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Big Data Pilot Demo Days

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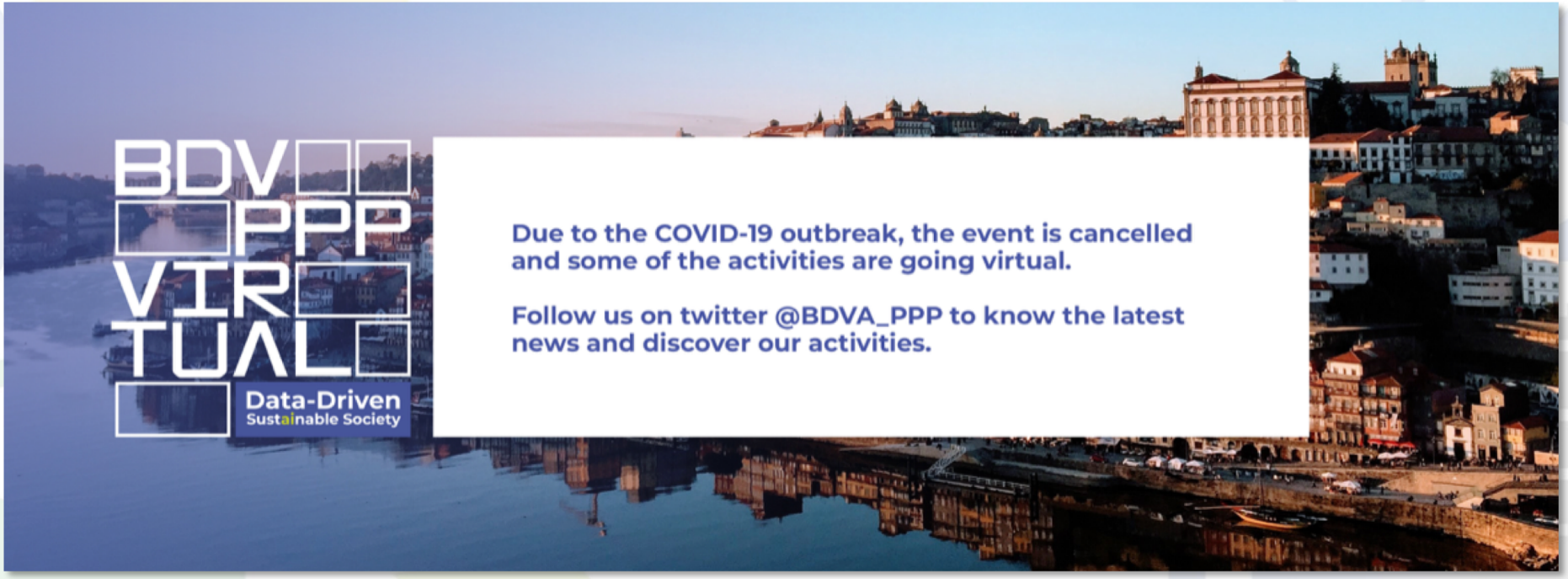
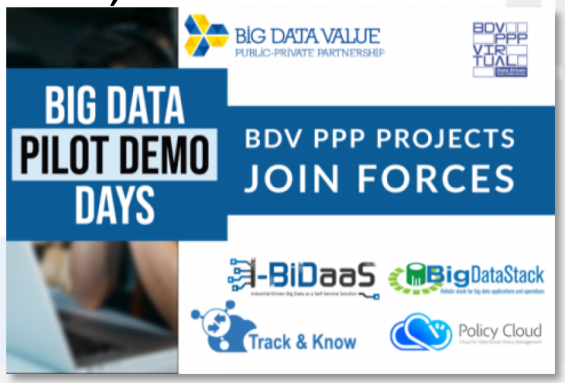
The below-mentioned project have been funded by the European Commission Horizon 2020
BigDataStack: grant agreement No 770747
I-BIDaaS: grant agreement No 780787
Track and Know: grant agreement No 780754

BDV PPP Summit 2020 went virtual



Why Big Data Pilot Demo Days?

- The new data-driven industrial revolution highlights the need for big data technologies to unlock the potential in various application domains.
- BDV PPP projects I-BiDaaS, BigDataStack and Track & Know and deliver innovative technologies to address the emerging needs of data operations and applications.
- To fully exploit the sustainability of the developed technologies, the projects onboarded pilots that exhibit their applicability in a wide variety of sectors.
- In their third and final year, the projects are ready to demonstrate the developed and implemented technologies to interested end-users from industry as well as technology providers, for further adoption.



BDV PPP Projects Join Forces

Holistic stack for big data applications and operations

Industrial-Driven Big Data as a Self-Service Solution

Big Data for Mobility Tracking Knowledge Extraction in Urban Areas

BDV PPP projects joining forces to showcase application of innovative technologies in a variety of domains, fostering futher adoption, contributing to Europe's digital future.

Big Data Pilot Demo Days - A Series of Webinars

1. I-BiDaaS Application to the Financial Sector
2. BigDataStack Connected Consumer demo
3. Track & Know applied to the fleet management sector
4. A BigDataStack Seafarer's Tale on Real Time Shipping
5. I-BiDaaS Application to the Telecommunication Sector
6. Track & Know applied to the automotive insurance sector
7. I-BiDaaS Application to the manufacturing sector
8. Track & Know applied to patient mobility in the healthcare sector
9. BigDataStack Smart Insurance

Today's Main Topic – Big Data as a Self-Service Solution

- I-BiDaaS overview
- CaixaBank's Pitches: Setting the requirements
- I-BiDaaS architecture: Scientific & Technical view; how it addresses the requirements set by CaixaBank.
- Step by Step demonstration of I-BiDaaS solution and its application to the banking sector.
- Questions & Answers

Webinar Speakers

Assistant Professor at the Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad, Serbia

I-BiDaaS Scientific & Technical Manager.

Dr. Dušan Jakovetić
University of Novi Sad, Serbia

Project Manager at Security Innovation & Transformation, CaixaBank, Barcelona

Dr. Ramon Martin de Pozuelo
CaixaBank

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Big Data Pilot Demo Days

I-BiDaaS Application to the Financial Sector

Thursday, May 21, 2020 - 14:00-15:00 CEST

The below-mentioned project have been funded by the European Commission Horizon 2020
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I-BiDaaS Overview

Dusan Jakovetic

Ass. Professor, University of Novi Sad, Faculty of Sciences, Serbia;
I-BiDaaS Scientific & Technical Manager

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Identity card

Project Consortium
13 partners

PROJECT NAME
Industrial-Driven Big Data as a Self-Service Solution

TOTAL BUDGET / TOTAL EC FUNDING
€ 4 997 035

PROJECT TYPE
RIA

START DATE
1 January 2018

DURATION
36 months

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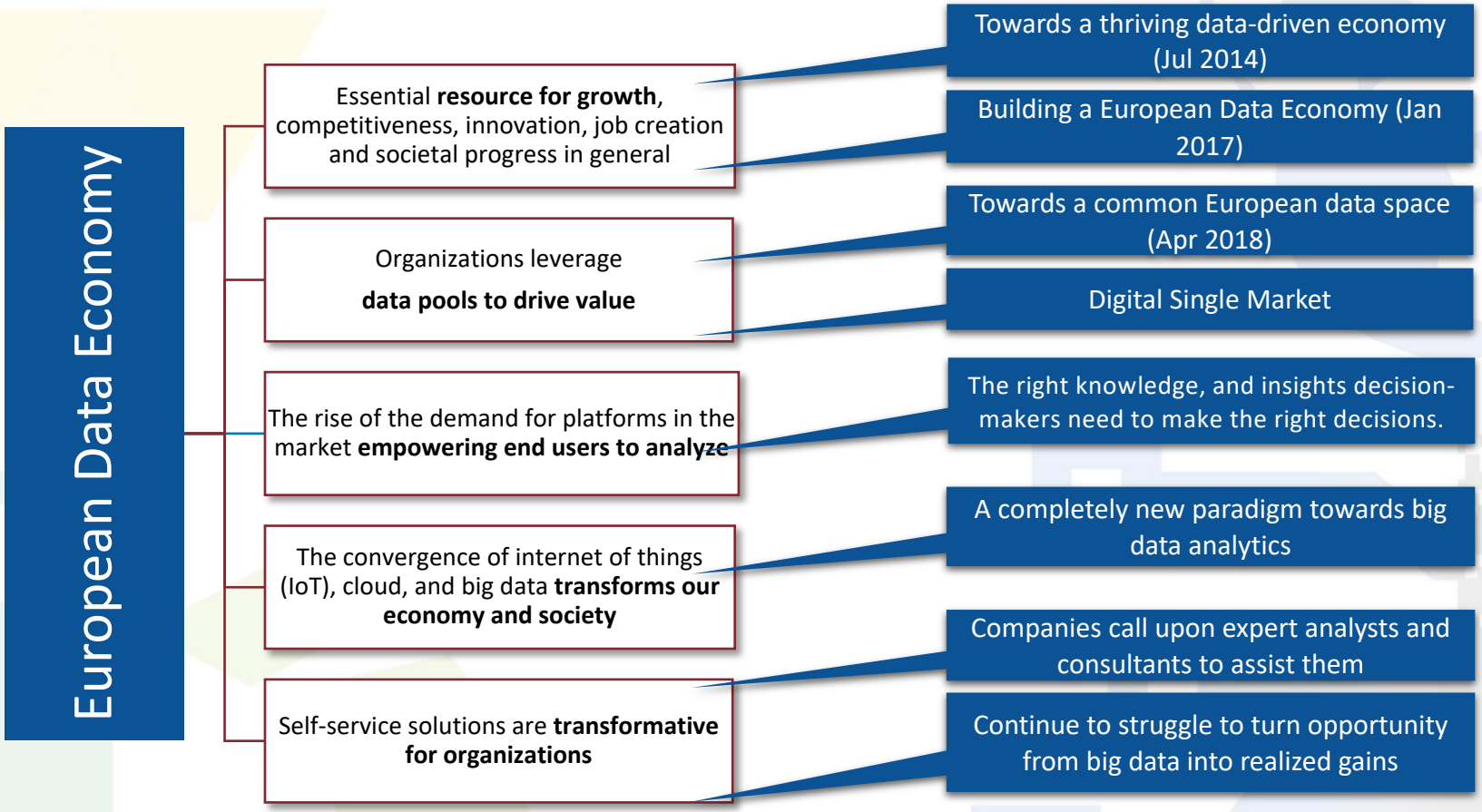
I-BiDaaS Consortium

1. FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (**FORTH**)
2. BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION (**BSC**)
3. IBM ISRAEL - SCIENCE AND TECHNOLOGY LTD (**IBM**)
4. CENTRO RICERCHE FIAT SCPA (**CRF**)
5. SOFTWARE AG (**SAG**)
6. CAIXABANK, S.A (**CAIXA**)
7. THE UNIVERSITY OF MANCHESTER (**UNIMAN**)
8. ECOLE NATIONALE DES PONTS ET CHAUSSEES (**ENPC**)
9. ATOS SPAIN SA (**ATOS**)
10. AEGIS IT RESEARCH LTD (**AEGIS**)
11. INFORMATION TECHNOLOGY FOR MARKET LEADERSHIP (**ITML**)
12. University of Novi Sad Faculty of Sciences Serbia (**UNSPMF**)
13. TELEFONICA INVESTIGACION Y DESARROLLO SA (**TID**)

Motivation


European Data Economy
Essential **resource for growth**, competitiveness, innovation, job creation and societal progress in general
Towards a thriving data-driven economy (Jul 2014)
Building a European Data Economy (Jan 2017)
Organizations leverage **data pools to drive value**
Towards a common European data space (Apr 2018)
Digital Single Market
The rise of the demand for platforms in the market **empowering end users to analyze**
The right knowledge, and insights decision-makers need to make the right decisions.
The convergence of internet of things (IoT), cloud, and big data **transforms our economy and society**
A completely new paradigm towards big data analytics
Self-service solutions are **transformative for organizations**
Companies call upon expert analysts and consultants to assist them
Continue to struggle to turn opportunity from big data into realized gains

Our Vision

A **complete** and **safe environment** for methodological **big data experimentation**

Tool and services to **increase the quality** of data analytics

A Big Data as a **Self-Service solution** that helps breaking industrial data silos and boosts EU's data-driven economy

Tools and services for **fast ingestion and consolidation** of both realistic and fabricated data

Increases impact in research community and contributes to industrial innovation capacity

Tools and services for the management of **heterogeneous infrastructures** including elasticity

