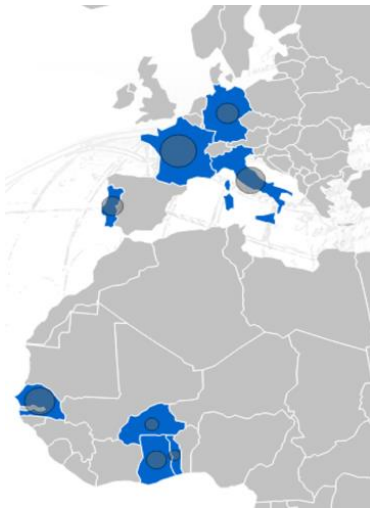
DISSEMINATION

- ◆ WAZIUP tightly involves end-users communities in the technical development and dissemination loop with frequent training and hackathon sessions organized accross Africa.
 - WAZIHacks: Senegal, Ghana, Togo
 - WAZIUP Workshops: IST-Africa 2017 & 2018
 - Trainings: Rwanda, Uganda, Ghana, Togo, Senegal, Tunisia, Cameroon, Maroc
 - IoT clubs: Togo, Benin, Ivory Coast



SCALING UP!

Feb 2016 - 2019



May 2018 - 2021

