

Lynx: real-time accurate fraud detection over massive data

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Who we are

Pioneers in Artificial Intelligence in Spain since **1989**

Research, development
and innovation in data-based
solutions.

OUR FOUNDING PARTNERS



Our DNA

Our work style

Join knowledge with
business processes
optimization



Academia



- Internal research and collaborations
- Sponsor of **3 University Chairs**:
 - Data Science and Machine Learning
 - Psychometrics models and applications
 - Computational Linguistics



Knowledge transfer

Experts in applied research

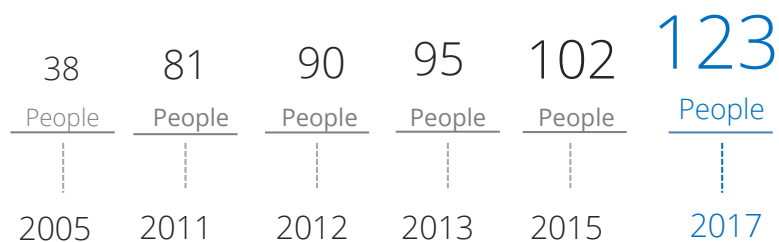
Deep knowledge in **algorithm engineering**
Collaborative work in challenging projects
that are useful for the general society



Industry

- Fast response time to market needs
- Flexibility, tailor-made solutions
- Application of the latest Big Data technologies

Our difference: our people



- ✓ Data Scientists
- ✓ Mathematicians
- ✓ Psychometrics experts
- ✓ Computational linguistics experts
- ✓ Consultants
- ✓ Psychologists
- ✓ Business experts
- ✓ Big Data engineers
- ✓ Software developers



Dónde estamos

International presence



- Germany
- Argentina
- Brazil
- Chile
- Colombia
- U.S.A.
- Spain
- Mexico
- Panama
- Paraguay
- Peru
- Portugal
- United Kingdom
- Romania
- Venezuela

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Servicio Madrileño de Salud
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Campofrío

PROSEGUR

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tecnatom

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Technologies

Experts in Advanced analytics

Using the latest
technologies



Analysis
AI - Data Science - Machine Learning

4



Massive data
processing

3



Big Data
storage

2



Hardware and
Cloud

1



www.iic.uam.es

We do
Data analysis in
every sector



Banking



Human
Resources



Digital



Utilities



Health



Customer
Intelligence

What is Lynx ?

Advanced fraud detection system for payments



Lynx in figures:

Over 30,000M transactions processed per year



Countries (Installations)

- Brazil (3)
- Chile (1)
- Mexico (2)
- Spain (4)
- United Kingdom (2)
- Germany (1)
- United States (2)

Objective:

Minimise the impact of fraud in results of banking institutions

Merchants



Phone Banking



Internet Banking



ATMs



Branches



Financial operations:

- Purchases
- Cash withdrawals
- Transfers
- Receipts
- Mobile top ups
- Loans, etc.

Non-financial operations:

- Balance inquiries
- PIN number changes
- Bank statements, etc.

Low False Positive Ratio



Our latest **statistical models**, created **ad hoc** for each client, provide a high fraud detection with a low false positive ratio: 1 fraud in every 10K payments. Besides, false positives are kept low as **analysis is completed with information on the legitimate customer**, avoiding troubles for customers.

360-degree Analysis of the Client



Complete study of all interactions with the financial institution: payments, transfers, non-monetary operations, made through any channel: Internet banking, phone banking, e-commerce, etc.

Customization



Lynx and all its components have been **entirely developed by IIC**, which allows us to **adapt** to specific needs of each client.

