# Advanced Global Payments

## Domain Certification

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# 1. Introduction to Payment Systems

## Chapter Overview

This chapter is designed to help the participants appreciate the need for payment systems in a modern, functioning and efficient economy. Participants will understand the role played by the payment system in economic operations.

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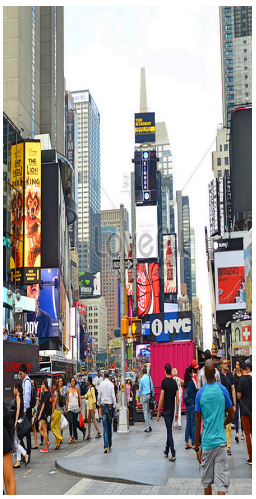
# 1.1.Introduction to Payment Systems

## 1.1.1.Need for payments

Payments are needed to complete all manners of transactions.

Let's look at some scenarios:

- ☑ Tom walks into a Walmart store in Chicago – purchases groceries and makes payment by way of a Check
- ☑ Rita calls up her Broker and orders the purchase of 100 common shares of Microsoft Corporation
- ☑ Franklin Templeton (FT) and Morgan Stanley enter into a Block Trade where FT sells 2,500,000 shares of Yahoo!
- ☑ A customer of SBI wants to make a foreign currency loan repayment of $20 M.
- ☑ Syntel acquires a mid-sized software company in an all-cash deal and has to pay $100 M for the transaction
- ☑ Raj bids for an old Sherlock Holmes masterpiece on www.eBay.com and makes the payment to a seller based in South America.
- ☑ Tyson Foods with more than one lakh employees on its rolls makes its salary payments on a weekly basis.
- ☑ AIG, the largest P&C insurer in the US collects monthly insurance premiums from over 1 million customers.
- ☑ Sachin walks into an electronic store, swipes his credit card and buys a Sony Bravia HDTV.
- ☑ Bipasha logs onto Amazon.com and buys a Panasonic Handycam.
- ☑ Hrithik walks into a Citibank ATM in Mumbai and uses his ABN Amro Bank ATM card to withdraw cash.
- ☑ Shriram withdraws cash from his Cosmos Cooperative Bank ATM using his ATM card.



What is common in all these scenarios? They:

- ☑ Represent routine day-to-day transactions
- ☑ Involve transactions in different markets; including securities settlements.
- ☑ Include Foreign Exchange – Cross-border payments/CLS
- ☑ Relate to general trade: domestic and international
- ☑ Are core to financial services: collection & clearing services of banks
- ☑ Are Business-to-Business transactions
- ☑ Involve movement of money: Inter-bank or Intra-bank

A typical customer for a bank would be:

- ☑ An industrial or commercial organisation;
- ☑ Manufacturing companies;
- ☑ Retailers;
- ☑ Services Companies

A large bank and its client-facing personnel have a good idea about the typical business model of such clients. Therefore, the bank is well placed to visualise the needs of these customers in the matter of Payment Services.

**Banks have several competitors in the financial space from amongst non-banks. These include:**

- Brokerages
- Currency exchange houses
- Financial Advisors
- Smaller, local banks

There is one area in which non-banks cannot compete; for payments: the movement of money: they are completely reliant on banks. In the case of smaller banks some of the more sophisticated requirements such as cross-border or large value payments require the smaller bank to tie up with a larger bank as a correspondent.

This makes it possible for a bank to market Payment Services to such companies as a market segment. Being familiar with each of these businesses the larger bank can visualise the needs of such customers quite easily.

## 1.2. Assessing needs of customers

Here are some examples of how the process of assessing needs of customers might work:

- **ExxonMobil** is the world's largest publicly traded international oil and gas company. It holds an industry-leading inventory of global oil and gas resources. They are the world's largest refiner and marketer of petroleum products. And their chemical company ranks among the world's largest.

  For its purchase of bulk crude the client will need large value payment systems. Since global trade in oil is US Dollar denominated this need might not be cross-border in nature.

  A marketer is more likely to receive smaller payments. Therefore it might be that there is lower need for making retail payments volume.

- **PayPal** is an e-commerce business allowing payments and money transfers to be made through the Internet. PayPal serves as an electronic alternative to traditional paper methods such as checks and money orders. Currently, PayPal operates in 190 markets, and it manages over 184 million accounts. PayPal allows customers to send, receive, and hold funds in 19 currencies worldwide. PayPal's Total Payment Volume (TPV), the total value of transactions in Q1 2009 was nearly $16 billion.

  The business is largely focused on small payments made by PayPal customers to "buy" electronic money. When e-money is used to make purchases on the net PayPal needs to make a remittance to the seller. PayPal likely needs a range of payment solutions appropriate to each market in which it operates. This could include paper methods as well as ACH/EFT payments. It would appear that PayPal does not have a significant need for bulk transfer of funds.

- **Du Pont** is a chemical company that was founded in July 1802 as a gunpowder mill by Eleuthero Irene du Pont. DuPont is currently the world's second largest chemical company (behind BASF) in market capitalization and fourth (behind BASF, Dow Chemical and INEOS) in revenue. The company's corporate headquarters are located in Wilmington, Delaware. The company's manufacturing, processing, marketing and research and development facilities, as well as regional purchasing offices and distribution centres are located throughout the world.

  Based on the wide spread regional purchasing offices it would appear the company has a number of suppliers small and large, the world over. The company needs to use various payment methods for each of those markets. Since manufacturing centres are

also globally distributed it is likely the company needs to make large funds transfers to those centres.

**The need for payments arises from commercial transactions of various types. Payment is the "delivery of money" making it a critical component of a commercial transaction.**

## 1.3. The Role of Payment Systems in the Economy

### 1.3.1. Significance of Payment Systems

Over the last decade and a half, operation of payment systems has generated considerable interest for the policy makers due to the increasing turnover of the payment systems, both in terms of volume and value, as well as due to the rapid technological advances in this area. It is now understood and appreciated that payment systems play a pivotal role in the financial infrastructure of the economy, is a necessary channel for monetary policy transmission and an agent that promotes economic efficiency.

### 1.3.2. Payment systems and financial stability

Any major payment system failure could result in failure to meet payment obligations by the system participants leading to erosion of confidence of the markets and financial structure. Similarly, adverse development in a financial market or institution will have a disruptive impact on the payment system operations. There is, therefore, a two-way interaction between stability in financial and banking markets and stability within the payment system. Bank and financial market supervisors need to communicate closely with the payment system overseers so as to ensure that, as far as possible, such problems can be anticipated and resolved at an early stage.

### 1.3.3. Payment systems and monetary policy implementation

In the course of maintaining monetary stability, central banks generally operate in the money market by influencing the short term interest rate which in turn would influence other rates. Alternatively, some central banks use the option of the statutory reserve requirements to achieve their monetary policy objectives. Both methods represent a market-orientated approach to monetary policy implementation thereby necessitating an active inter-bank money market and efficient forecast of liquidity conditions / requirements in the economy by the central bank. A reliable large-value payment system with same-day settlement is very much a requirement for meeting both of these conditions.

### 1.3.4. Payment systems and economic efficiency

If a payment system is inefficient and unreliable, it may take weeks rather than days for a payment instruction to move from the payer's bank to the payee's bank and for the final recipient's account to be credited. Such inefficiencies in the payment system are not just an inconvenience to the users, but can have an adverse impact on how the economy works. If money is "tied-up" in the payment system, then it is not available for other, productive, purposes.

## 1.4. Understanding Payment Systems and Basic Concepts

Under the **Bank for International Settlements (BIS)** definition, a **"Payment System"** consists of instruments, banking procedures, and typically interbank funds transfer systems that ensure and facilitate the circulation of money. In essence, it facilitates corporations, businesses and consumers to transfer funds to one another.

A payment system normally requires:

- **A Set of Instruments** – Every payment system consists of various modes of making payment. Examples include check, credit cards, debit cards, E-money, Demand Drafts, Banker Check, Pay Order, Mail Transfer, Telegraphic Transfer, Traveler's check etc. The adoption of new payment system depends on incentives the new payment mode provides to the customer. These instruments instruct the bank on how and where the funds are to be transferred.

- **Procedures** – After a payment instruction is initiated by the payer the back office operation of fund transfer starts. The procedures employed for the fund transfer are known as **Clearing and Settlement procedures** in which two or more banks participate to settle the accounts of the payer and payee under a Clearing & Settlement Agency. Most of the times, the central bank of the country or its authorised representative bank acts as the clearing & settlement agency.

- **Rules of Fund Transfer:** They are the norms or regulations which each party participating in the payment services/funds transfer should follow. Generally, all fund transfer take place electronically through the payment system network. The rules specified are the protocols or the message formats used for various types of fund transfer.

- **System Participants**


Figure: key participants in payment systems

**Paying bank** – The bank where payer has an account and from where the payment is initiated.

**Receiving bank** – The bank where payee has an account and receives the money.

**Clearing House** – A place of book keeping where the accounts of every bank with the central bank are maintained. It performs the functions of crediting or debiting i.e. increasing or decreasing the respective banks' accounts with the central bank.

