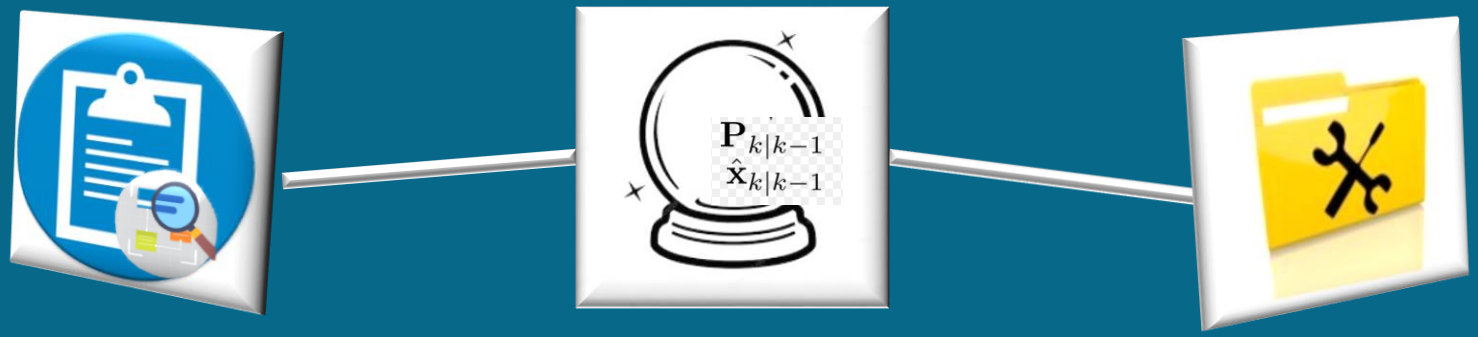
La force de l'innovation

MACHINE LEARNING
& IKATS PLATFORM
& PREDICTIVE MAINTENANCE



December 2018, Craïova

MACHINE LEARNING : ASSESSMENT

➔ Algorithms → no major “scientific” obstacle

- Predictive “data driven” modelling
- Strong theoretical foundation
  - Supervised/ unsupervised training, …
- Many “use cases”

➔ Evaluation → toward reproducibility and validation

- Articles with “words” more than “figures”
- Evaluation criteria not enough specified nor standardized; criteria definition is challenging

INDUSTRIAL MACHINE LEARNING

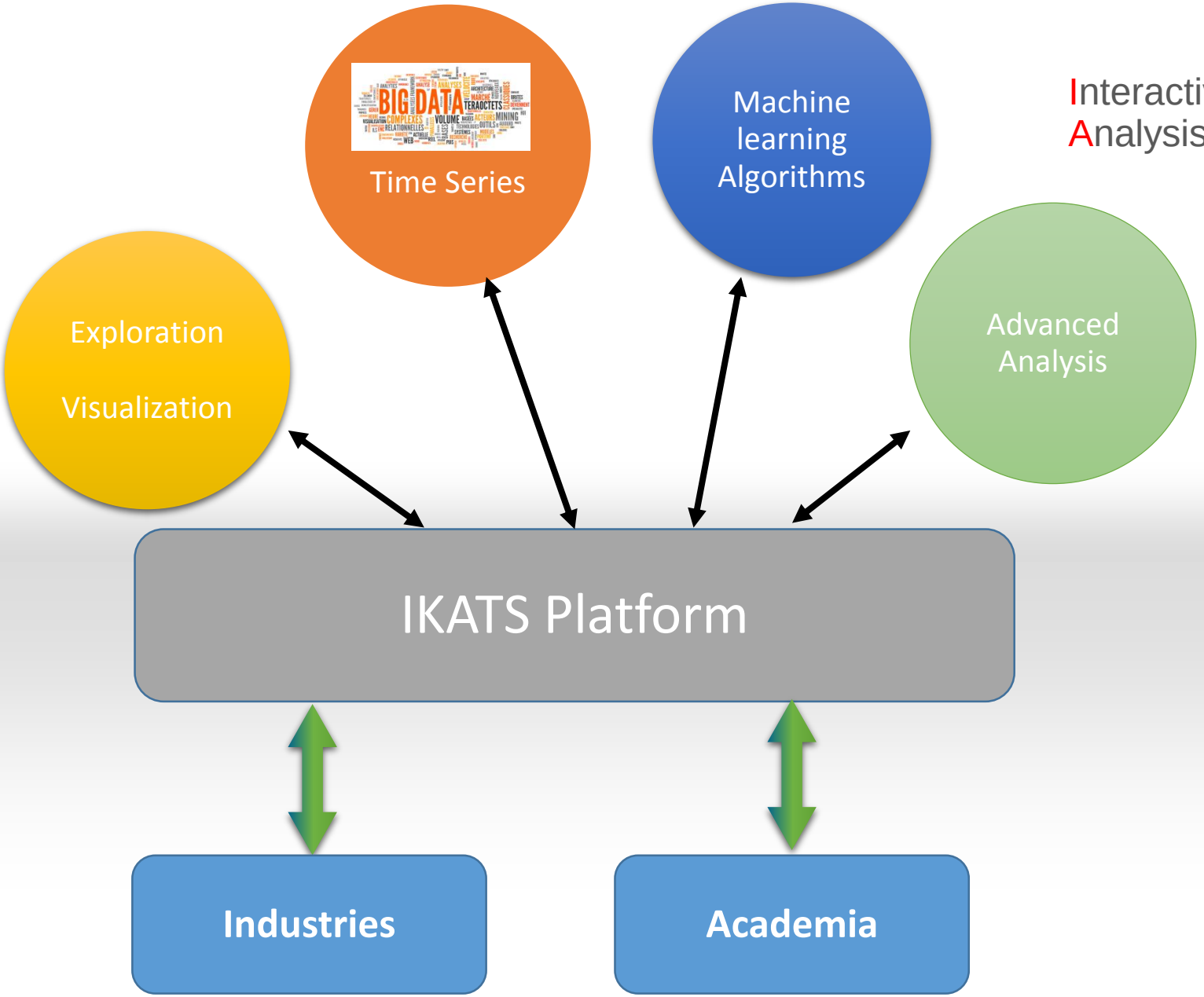
- Dealing with time series data is a key requirement of industrial machine learning that distinguishes it from consumer applications