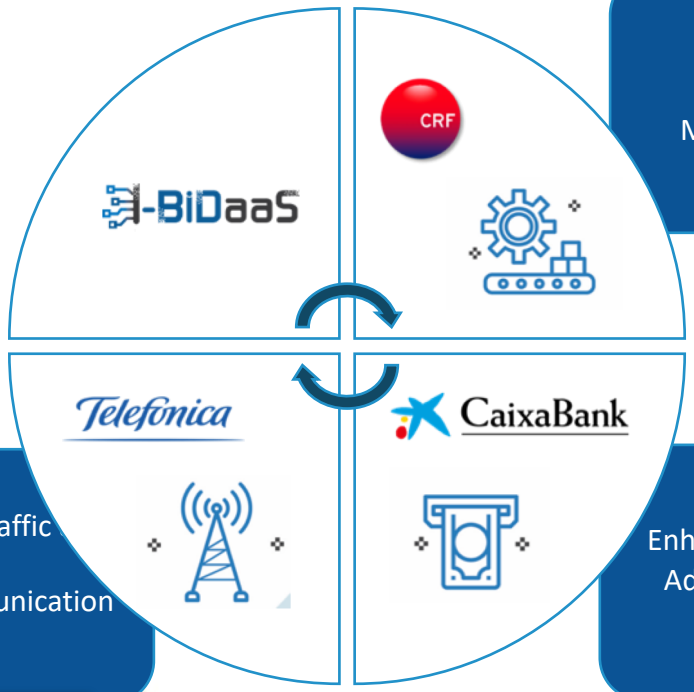
Project Statement

I-BiDaaS *aims to* ***empower*** *users to easily* ***utilize and interact*** *with* ***big data technologies****, by designing, building, and demonstrating, a* ***unified framework*** *that:*

significantly increases the ***speed of data analysis*** *while coping with the rate of* ***data asset growth****, and facilitates* ***cross-domain data-flow*** *towards a thriving* ***data-driven EU economy****.*

I-BiDaaS will be tangibly validated by three real-world, ***industry-lead*** *experiments.*

Application / Experimentation



CRF

Production process of aluminium casting

Maintenance and monitoring of production assets

Manufacturing Industry

TID

Accurate location prediction with high traffic visibility

Optimization of placement of telecommunication equipment

Quality of Service in Call Centers

Telecommunications Industry

CAIXA

Enhance control of customers to online banking

Advanced analysis of bank transfer payment in financial terminal

Analysis of relationships through IP address

Banking/Finance Industry

I-BiDaaS application domains

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Setting the Pilot Requirements

Ramon Martín de Pozuelo

Project Manager at Security Innovation & Transformation at CaixaBank

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CaixaBank and the Use of Data

CaixaBank is the **leading financial group in Spain**, both in banking and insurance and it is developing a strategy of diversification with stakes in international banks and also within leading service companies.

- **13.8M** Customers
- **5.8M** On-line banking
- **4.8M** Mobile Banking
- **32K** Employees
- **9.1K** ATMs
- **4.2K** Branches

In January 2014 CaixaBank created **the Big Data Department**

- We manage 1.247 TB of information only in our Big data
- Department of more than 100 internal people providing Data analytics services to all the Organization.
- Due to Regulation constraints all the infrastructure and the analysis is done internally

Why do we need I-BiDaaS?

Current data sharing situation in CaixaBank and I-BiDaaS approach

We have **tons of data** but **confidential**.
We are the data managers but the **real owners of the data are our customers**.

Lack of agility in our Datapool for extracting data externally.
Security procedures and constraints are necessary but hinder and slow down data sharing processes.

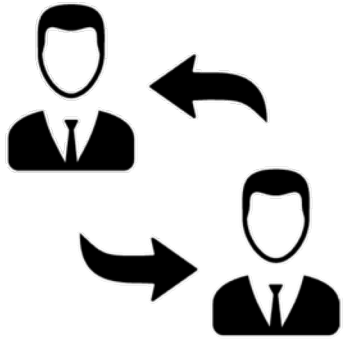
Requirements

Requirement	Control
Data privacy	Data of customers (e.g., social graph) and external suppliers (e.g., SIEM) can not be accessed or shared with other partners
Regulation Compliance	All activities related to CaixaBank within the project must comply with the relevant regulations (e.g., ISO 27001, GDPR)
Fraud and Security Analytics	Use cases presented will be related to the improvement of security and the prevention of fraud.

Objective: Exploit the I-BiDaaS platform to gain agility, efficiency and flexibility in our analytics for security.

Why do we need I-BiDaaS?

- **Breaking external and cross-sectorial data silos while complying Regulation**
  - *Sharing Data models with other FI*
  - *Sharing Data models with other sectors*
  - *Following ECB & Banco de España constraints, we already have proved with I-BiDaas that this is possible*

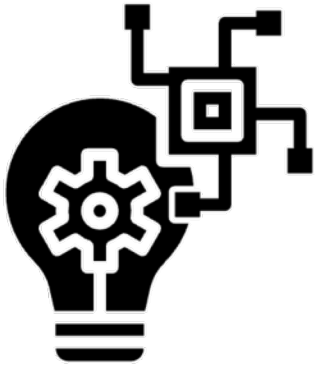


Why do we need I-BiDaaS?

- **Secure Self-Service Infrastructure**
  - *Being able to outsource Big Data Infrastructure preserving privacy & security*
  - *To grow in a dedicated and specialized infrastructure*
  - *To count on dedicated and specialized specialists*

Why do we need I-BiDaaS?

- **Competitiveness & Innovation**
  - *Fast, agile and specialized adaptation to new technology.*
  - *Vs Current proprietary infrastructure*
- **Efficiency**
  - *Reducing the costs and time of analyzing large datasets*



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Big Data Architecture

Dusan Jakovetic

Assistant Professor, University of Novi Sad, Serbia;
I-BiDaaS Scientific & Technical Manager

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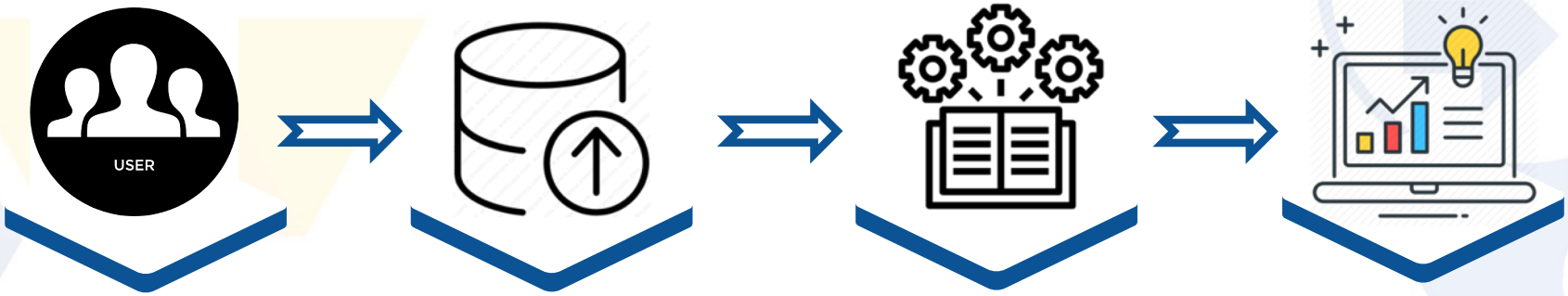
The I-BiDaaS Solution: Front-end



Users

- Expert mode
- Self-service mode
- Co-develop mode

Data

- Import your data
- Fabricate Data
- Tokenize data

Analyze your Data

- Stream & Batch Analytics
- Expert: Upload your code
- Self-service: Select an algorithm from the pool
- Co-develop: custom end-to-end application

Results

- Visualize the results
- Share models

Benefits of using I-BiDaaS

Do it yourself In a flexible manner

Break data silos

Safe environment

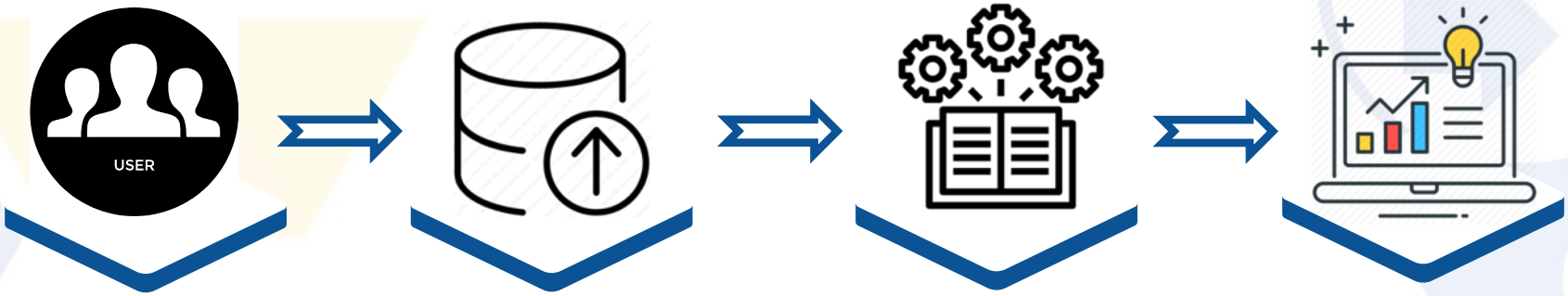
Interact with Big Data technologies

Increase speed of data analysis

Intra- and inter-domain data-flow

Cope with the rate of data asset growth

The I-BiDaaS Solution: Front-end



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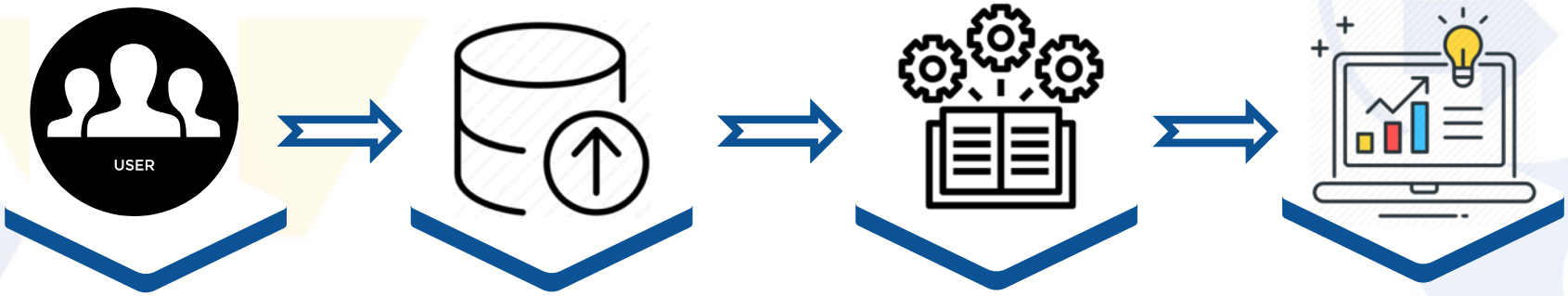

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- **Expert mode**
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Analyze your Data

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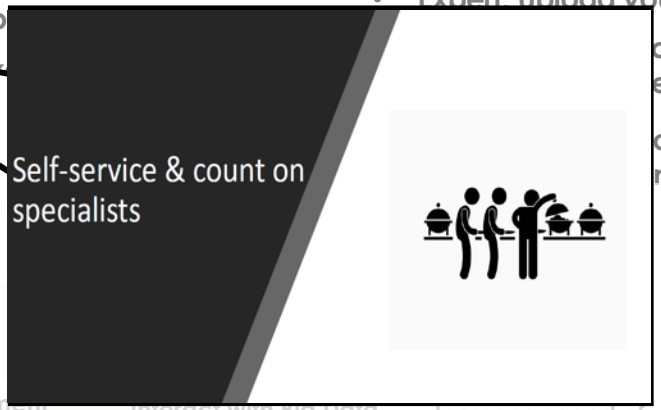


