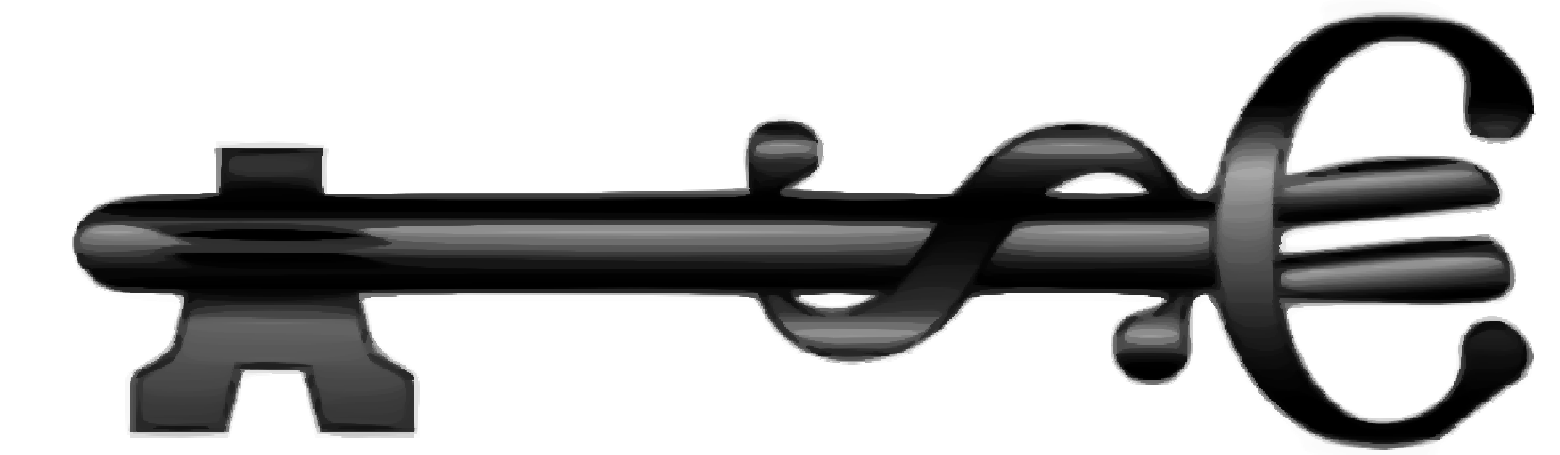


Logs simulator for fraud detection in mobile payments

FC13



Chrystel Gaber¹²³⁴⁵, Baptiste Hemery²³⁴⁵, Mohammed Achemlal¹²³⁴⁵, Marc Pasquet²³⁴⁵, Pascal Urien⁶

