Hewlett Packard Enterprise

ESME sudria Lille - Paris - Lyon

{ WE ARE LINKYD }

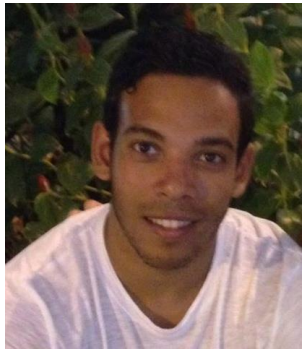
Final Project

Realisation of a POC about connected electricity meters

{ TEAM }

```
def OurTeam:
   for name in awesome_peoples:
      print name, picture
```

Clément Tailleur



Cyril Monti

Rémi Ferreira

3 motivated **students** looking forward to become real **engineers**!

{ CONTEXT }

```
from iOT, SmartGrids import *
class Context:
```

More than **50 billions** of connected objects in **2020**

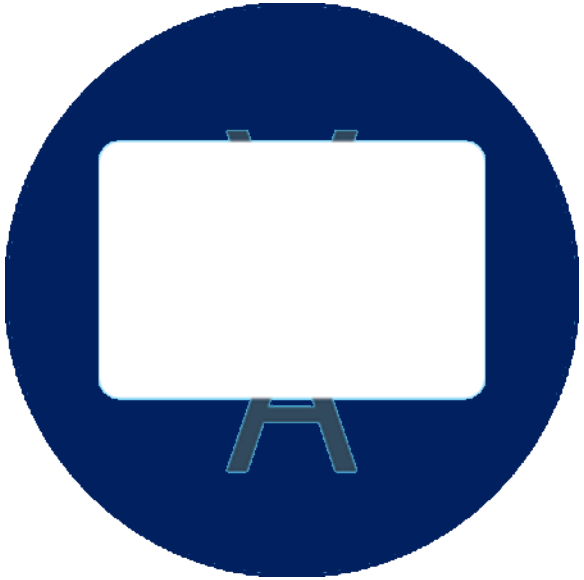
Big Data's next challenge

Prices of the electricity constantly **raising** in France

This is in this context that EDF started to launch: Linky

{ LINKY } class Linky(iOT, ElectricityMeter):

Electricity meter from Enedis
Planned to be deployed in 700 000 houses and finally in 35M

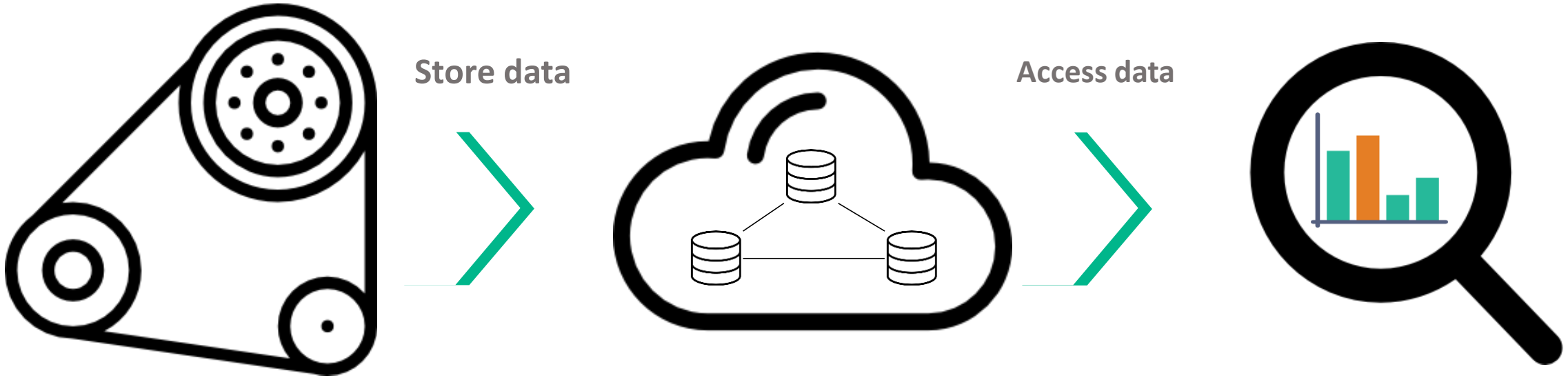


Project:

- **Simulate consumption of 700 000 homes equipped with Linky.**
- **Store simulated data.**
- **Analyze data and build predictive models**

{ PROJECT }

```
project = Project(awesome_people)
```



{ PROJECT }

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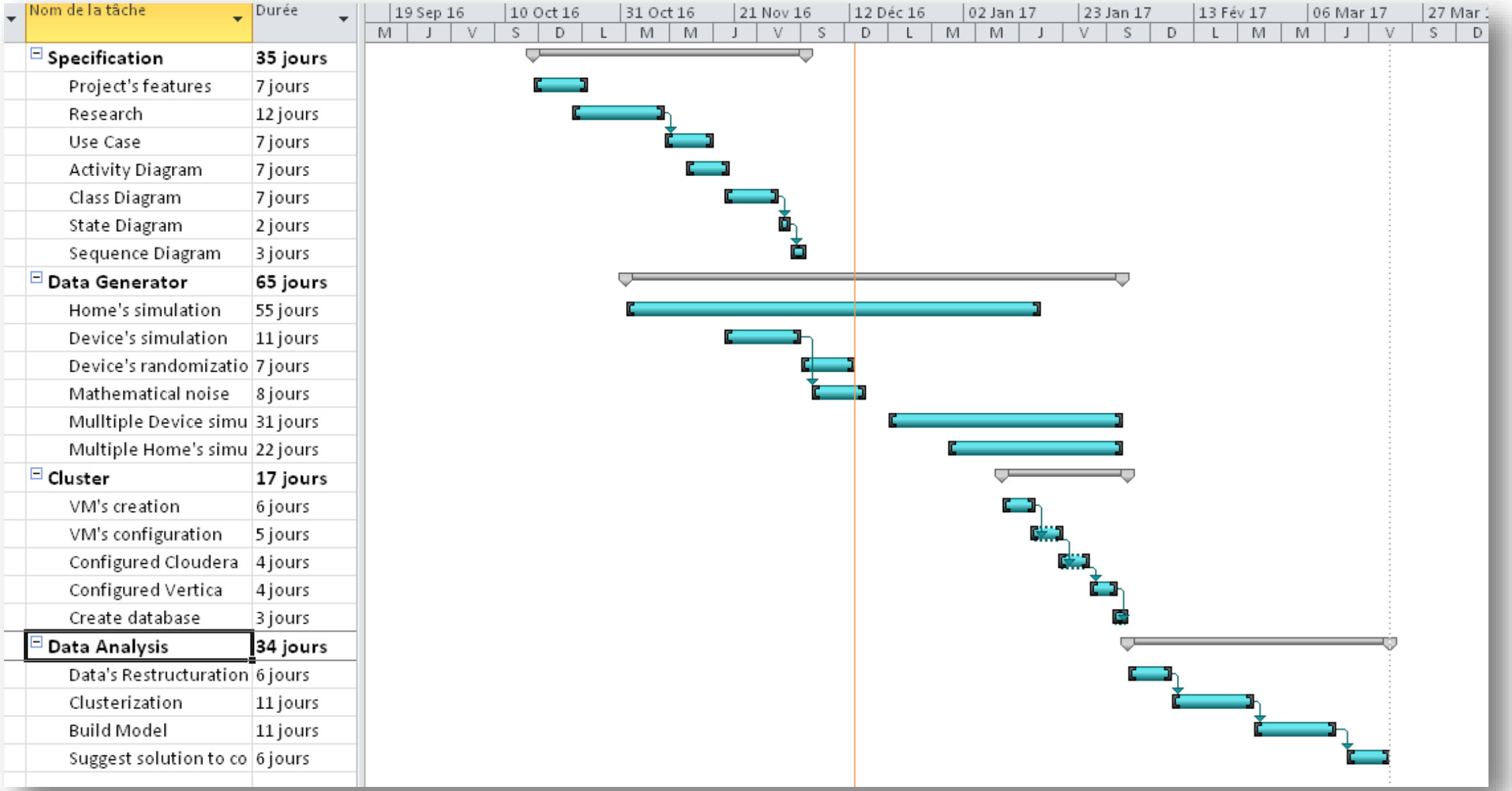