Benefits of using I-BiDaaS

Do it yourself In a flexible manner

Break data silos

Safe environment

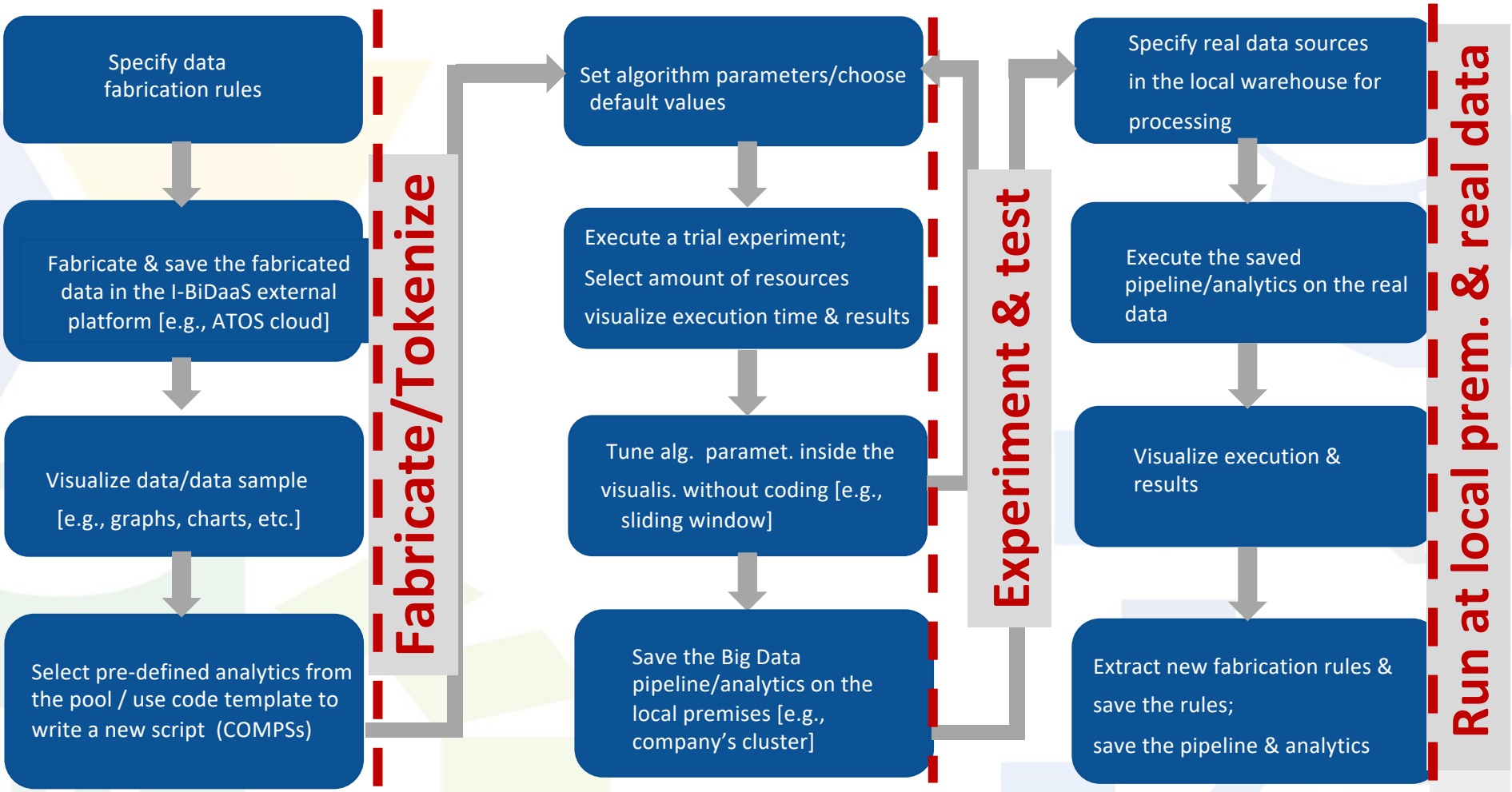
Interact with Big Data technologies

Increase speed of data analysis

Intra- and inter-domain data-flow

Cope with the rate of data asset growth

I-BiDaaS – Prototypical Experimental Workflow



I-BiDaaS – Experimental Workflow

Specify data fabrication rules

Fabricate & save the fabricated data in the I-BiDaaS external platform [e.g., ATOS cloud]

Visualize data/data sample [e.g., graphs, charts, etc.]

Select pre-defined analytics from the pool / use code template to write a new script (COMPSs)

Fabricate/Tokenize

Set algorithm parameters/choose default values

Execute a trial experiment;
Select amount of resources
visualize execution time & results

Tune alg. paramet. inside the visualis. without coding [e.g., sliding window]

Save the Big Data pipeline/analytics on the local premises [e.g., company's cluster]

Experiment & test

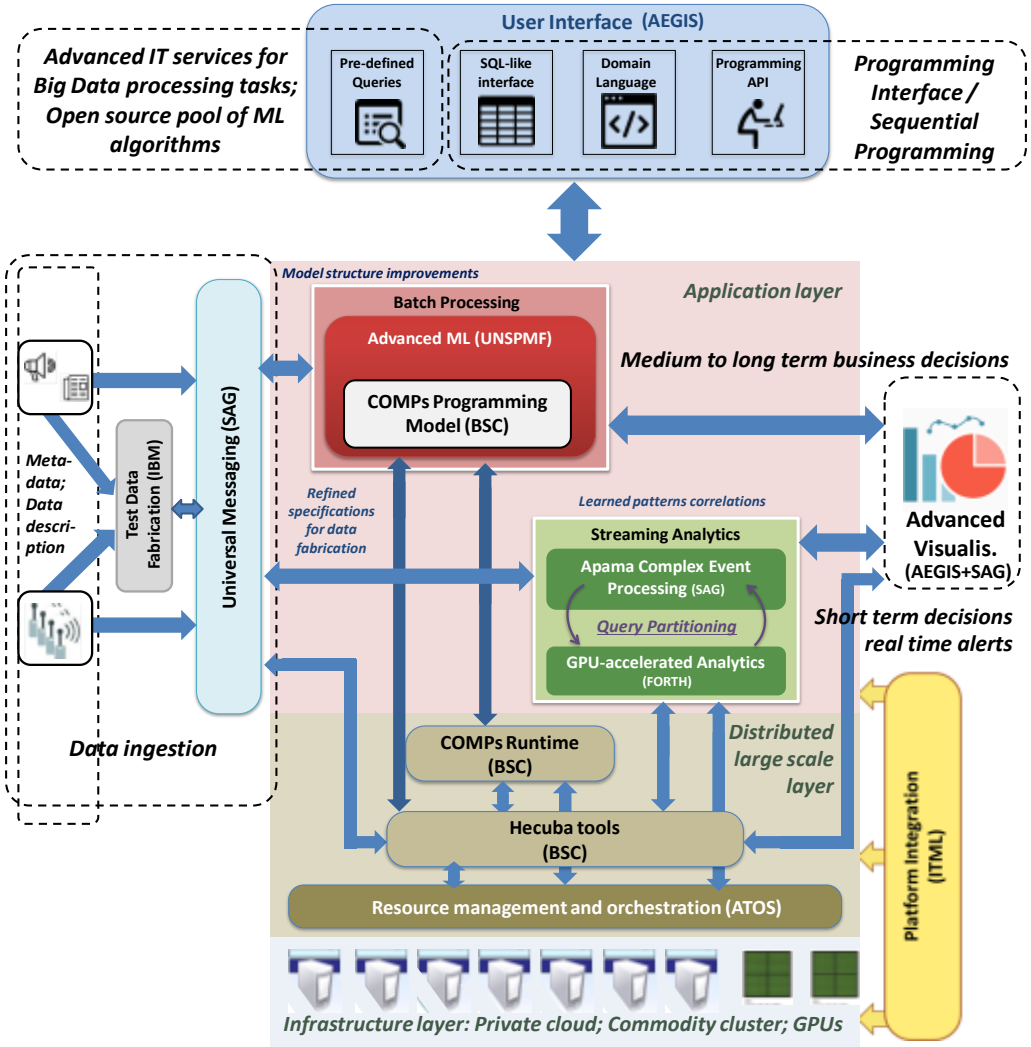
Execute the saved pipeline/analytics on the real data

Visualize execution & results

Extract new fabrication rules & save the rules;
save the pipeline & analytics

Run at local prem. & real data

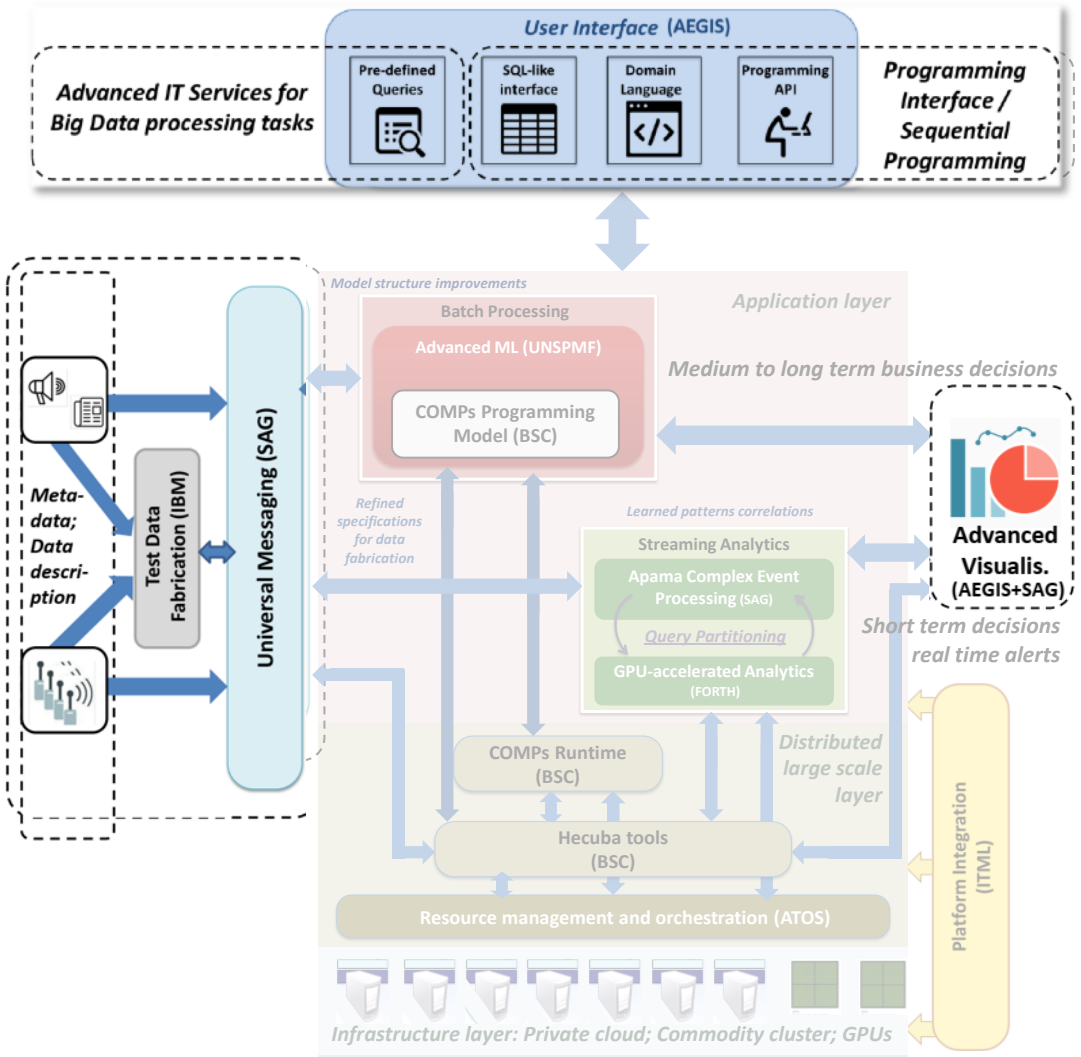
The I-BiDaaS Solution: Architecture/back-end



WP2:
Data, user interface, visualization

Technologies:

- IBM TDF
- SAG UM
- AEGIS AVT



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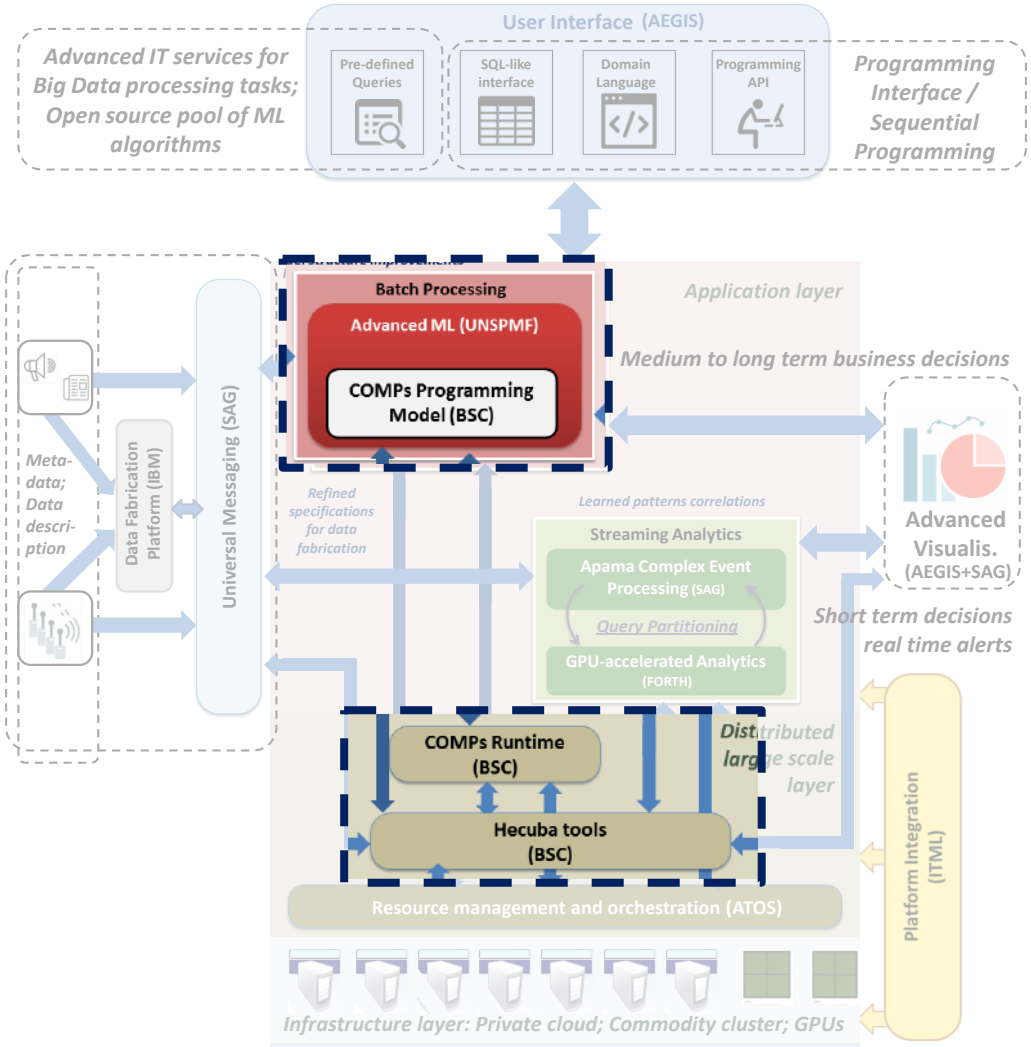
WP3:
Batch analytics