1. Orange Labs, 2. Normandie Univ, 3. UNICAEN GREYC, 4. ENSICAEN GREYC, 5. CNRS, 6. Telecom Sud Paris



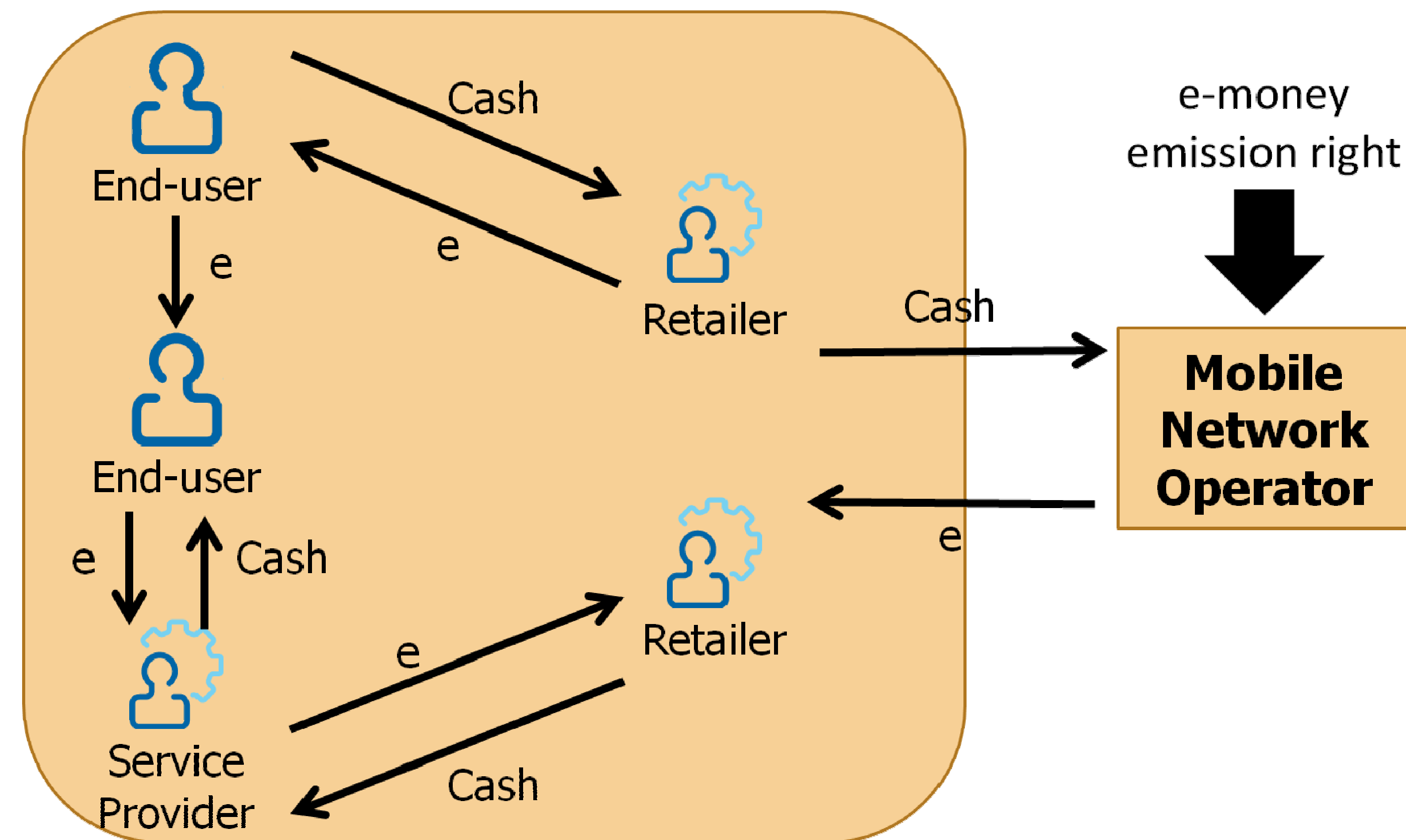
Introduction :

- **Scarce test data** for the study of fraud detection algorithms