Nom de la tâche	Durée
Specification	**35 jours**
Project's features	7 jours
Research	12 jours
Use Case	7 jours
Activity Diagram	7 jours
Class Diagram	7 jours
State Diagram	2 jours
Sequence Diagram	3 jours
Data Generator	**65 jours**
Home's simulation	55 jours
Device's simulation	11 jours
Device's randomizatio	7 jours
Mathematical noise	8 jours
Mulltiple Device simu	31 jours
Multiple Home's simu	22 jours
Cluster	**17 jours**
VM's creation	6 jours
VM's configuration	5 jours
Configured Cloudera	4 jours
Configured Vertica	4 jours
Create database	3 jours
Data Analysis	**34 jours**
Data's Restructuration	6 jours
Clusterization	11 jours
Build Model	11 jours
Suggest solution to co	6 jours

DATA GENERATOR

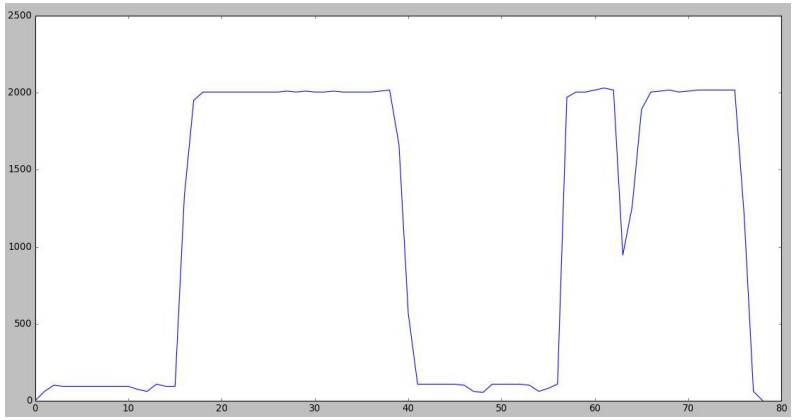
```
while DataGenerator.isOn :
    var = random(0,100)
    totally_accurate_data.append(var)
```

Simulate:

1. Consumption of devices
2. Monthly/daily usages profiles
3. A home profile
4. Consumption of a family
5. Consumption of a whole town

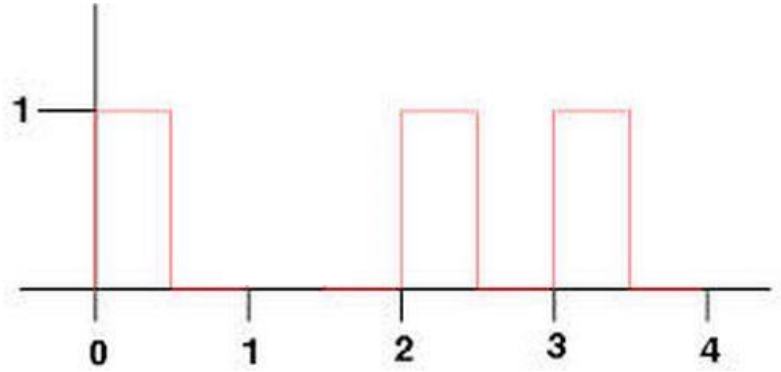
→ Store in database

1.