- Specific criteria are required to make industrial machine learning applicable

- (Industrial) Machine learning has to be deployed :
  - In integrated software systems /solutions (as compared to hardware equipment)
  - With on-going or recurrent upgrades

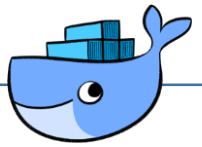
- From an industrial and operational point of view, it’s a disruption

IKATS PLATFORM



Interactive Toolkit for Analysis of Time Series

IKATS : TECHNICAL OUTLOOK



Kubernetes

Ressource management

Computing and analytics

python

NumPy

SciPy

scikit learn

APACHE Spark™

User Workbench & Data Viz

HTML JS CSS

jupyter

Data Organisation and distribution

OPENTSDB

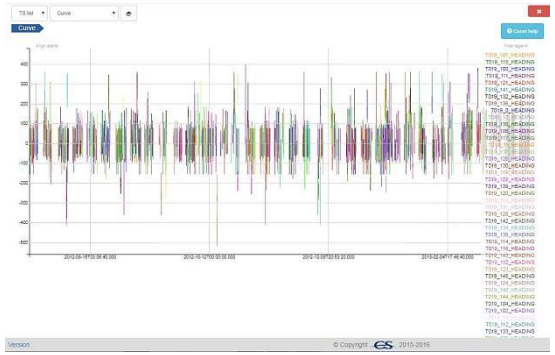
PostgreSQL

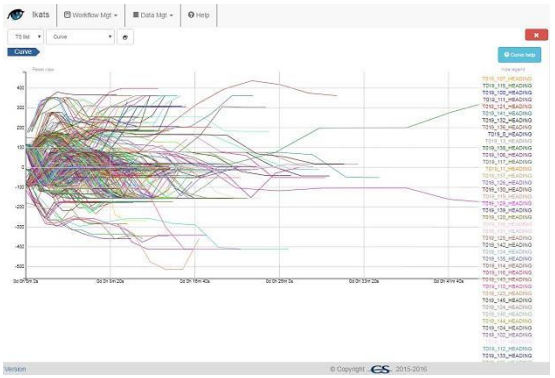
Infrastructure: storage, network

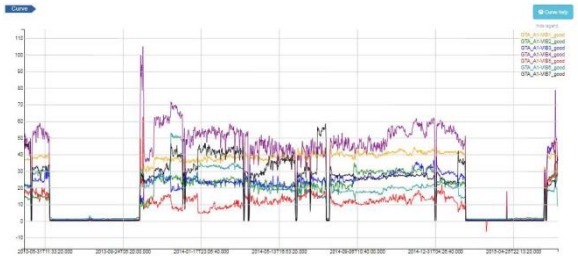
hadoop

APACHE HBASE

DEALING WITH TIME SERIES…







- Product “3 in 1”
- Dedicated Time Series
- Scalable for Big Data
- Data Viz & Analysis
- Cloud compatible
- User Friendly
- Evolutivity
- Open Source