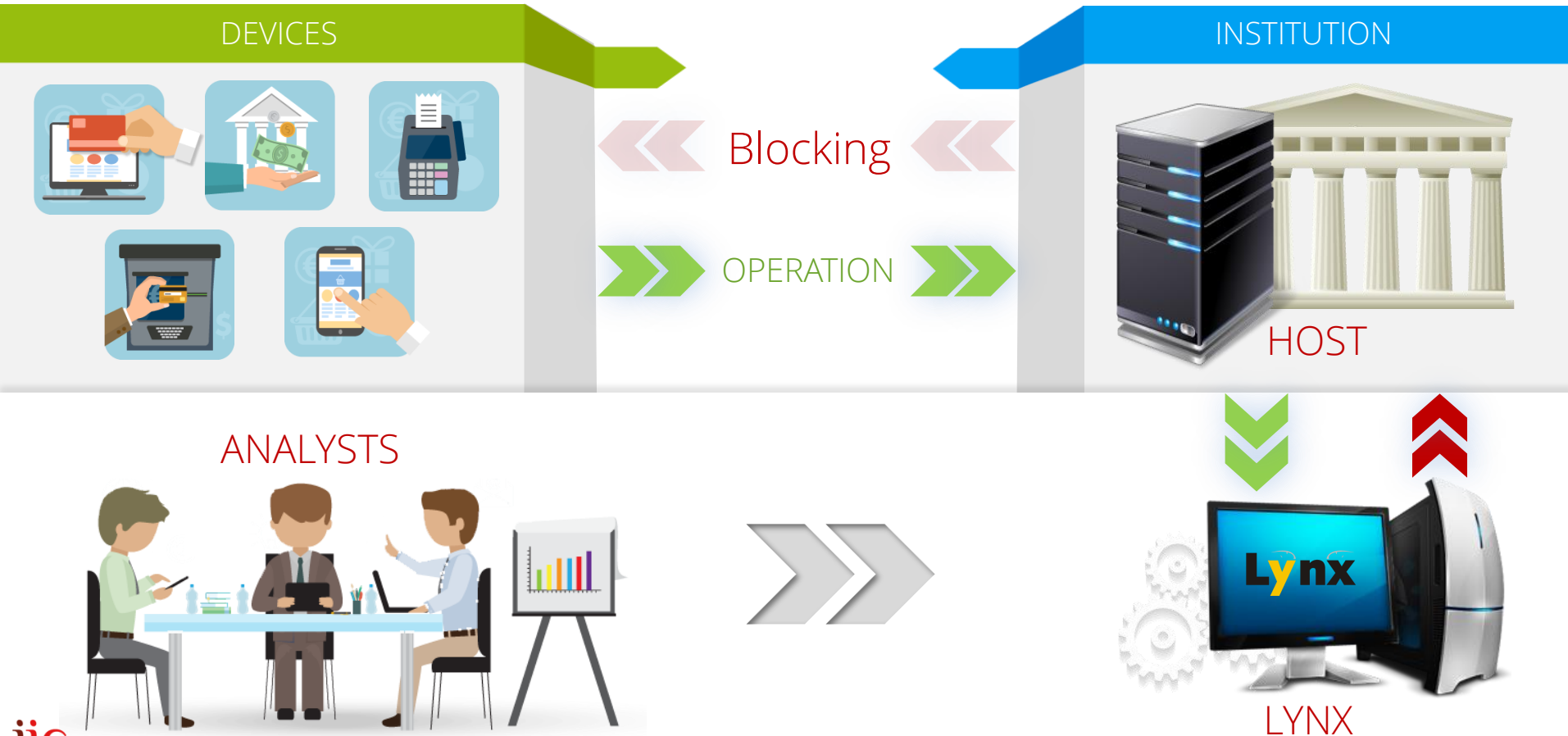
Real Time



Both the system architecture and optimization of every component allow us to issue a risk qualification and a **response in a few milliseconds**. This is possible thanks to custom-developed shared memory channels and extremely efficient models.

How does Lynx work?





Lynx Analysis

Parametric Analysis (based on rules)

- Easy to build.
- Based on the experience of specialized analysts.
- Prevents temporary attacks.
- Classifies operations that fulfil the conditions of the rules.
- Unique explicit behaviors considered.
- Fast obsolescence.