Technologies:

- BSC COMPSs
- BSC Hecuba
- BSC Qbeast
- Advanced ML (UNSPMF)



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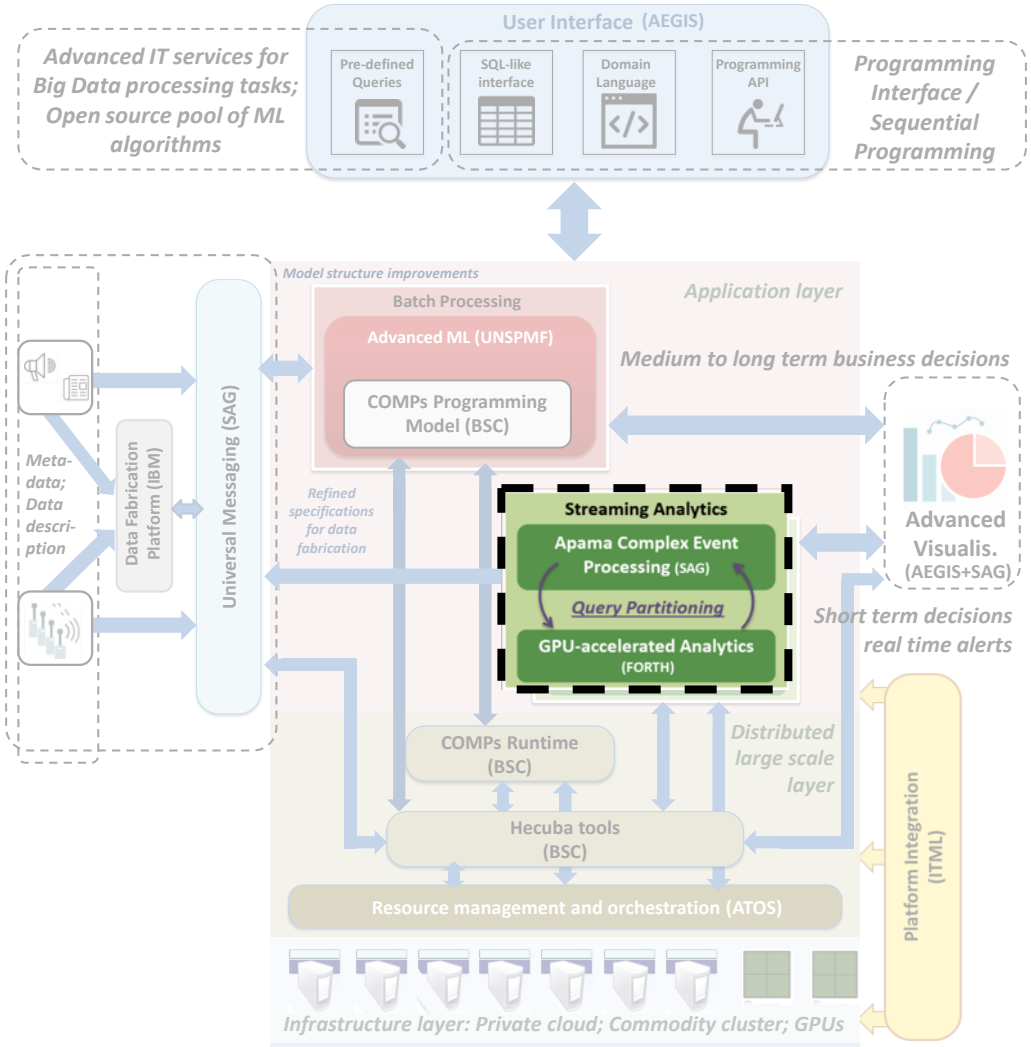
WP4:
Streaming analytics

Technologies:

- SAG Apama CEP
- FORTH GPU-accel. analytics



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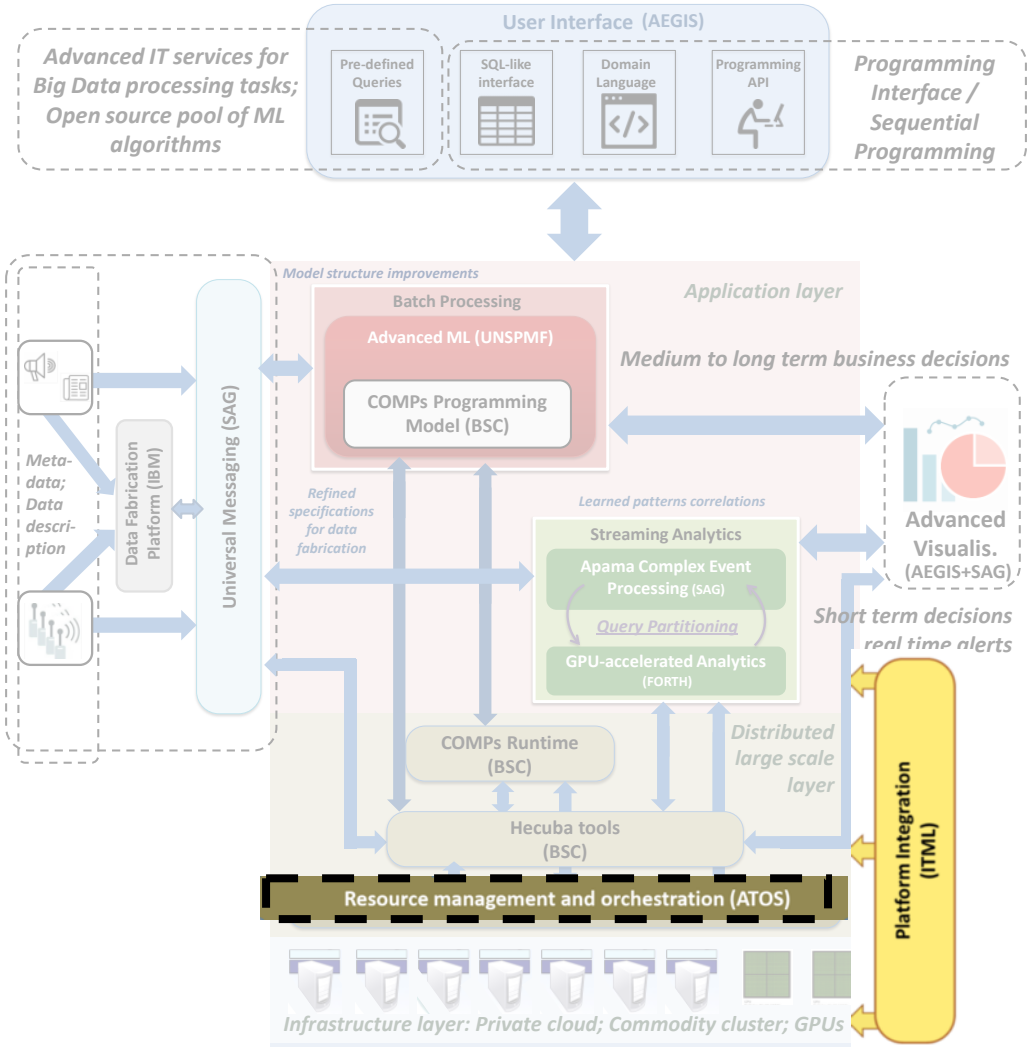
WP5:
Resource mgmt & integration

Technologies:

- ATOS Resource mgmt
- ITML integration services



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Key Features & Innovations

- Data fabrication capabilities
- Solution flexibility
- Easy to code programming paradigm
- High code reusability

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- Data fabrication capabilities
- Solution flexibility
- Easy to code programming paradigm
- High code reusability

CAIXA: From 3 months to 1-2 weeks for a new proof-of-concept Big Data technology

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Key Features & Innovations

- Data fabrication capabilities
- **Solution flexibility**
- Easy to code programming paradigm
- High code reusability

CAIXA: Bank transfers use case: ~3-4 less time to analysis

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Key Features & Innovations (Cont'd)

- GPU-accelerated analytics; Synergy of CEP and GPU-accelerated analytics for streaming data
- Feedback from analytics to data fabrication
- Feedback from analytics to problem modelling
- Demonstrated on use cases across 3 different data providers and 3 different industries

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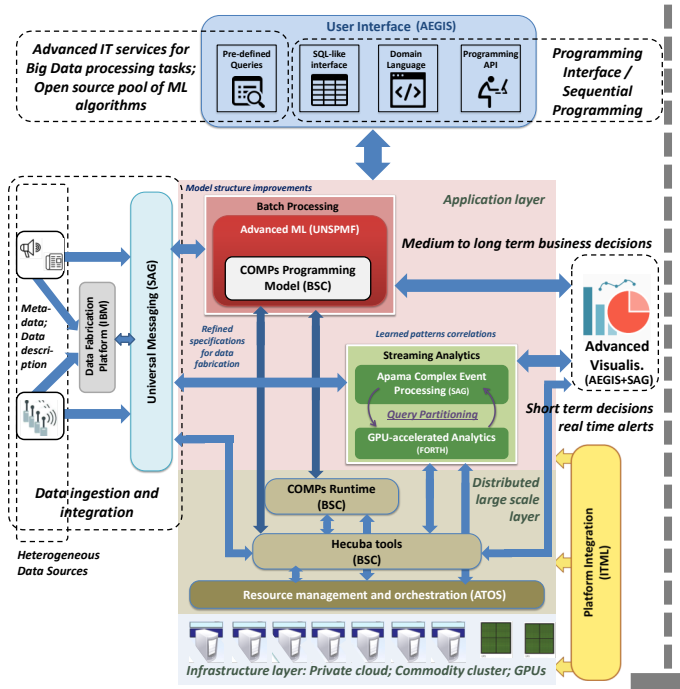
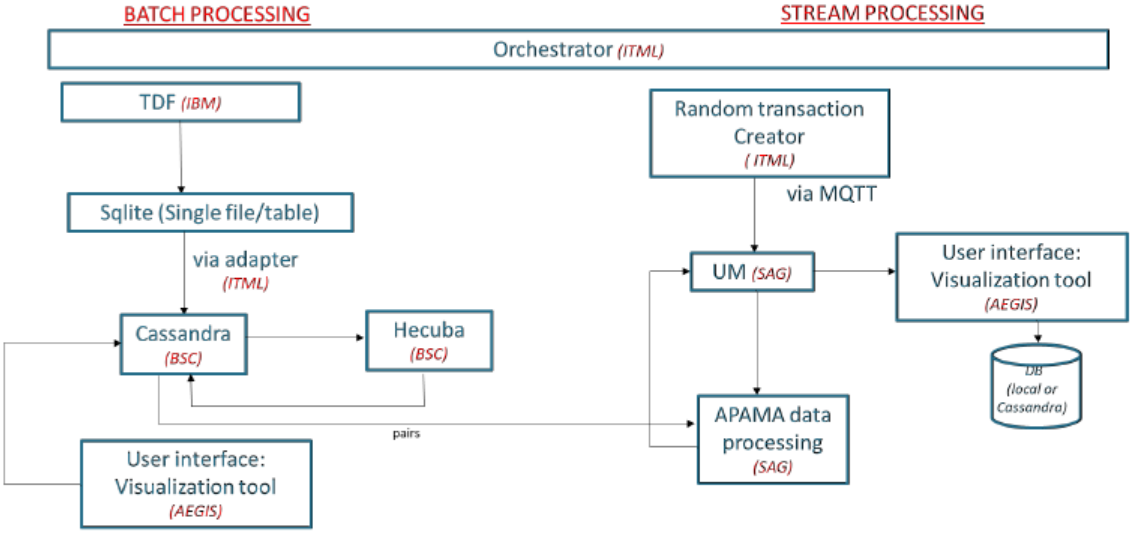
I-BiDaaS Solution: A CaixaBank Use Case Example