SCIENTIFIC INTERESTS

- Evaluation / comparison of algorithms

- “Reproducibility” / Reuse
  - Archive / record of experiments
  - Meta-parameters tuning

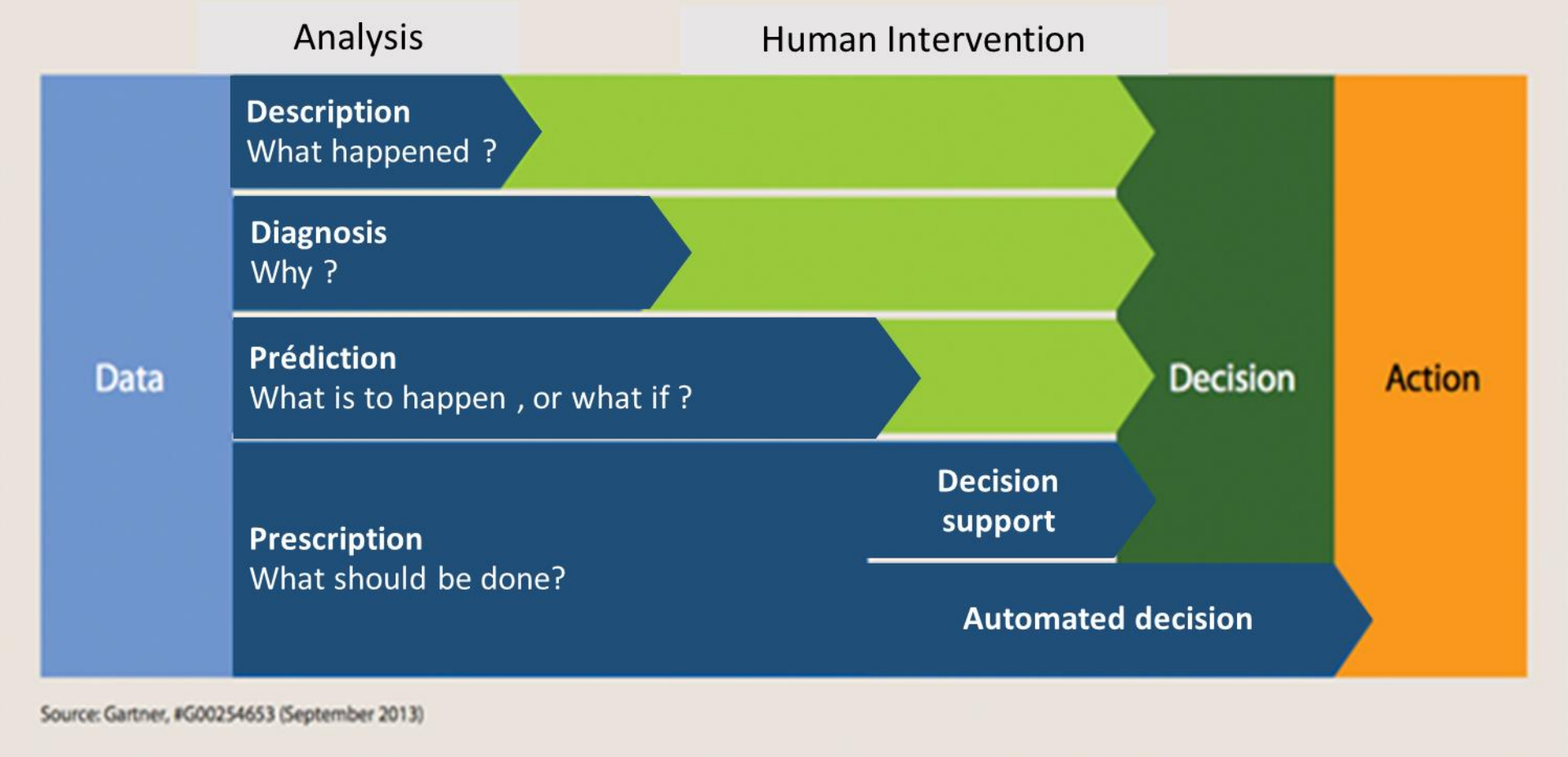
- Leverage “multidisciplinary approach”, between
  - Applied mathematics and machine learning
  - Information Technologies and big data
  - Each respective discipline:
    - Engineering,
    - Physics
    - Medicine, e.g. physiology,
    - Biotech,
    - Sociology
    - …

