



AI-powered digital payments

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Abstract: This research paper explains how a payment can be automated and how we can remove a lot of manual work from the back office that goes on to verify the payment. This research paper is an overview of the International Payments domain and by using ML, AI, and NLP we can automate the entire process and we can verify each payment using STP.

Keywords: STP, SEPA, SWIFT, IBAN, BIC

I. Introduction

When making an international transaction there are a lot of things that need to be considered i.e., IBAN, BIC Code, NCH code of the respective country, etc. So, to make sense of all these terminologies and details we need a system and luckily there is a system present which is known as STP.

II. STP

The ability to send, receive and process a financial transaction from start to finish using an electronic system and without any manual intervention is known as STP. STP stands for straight-through processing. STP requirements for different banks can be different depending on their back-office systems. STP mainly uses AI (Artificial Intelligence) and NLP (Natural Language Processing) to process payments.

III. How did STP come into existence?

The banking industry is under permanent pressure for the innovation of banking services and banking products. According to World Payments Report 2018 during 2015-2016, global non-cash transaction volume grew at 10,1% to reach 482,6 billion and it is growing rapidly. We must agree with Chris Hamilton, Group CEO, BankServ Africa that without a developed payment system we cannot have a developed economy. The growth of the economy depends upon the digital payment systems that are implemented. The head of international payments and receivables at BNP Paribas Mr. Bruno Mellado stated that the whole market infrastructure worldwide is moving fast to real-time payments and taking away the restrictions of end-of-days and validations as things would be working 24/7. Together with digitization and the development of new technologies, they are creating new opportunities for entrepreneurship in a volatile, uncertain, resulting in a revolution of demand and supply in the field of the energy supply side, which requires an adequate transformation of existing business models.

Technological innovation such as smartphone adoption has reached 70% in developed countries, while in various developing countries smartphones are replacing cash and banking cards i.e., debit cards, credit cards, etc. Payment providers are regularly popping up due to catalysts like social platforms: nearfield communication (NFC) based payments and digital currencies. While the traditional financial industry once controlled the

payments world, new-age fintech start-ups and partnerships are introducing new options for the payments sector. In the last few years, numerous new FinTech start-ups have launched with a focus on mobile payments. The main aim is to provide new services such as security with fraud detection and authentication, improved customer experience, or making funds available quickly to small businesses when their line of credit is approved. Nowadays, secure development has become a real and urgent matter in many countries around the world. The future step for these organizations is to determine whether real-time payment becomes a core business element and a way to design an operating model to help optimize that service delivery.

In 2014 all members of the Eurozone implemented a new payment system developed under the Single Euro Payment Area project (SEPA). SEPA makes the euro payments in Europe unified. In 2016 other member states of the European Union joined this platform. SEPA enables consumers, business owners, and administrators to send and receive credit transfers, direct debit payments, and credit cards under the same basic conditions. SEPA bank transfer is affected in the system in one banking day. The competition in nonfinancial institutions led banks to go further and as a result, it was the implementation of the first SEPA instant payment in 2017, realized in max. 10 seconds. The Society for Worldwide Interbank Telecommunication (SWIFT) is one of the most important institutions that fast-forwarded innovations in international payments, which offers a new cross-border payment system known as SWIFT global payments innovation (SWIFT). To achieve this aim we are using STP which supports SEPA and SWIFT.

IV. Why STP is required?

Problem Areas:

- Incorrect information e.g., IBAN, BIC, NCH Codes
- Unwanted punctuations in Account Numbers, NCH Codes
- Incorrect routing of transactions
- Information embedded in Narrative

Issues due to non STP:

- Delay in the processing of Payments
- Increase FTE costs for processing payments and in turn increase costs.
- Process lower volumes and reduction in revenue
- Higher cost in supporting customer enquires

V. How does STP work?

STP applies analysis rules to the messages received and raises appropriate warnings if the messages do not meet the STP guidelines. The warnings raised by STP can then be appended to the messages and sent back to the back-office application if required.

Before Repair:

- STP checks the message for syntactic and semantic validation.
- The messages are checked to see if they conform to the applicable structural and inter and intra field validations.

