

# Analysis of Interbank Messages for the Enforcement of Financial Regulations

Nam-Luc Tran

EURA NOVA

Rue Emile Francqui 4, 1435 Mont-Saint-Guibert, Belgium  
namluc.tran@euranova.eu,  
<http://euranova.eu>

**Abstract.** In the context of the recent policies concerning anti-money laundering and counter terrorist financing defined by the Financial Action Task Force Recommendation 16, it is the responsibility of the financial institution to monitor the quality of the information present in wire transfers. To that end, we present in this paper an approach to automate the monitoring and the validation of the information contained in interbank transfer messages. The approach is implemented in a solution built around an event-driven architecture where the data is processed as a stream and transformed at each stage. This architecture is in line with the latest research in data warehouses with stream data processing. We show that our approach is suitable to the requirements and the standards in the banking industry.

## 1 Policies and Regulations in the Financial Industry

The Financial Action Task Force (FATF) is an independent inter-governmental body that develops and promotes policies to protect the global financial system against money laundering, terrorism financing and the financing of proliferation of weapons of mass destruction. The recommendations and policies emitted by the FATF in (The Financial Action Task Force, 2012) are recognized as the global anti-money laundering and counter-terrorist financing standard.

These policies are then adapted by the markets around the world. The European Commission has already initiated the adoption of laws with regards to the Anti-Money Laundering Directive.<sup>1</sup> Having a European legislation put in place will lead to more and more jurisdictions adapting their local laws accordingly. It is expected that the proposals will become legislation in 2015.

## 2 Enforcing the FATF Recommendation 16

The FATF Recommendation 16 requires that financial institutions include accurate originator and beneficiary information on wire transfers and related messages. The required in-

---

1. At the time of writing, the proposal issued by the European Commission has reached the second stage and is adopted by the Parliament.

formation must also remain throughout the payment chain. It is however up to the financial institutions to monitor the wire transfers for the purpose of detecting missing information and take appropriate measures, including freezing of the transfer and prohibition of transactions with designated persons and entities.

On the other side, the policy is defined in generic terms and expresses a global intention. Enforcing the policy in practice at the financial institution side requires analyzing customer data present in various forms – including structured fields and free-form text– and for which the quality is not standardized. At the current time, each financial institution has its own workflow for the monitoring and the detection of such cases.

The aim of this project is to analyze the FATF Recommendation 16 and provide a common formalization of the rules across financial institutions. The outcome of the project will be a tool helping the financial institutions in understanding and applying the regulation.

### 3 Business and Technical Requirements

Following the previously cited requirements we have developed a platform serving as the application skeleton to our approach. From the business point of view, the requirements define a streamlined solution for financial institutions to track infringing transfers and missing information with regards to the FATF Recommendation 16. The approach should define a common set of rules which institutions can then combine in order to compose the validation rules tailored to their needs and experience. Furthermore, it should be able to cope with data in various formats and quality.

The technical solution to the aforementioned challenge requires the following characteristics in order to be compliant with the standards in the banking industry:

- **Volume of data:** all operations between financial institutions require exchanging of interbank messages. Depending on its size, a bank can emit and receive from several thousands to millions of messages concerning wire transfer operations per week.
- **High performance:** banking operations must not be held back longer than necessary. The analysis of the messages should not impact the productivity of the financial institution.
- **Offline processing:** for the purpose of security and compliance to standards in the banking industry, the solution should work in a batch setup, in parallel from the regular flow of messages between the bank and the network.

These technical requirements are in line with the latest research in data warehouses including data streaming as in De Francisci Morales et al. (2014) and Ramesh (2015). These data streaming architectures offer the following benefit compared to the traditional data warehouse in our case: high throughput, low latency and scalability.

### 4 The Analysis Platform

The platform is centered around an event-driven architecture where the information is processed as a data stream and is transformed at each stage by the adequate subscribers. In the next paragraphs we will review some of the analyses that back our exploratory approach.

The first stages parse the incoming data and extract the relevant information from the recognized fields. The fields contain either structured information or free-form text.

The validation subscriber runs a series of defined rules and checks against the extracted information from the previous stages. It then generates a report with the results of the validation. Examples of rules comprise searching for valid country names across all fields, tagging of suspicious words, and identifying specific payment scenarios.

The tokenization subscriber builds a lexicon from the corpus of information entered in the original customer data. This allows us to identify the most common used words and build a list of stop words.