Statistical Analysis (based on algorithms)

Classification Models

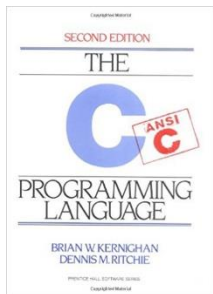


Behaviour Analysis

- Difficult to build.
- Complete analysis; no considerations beforehand.
- Detects implicit behaviours.
- Automatic learning capacity.

Lynx Technologies

"Ancient"



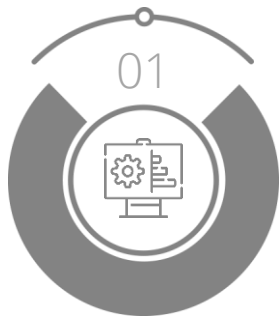
- Decades-tested
- Extremely efficient in time and memory
- Allows for low-level design of every component in the solution
- Production models

New

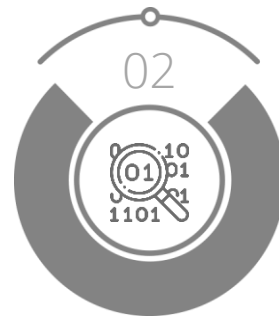


- Easier development and management of non time-critical modules
- Horizontal scalability
- Model prototyping

Model deterioration



Due to the passage of time. New transactions and new patterns appear, which correspond to new and unknown situations. The longer the elapsed time the more likely the deterioration to happen.



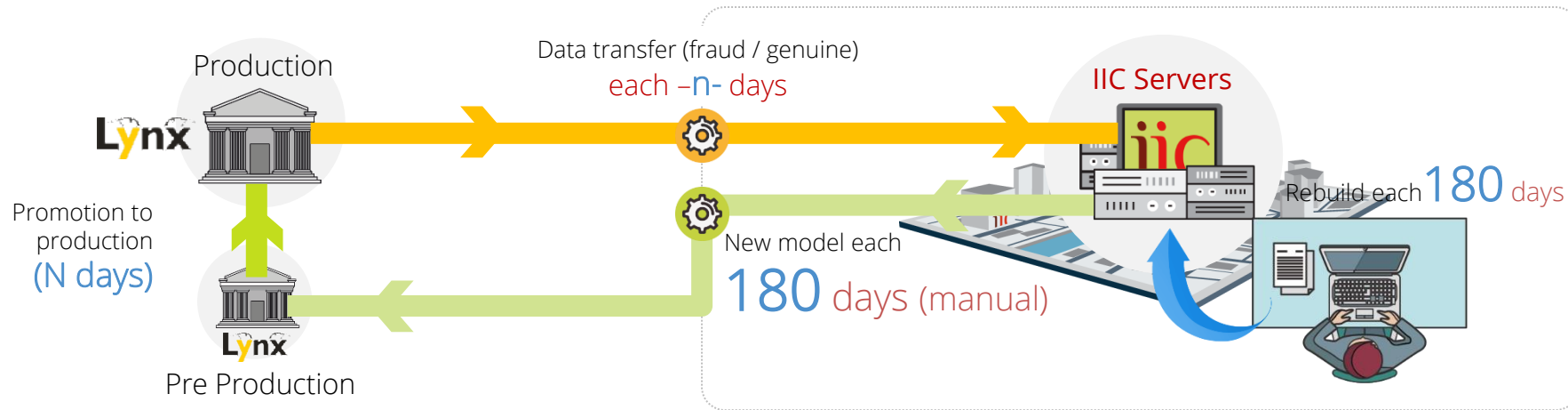
Changes in the fraudster activity. Due to the fact that the system is declining fraudulent transactions fraudsters change their behavior to get them approved. Since the FDS is taking actions, these actions change the way fraudsters behave in order to circumvent it.