**Central Bank** – The prime monetary/regulatory authority of the country, issuer of currency, banker of banks. It formulates, implement and monitors the monetary policy, maintain price stability and ensure adequate flow of credit to productive sectors, managing country's foreign exchange and gold reserve and managing both inflation and exchange rates.

**You should now be able to:**

- ☑ Appreciate the need for the payment system in a modern economy
- ☑ Understand the role played by the payment system

*Historically, payments were made only by physical objects that were durable and therefore a good store of value.*

*That eventually included precious metals.*

*If old coins interest you, go here to see more!*

# 2. Participants in a Payment System

### Chapter Overview

In this chapter participants get an overview of the various participants in the payment system and the role they fulfil in achieving the goals of an efficiently functioning payment system. The key components needed to qualify as a system that meets the needs of a fast changing and challenging environment are also shared.

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## 2.1. The Banks


Banks are the compulsory intermediates between users and payment systems as they hold a licence to take deposits and effect payments for which they are subjected to regulation. They maintain accounts on behalf of their customers which are debited or credited when a payment is effected or funds are received.

If a payment is effected between two accounts held by the same bank, the amount will be transferred between the debtor's and the creditor's accounts. These **intra-bank** payments, known as 'on us' or 'book entry' payments, do not affect the bank's overall treasury position. If, however, the creditor's account is held by a different financial institution this **interbank** payment results in a debt between the two banks which has to be settled through correspondent accounts (accounts held by banks with each other) or a payment system, which impacts the treasury, liquidity and risk positions of both banks.

Although access to most payment systems is restricted to banks, several disintermediation factors have emerged over the past 10 years.

## 2.2. The Settlement Agent

The settlement agent manages the settlement accounts of the direct members and transfers amounts between them to achieve finality. Technically this role could be undertaken by a commercial bank or a central bank, but risk management considerations point towards the central bank which holds the monopoly for issuing legal tender: the credit and liquidity risk are theoretically nil as only the central bank can issue currency without limits or security, influenced only by macro-economic considerations such as money supply, price stability, interest or exchange rates. This has given rise to the settlement in central bank money doctrine which dictates that assets used for settlement should preferably be a claim on the central banks particularly for systemically important systems. All large-value systems and national ACHs are considered to be systemically important.

## 2.3. Clearing Houses

Clearing Houses settle balances at the end of the day. As the value of payments grew, reaching trillions of dollars daily, central banks became concerned that a bank could default on its obligation at the end of the day. This *intraday (or daylight overdraft) risk* could easily generate *systemic risk* 'the risk that the failure of one participant in a transfer system, or in financial markets generally, to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due.

Central banks imposed therefore that large value transactions had to be settled gross (without netting) as they are initiated, giving birth to Real-time Gross Settlement Systems (RTGS) which debit and credit the banks' accounts at the central bank in real-time, providing instant irrevocable finality. These systems normally process a relatively small amount of large-value payments: in the UK for instance, the CHAPS sterling RTGS system accounted in 2006 for 90 per cent of non-cash payment values (in £s) as opposed to only 0.2 per cent of the volume (number) of non-cash payments. This move to RTGS for the large-value payments resulted in dramatic changes in the way banks manage their treasury and liquidity.

For a net system settling end-of-day, it suffices for the bank to have enough liquidity to settle its end-of-day net position, its short positions (amounts it owes to other banks) being reduced by its long positions (amounts owed to it by other banks). In a RTGS system, the balance on its settlement account with the central bank will fluctuate according to the payments it sends and receives. Central banks, no longer willing to act as 'lender of last resort' will only grant credit facilities to the commercial banks against collateral, normally securities on deposit or repurchase agreements (repos), which represents an opportunity cost to the banks who cannot trade them. Payments which cannot be effected because they would breach the credit limit are queued, therefore delayed, awaiting incoming payments or a further injection of liquidity. Banks must

therefore manage their liquidity carefully during the day, seeking to minimise the collateral posted to secure credit facilities. Payment systems generally operate during pre-determined opening hours; most important is the cut-off time beyond which payments received will not be processed and are carried over until the next working day.

## 2.4. The Central Bank


As we have seen, central banks act generally as settlement agent. They also, most often, operate the large-value RTGS systems, while the private sector operates some large-value systems (for instance CHIPS in the US and the EURO1 system operated by the Euro Banking Association [EBA]) as well as virtually all low-value ACHs and card clearings. Central banks are however responsible for oversight: 'a central bank task, principally intended to promote the smooth functioning of payment systems and to protect the financial system from possible 'domino effects' which may occur when one or more participants in the payment system incur creditor liquidity problems.

Payment systems oversight aims at a given system (e.g., a funds transfer system) rather than individual participants'. The Committee on Payment and Settlement Systems (CPSS) of the Bank for International Settlements (BIS) in Basel is the main forum where central banks cooperate internationally to issue common guidelines on oversight and managing risks in payment systems. Although bank supervision is not always the responsibility of the central bank (for instance in the UK where it has been devolved to the FSA), it can take action against the entire banking system or individual banks. As it maintains the settlement accounts, the central bank is well positioned to monitor each bank's position in real time: balance, liquidity, number of payments queued, ability to secure funding in the money markets If a bank appears to be in difficulty, the central bank can secure emergency funding or, in extreme cases, suspend the bank from the payment system; this would however be a very serious decision as it could create a systemic, or 'domino' crisis which would affect the reputation of the financial marketplace. Whatever action it takes, the central bank will be Open to criticism, either for intervening too late, or too early!

In theory, central banks are not obligated to help a commercial bank in difficulty according to the 'moral hazard' principle; historically however, central banks have intervened in most cases to prevent a run on banks under the 'too big to fail' principle or to prevent a panic, as witnessed during the liquidity crisis since mid-2007. Finally, central banks are also active participants in payment systems for payments between them and commercial banks and 'open market' purchase or sale of government bonds to implement their monetary policy.

## 2.5. Clearing and ACHs

The ACH receives batches of payments from all banks which are first validated in terms of formatting and non-duplication. Some ACHs will also receive files of payments directly from corporations, for instance the payroll, which they will process subject to authorization from the account holding bank. This authorization can either be for each file, or against credit limits which the bank sets on each customer registered to use this corporate access service. Files are opened and the payments are sorted and merged into files of payments for the banks of the beneficiaries.

Procedures exist to handle *returns*, payments which cannot be effected because of incorrect account numbers, closed accounts and, in the case of direct debits, insufficient funds. Some ACHs incorporate risk management procedures enabling banks to place limits on each other or imposing net debit caps on each member's overall position. Once a payment has entered the ACH, it cannot be cancelled; should this be necessary, the bank would have to ask the beneficiary's bank to initiate a reverse payment.

The ACH also calculates the net positions. These can be either bilateral between each member or multilateral (also known as net/net): the algebraic sum of the bilateral positions of each bank resulting for each into one position vis-à-vis the system: short if the bank owes money or long if it is owed funds Multilateral netting reduces the amounts and the number of payments each participant has to handle. These net positions are then transmitted either to the central bank for

settlement, or to the relevant RTGS system which will settle them with other high-value and systemic payments. The ACH is financially neutral as all net positions should algebraically add to zero. Clearing houses also issue reports for reconciliation and maintain audit trails and historical data for queries, investigations, billing and statistics.

These payment systems are known as Deferred Net Systems (DNS) as settlement takes place at some later time. DNS systems would generally settle end-of-day: batches were transmitted to the banks in the evening which would process them overnight and credit the beneficiaries next day if not later. Several ACHs now run multiple settlement cycles throughout the day to reduce the window of intraday risk and provide earlier availability of funds. In the current competitive climate among ACHs, most now offer additional value-added services: back office processing for banks and corporates, queries and investigations, e-billing, mobile payments, etc.

It should be noted that some countries do not operate an ACH (for instance Australia, Germany, Ireland and Finland) in which case the banks exchange files of payments bilaterally, agree the net amount, and settle through the local RTGS system. The generic term Clearing and Settlement Mechanism (CSM) is therefore used to describe these operations irrespective of whether an ACH is involved or not.

## 2.6. RTGS systems

RTGS systems, which handle a small amount of large value payments, settle payments one-by-one gross through the settlement accounts held with the central bank. Payments, after format and non-duplicate validation, are only processed if sufficient funds or credit is available at the initiating bank's settlement account. Payments which cannot be effected are queued and consequently delayed. Each bank must therefore carefully assess its liquidity requirements throughout the day:

Liquidity
= funds brought in by the bank
+ incoming payments
+ collateralised credit line negotiated with the central bank
+ / − outgoing payments

At the beginning of each day, banks will transfer funds into their settlement account and/or post the collateral required securing the necessary credit facility. Should the queue lengthen because of insufficient incoming payments, the bank must either top-up its settlement account by transferring own funds, accessing the money market, or post additional collateral with the central bank to extend its credit line.