STATUS

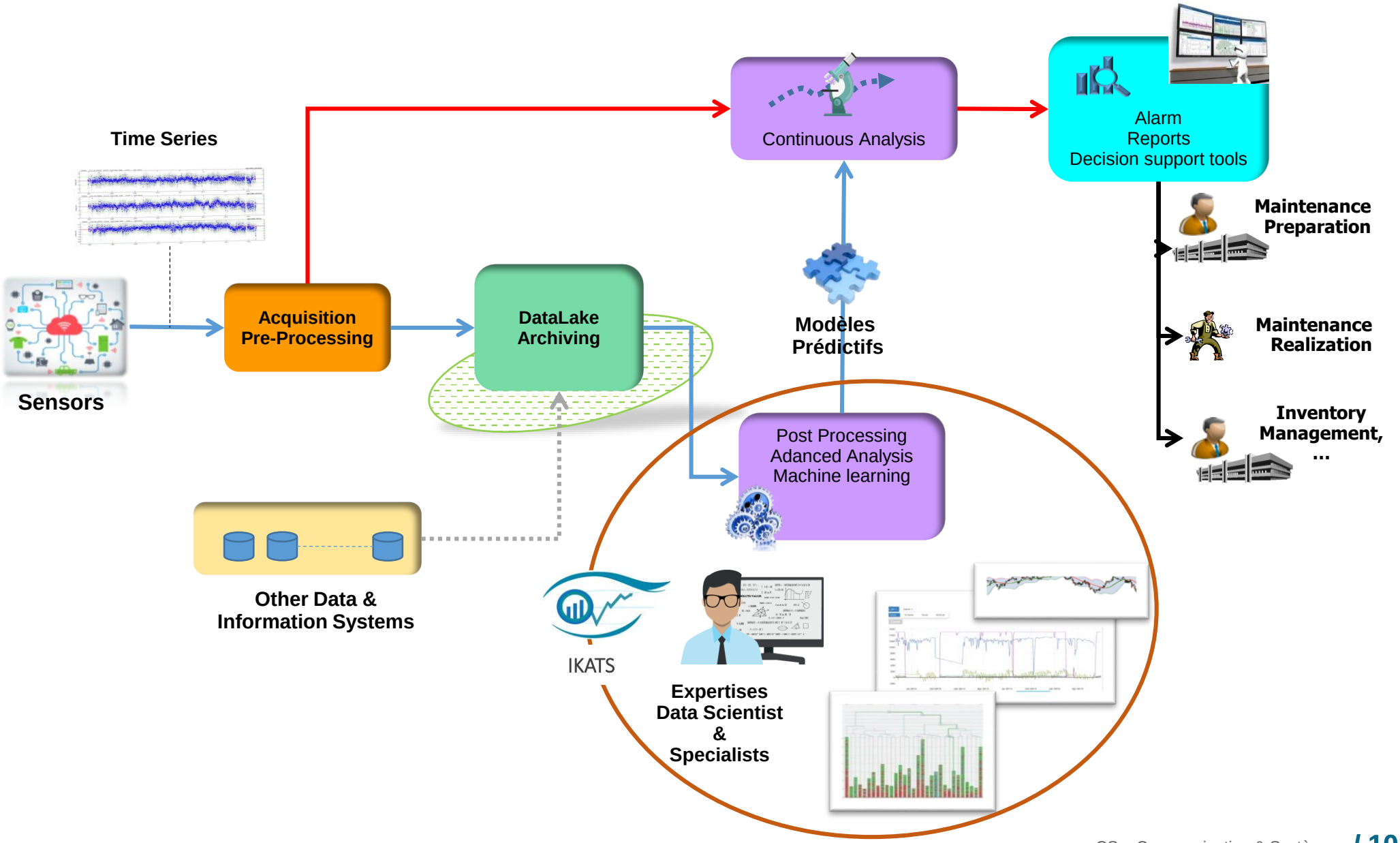
➔ IKATS

- Is developed and leaded by CS, within an overall project associating LIG (Laboratoire Informatique de Grenoble)
- https://ikats.org
- https://github.com/IKATS/IKATS