- **Unkonwn groundtruth** in real data
- Need to **evaluate** the results of **MASSIF** (FP7 EU project) with test data

Aim :

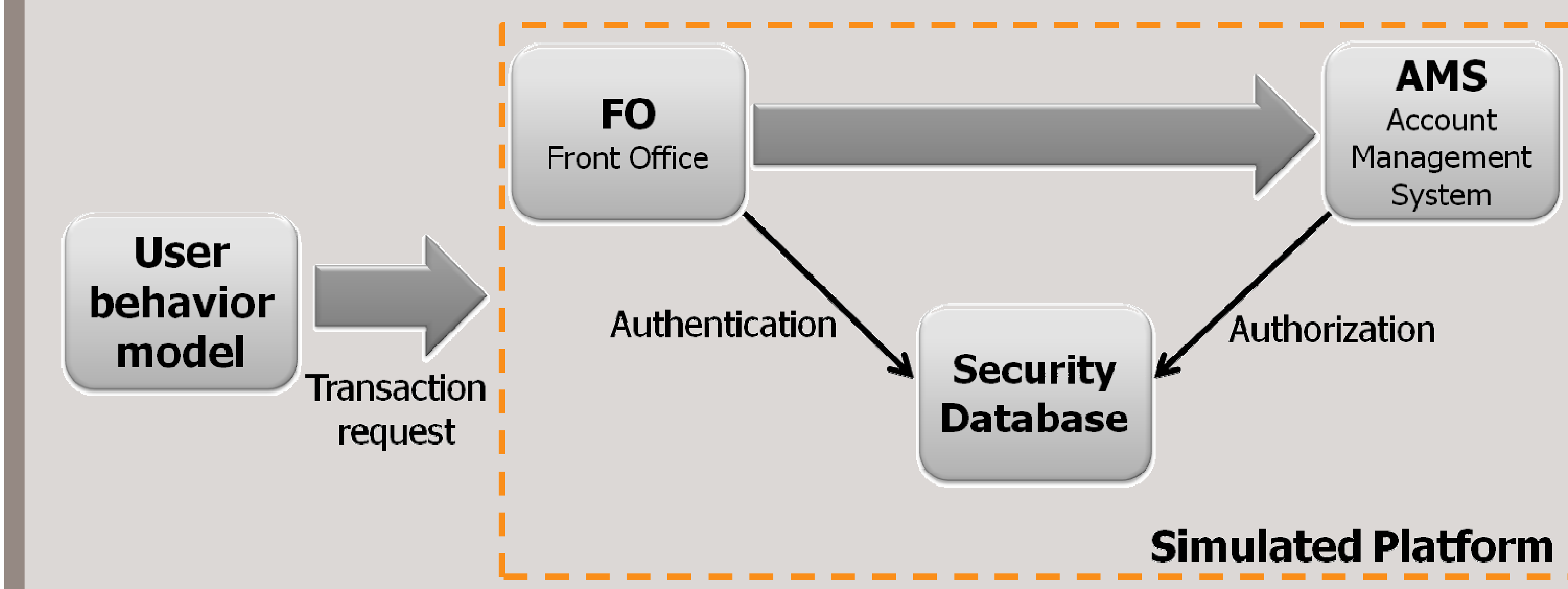
- **Model** a Mobile Money Transfer System and its users
- **Generate** synthetic logs