Efficient liquidity management is essential in RTGS systems as the substantially higher cost of RTGS payments relative to ACH payments is less dependent on the processing charge than on the cost of the liquidity: interest on money market operations or the opportunity cost of immobilising securities for collateral.

For this reason, great efforts have been deployed to implement liquidity saving features in RTGS systems:

### 2.6.1. Priority levels:

High level priority payments will always take precedence over lower priority payments: separate queues are maintained for each priority. The highest priority is normally reserved for payments related to operations with the central bank and the settlement of DNS payment systems, or securities clearing systems, which settle through the RTGS system (known as ancillary systems). The higher priority queue(s) are normally processed on a first-in-first-out basis (FIFO).

### 2.6.2. Queue management:

Up until settlement, payments can be re-ordered within queues, moved between priorities or even cancelled.

### 2.6.3. Offsetting payments:

A lower priority payment from bank A to bank B will be delayed until a payment from bank B to bank A is presented: both payments will be submitted simultaneously so that only the difference will reduce the liquidity. RTGS systems which also include such netting facilities are known as hybrid payment systems.

### 2.6.4. Liquidity reservation:

Liquidity can be set aside for high priority payments and the settlement of ancillary systems.

### 2.6.5. Timing of payments:

Earliest and/or latest submission times can be allocated to payments, which can be changed before settlement.

### 2.6.6. Liquidity:

Pooling across the various subsidiaries and foreign branches of a multinational bank.

In addition, banks can limit their risk vis-à-vis other direct members by setting bilateral limits against individual banks and/or multilateral limits against groups of banks which can be changed throughout the day. A situation may arise when the system is *gridlocked*, meaning that payments are queued because of insufficient funds on some banks' settlement accounts which, if settled, would lift the balance to allow other banks' payments to be settled. Modern systems include automated gridlock resolution routines which allow payments to flow in most cases. Information and control facilities are also available to enable banks and the central bank to monitor balances; liquidity, limits and track progress of individual payments in real-time.

RTGS systems also issue end-of-day reports for reconciliation and maintain audit trails and historical data for queries, investigations, billing and statistics.

## 2.7. Communication networks

The transmission of payments and reports between customers, the banks, the ACHs, the RTGS systems and the central bank should take place over secure and resilient transmission networks. SWIFT, a bank-owned global network for financial messages and service provider has established itself as the preferred transmission network for large-value systems. Several routing solutions have evolved over time in response to requirements emanating from the scheme owners, designated by the capital letter they resemble.

The simplest is the V routing, whereby the payment messages are simply transmitted between the direct members and the payment system. In the T-copy routing, messages are sent between banks and copied to the payment system.

The copy can either contain the full payment message, or only the information necessary for clearing and/or settlement: essentially identifiers for the payer's and beneficiary's bank and the amount; information such as the originating and beneficiary customers as well as the motive for the payment, such as an invoice reference, are not required for settlement.

The most sophisticated is the Y-copy, essentially used for RTGS systems. The message is copied to the RTGS system and held by SWIFT until settlement. Confirmation has been received from the RTGS system so that the receiving bank knows that the funds have been irrevocably settled.

## 2.8. The Money Market

The money market is an essential component of payment systems although it is not, strictly speaking, part of them. An efficient and liquid intraday (for instance repos) market, offering a variety of instruments with varied maturities, is essential for the smooth operation of a payment system as it enables the commercial banks to fund their liquidity and settlement positions. From a macro-economic viewpoint, a payment system can only function if those members of the clearing with long positions accept to lend funds to those with short positions. Some payment systems even incorporate automatic lending-borrowing facilities to facilitate settlement.

The money market would be 'perfect' if:

- ☑ All participants had access to the same information at the same time;
- ☑ No participant held a dominant share enabling it to influence liquidity and pricing (interest rates); and
- ☑ The market was sufficiently liquid.

In practice, imperfections in the market are introduced by the bilateral credit lines which limit the funds a bank is prepared to lend to another. In addition to the interbank money market, whether directly between institutions or through brokers, the central bank can also intervene by granting credit to the commercial banks, generally end-of-day when the money market closes and dealers have squared their positions. In certain countries, this facility is known as the Discount Window, referring to the time when banks would send representatives to a teller window at the central bank to negotiate credit facilities.

## 2.9. Clearing and Settlements in Payments – Specific and Notable

Calculation of obligations is based on a customer's instruction asking a bank to pay. Settlement is the settlement of obligations between two banks giving effect to the delivery of funds. There is **NO** counter-obligation of the recipient associated with payments.

This contrasts with Clearing & Settlement in the Securities Markets, where one counterparty's obligation is matched with counterparty's obligation

## 2.10. Important Requirements of the Payment System

- ☑ **Safety,**
- ☑ **Security,**
- ☑ **Soundness and**
- ☑ **Efficiency.**

Safety relates to addressing risk, so as to make the **systems risk free** or with minimal risk

Security will address the issues relating to **confidence**, with specific reference to the **users of these systems.**

Soundness will be aimed at ensuring that the systems are built on **strong edifices** and that they **stand the test of time.**

Efficiency represents the measures aimed at efficiencies of costs so as to **provide optimal and cost-effective solutions**.

## 2.11.Cases of payment crisis

**Case # 1**
UK Faster Payments outage delays thousands of transactions
Financial Times, London
10 July 2018

The UK's Faster Payments system has not been so fast for some customers this week thanks to a system failure on Sunday that has seen thousands of transactions take two days to process.
The Faster Payments Scheme, which is used by all the major UK banks, says that it experienced "intermittent issues with its central infrastructure" for four and a half hours on Sunday afternoon.

The "vast majority" of the backlog payments were processed later that day but, nearly two days later, around 8000 were still outstanding.

Some affected customers have been hit by overdraft fees as a result of the outage, although the Faster Payments Scheme insists that no one will be left out of pocket.

In the meantime, the scheme is working with Mastercard owned Vocalink, which is behind the Faster Payments IT infrastructure, to investigate the cause of the problem.

While details are scant, the issue is related to the central infrastructure, not the bank gateways.

**Case # 2**

# IT outage hits hundreds of thousands Lloyds Bank customers

**Nicholas Megaw**, Retail Banking Correspondent JANUARY 18 2019

An IT outage at Lloyds Banking Group left it unable to process hundreds of thousands of payments on Friday, with customers at risk of being repeatedly charged for the same transfers.

Customers began complaining about problems transferring cash on Friday morning, which the bank blamed on a problem with Faster Payments, the system used to process telephone, internet, mobile and standing order payments.

**Other Cases Summarised**

| Risk type/detailed risk category | Event |
|---|---|
| Settlement risk: settlement member insolvency/illiquidity | 'On 15 September 2008, Lehman Brothers...was placed in administration. ...Lehman Brothers' default occurred after some intraday funding via the self-collateralising repo mechanism had been undertaken by [CREST] settlement banks. This demonstrated the importance of settlement banks ensuring adequate liquidity management planning for a client default.' |
| Settlement risk: settlement member operational problems | 'One particular [CHAPS] member had an outage that lasted most of the day on 3 January 2008, owing to an extremely rare software failure. ... Communication between members meant that they were able to stop or delay sending payments to the stricken bank, so that it did not become a liquidity sink... .' |
| Operational risk: disasters/terrorist attack | 'Following the London bombings on 7 July 2005, LCH.Clearnet Ltd was required to evacuate its head office and operate from its secondary office site.' |
| Operational risk: systems/network failures | 'On 29 August [2006]...a software bug affecting communication between the SSE [Single Settlement Engine] and the CREST system resulted in a three hour outage. As a result, CHAPS processing had to be extended, sterling deadlines were pushed back to around 19:15, and major banks were only able to close their systems and process client accounts after 20:00.' |

## You should now be able to:

- ☑ Name participants in the payment system
- ☑ Name the four essentials in a modern payment system

## Concept Check

A. The payment system at the economy level is operated by:

- ☐ The Clearing House
- ☐ The Banks
- ☐ The Fed
- ☐ The Government

B. The prevention of hacking of the payment system at the national level addresses:

- ☐ Security
- ☐ Efficiency
- ☐ Soundness
- ☐ Cost management

C. When the Central Banker improves the time in which a payment is processed it is focusing on:

- ☐ Security
- ☐ Efficiency
- ☐ Soundness
- ☐ Cost management

The technical details behind these failures can be very interesting. The interested student may look up the full report on one of UK's system

# 3. Classification of Payment Systems

## Chapter Overview

This chapter provides a quick overview of the different types of payment systems forming a foundation for going deeper into the working of each type of payment. More particularly, the methods of netting obligations between banks as clearing members is discussed.