X

2.



(knowing)

3.

```
class Home:
    nb_people = 3
    nb_TVs = 2
    nb_dishwasher = 1
          .
          .
          .
```

DATA GENERATOR

```
while DataGenerator.isOn :
    var = random(0,100)
    totally_accurate_data.append(var)
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Simulate:

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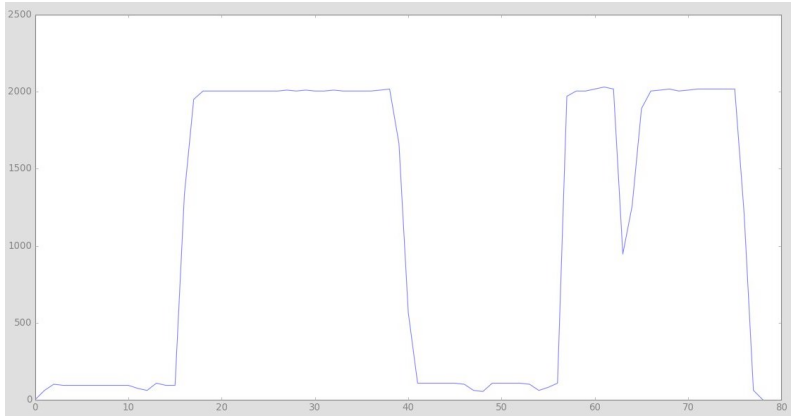

2.

X

We get #4

Repeated, we get #5

3.

(knowing)

```
class Home:
    nb_people = 3
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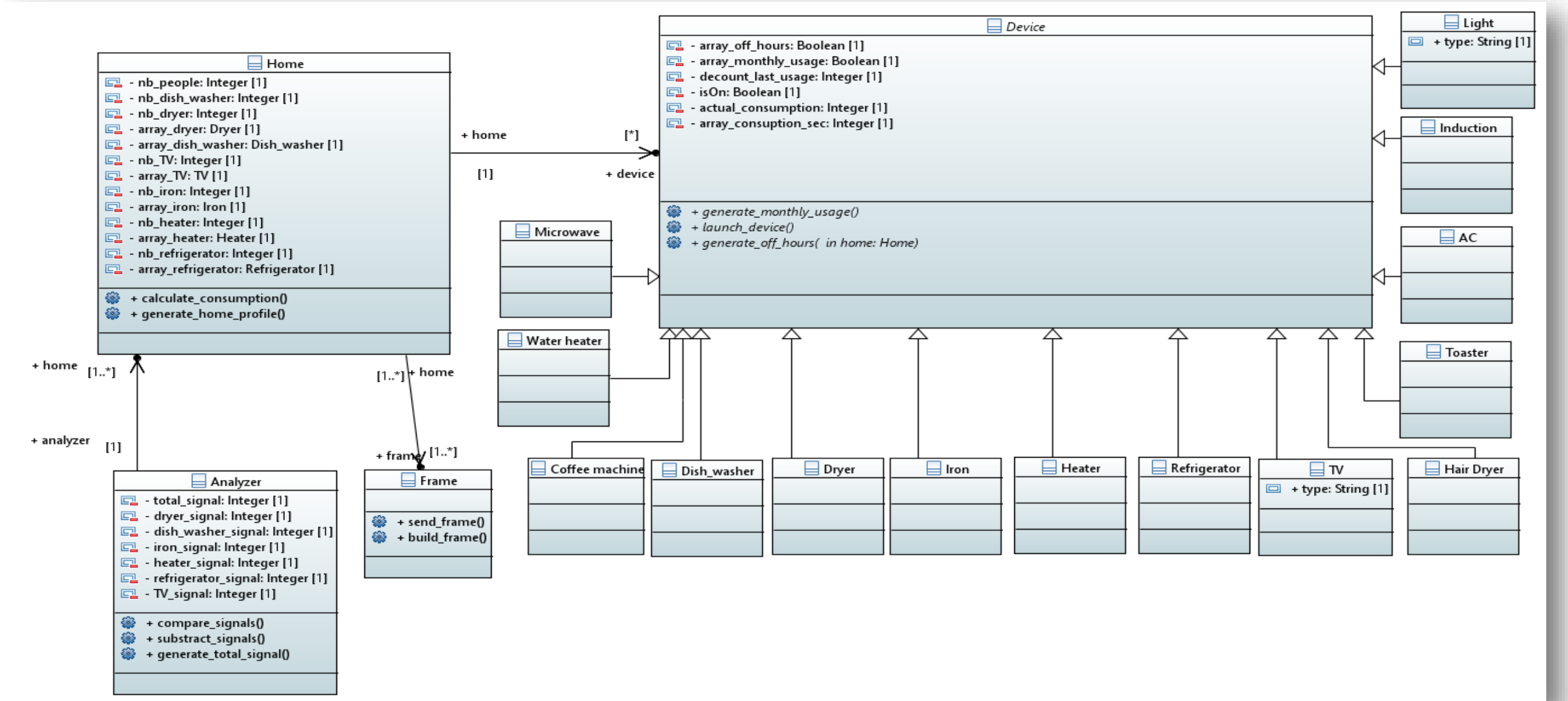
    nb_dishwasher = 1
        .
        .
        .
```

{ DATA GENERATOR }