Mobile Money Transfer System:

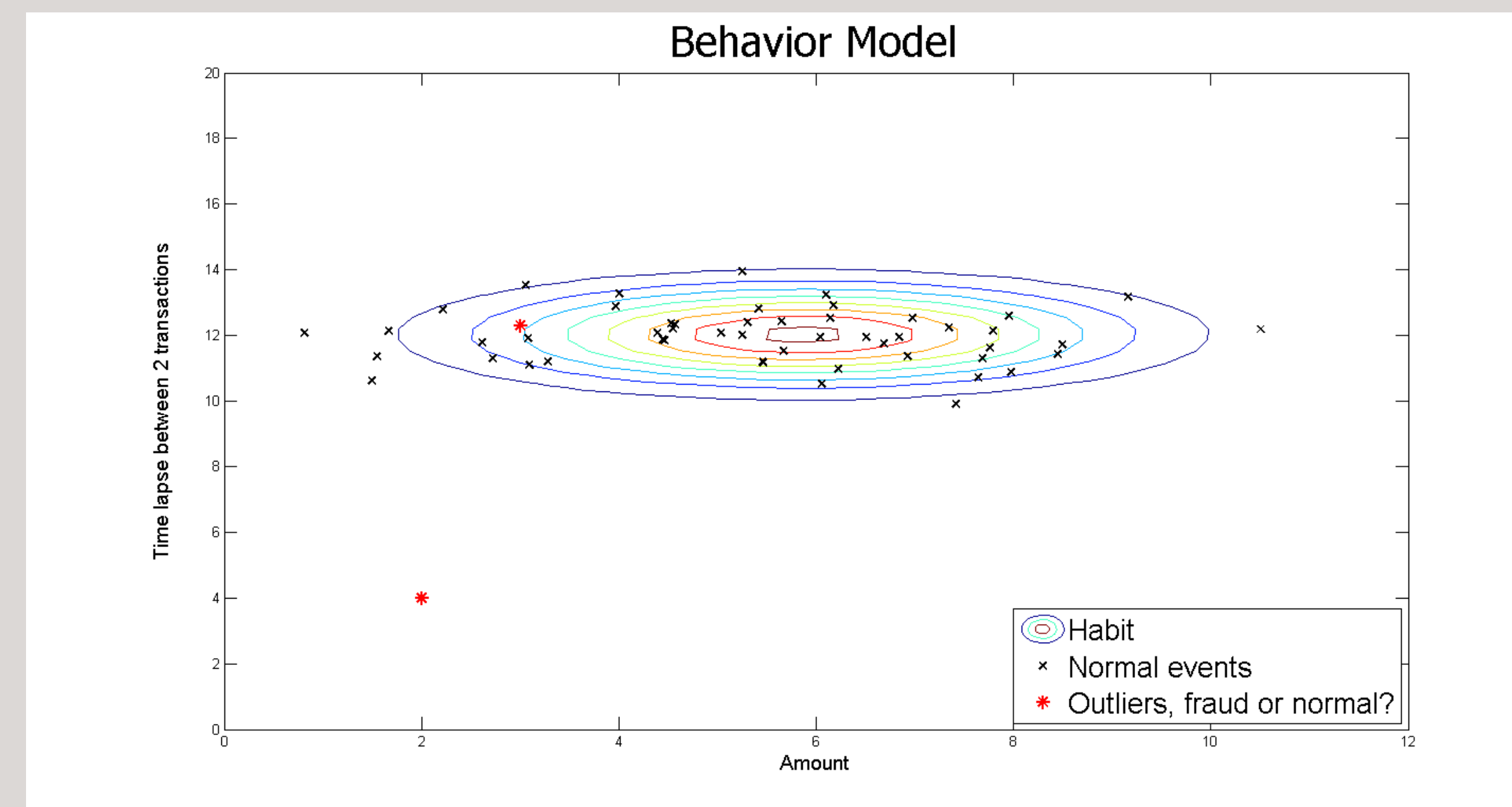


Method :

- Create complex logs from the behavior of individuals (**H 2**)
- Payment platform model
 - Front / Back Office
 - Security Database
- User's behavior model
 - Legitimate users
 - Fraudulent users



User behavior model :



Legitimate users model

A behavior is a set of habits which are caraterized by a **type of transaction**, a **bivariate normal distribution** of transaction amounts and time between two transactions, a **beginning** and an **end**.

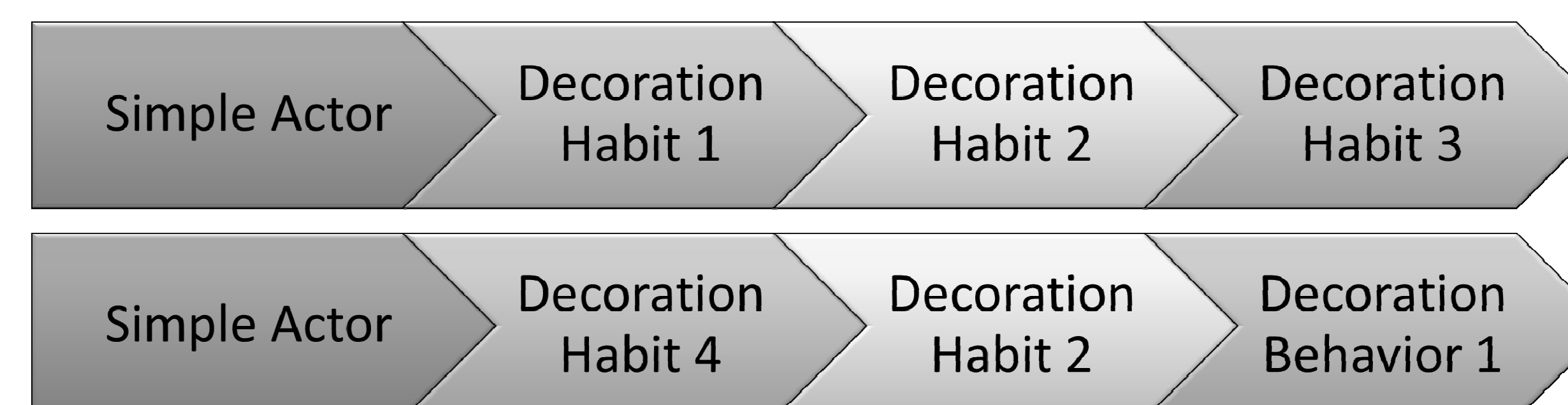
$$(H 1) \quad Habit_i = (Type, N_2(\mu, \Sigma), Begin, End)$$

Fraudulent users model

- **Behavioral fraud** : Exploitation of vulnerabilities to take over a legitimate user's account,. The **account** is used **concurrently** by the user and the fraudster. **Behavior shifts** are observed.
- Example :
A **botnet** is deployed on several phones. Periodically, a transfer of small amount (< 20) is made to a mule who withdraws the money shortly after.