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## 3.1. High Level Classification of Payment Systems:

There are several ways to classify payment systems. The simplest and most intuitive way is given below:

### 3.1.1. Retail Payment Systems:

- ✓ **Check payment systems** - ACH clearing and settlement: mostly deferred net settlement
- ✓ **Card based payment systems** – ATM Networks, Bank Card Association clearing and settlement, mostly deferred net settlement
- ✓ **Electronic payment systems:** internet banking, mobile banking: mix of deferred net settlement and real time gross settlement
- ✓ **International Remittances** – money transfers: mostly deferred net settlement

### 3.1.2. Wholesale Payment Systems:

- ✓ Large Value Payment systems – RTGS – inter-bank, intra bank mostly real time gross settlement and also hybrid systems (mix of real time gross and net settlement systems)

## 3.2. Further Classification and Uses of these Systems:

### 3.2.1. Retail Payments

**3.2.1.1. Retail Electronic Payments** are of two types, namely:

**3.2.1.1.1.** Electronic Credits: These follow the format: Single Debit multiple Credits

3.2.1.1.2. Electronic Debits: Single Credit multiple Debits (the debit needs to be )

While these are classified here as Retail: these are also used by corporates to reach money to retail individuals.

### 3.2.2. Wholesale Payments

**Wholesale** (Large Value) payment systems are characterised by:

- ✓ Large value of each transaction
- ✓ Completed in Real Time

This makes LVPS suited and preferred for securities, money markets and large value transactions. Every significant economy has large value payment systems. They operate in a

very similar fashion though one will find differences in times and certain finer aspects. From a end-user point of view they are all identical:

Here are the names of LVPS by country:

| | | | |
|---|---|---|---|
| UK | CHAPS | EU | TARGET2 |
| USA | Fedwire | INDIA | RTGS |
| SINGAPORE | MEPS + | HONG KONG | CHATS |
| JAPAN | BOJ - Net | AUSTRALIA | RITS |

LVPS are linked to a local economy / market. They are not Cross Border (International) Payment Systems – though they play a part in that process.

## 3.3. Settlement Types:

### 3.3.1. Net Settlement & Gross Settlement

Participating banks, can settle their payment balances with the other banks either at the end of every day or they can settle it after every payment made or received. Depending upon the frequency of the settlement of the payments, at the end of day or payment by payment basis there are two methods to settle payments:

- ✓ **Net settlement**
- ✓ **Gross settlement**

Both of these methods have their own issues and implications.

#### 3.3.1.1. Net Settlement Mechanism

In the net settlement mechanism the total number of a particular bank's out payments are offset against the total number of banks in-payments i.e. as soon as the payment is made or received by a bank no actual transfer of funds takes place between the settling authority (assume central bank) and the bank instead only the entries are made into the account of the bank with RBI.

At the end of day, i.e., at the settlement time the final transfer of funds takes place which is equivalent to the net position of the bank.
The process of Net Settlement can be divided into two steps, either of which may form the basis for producing the entries for posting to settlement accounts:

##### 3.3.1.1.1. Bilateral Net Settlement

Let's take an example of banking system comprising of four banks. In it every bank deals with every bank bilaterally i.e. payments are offset between each pair of bank individually.

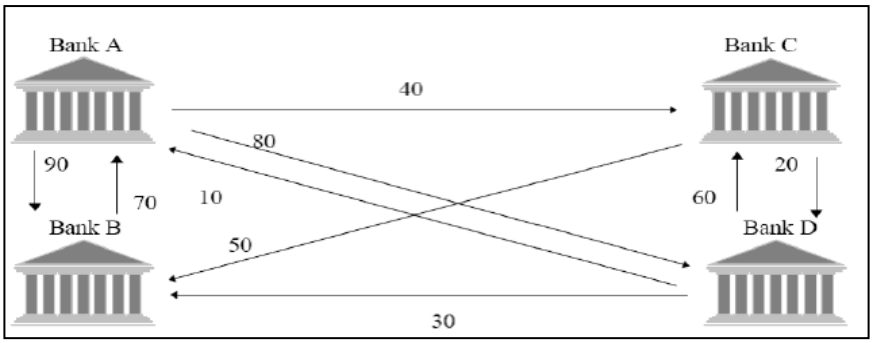



Figure: Bilateral Settlement

The diagram above shows the day long actual flow of instructions in between every pair of bank. Let's take a look at the flow of funds in a tabular form.

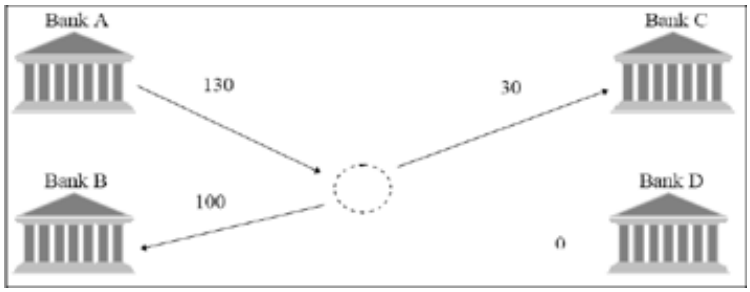
| From /To | A | B | C | D |
|---|---|---|---|---|
| **A** | - | 90 | 40 | 80 |
| **B** | 70 | - | 0 | 0 |
| **C** | 0 | 50 | - | 20 |
| **D** | 10 | 30 | 60 | - |

The net payment positions are calculated bilaterally for each bank. Here clearing house comes into the picture. The clearing house calculate net obligation of each bank by considering all the payments to be made to other banks individually and total payments to be received from other banks.

In other words, bilateral netting involves the offsetting of the bilateral claims and obligations between each pair of banks. In the four-bank example this means that each bank will have three separate bilateral positions with respect to the other members of the system: positions that can be either a 'net pay' or a 'net receive' or a zero net obligation.

When bilateral net positions are calculated, then in the second step each bank in the system settles its overall net position with respect to all the other members of the system. There will only be one settlement account entry for each bank.

#### 3.3.1.2.**Multilateral Net Settlement**




**Fig**ure: Multilateral Net settlement

Under multilateral net settlement, Bank A is a net payer, Banks B and C are net receivers, while Bank D has a zero net position Payment systems with multilateral net settlement usually operate through a clearing house, a central location through which the payment instructions pass and which is responsible for calculating the multilateral net positions of the member banks and passing them on to the central bank for posting to the members' settlement accounts.

This leads naturally onto the question of the timing of settlement. A netting operation requires the collecting together of details of in and out-payments submitted over a specified time period often a whole business day, although it may involve shorter, more frequent periods. There is thus a delay between the initial submission of the payment instruction and the settlement across the accounts at the central bank.

Indeed, it may be the case that payment instructions pass through the clearing house and on to the receiving banks before settlement takes place. This has important implications for the risks in payment systems.

### 3.3.2.Role of clearing houses in Settlement

Lot of calculation is needed to come up to the final net payable or receivable position of each participant. A question arises on which entity should complete those calculation. That entity is the clearing house which determines everybody's net funds payable or receivable positions before passing on the result to the central bank**.**

The thing which is to be kept in mind that it's not the clearing house which also holds the accounts of every participating bank with it. This is the task of central bank**;** clearing house just passes the information to the bank that how much is to be settled by which bank

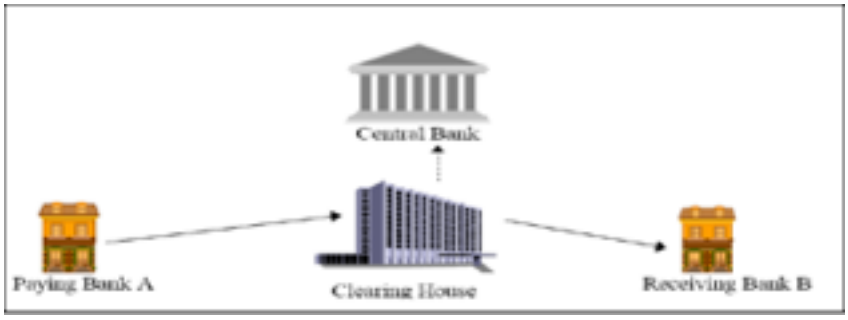



*Figure: Role of clearing house*

Things to be noted here are:

- ✓ Payment system clearing houses can take a variety of forms. They may be owned and operated by the central bank itself, or by the commercial banks, or by a combination of the two.
- ✓ They may be designed to handle either paper or electronic/automated payment instructions, or both. With electronic payments, the clearing house may process them in batches, or in real-time as each instruction arrives. The latter alternative enables the clearing house to monitor banks' net positions on a continuous basis. This is important if there is a structure of limits in place.
- ✓ They may be organised to serve the whole country, or on a regional basis within the country. The latter may be useful in countries with poor communications and transport infrastructure, or where there are large distances between centres of population and activity. In such cases, the settlement accounts of the banks in the regional/local clearing house may be held at the local branch of the central bank. Clearing houses may be owned and operated by central bank.