Adaptive models

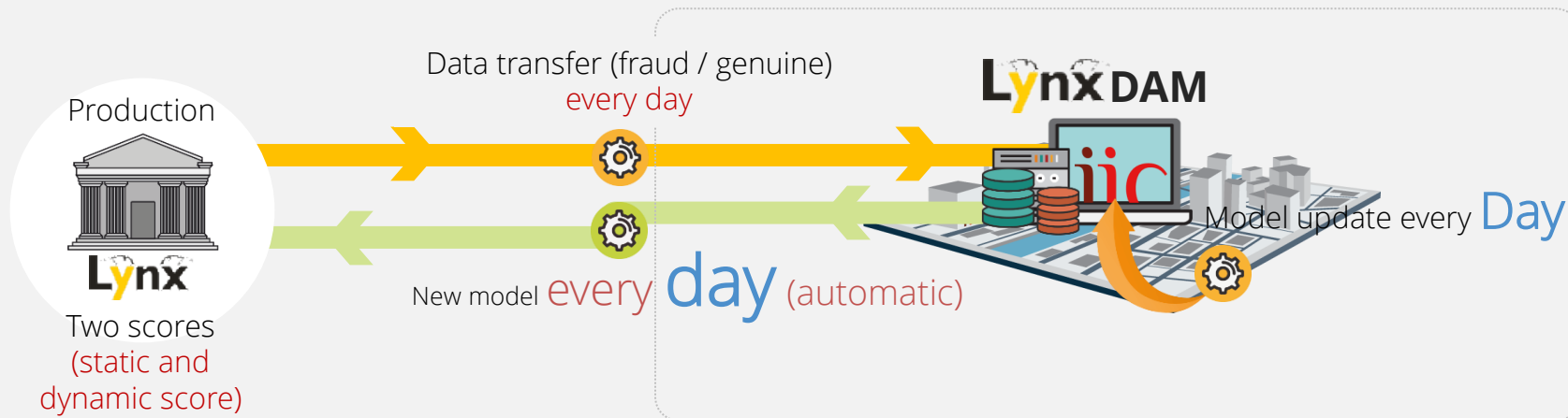


Daily Adaptive Model

Current situation



New procedure with DAM



Daily Adaptive Model

IIC model servers



- 384 threads
- 6 TB RAM
- 40 TB SSD

Data security – 3 levels



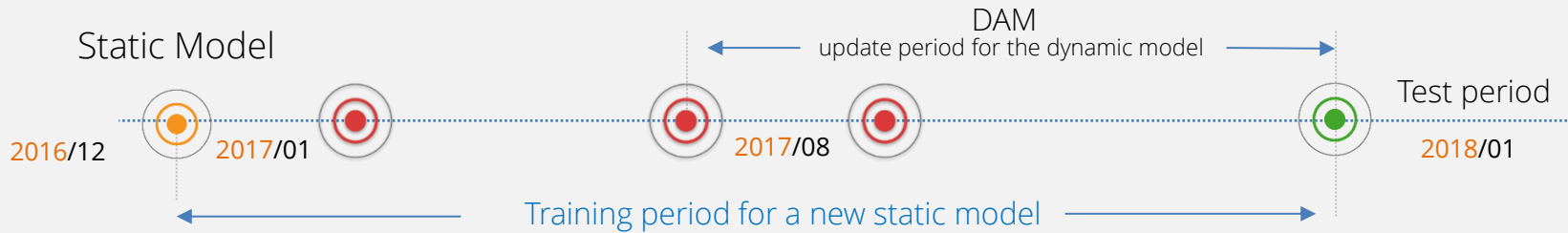
- Sensitive data hashed with non-reversible SHA512.
- Data transfers encrypted with GPG
- Access to bank data servers through encrypted VPN network