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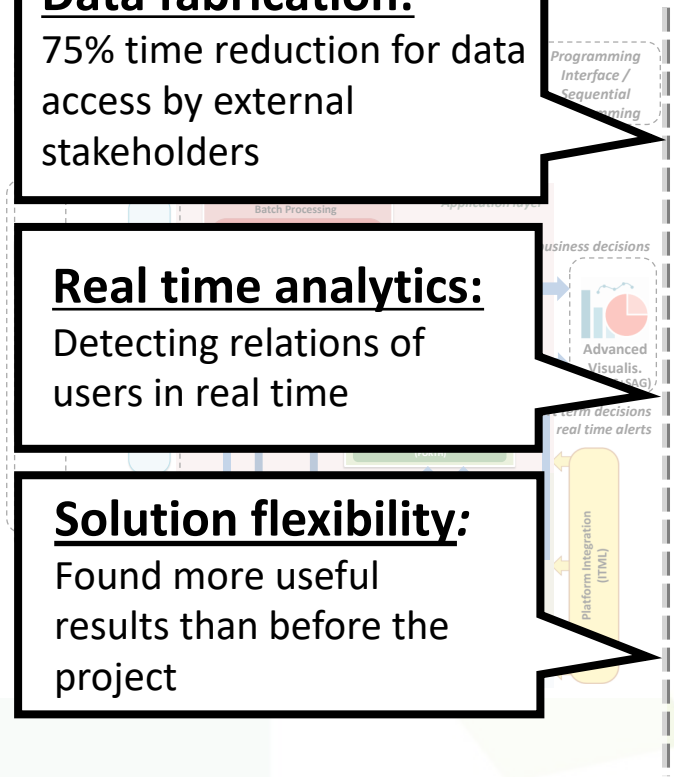
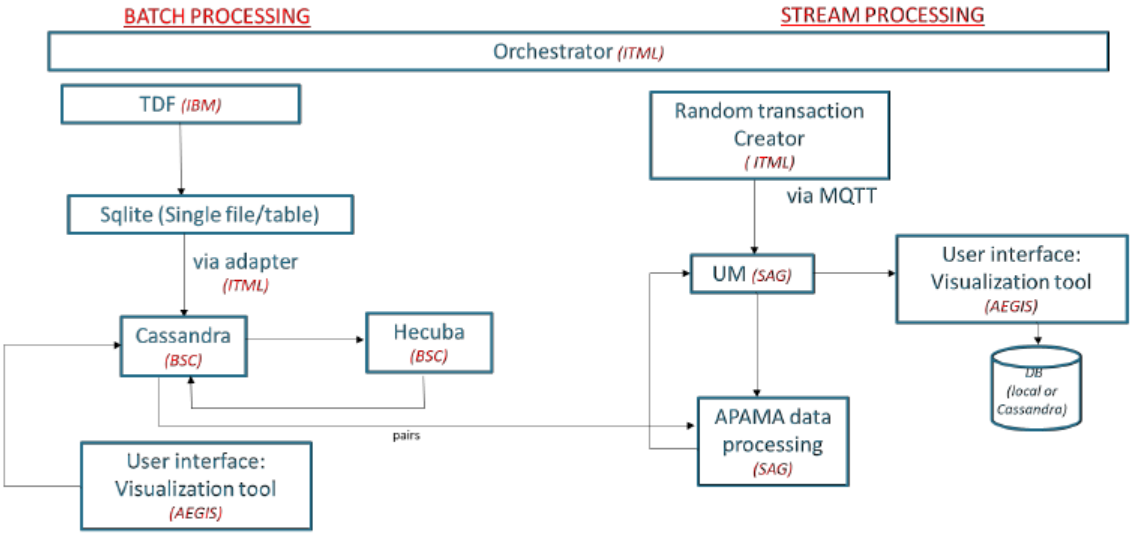
I-BiDaaS Solution: A CaixaBank Use Case Example

Data fabrication:
75% time reduction for data access by external stakeholders

Real time analytics:
Detecting relations of users in real time

Solution flexibility:
Found more useful results than before the project





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Financial Pilot: step by step

Ramon Martín de Pozuelo

Project Manager at Security Innovation & Transformation at CaixaBank

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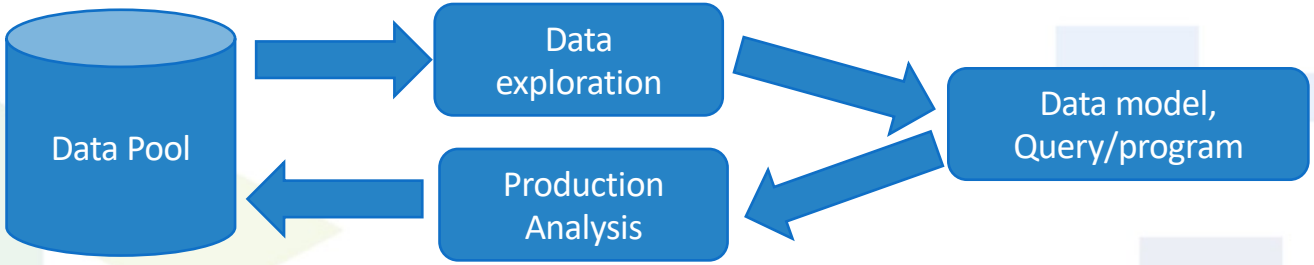
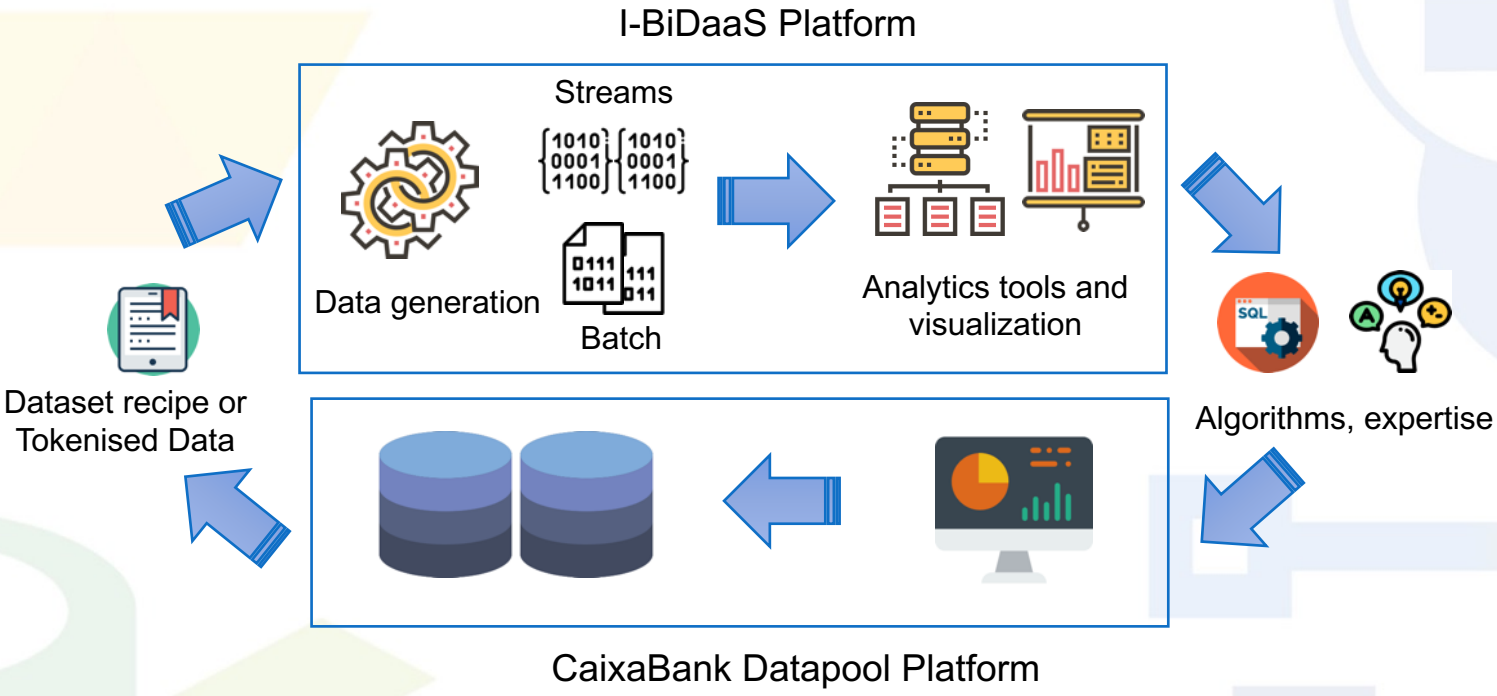
Current situation

- **Fraud Detection Analytics in CaixaBank**
  - **Currently,** CaixaBank analytics are **executed in-house**.
  - **Analytics lifecycle**:
    - *Security analysis data storage: DataPool (Oracle), Qradar (IBM)*
    - *Data exploration phase to build a model/query (expensive to run)*
    - *Execution of model/query on data in production mode*
  - This process is executed **periodically**.

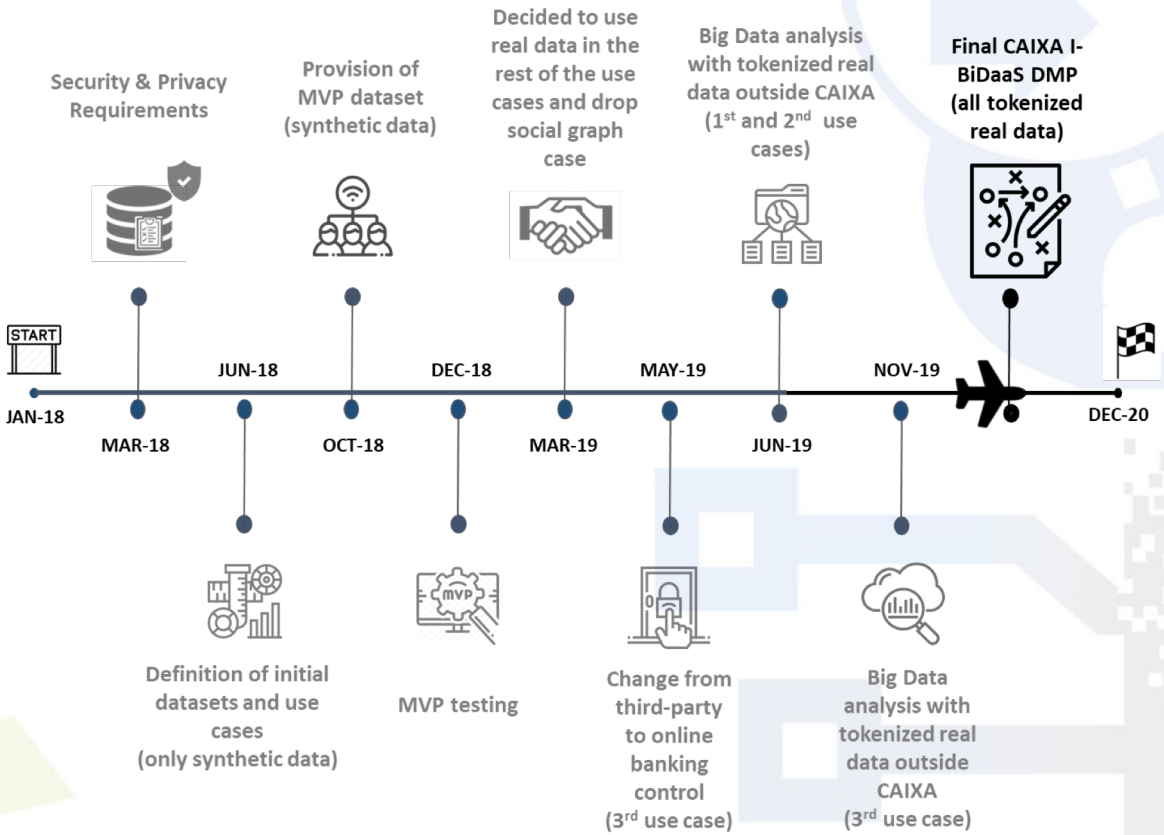


I-BiDaaS solution



CaixaBank Data Roadmap

- **Synthetic data usage:**
  - *We explored the synthetic data solution in the MVP.*
- **New opportunities**:
  - *The possibility to work with real data outside CaixaBank in a secure way.*
  - *We moved from totally synthetic approach to tokenized real datasets.*
  - *We include a comparison between synthetic and real data to know better the differences*



Initial Data & use cases

Enhance control over third party agencies

Facilitate the analysis / detection of connections from external suppliers.

Advanced analysis of bank transfer payment in financial terminal

Facilitate the analysis / detection of fraudulent transfers through Financial Terminal.

Analysis of relationships through IP address

Facilitate the analysis / detection of user relationships with the same residential IP.

Building of a social graph

Choose a graph-oriented DB.

Test technologies and tools for the treatment of the graph.

Validate the use of synthetic data for analysis, if the rules act in the same situations as with the real data.

Establish testing environment for new Big Data tools without sensitive data constraints

Final Data & use cases

Enhance control of customers to online banking

Facilitate the analysis / detection of fraudulent mobile to mobile bank transfers in online banking.

Advanced analysis of bank transfer payment in financial terminal

Facilitate the analysis / detection of fraudulent transfers through Financial Terminal.

Analysis of relationships through IP address

Facilitate the analysis / detection of user relationships with the same residential IP.

Synthetic and real tokenized datasets

Establish testing environment for new Big Data tools outside of CaixaBank premises.

Open CaixaBank data to a wider community and explore novel data analytics methodologies.

Validate the use of synthetic data for analysis, if the rules act in the same situations as with the real data.