## You should now be able to:

- ☑ Name the methods of payments
- ☑ Differentiate between large value and other payment methods
- ☑ Differentiate between paper and electronic methods
- ☑ State the impact difference between different netting methods

## Concept Check

A. Which of the following methods of payment is 'retail':

- ☐ Check
- ☐ ACH Debit
- ☐ ACH Credit
- ☐ Fedwire

B. A large value payment system is more useful for

- ☐ Buying groceries
- ☐ Sending gifts to relatives
- ☐ Securities market transactions
- ☐ Parking ticket payments

C. For Transaction # 456, Bank A has to pay Bank B $ 500 million. At the same time for Transaction # 457, Bank B has to pay Bank A $ 200 million. In a Gross Settlement System which of the following will happen:

- ☐ Bank A will pay Bank B $ 300 million
- ☐ Bank B will pay Bank A $ 300 million
- ☐ Bank A will pay Bank B $200 million
- ☐ Bank A will pay Bank B $ 500 million separately; Bank B will pay Bank A $ 200 million separately

D. For Transaction # 456, Bank A has to pay Bank B $ 500 million. At the same time for Transaction # 457, Bank B has to pay Bank A $ 200 million. In a Net Settlement System which of the following will happen:

- ☐ Bank A will pay Bank B $ 300 million
- ☐ Bank B will pay Bank A $ 300 million
- ☐ Bank A will pay Bank B $200 million
- ☐ Bank A will pay Bank B $ 500 million separately; Bank B will pay Bank A $ 200 million separately

The USA had a widely prevalent system of private clearing houses, now under retreat. You can read about that piece of history

# 4. Definition & Characteristics of Payment Systems

## Chapter Overview

This chapter is designed to help the participants get a sound understanding of characteristics of Payment Systems. Specifically, you will learn about Paper check and their processing, Intra and Inter Bank checks, the role of clearing, MICR Checks, Check 21, remote creation of checks and digitisation of paper checks.

## Table of Contents for Chapter 4

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### 4.1. The Payment Process

In Transaction Processing, as in any process, there is an Input, a Process and an Output. For the Process to produce the desired Output the Input to the Process needs to be complete and exact. It is possible (necessary) to spell out the precise inputs needed. Then it becomes possible to get it "Right First Time". In the context of Payments it is worth noting that the Input and the Process is specific to the payment method being used.

## 4.2. Paper Checks

In the case of paper checks the instruction to the bank is written by the customer on the face of the check!

- ✓ You hold money in your bank
- ✓ You need to make a payment to someone
- ✓ You write a letter to your banker asking him to pay that amount to Mr. Seller
- ✓ Mr. Seller takes the letter you wrote to your banker
- ✓ The banker, recognising your signature, gives the amount to Mr. Seller
- ✓ The letter you wrote to your banker giving him the instruction to take money from your account (permission to debit you) and give it to a third party is the check (check).
- ✓ Quite often Mr. Seller will not directly go to your bank. He will ask his bank to take the letter and show it your bank. That is the paper clearing system.

**NOTE**: this is not a legal description of the check as an instrument. It functionally describes how a check operates.

### 4.2.1. Processing the Check

This input from the customer in the form of the check gets processed by the bank: it follows those instructions exactly

- ✓ **Input:** The check
  - The check is written by the Payer. But it is brought to the bank by the Receiver. In that sense the input from the Payer is brought to the bank by the Receiver.
- ✓ **Process:**
  - Ensure the check is duly signed
  - Ensure there is money in the account
  - Verify the date
  - There should be no alterations on the check
- ✓ **Output:** Transfer of funds
  - Money moves from Payer's account to the Clearing House through its banker; thence to Receiver's account. The output of the process is: "Debit the Payer."

*(In contrast to the source of the Input in the case of checks, the source of inputs/instructions for all electronic payments is the Payer.)*

### 4.2.2.Basics of Check clearing process

Paper based instruments like checks; demand drafts are very important constituents of a nation's payment systems. Hence it is very important to know how the paper based instruments are cleared and settled. However, with the advent of payment cards, paper-based instruments have seen a decline but still they are an integral part of the payment system. The introduction of MICR (Magnetic Ink Character Recognition) technology brought about a revolution in check clearance and settlement during the mid-eighties and early nineties. Although other revolutionary techniques like E-check and Check Truncation are now in the phases of trial and testing, MICR forms the backbone of check clearing mechanisms in India and rest of the world.

- The customer (payee or holder) deposits the check that he has received from the Payer drawn in his favour with his Bank.
- The payee's bank processes the check and sends it to the clearing house along with other checks that it has received for clearing purposes.
- At the clearing house the checks are sorted bank-wise and all the banks (drawee banks) collect the checks that are drawn on them (the checks for which they have to make payment).
- The Drawee banks process the checks and validate them for details like signature, availability of amount in the customer's account and so on.
- The Drawee banks communicate the fate, (i.e., if the payer's account has sufficient funds to honour the payment or not, if the signatures matching or not), of the checks to the clearing house within the time frame as specified by the clearing house.
- With this information, the payee banks either credit the customer's account with the check amount or return the unpaid check to the customer.

### 4.2.3. Processing House Transfers

The Diagram below depicts the cheque clearing process:

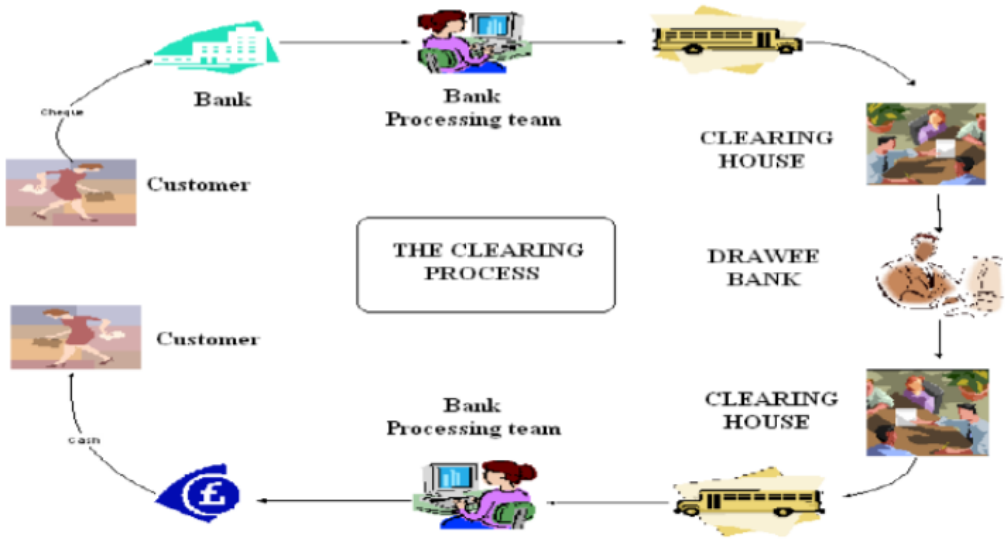
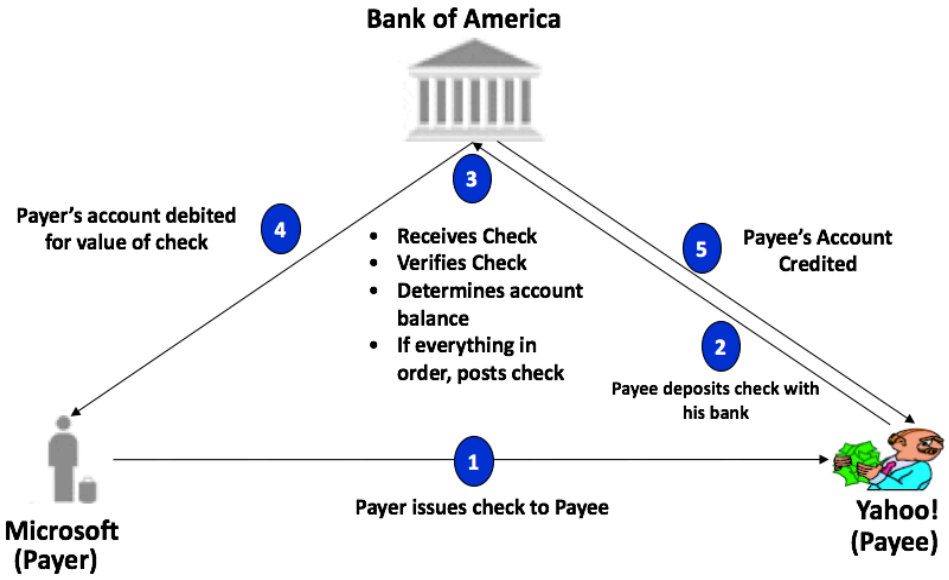



Figure: the process of cheque clearing

This is an intra-bank movement of funds. Sometimes it is also called a house transfer or a book transfer. The process flow is depicted in the chart below:

Life

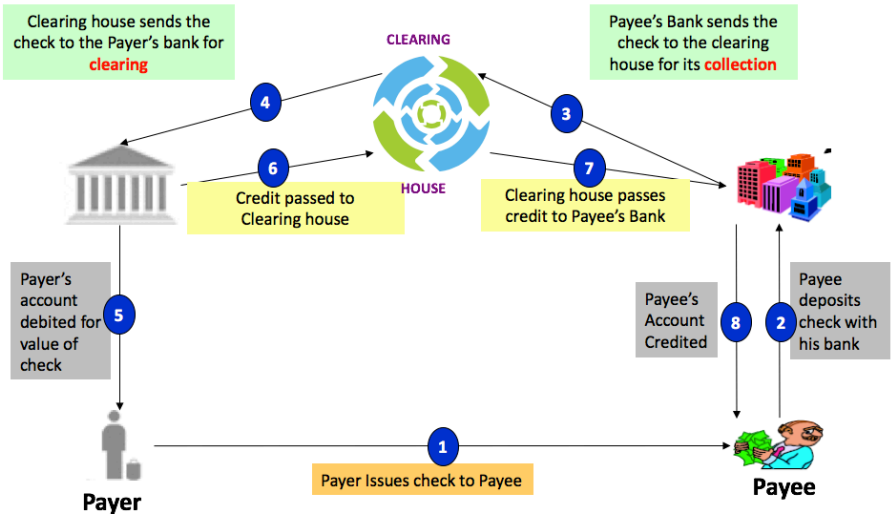



would be so simple if all of us had our accounts with only one Bank. But life is never simple. There are thousands of banks spread across the globe, and the Amazons, Facebooks Microsoft, Tatas and the Fords of the world have their accounts with different banks, and money constantly changes hands across this vast network.

So how does this **inter-bank** movement of funds take place?

## 4.2.4.The Clearing House

When checks go from one bank to the other for clearing, the clearing house enters the picture and is needed for Clearing & Settlement of Funds. This is called Inter-bank clearing. While presented here for the clearance of checks, Inter-banking clearing and the involvement of a Clearing House is to be found for all other payments as well, so long as money moves from one bank to another.



In order to sort checks by Payer bank and then re-sort them when amounts are received back, they need encoding so that the process can be automated.

This led to the evolution of the MICR Coding.

## 4.2.5.Mechanised Check Processing based on MICR

It is defined as the machine recognition of numeric data printed with magnetically charged ink. It is used on bank checks and deposit slips. MICR readers detect the characters and convert them into digital data. This technique is useful to accelerate the check routing process as also to route the check back to the location where the funds exist and to settle the transaction in minimum time.

Checks were processed manually until the rapid increase in their use after the Second World War necessitated the introduction of a reliable automated method of check processing. This growth was most marked in the USA, and the American Bankers Association (ABA) in 1956 adopted a process of Magnetic Ink Character Recognition, or MICR, which was developed jointly by the Stanford Research Institute and General Electric Computing Laboratory. MICR is standardized by ISO 1004. The MICR proofing systems have also developed since the early 1960s to incorporate scanning technology and advanced optical character recognition techniques to improve the automation of document processing.

This technology, known as “Image Processing”’ provides the means for converting the image of documents into a digitized format suitable for electronic processing and storage. The data contained in the MICR code line is still predominantly captured magnetically.

Following were the factors responsible for the adoption of MICR technology:

- ✓ Increasing clearing volumes
- ✓ Faster realisation of checks
- ✓ Better control over clearing reconciliation
- ✓ Use of state-of-the-art technology in check clearing
- ✓ The availability of check-wise data on instruments processed in clearing
- ✓ The facility to store, retrieve, and group data on clearing instruments with the aid of the computer systems used for the MICR processing
- ✓ The capability to provide data in a meaningful manner enabling further analysis.

### 4.2.5.1.Advantages and disadvantages of MICR

4.2.5.1.1.Advantages:

- ✓MICR systems are secure against most common types of defacements like overprinting, dirt or writing across numbers
- ✓A layer of transparent adhesive tape over the numbers does not prevent desirable results
- ✓Imprinting with magnetic ink is highly durable and can withstand thousands of transits across the read-head with no impairment of the signal
- ✓Documents are difficult to forge
- ✓Reduces human errors.

4.2.5.1.3.Disadvantages:

- ✓Highly stylised font required to ensure character discrimination
- ✓Limitation to numbers and only about four other characters
- ✓Difficulty in scanning with hand held device
- ✓A very shallow depth of field
- ✓MICR readers and encoders are expensive.

## 4.2.6.Check 21 – an overview

In the year 2000, Federal Reserve Board (FRB) started working on improvement of the processing of checks in U.S in accordance with the changed scenario (to suit the needs of the 21st century). Fed mainly focused on promotion of check truncation, and electronic check presentation. The final outcome of their endeavour was “Check clearing for the 21st Century Act” (popularly known as Check 21). The main idea was to come up with a machine readable copy of a check (a substitute check) for traditional check for forward collection or return.

Substitute checks that meet the requirements of this act would be legal and practical equivalent of the original check.

Check 21 allows banks to create and process a substitute check, also known as an **Image Replacement Document** (IRD) in lieu of an original check. Its purpose is to improve the speed and reliability of the check-clearing process by taking as much of the paper out of the process as possible. It helped develop the **Substitute Check** that is the legal equivalent of the original check and it is the electronic copy or image of the original check.

## 4.2.7.Highlights of the Check 21 act

### 4.2.7.1.Main purposes of Check 21 are

- ✓ To facilitate check truncation
- ✓ To develop innovation in the check payment without mandating the payment of check in electronic format
- ✓ Overall improvement of the payment system.

### 4.2.7.2.This act created a new negotiable instrument called “substitute check”

- ✓ If this substitutable check meets the criteria of the act then it is legally substitutable to the paper-written traditional check
- ✓ This substitute check can be processed similar to the paper check
- ✓ Involved Parties cannot refuse to accept these substitute checks if they follow all the requirements by the act “Parties” involve all the banks, Federal Reserve, consumers, customers and other financial services institutions.

### 4.2.7.3.The act provides legal equivalence only for substitute checks.

- ✓ The act provides check truncation and electronic image / exchanges but does not provide legal equivalence for electronic check or image presentment
- ✓ Check clearing services where electronic checks are used, require the agreement of the parties who are accepting the electronic form of the instrument for value
- ✓ This act encourages the use of electronics to the empowering banks to truncate the original checks, and give paper checks where necessary.

- ✓ All checks except foreign checks are eligible to become substitute checks, some of the following which can act as substitutable checks are

  - ☑ Consumer checks
  - ☑ Business checks
  - ☑ Corporate checks
  - ☑ Government warrants
  - ☑ U.S treasury checks
  - ☑ Money Orders
  - ☑ Control disbursement checks
  - ☑ Payable through drafts
  - ☑ Traveller’s checks.

**Difference in Process for Check21 compared to conventional clearing:**

The only difference is in the manner the receiver's bank sends the instrument to the payer's bank: the image is transmitted rather than the physical instrument being dispatched. All other aspects of clearing are identical where Check21 is used.

### 4.2.8. Remotely Created Checks

Quite often a customer has to:

- Expedite payment to a creditor
- Make a purchase via telephone or internet
- Compensate a merchant for a returned check
- Establish a payment plan with a collection agency

How does the Customer Pay in these Situations? Originate a remotely created check.

What is a remotely created check?

- Created remotely by a payee
- Under the authority of the account holder
- Does not bear the account holder's signature
- Is a paper instrument with its negotiability intact
- Is processed through the regular banking channels

So is there any difference between a remotely created check and the regular check at all? A remote check is created by the Payee while the regular check is created by the Payor.

The check does not bear the drawer's signature; instead the signature line displays the drawer's name or some other words referencing the drawer's authorization to create the check. See the image below of a remotely-created check:


#### 4.2.8.1. How are these Checks Created?

##### 4.2.8.1.1. Payer step:

- ✓ Payer grants payee authorization to produce a remotely created check on his account

##### 4.2.8.1.2. Payee steps:

- ✓ Payee obtains MICR line info
- ✓ Creates an electronic template of a check or a paper check. The payee or a TPP acting on behalf of the payee can create this
- ✓ Deposit the remotely created check with its bank for collection

The item then follows the traditional collection process – Paper-based or Image-based or ECC.

### 4.2.9. Regulations that govern these processes

Anything can be developed and automated. But the law needs to be there to protect the interests of all concerned where a dispute arises.

In the case of checks many of these are contained in Regulation CC.

**REG CC 229.34 (d)**

"If paying bank claims that the IMAGE does not match the original issuance of the check by the issuer of the check THEN The Depository Bank can prove that it warranted correctly by showing the customer of the Paying Bank to have been negligent in forgery prevention."

**REG CC 229.51**

A substitute check … has the same legal status as the original check. (Substitute checks arise when the image is reprinted for any reason or requirement.)

**REG CC 229.51**

The substitute check shall accurately represent all of the information on the front and back of the original check as of the time the original check was truncated; and (2) bear the legend, "This is a legal copy of your check. You can use it the same way you would use the original check."

**REG CC 229.54**

If a customer claims his account was wrongly debited for a substituted check, the customer must make the claim on the Paying Bank: Within 40 days

If made orally, and bank then requires it in writing, if the oral claim was made in 40 days that is good enough.