Training data



- 800K – 5M new patterns/day
- Around 3K features

Production models: DAM performance

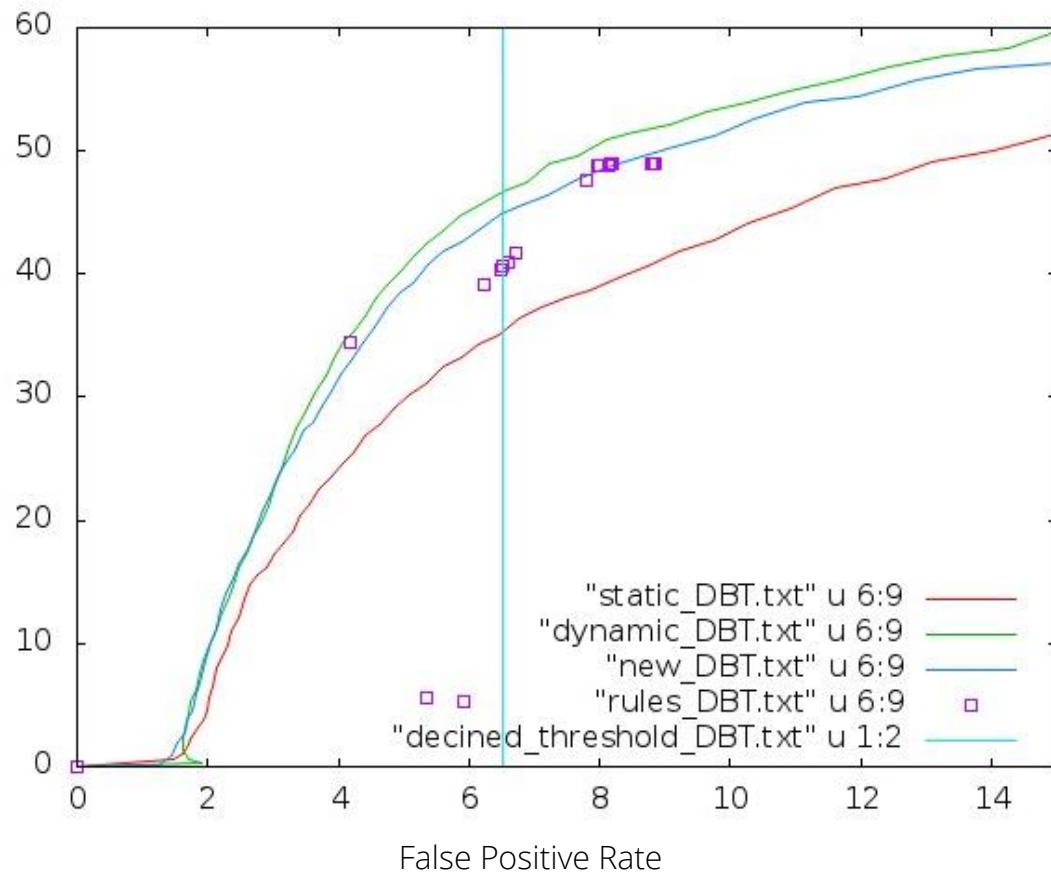


- Static model trained until 2016/11 and validated with 2016/12
- DAM started in August 2017
- Everyday the model is updated, dynamic model

- Static and dynamic models score every transaction
- January 2018 has been used to measure performance
- A new model (fresh model) has been trained until December 2017 and tested with January

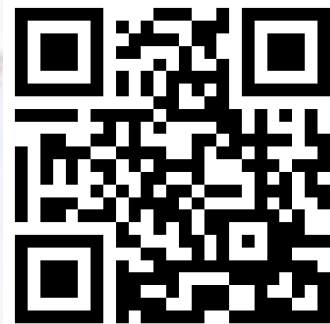
Debit Model

Value Detection
Rate
(% of detected fraud amount in €)





We are always
looking for
high-performers



- ✓ Data Scientists
- ✓ Machine Learning Engineers
- ✓ Core (C) developers
- ✓ Web (PHP) developers
- ✓ Computational linguistics experts
- ✓ Big Data engineers



<http://www.iic.uam.es/en/jobs/>

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