Implementation :

- Repast Symphony Platform
- Decorator design pattern

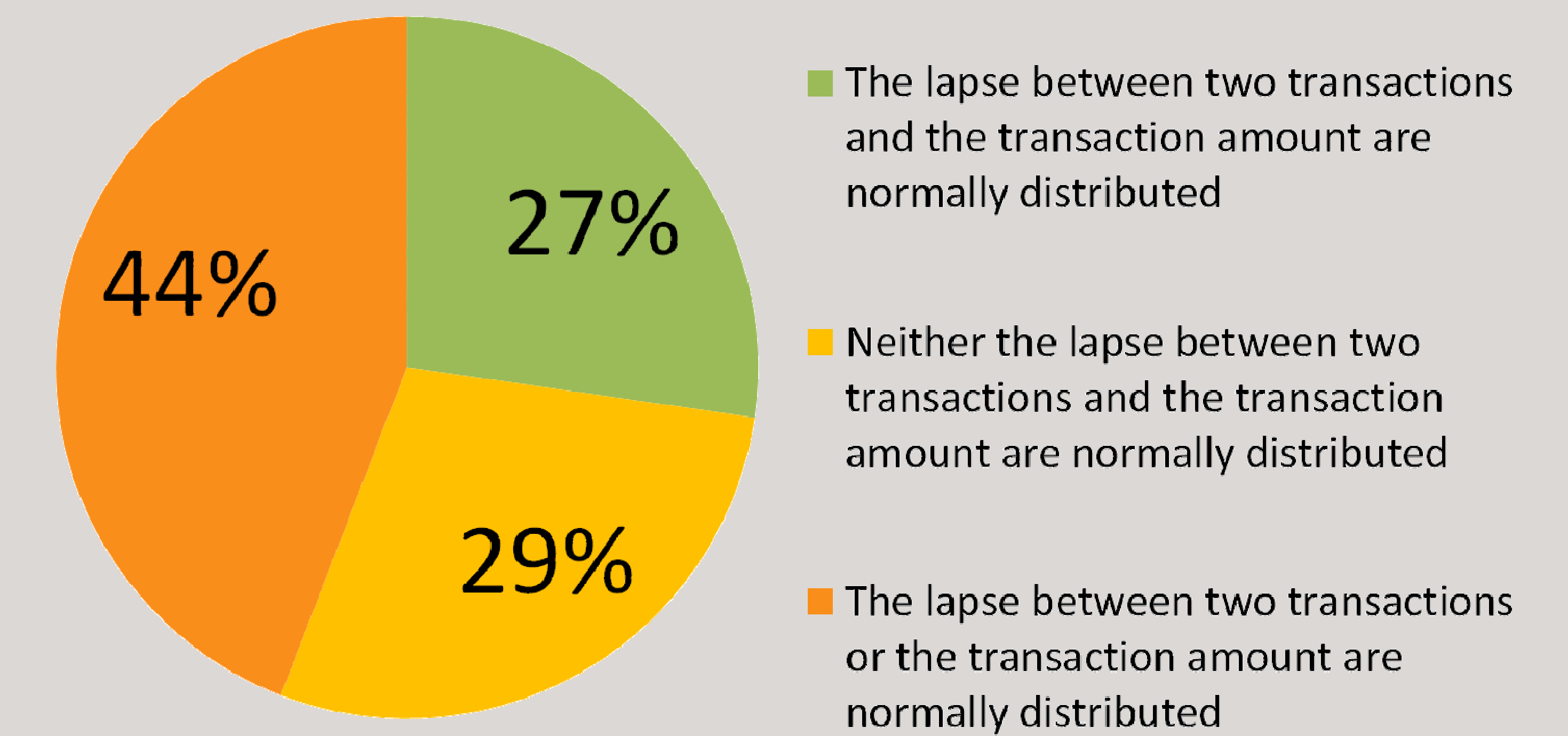


Contact : chrystel.gaber@orange.com, bhemery@ensicaen.fr

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Model validation (Preliminary results)

Results of the χ^2 tests to validate H1



These results were obtained by considering 4 277 pairs of users and transaction types over 3 months of real data.

H 2 : Evaluation of the log generator's average accuracy

Transaction type	MD	MW	C2C	MP	AR	ALL
Number of transactions (%)	12	5	3	6	31	18
Total Transaction Amount (%)	14	11	19	2	21	23
Total Transaction Amount(%)	3	3	3	3	3	5

These results were obtained by comparing the behavior of 35 users during 3 months with their model in the simulator. The accuracy measures correspond to the symmetric mean absolute percentage.

Conclusion and perspectives:

- Basis of two **demonstrators** for the MASSIF **project review** by the European Commission (October 2012, November 2013)
- Enhance user behavior model and fraud scenarios