AN INDUSTRIAL OBJECTIVE : PREDICTIVE MAINTENANCE



PREDICTIVE MAINTENANCE CHAIN

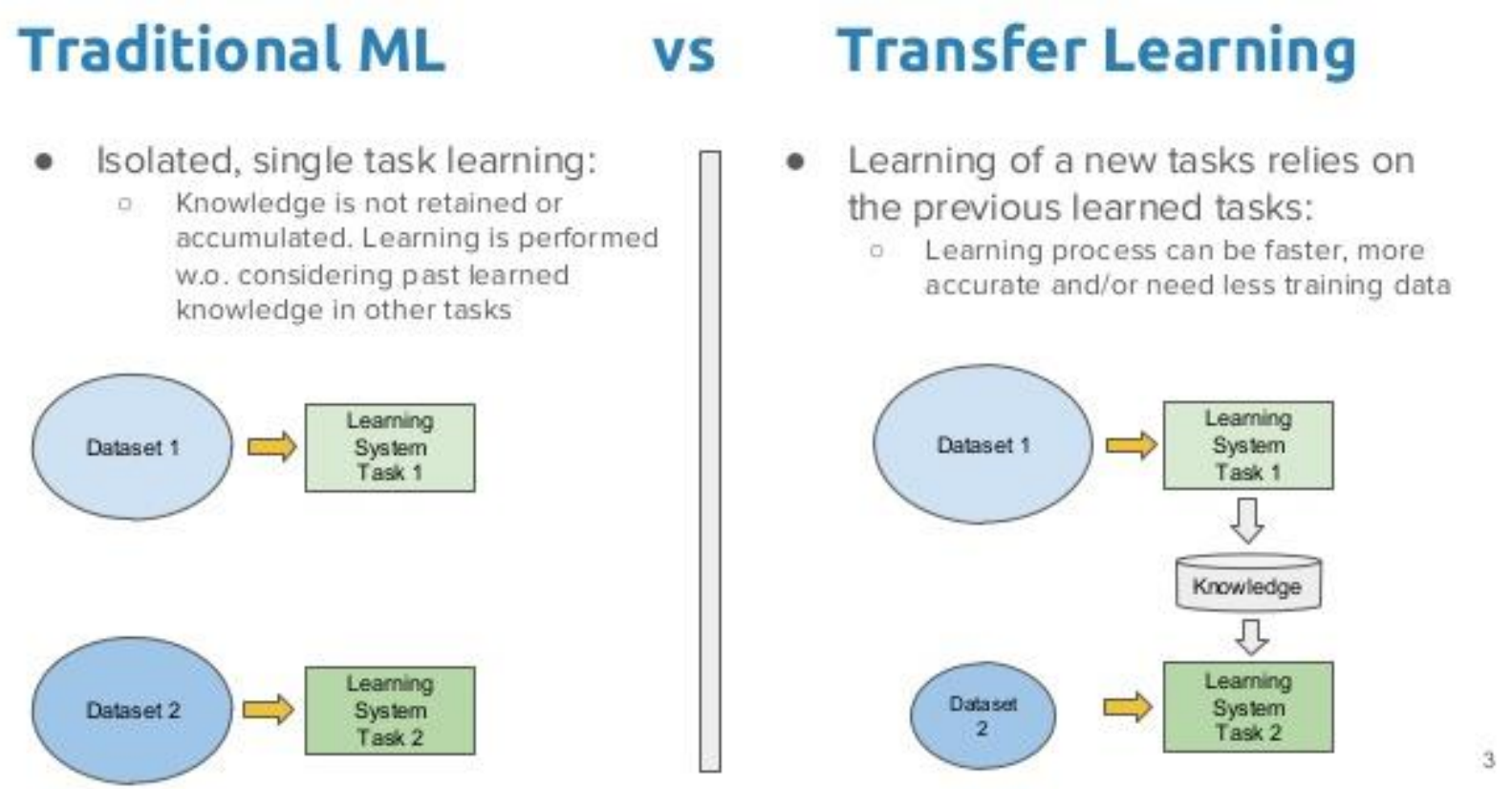


LESSONS LEARNED

➔ From an industrial and operational perspective,

› a first tough challenge is in data collection and analysis. It's a prerequisite

› "Transfer learning" might be an approach to be favoured,



THANK YOU