```
from CoolDiagrams
import ClassDiagram
```



{ CLUSTER }

cd **cluster**/hadoop/cloudera

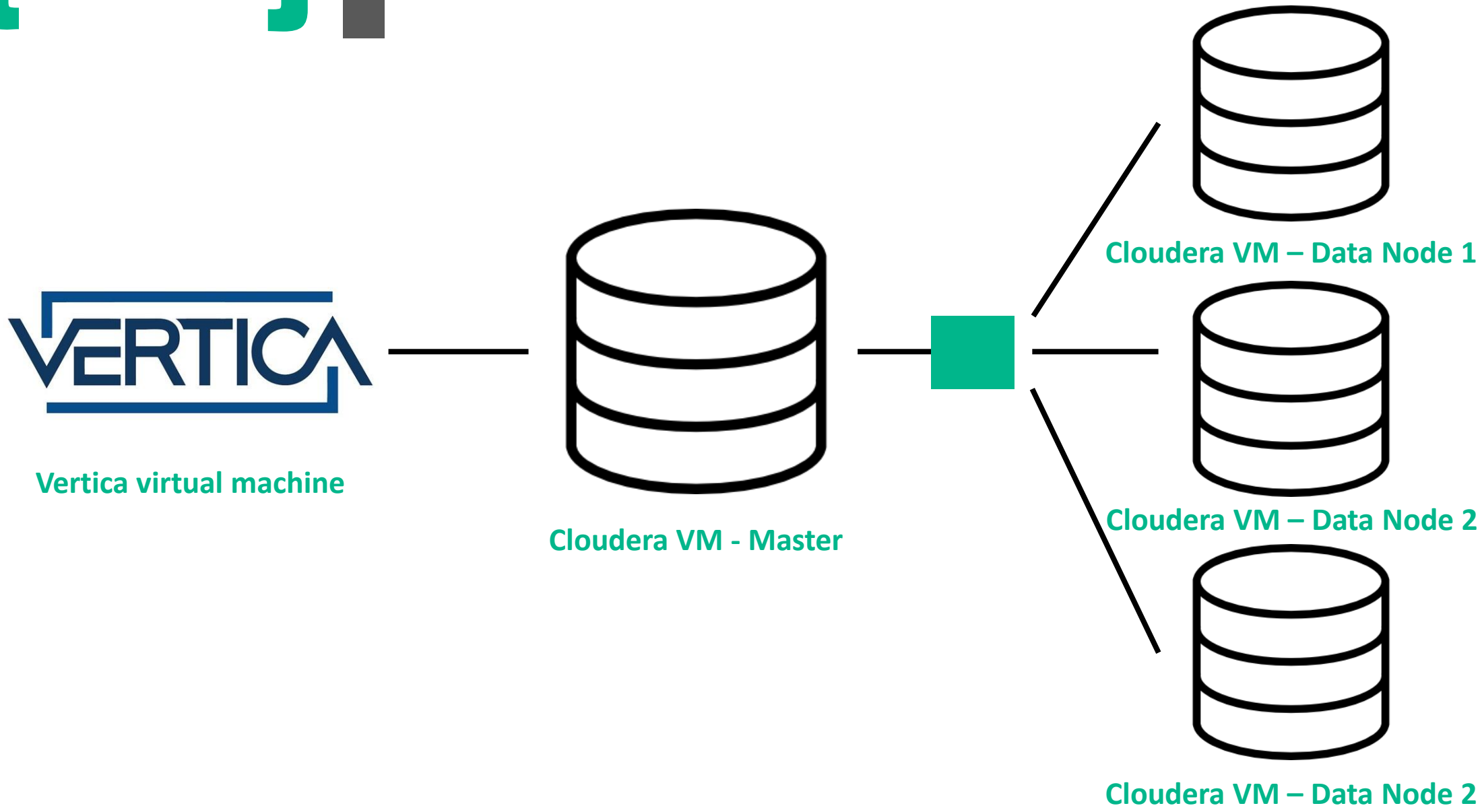
Softwares, libraries and IDE

VERTICA

cloudera

{ CLUSTER }

cd **cluster**/hadoop/cloudera



{ ANALYSIS }