This is called a "Claim for Expedited Re-credit" The claim may be treated as "Valid" and credited; or NOT Valid

### 4.2.10. Promoting the Digitisation of Paper Checks

Even as electronic retail payments gather momentum, the issuance of checks is a deep-rooted habit in the USA. While individuals continue to issue checks, it is not necessary that the payment system handle this as paper. Various rules enable what starts as paper to be processed electronically.

Here are the ways in which that happens:

The data is unmistakable about the decline of checks through actions of various governments and agencies. This is seen in the BIS data which is released annually. The latest one is shown below:

**ARC:** Account Receivable Conversion: Check deposited by my customer: present it through ACH as an Electronic Debit

**BOC:** Back Office Conversion: Customer pays by Check at checkout counter of store. Informed that debit will be through ACH. Check processing done EOD in a back office, or consolidated for processing regionally/ centrally

POP: Point of Purchase: Customer pays by Check at checkout counter of store. Check is scanned at POP thru a MICR scanner. Debit raised through ACH. Customer may decline this process.

RCK: Re-Presentation Check Entry: ECP of a check previously returned. It can be a single-debit ACH instruction; value less than USD 2,500/-.

| | Cheques | | | | | E-money payment transactions | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Australia | 256.4 | 224.4 | 194.4 | 166.6 | 139.5 | nap | nap | nap | nap | nap |
| Belgium | 6.5 | 5.4 | 4.3 | 8.5 | 9.5 | 50.5 | 46.2 | 29.4 | 28.5 | 7.0 |
| Brazil | 1,590.2 | 1,439.3 | 1,297.0 | 1,164.8 | 1,018.0 | 37.4 | 36.0 | 38.1 | 27.8 | 24.4 |
| Canada | 870.9 | 805.5 | 761.1 | 708.9 | 648.2 | nav | nav | nav | nav | nav |
| China | 846.7 | 783.7 | 693.4 | 578.2 | 417.0 | nap | nap | nap | nap | nap |
| France | 2,971.4 | 2,805.6 | 2,620.6 | 2,482.8 | 2,238.9 | 46.5 | 52.2 | 50.5 | 52.9 | 36.5 |
| Germany | 40.6 | 34.4 | 31.3 | 29.9 | 21.2 | 35.9 | 33.6 | 31.8 | 34.2 | 31.6 |
| Hong Kong SAR | nav | nav | nav | nav | nav | nav | nav | nav | nav | nav |
| India | 1,341.9 | 1,313.7 | 1,257.3 | 1,195.8 | 1,096.4 | 30.6 | 66.1 | 133.6 | 310.7 | 748.0 |
| Italy | 291.6 | 275.7 | 252.4 | 231.5 | 208.6 | 151.9 | 191.2 | 244.0 | 291.4 | 373.9 |
| Japan | 82.6 | 77.5 | 73.1 | 68.9 | 64.1 | 2,342.0 | 2,836.6 | 3,453.4 | 4,235.4 | 4,827.7 |
| Korea | 612.9 | 460.1 | 364.3 | 310.3 | 254.0 | 113.1 | 69.6 | 47.9 | 38.8 | 33.3 |
| Mexico | 398.3 | 377.5 | 348.3 | 330.5 | 311.5 | nav | nav | nav | nav | nav |
| Netherlands | nav | nav | 0.2 | 0.2 | 0.2 | 171.7 | 148.0 | 121.2 | 76.2 | 2.4 |
| Russia | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 106.2 | 225.7 | 564.4 | 1,013.6 | 1,075.4 |
| Saudi Arabia | 7.1 | 7.1 | 7.1 | 6.8 | 6.7 | nap | nap | nap | nap | nap |
| Singapore | 76.8 | 74.6 | 72.2 | 69.4 | 65.7 | 2,888.2 | 3,015.1 | 3,085.3 | 3,138.1 | 3,233.0 |
| South Africa | 53.7 | 42.2 | 30.9 | 22.9 | 16.9 | nap | nap | nap | nap | nap |
| Sweden | 0.4 | 0.2 | 0.1 | 0.0 | 0.1 | nap | nap | nap | nap | 3.5 |
| Switzerland | 0.3 | 0.3 | 0.2 | nav | nav | 10.6 | 2.8 | 1.4 | nav | 22.5 |
| Turkey | 18.2 | 18.5 | 17.2 | 17.4 | 16.9 | nav | nav | nav | nav | nav |
| United Kingdom | 970.0 | 848.0 | 718.0 | 644.0 | 558.0 | nav | nav | nav | nav | nav |
| United States | 20,378.0 | 18,334.5 | 16,319.7 | 14,338.9 | 12,287.1 | nav | nav | nav | nav | nav |
| **CPMI**[1] | **30,814.4** | **27,928.0** | **25,063.1** | **22,376.3** | **19,378.6** | **5,984.7** | **6,723.3** | **7,800.9** | **9,247.6** | **10,419.2** |

Please refer to the individual country tables for a detailed explanation.

[1] Sum or average excluding those countries for which data are not available. For credit transfers, data for France (prior to 2005) and the United Kingdom include interbank transactions; however, the total number is relatively small.

The US Fed's December 2019 report shows the continuing trend in the USA.

**The 2019 Federal Reserve Payments Study: Initial Data Release**

**Noncash payments, 2012, 2015 and 2018**

| Noncash payment type | 2012-15 | | | | 2015-18 | | | |
|---|---|---|---|---|---|---|---|---|
| | Change | | CAGR (percent) | | Change | | CAGR (percent) | |
| | Number (billions) | Value ($trillions) | Number | Value | Number (billions) | Value ($trillions) | Number | Value |
| **Checks** | **-1.6** | **1.97** | **-2.8** | **2.4** | **-3.6** | **-3.39** | **-7.2** | **-4.0** |
| Interbank | -0.5 | 3.85 | -1.2 | 6.9 | -2.6 | -2.31 | -6.9 | -3.8 |
| On-us | -1.1 | -1.88 | -7.0 | -6.9 | -1.0 | -1.07 | -8.2 | -4.8 |
| ***Additional estimates*** | | | | | | | | |
| **Checks written** | **-2.2** | **1.85** | **-3.4** | **2.2** | **-4.2** | **-3.48** | **-7.5** | **-4.1** |
| Checks converted to ACH | -0.6 | -0.12 | -8.5 | -7.0 | -0.6 | -0.09 | -9.9 | -6.8 |
| **ATM cash withdrawals** | **-0.6** | **0.08** | **-3.4** | **3.6** | **-0.1** | **0.03** | **-0.9** | **1.5** |

Continuing decline.

**You should now be able to:**

- ☑ Explain the concept underlying checks
- ☑ Describe methods by which any checks still in circulation will be settled digitally

## Concept Check

A. After Check 21 and other regulations on digitisation have been passed, the signing of a check by a customer implies

- ☐ Permission to debit the customer account only through paper clearing
- ☐ Ignorance on the part of the customer that checks should no longer be issued
- ☐ That the paper clearing system will continue to operate till checks are issued
- ☐ Permission to debit the customer account through any clearing house by converting the check to an electronic debit

B. When a check is processed as a paper instrument through the check Clearing House the paying bank is looking at

- ☐ The paper check
- ☐ The image of the paper check
- ☐ The customer to replace the check with a digital payment
- ☐ Contacting the customer to verify check details

C. A Remotely Created Check is created by

- ☐ The payer over the internet
- ☐ The payer's bank over the internet
- ☐ The recipient (payee) itself or its bank on instruction from payer
- ☐ The payer on its mobile

Click this link to access an interactive chart where you can research payment trends buy different instruments by yourself

# 5. Electronic Payment Transactions

## Chapter Overview

This chapter helps understand the different types of electronic payment methods and how they operate. Further, the uses of these payment methods in different commercial situations is explained. A distinction is made between large value electronic payments and other electronic payments; the chapter focuses on non-high value payments. The concepts of B2B, B2C, C2C, P2P are explained.

## Table of Contents for Chapter 5

CLICK ON THE NUMBER TO GO TO THAT PAGE

## 5.1. Differences: Paper vs. Electronic Payments

The defining difference between paper systems and electronic payment systems (whether retail or LVPS) is as follows:

- ✓ It is payer initiated
- ✓ Payer needs to give its bank substantial key information about the receiver
- ✓ This includes receiver bank details
- ✓ For this the receiver must send the information to the payer in the first place
- ✓ This information has to be complete and exact
- ✓ Neither payer nor receiver may be a bank and may not know enough about payments to ensure accurate data
- ✓ If a payment related to a **Settlement Obligation** is initiated and it **FAILS** due to lack of proper details of the **RECIPIENT**: it constitutes **Settlement Failure**. This is **NOT** a failure of the **Payment System**.
- ✓ A payer initiated system then becomes a "push" based system as the payment is pushed through.
- ✓ Check systems are "pull" systems because the receiver pulls the money in.

We focus for now on "Retail" electronic systems.