CAIXA 1st case

MVP use case

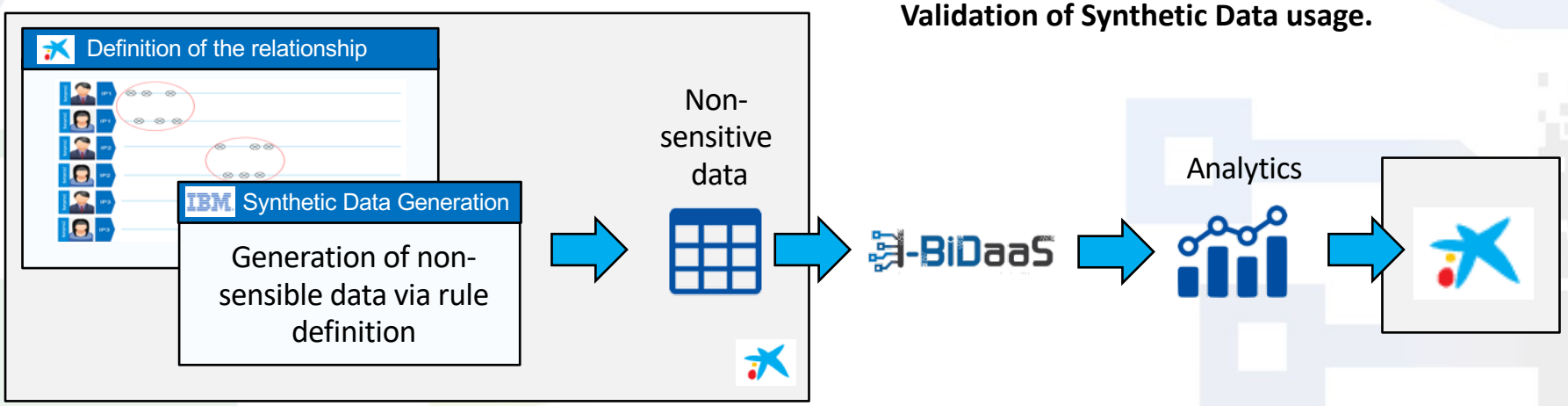
Use Case	I-BiDaaS dataset	Data
Enhance control of customers to online banking	Online banking connections	Real tokenized
Advanced analysis of bank transfer payment in financial terminal	Bank transfers	Real tokenized
Analysis of relationships through IP address	IP address	Synthetic / real tokenized

- **Business Goal:**

The transaction between two people related by an IP is not Fraud.

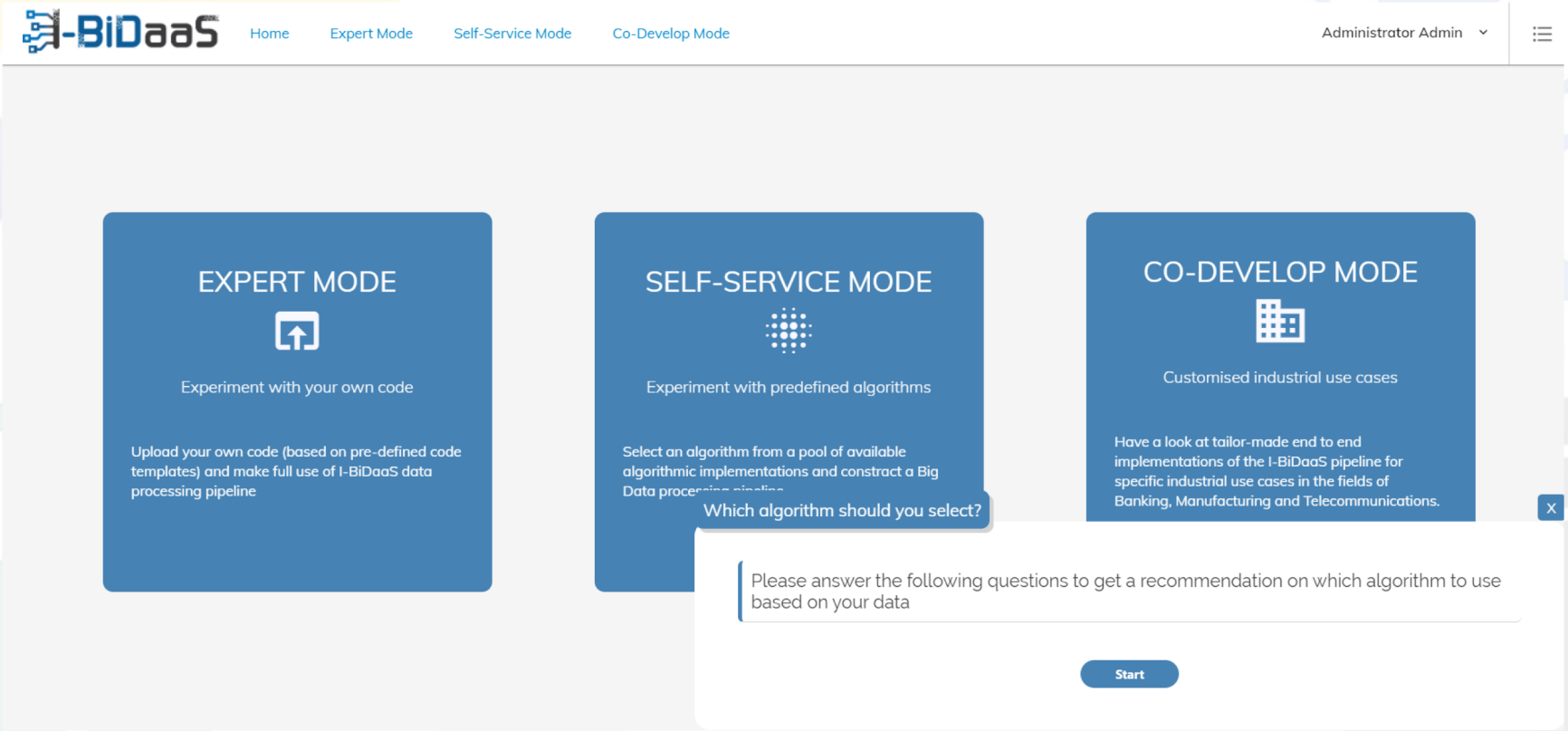
- **Use Case Goal:**

Validation of Synthetic Data usage.



CAIXA 1st case

MVP use case



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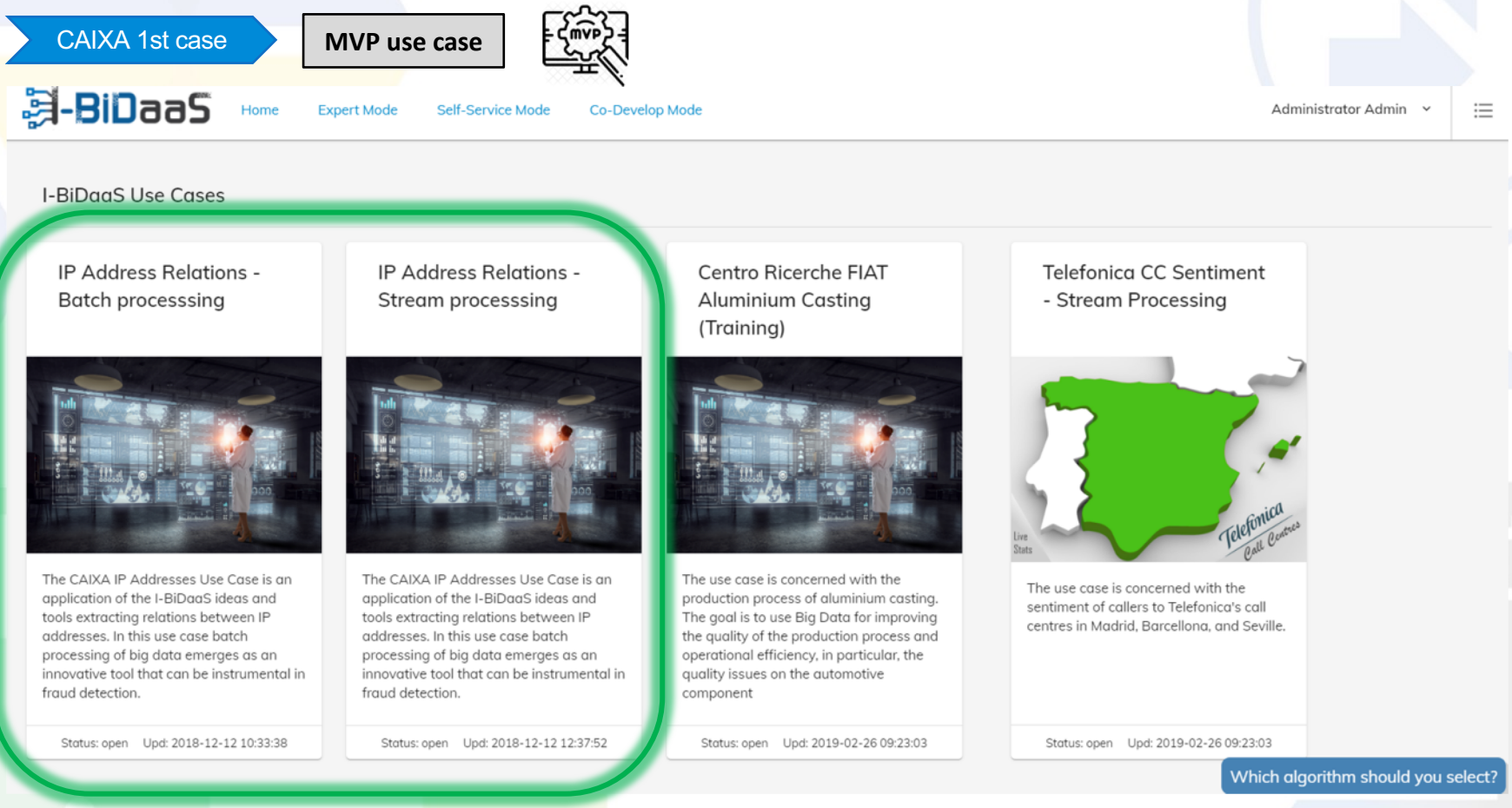
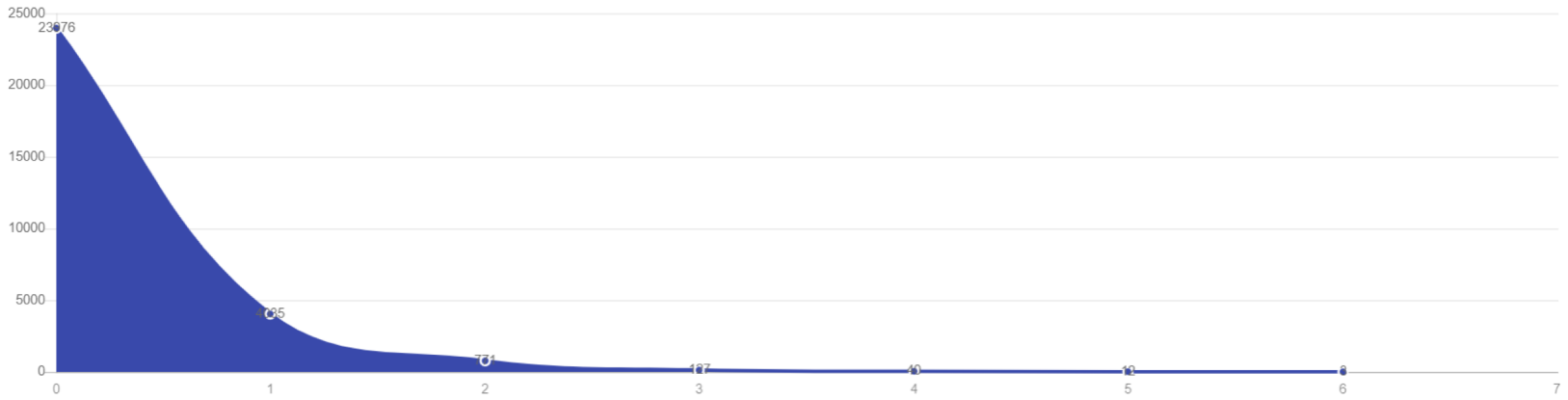


CAIXA 1st case

MVP use case

People Per Relationships

Today

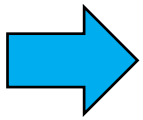


Description:
Download URL:

BACK DOWNLOAD FILE

CAIXA 1st case

MVP use case



A1 | Client_ID_1

	A	B	C	D
1	Client_ID_1	Client_ID_2		
2	19440	8810		
3	19440	81427		
4	99560	4423		
5	86814	77216		
6	4897	69743		
7	93297	56347		
8	4659	69543		
9	50790	5677		
10	50790	20044		
11	50790	20548		
12	50790	28930		
13	50790	34807		
14	73358	29298		
15	65647	36884		
16	47305	29446		
17	90833	15211		
18	35403	74935		
19	76443	97593		
20	42385	55955		
21	94502	44981		
22	8959	49501		
23	26040	8404		
24	44281	48842		
25	93004	1841		

relationships

CAIXA 1st case

MVP use case

i-BiDaaS Home Expert Mode Self-Service Mode Co-Develop Mode Administrator Admin

Run Experiment

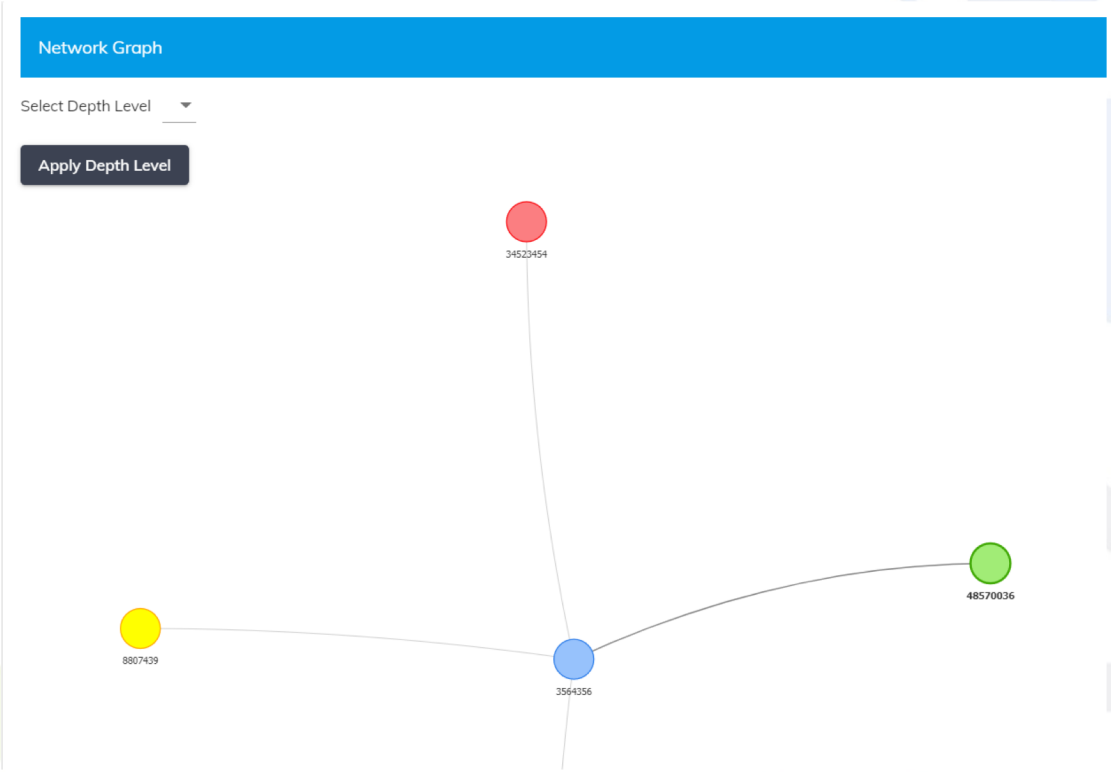
IP Address Relations - Stream processsing

Date	Description	Type	UserId 1	UserId 2
15/05/2020 04:27:44	Found related user pair.	Info	12348	23452349
15/05/2020 04:27:48	Found related user pair.	Info	34523454	21523454
15/05/2020 04:27:49	Found related user pair.	Info	34523456	21523456
15/05/2020 04:27:51	Found related user pair.	Info	23452349	12348
15/05/2020 04:28:27	Found related user pair.	Info	3564356	123123

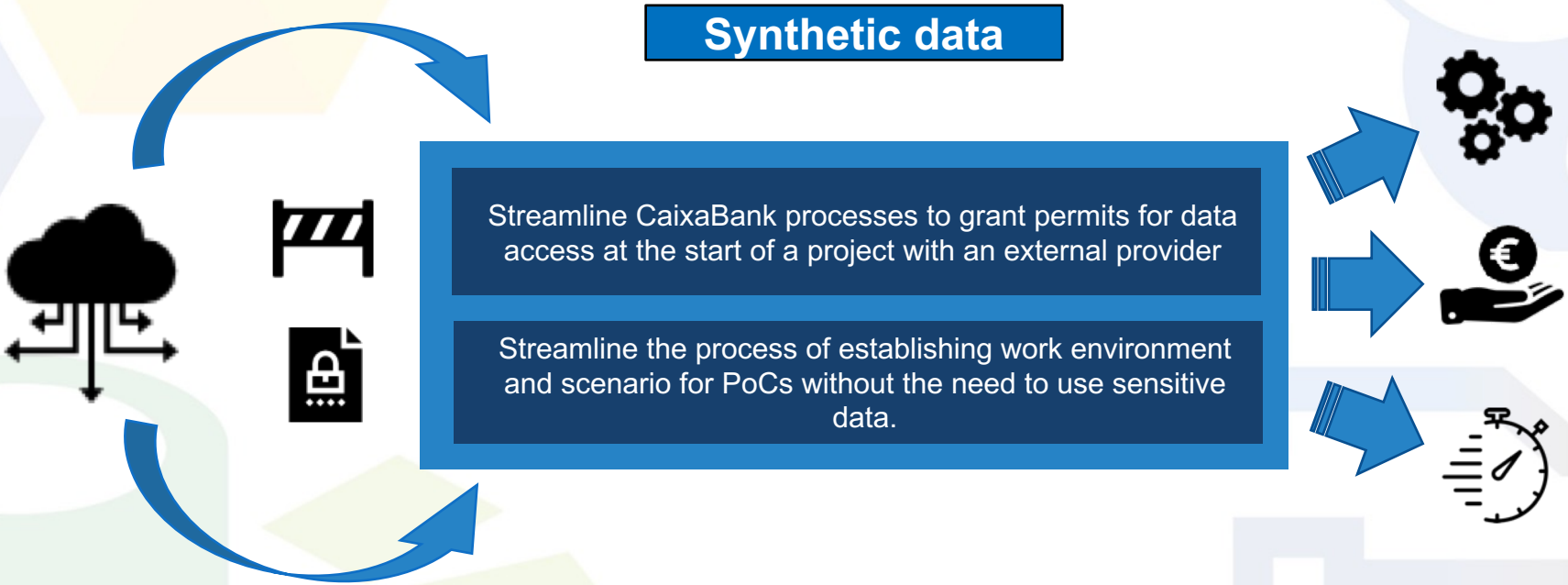
Items per page: 5 6 - 10 of 10

CAIXA 1st case

MVP use case

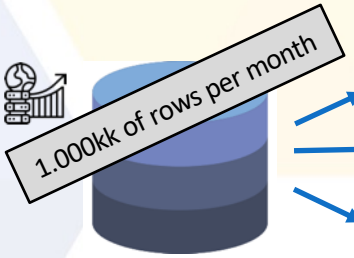


How I-BiDaaS is helping us?



CAIXA 2nd case

Analyse bank transfers executed from employees financial terminal in the name of a customer. Potential fraudulent transfer or bad practices (e.g. check that the client was present in the time of the movement.)



TIME OF THE TRANSFER

IDENTITY NUMBER

ADDITIONAL NOTES

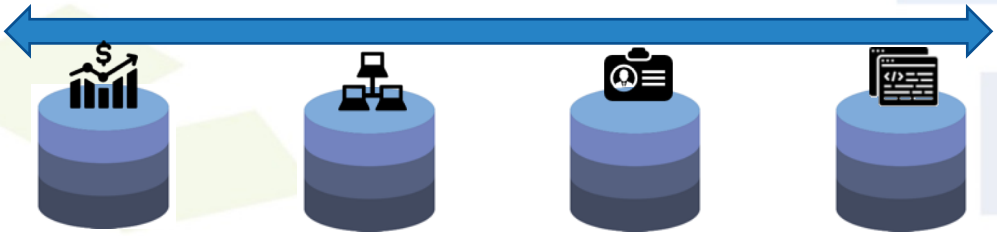
Ensure the security of our data: Decide what are we going to share clear, tokenized or encrypted.

The challenge relies on finding the limit of **what and how real data can be shared** to comply to regulation and not lose aditional and valuable information for analytics.

Big Data Analytics objective: Discover fraudulent scenarios from our data by analysing the presence or not of the client.

Use case high-level objective: Breaking internal and external silos

Financial Operation Data, Security Management (SIEM), etc.



CAIXA 2nd case

Analyse bank transfers executed from employees financial terminal in the name of a customer. Potential fraudulent transfer or bad practices (e.g. check that the client was present in the time of the movement.)

CONTEXT

Point of view:

- Final User

- Programmer

OBJECTIVES

- Identify and glue events, followed by enriching the transfer payment dataset
- Encrypt the data without lossing value
- Advanced analytics

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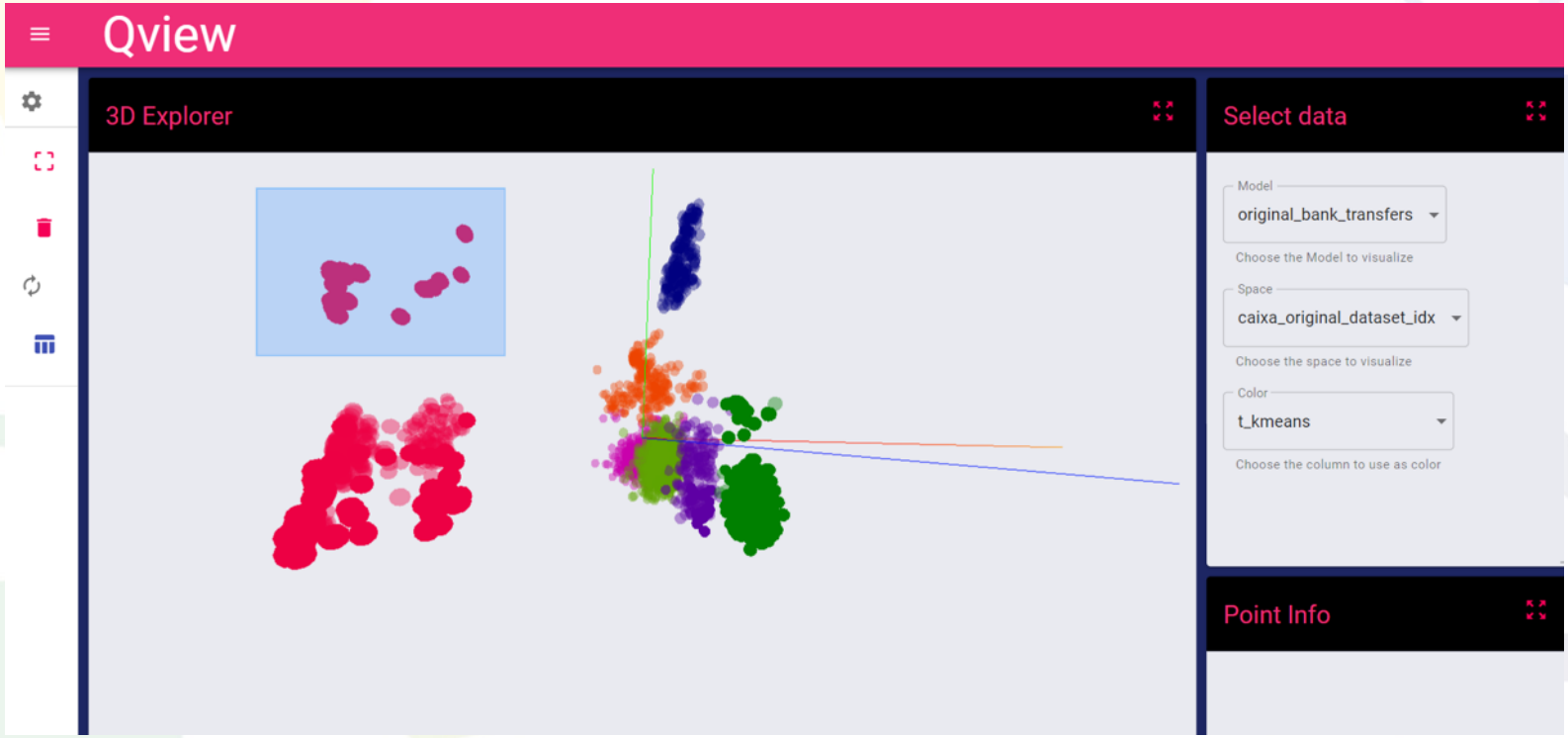

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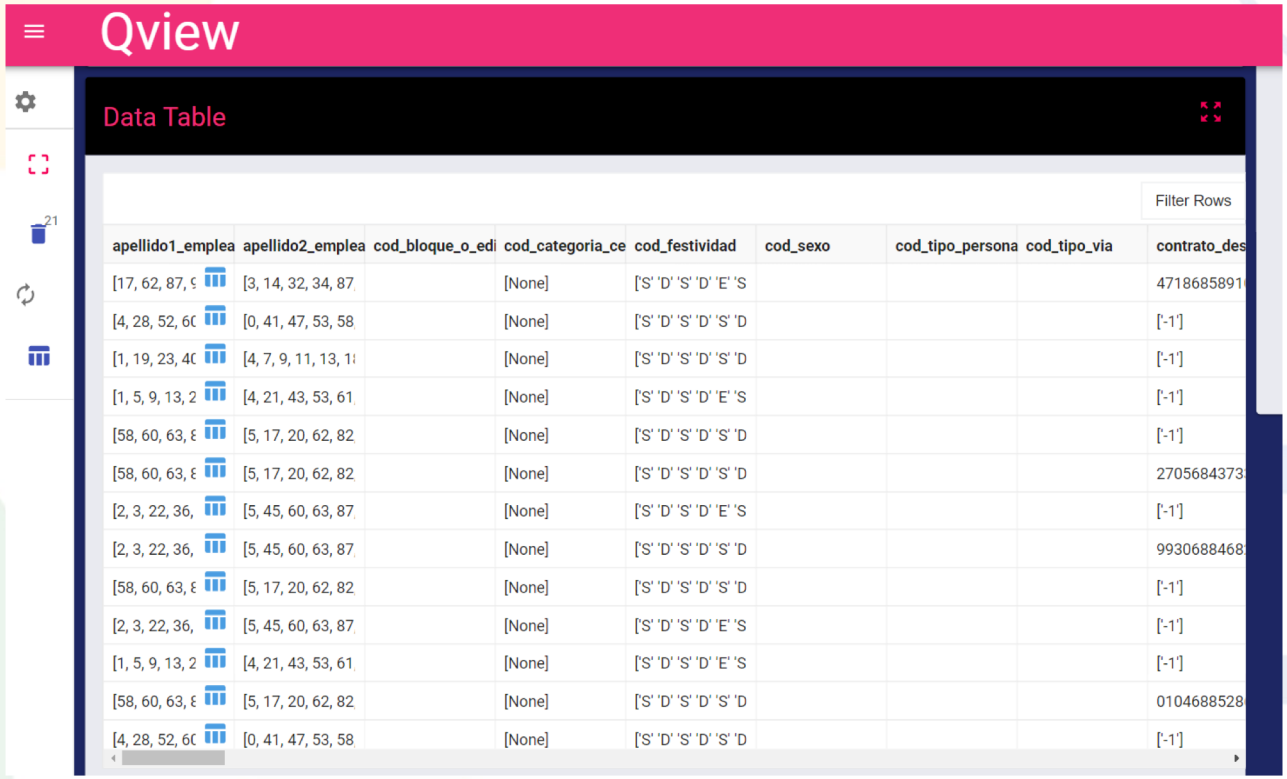

CAIXA 2nd case

Analyse bank transfers executed from employees financial terminal in the name of a customer. Potential fraudulent transfer or bad practices (e.g. check that the client was present in the time of the movement.)