```
def Analysis:
  if pattern1 == pattern2:
    print ''Yeah, cool they are the same…''
```

Softwares, libraries and IDE

{ ANALYSIS }

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  if pattern1 == pattern2:
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```
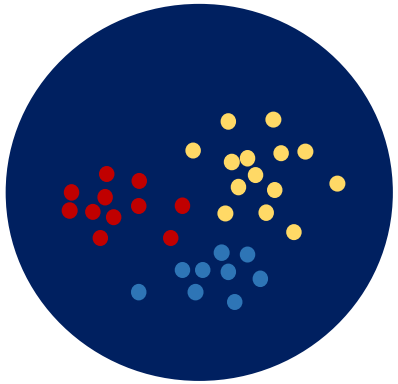

Goals

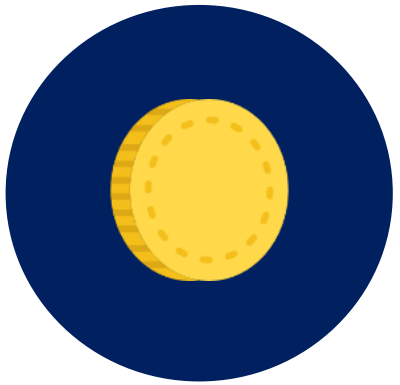


Find household type randomized during the data generation :

clusterisation

Be able to know which device is used at a specific point in time :

build model based on various households

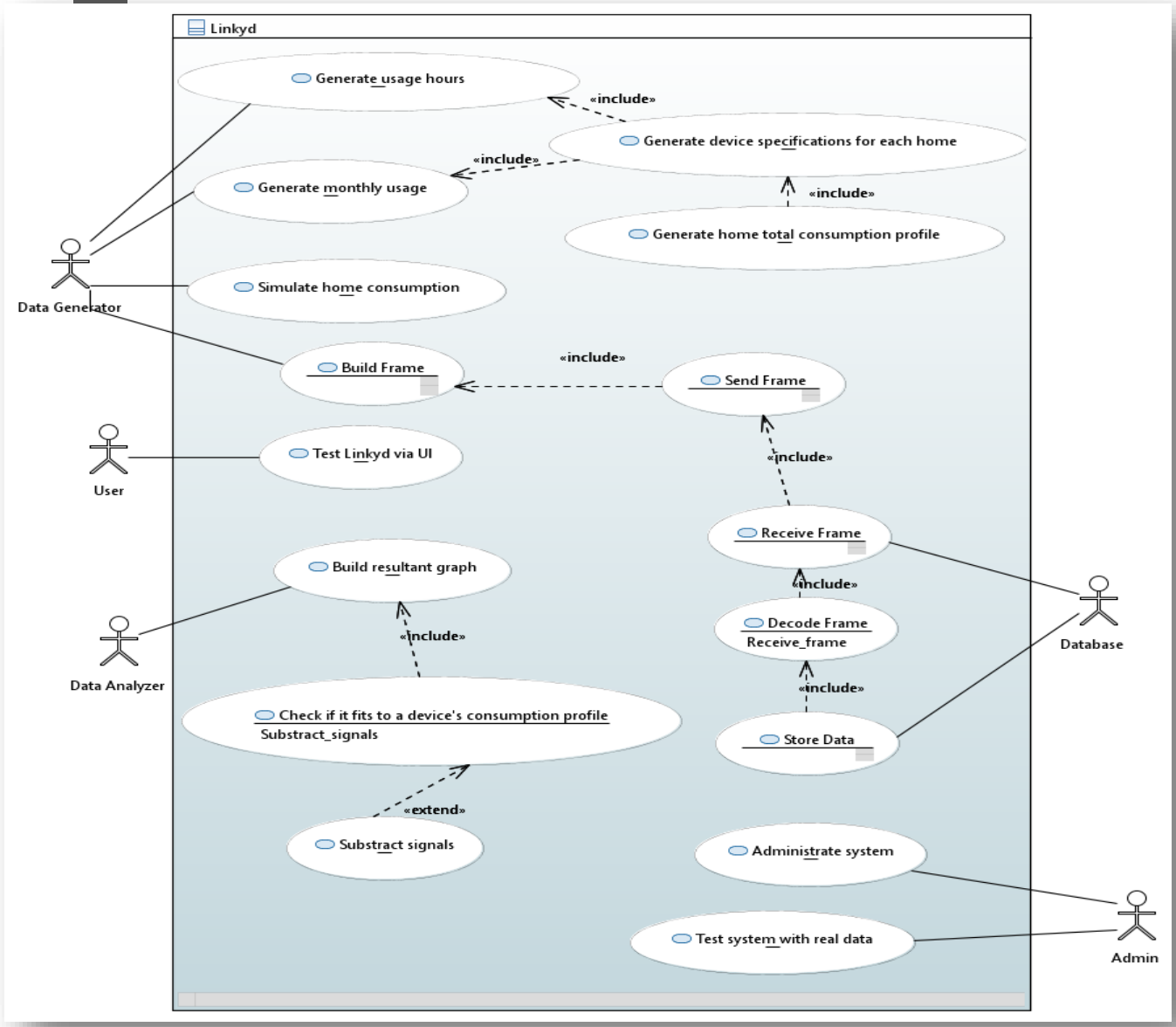


Emphasize the most electricity consuming appliances :

suggest solution to consumers in order to save money

{ USE CASE }

```
from CoolDiagrams
import UseCaseDiagram
```



{ NOW }

```
import time
print Now
```

Done

- Generation of 1 device consumption signal
- Generation of a home profile
- Generation of daily/monthly usages
- Generation of a home device
- Generation of a home consumption, with one device over a year.
- Generate different signals for a single device

In process

- Finding other devices' consumption profiles
- Generating multiple devices in the same time for 1 family
- Creating VMs for the Big Data cluster

To do

- Building the cluster
- Configure data storage
- Configure cluster
- Restructure database
- Clusterisation
- Build model based on various households
- Suggest solution to customers to optimize their consumption


{DEMO}