The obfuscator subscriber anonymizes the data while keeping the structural information intact (word length, structure, digits length, value hashing). These transformations allow to perform analyses across messages while preserving privacy and banking secrecy.

The statistics subscriber generates a report containing aggregated facts on the usage of the data.

The alerts generated from the validation are fed to a case manager, where manual verification and further information requests between banks are handled by a human operator.

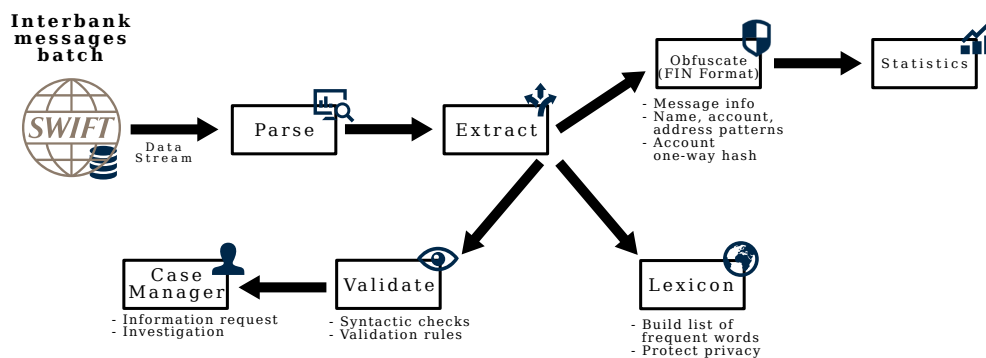


FIG. 1 – Architecture of the analysis tool for the monitoring of required information in wire transfers in the scope of the FATF Recommendation 16 – The initial batch of data is processed as a stream through the subscribers at the different stages of the process. The output of the subscribers are combined to form the final report

## 5 Discussion

The proposed solution fulfills the requirements expressed in Section 3. First, by using a staged architecture we ensure the flexibility of the workflow with regards the monitoring of the information and the reporting at each stage. This allows to streamline the maintenance of the application and the extension with additional transformations.

The data stream and the transformations are implemented as a stream of immutable objects. This ensures thread safety by design and each subscriber can perform its process in parallel in separate threads without the need for synchronization.<sup>2</sup> This fulfills the high throughput

2. <http://reactivex.io/>, an API for asynchronous programming with observable streams.

requirement as the solution is able to efficiently use the available CPU cores in parallel. Furthermore, this design is also scalable by allowing the distribution of the processing if required.

The set of predefined rules is defined within a dedicated subscriber. A possible improvement is to propose a way for the users to seamlessly refine and redefine rules using a higher level language or a domain-specific language.

Finally, using an event-driven architecture allows a seamless integration with business processes, such as triggering investigations and managing information requests between offending parties.

## 6 Conclusion

Enforcing the FATF Recommendation 16 is an industry-wide challenge. It is also a necessity once the recommendation is adopted as a law. By building the definition of the rules and the analysis around a flexible architecture, we streamline this process across financial institutions and contribute to the global application of the regulation.

## References

De Francisci Morales, G., J. Gama, A. Bifet, and W. Fan (2014). Big data stream mining tutorial. Presented at the 2014 IEEE Conference on Big Data.

Ramesh, N. (2015). Apache Samza: LinkedIn's stream processing engine. <http://engineering.linkedin.com/samza/apache-samza-linkedin%E2%80%99s-stream-processing-engine>.

The Financial Action Task Force (2012). International standards on combating money laundering and the financing of terrorism & proliferation. <http://www.fatf-gafi.org/topics/fatfrecommendations/documents/fatf-recommendations.html>.

## Résumé

Dans le cadre de la politique de lutte contre le blanchiment de capitaux et le financement du terrorisme définie par la Recommandation 16 du Groupe d'action financière, les organismes financiers ont la responsabilité de s'assurer de la qualité de l'information accompagnant les transferts bancaires. Dans ce contexte nous présentons dans cet article notre approche pour l'automatisation de la validation des informations contenues dans les messages interbancaires. L'approche est soutenue par une plateforme d'analyse construite sur une architecture orientée évènement. Les données sont traitées sous forme de flux et sont transformées à chaque étape. Cette architecture est en ligne avec les dernières avancées dans le domaine des entrepôts de données incluant le traitement des flux de données. Nous montrons enfin que notre approche répond aux exigences et aux standards d'application dans le secteur financier.