VI. Reference Database supported by STP

- Bank Directory Plus and IBAN Plus directories published by SWIFT
- BSB database published by Australian Payments Clearing Association
- BLZ database published by Bundesbank
- IFSC database published by RBI
- CHIPS database published by CHIPS Clearing House Association
- Fedwire database published by Federal Reserve Bank

VII. STP Functionalities

1. Standard Repair: It consists of BIC repair, NCH code repair, reformats account number, redundant information cleans up, and insertion of STP code.
2. Advance Repair: It consists of account number repair, intra field repair, removing receiver information from credit party, ignore codes for no repair, repair of BIC/NCH/Account number using hierarchy logic, the correspondent lookup based on Standard Settlement Instruction (SSI) table and CHIPS preferred correspondent repair.
3. IBAN Repair: It supports DAN (Domestic Account Number) validation, IBAN (International Bank Account Number) validation, IBAN to BIC validation, IBAN Composition, IBAN Inconsistency.
4. Customization: This is specific to different financial and non-financial institutions that are using STP they can specify what they want.

VIII. Different Message Families and types

SWIFT	CHIPS	IFML	FEDWIRE
MT 103	Payment Message [010]	Native Message SWIFT	Bank Transfer [BTR]
MT 103 +	Receive Notification [031]	Native Message FEDWIRE	Customer Transfer [CTR]
MT 200		Native Message CHIPS	New Customer Transfer Plus [CTP]
MT 202			
MT 202 COV			
MT 205			

IX. SEPA

One of the most important payment projects of the new century is the SEPA project, an initiative of the enabled European banking industry which was managed by the European Payments Council (EPC). SEPA aims to eliminate the differences between domestic and cross-border bulk payment transactions within the Automated Clearing House (ACH), increase efficiency, and reduce costs for all parties involved. The biggest achievement of the European project is the implementation of a new payments landscape that will be able to realize cross-border payments at the same time simultaneously price conditions as domestic ones, and even more important is the standardization possibilities.

SEPA brought a lot of changes in banking systems: banks had to change their national codes and account numbers - IBAN (International Bank Account Number) and BIC (Bank Identification Codes). This shift represented a challenge for banks within SEPA, as they were using previously different codes for bank accounts in member states. The introduction of SEPA focused on SEPA's benefits in retail payments to consumers, retailers, and banks. In recent years, globalization reached such importance that currently multinational and transnational companies can benefit from SEPA the most. There are now simpler system configurations at hand, thanks to the elimination of domestic formats. Corporates can harmonize and use one database format (XML) for the whole of Europe.

Instant payments can be extremely useful in several situations, for instance, to urgently send money to a relative living abroad. But the thing that is more relevant is instant payment can be an excellent substitute for cash. These are very convenient when paying for goods or services that require on-the-spot payment, such as moving company services or buying antiques. Concerning payments functionalities and reach, corporates have probably more requirements than individuals and their demand for instant payments may be lower because they have alternatives. For a B2B environment, the limitation of EUR 15,000 could become an obstacle and that is the reason that they are watching it closely and, if necessary, they will increase that amount. However, for many purposes, having instant payments functionality is something valuable and beneficial, and corporates and businesses will benefit from it as well.

X. SWIFT

The SWIFT global payments innovation is the largest change in cross-border payments over the last 30 years and is a new standard. SWIFT dramatically improves the customer experience in cross-border payments by increasing their speed, transparency, and end-to-end tracking. Hundreds of thousands of cross-border payments are today being sent, using this standard, and payments are made quickly, typically within minutes, even seconds. SWIFT allows corporates to receive an enhanced payments service, with the following key features:

- Faster, same-day use of funds within the time zone of the receiving member
- Transparency of fees
- End-to-end payments tracking and
- Remittance information transferred unaltered.

Launched in 2017, one year later already accounts for 25% of SWIFT cross-border payment traffic. More than 165 banks, representing 80% of SWIFT's cross-border payments traffic, and including 49 of the world's top 50 banks, have signed up for the service. To date, 50 million payments have been processed, with hundreds of thousands of payments sent daily across 350 country corridors, in more than 100 currencies.

XI. Conclusion

In the past ten years or so, we have seen huge changes in technology and business models. The New payment platforms and solutions updated regulations deals with efficiency and security of payments and can be most notable with higher expectations from traders and consumers. It allows consumers, businesses owners, and public administrations to send and receive credit transfers, direct debit payments, and credit cards under the same basic conditions. STP methodology using SEPA, and SWIFT is the future of transactions.

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