Comparing solutions and processes to analyse data outside CaixaBank premises

Data Analytics comercial products

DataRobot

CAIXA 2nd case

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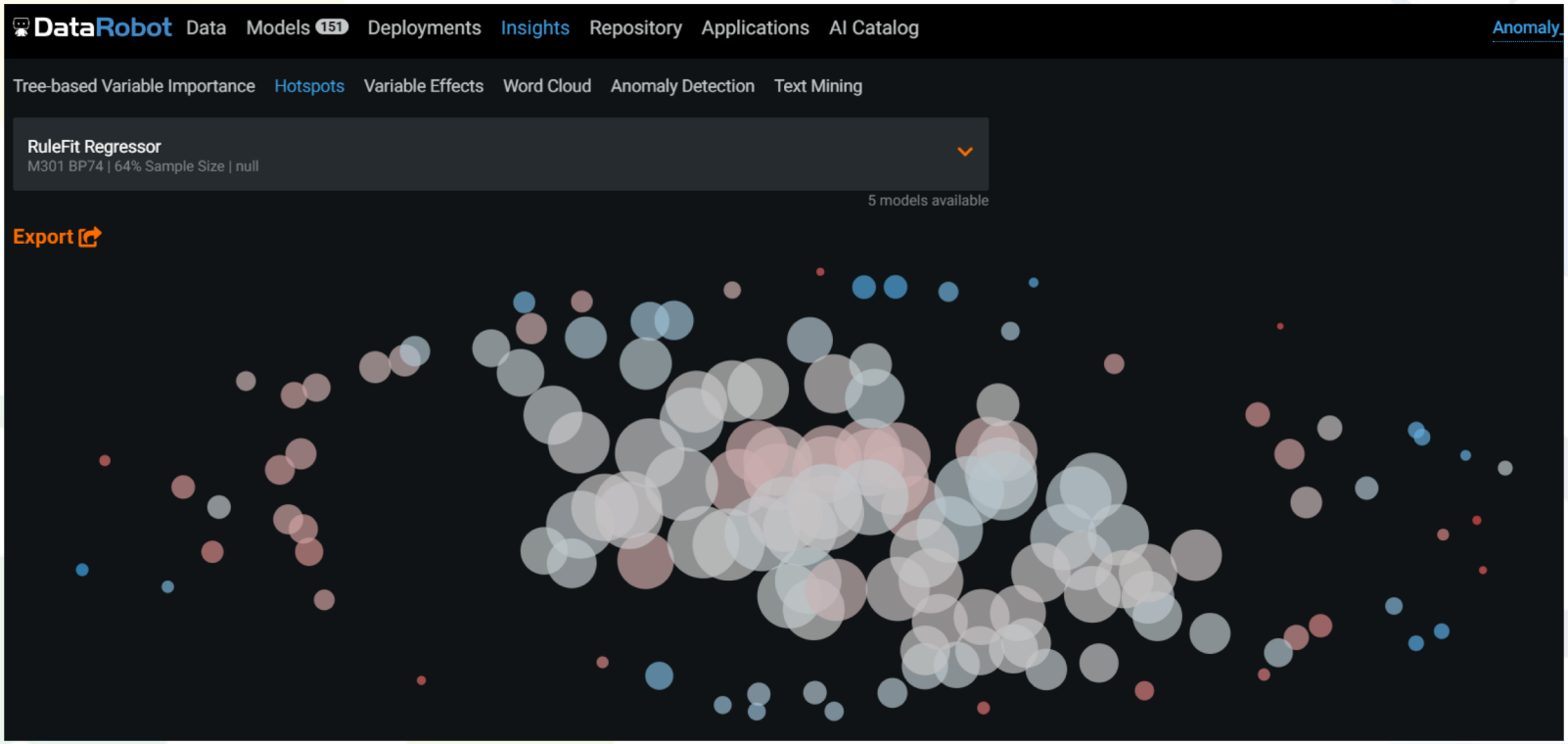

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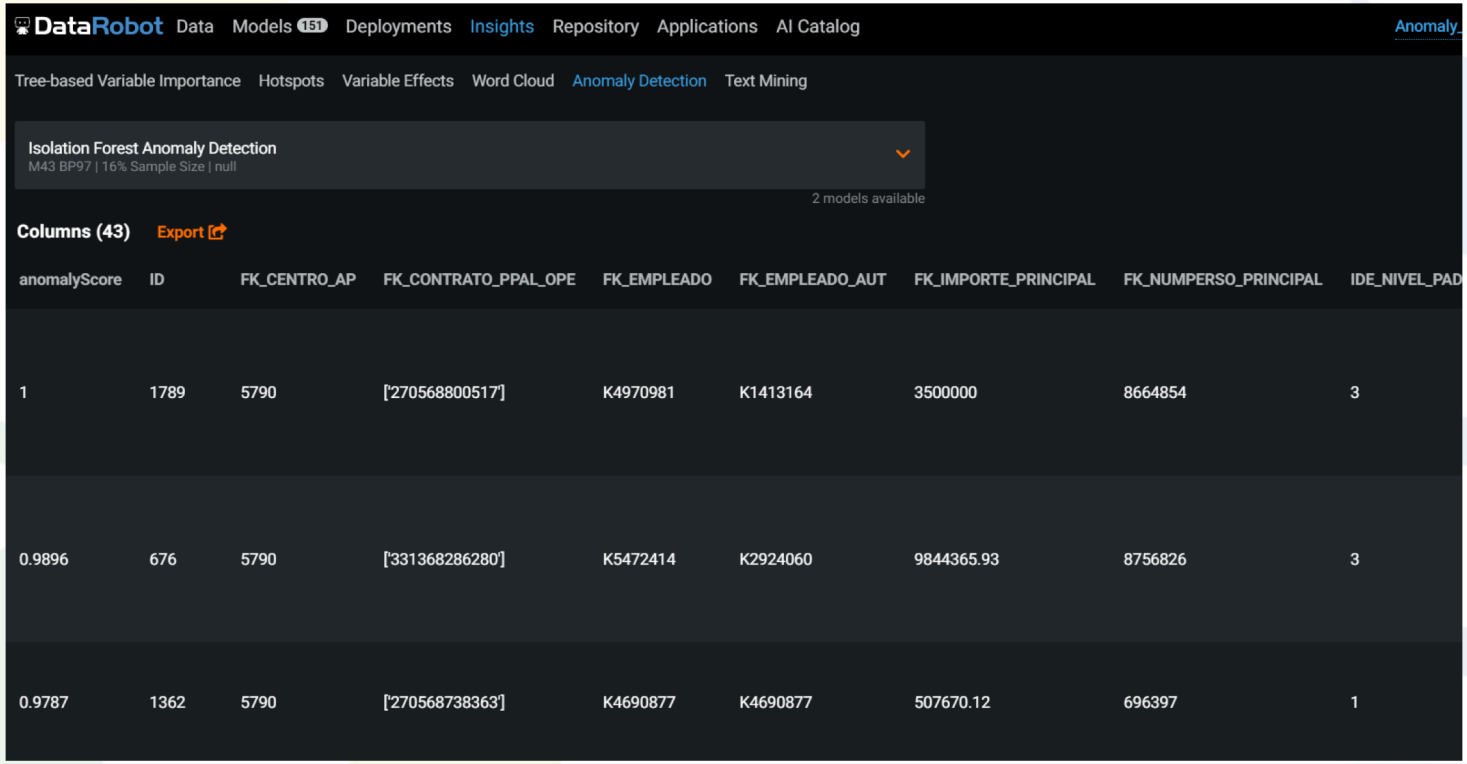


anomalyScore	ID	FK_CENTRO_AP	FK_CONTRATO_PPAL_OPE	FK_EMPLEADO	FK_EMPLEADO_AUT	FK_IMPORTE_PRINCIPAL	FK_NUMPERSO_PRINCIPAL	IDE_NIVEL_PAD
1	1789	5790	['270568800517']	K4970981	K1413164	3500000	8664854	3
0.9896	676	5790	['331368286280']	K5472414	K2924060	9844365.93	8756826	3
0.9787	1362	5790	['270568738363']	K4690877	K4690877	507670.12	696397	1

CAIXA 2nd case

Analyse bank transfers executed from employees financial terminal in the name of a customer. Potential fraudulent transfer or bad practices (e.g. check that the client was present in the time of the movement.)

DataRobot comparison results

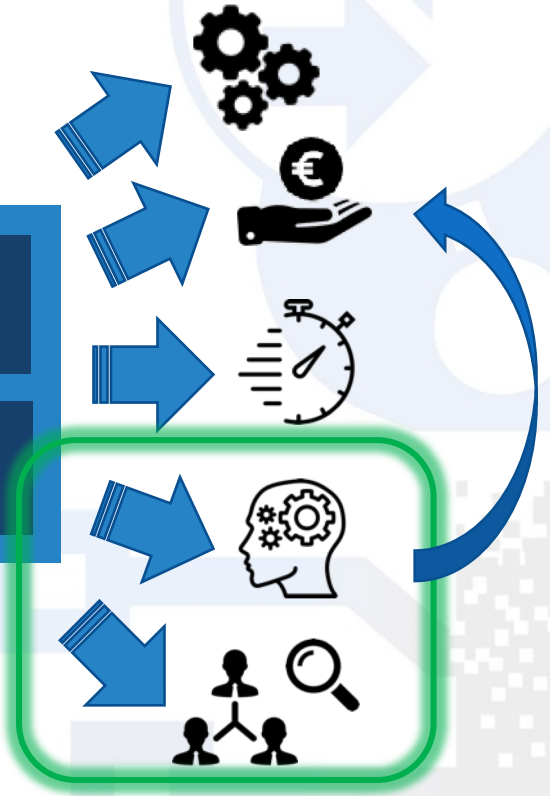
- ***Custom solutions:***
  - I-BiDaaS provide more flexibility in the definition of your own code, scoring metrics, etc.
- ***Unsupervised learning:***
  - DataRobot has very limited number of unsupervised learning models. I-BiDaaS can provide much more detailed results on unsupervised learning use cases.

How I-BiDaaS is helping us?

Real Tokenised Data

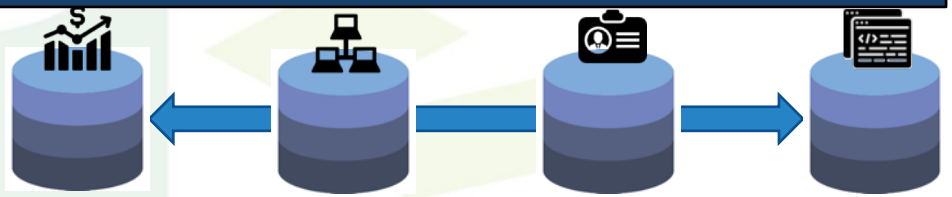
Establish testing environment for new Big Data analytics tools outside of CaixaBank premises.

Open CaixaBank data to a wider community and explore novel data analytics methodologies.



High-level objective: Breaking internal and external silos

Financial Operation Data, Security Management (SIEM), etc.



CaixaBank benefits from I-BiDaaS

Benefits	KPIs
To increase the efficiency and competitiveness in the management of its vast and complex amounts of data.	75% time reduction data access from external stakeholders using synthetic data (From 6 to 1.5 days).
To break data silos not only internally, but also fostering and triggering internal procedures to open data to external stakeholders.	Real data accessed by at least 6 different external entities skipping long-time data access procedures.
To evaluate Big Data analytics tools with real-life use cases of CaixaBank in a much more agile way.	I-BiDaaS overall solution and tools experimentation with 3 different industrial use cases with real data.

BigDataStack
Holistic stack for big data applications and operations

I-BiDaaS
Industrial-Driven Big Data as a Self-Service Solution

BIG DATA VALUE
PPP

Track & Know

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Questions?

Thank you!

Your feedback is valuable for us!

https://bit.ly/2Zl19IJ

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BigDataStack: grant agreement No 770747
I-BiDaaS: grant agreement No 780787
Track and Know: grant agreement No 780754