While we use the word retail these systems are for values which are NOT large and fit within the following descriptions:

- ✓ Business to Consumer (B2C)
- ✓ Consumer to Consumer (C2C)
- ✓ Consumer to Business (C2B)

(Peer to Peer [P2P] as a description could include Large Value transfers between two large banks like JPMC and Bank. However, large value payment systems (LVPS) are covered separately.)

## 5.2. The ACH Network - USA

The Automated Clearing House (ACH) is a network for electronically exchanging funds and related information among individuals, businesses, financial institutions, and government entities. ACH rules and regulations are established by the National Automated Clearing House Association (NACHA). Private ACH operators and other local and regional ACH associations provide input into the rules.
The payments transferred over the ACH have represented recurring credit payments intended for the accounts of the receivers. Typical payments are salaries, consumer and corporate bill payments, interest and dividends, and Social Security and other entitlement programs originated by the U.S. Treasury. The ACH has the ability to process large volumes of payments efficiently and to allow an originator to debit the banking account of the payer because of which it is increasingly used for other types of payments, such as insurance premiums, purchases of stock, and consolidation of corporate cash balances also.

The Federal Reserve is the principal ACH operator, distributing ACH transactions through Fedline. There are also over 20 private sector operators, such as EastPay, Inc., Mid-America Payment Exchange, Visa U.S.A., Payment Resources One, and Western Payments Alliance.

All participants in the network fall into one or more of these six categories:

i. **Originator** - The Originator is the entity that agrees to initiate ACH entries into the payment system according to an arrangement with a Receiver. The Originator is usually a company directing a transfer of funds to or from a consumer or another

company's account. In the case of a consumer-initiated entry; however, the Originator may be an individual initiating funds transfer activity to or from his or her own account.

ii. **Originating Depository Financial Institution (ODFI)** – An institution that receives the payment instruction from the Originator and forwards the entry to the ACH operator. A DFI may participate in the ACH Network as a RDFI (see below) without being an ODFI; however, if a DFI chooses to originate ACH entries, it must also agree to act as an RDFI.

iii. **ACH Operator** - A central processing facility operated by the Federal Reserve Bank or other private sector organization. The operator receives electronic entries from ODFIs and distributes entries to the appropriate RDFIs (see figure 9.5 below), and performs the settlement functions for the affected financial institutions.

iv. **Receiving Depository Financial Institution (RDFI)** is a financial institution, which receives ACH entries from the ACH Operator and posts to the receiver (depositor) account.

v. **Receiver** – An individual or organization, which has authorised an Originator to initiate an ACH entry to the Receiver's account with the RDFI.

vi. **Third Party Processor** - A third party processor may serve as an agent for an ODFI or RDFI. The ODFI and RDFI are still responsible for compliance with ACH rules and regulations.

## 5.2. ACH System Operations

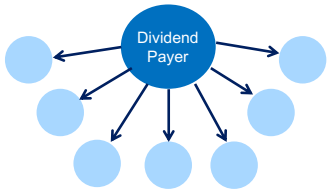
The ACH system supports both credit and debit transactions. In credit transactions, funds flow from the Originator's account through the ODFI to an account held by the receiver at the RDFI. For ACH debit transactions, the funds flow from the receiver's account at the RDFI through the ODFI to the account of the Originator.

## 5.3. ACH credits and debits

ACH transactions are a common form of electronic funds transfer used to make both recurring and non-recurring payments. Depository institutions originated 6.8 billion ACH transactions during 2000 for themselves and their customers, twice as many as were initiated during 1995. ACH payments may be either credit or debit transactions. In an ACH credit transaction, funds flow from the originator to the receiver, and in a debit transaction, funds flow from the receiver to the originator. ACH credit payments include direct deposit of payrolls, government benefit payments and corporate payments to contractors and vendors. The proportion of payroll payments made by businesses using the ACH was 50% in 2000. Debit payments include mortgage and loan payments, insurance premium payments, consumer bill payments and corporate cash concentration transactions.13 In addition, businesses and individuals may use the ACH to make payments to, or receive reimbursement from, the federal government related to federal tax obligations.

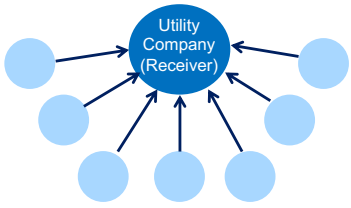
**Examples of ACH Credits:**

- ☑ Payroll direct deposits
- ☑ Social Security payments
- ☑ Dividend and interest payments
- ☑ Corporate bill payments to customers




**Examples of ACH Debits:**

- ☑ Insurance premium collections
- ☑ Mortgage and loan payments
- ☑ Consumer bill paying
- ☑ Corporate cash concentration



ACH data transmissions always flow in the same direction i.e. are unidirectional: from Originator to the ODFI to the ACH operator to the RDFI. This is true whether the item is a debit or a credit. For credits, the ODFIs settlement account is debited and the RDFI's settlement account is credited. For debits, the ODFIs settlement account is credited and the RDFI's settlement account is debited.

Here are some of the purposes for which ACH is used.

| | |
|---|---|
| Direct Deposit | Payroll, Social Security, Dividends |
| Direct Debit | Utility payments, mortgage payments |
| Point-of-Purchase | Enables conversion of a consumer check to an ACH by the merchant with consumer authorisation at point-of-purchase. |
| Account Receivable Conversion (ARC) | Facilitates conversion of consumer checks received at lockboxes to ACH on the presumption that the issuance of a check is an "authorization to debit". |
| Telephone Initiated (TEL) | One-time consumer debits initiated via a phone call and authorized by the consumer. |
| Web-initiated | Consumer authorizes debit via the internet. |
| Cash Concentration Disbursement (CCD) | Debit and credit entries to corporate accounts. |

## 5.4. ACH Credits

The ACH Credit is a ONE-to-MANY system: One entity makes payments to a large number of others.

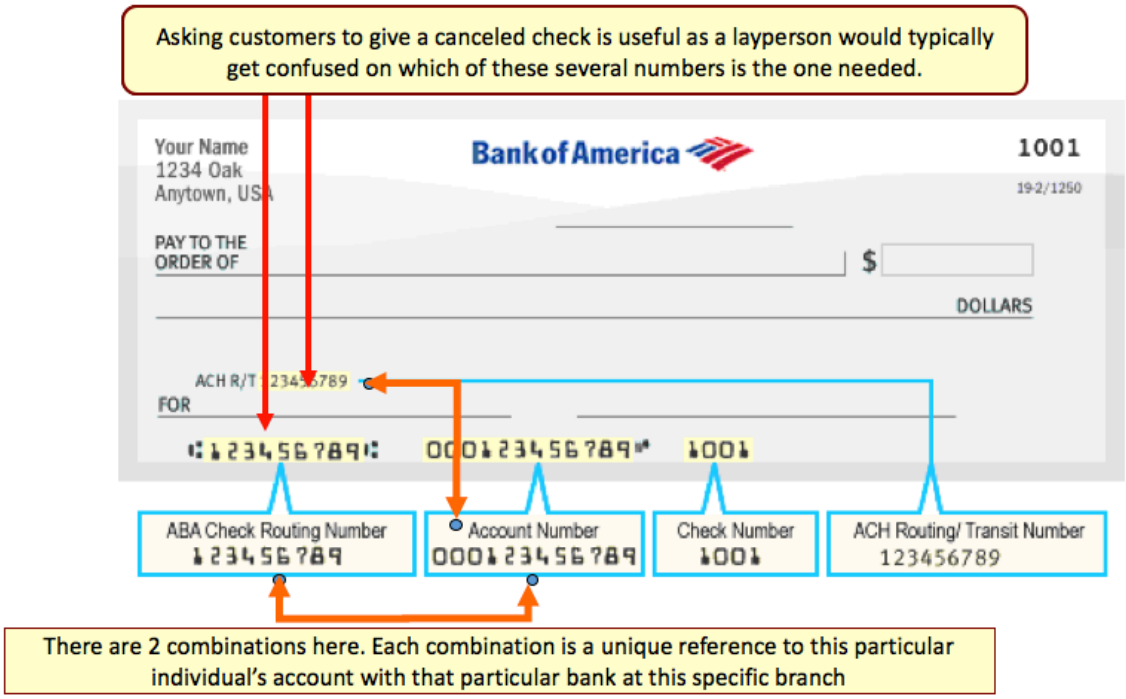
Good examples of this usage:

- ✓ Paying rent
- ✓ Paying dividends
- ✓ Paying salaries
- ✓ Paying pensions

The Beneficiary Bank **has to be** a NACHA member else recipient **cannot** receive funds by ACH Credit. Any mistake in providing the ACH Routing number will cause a mismatch: at that particular Beneficiary Bank location, the stated account number might not exist.

To make sure that the data is captured correctly, the traditional method is to ask for a cancelled check from the intended receiver of funds and extract information from that.

Here is mapping that helps link the information on a check to the ACH Routing number that is so vital for making payments:




**The use of identical numbers in this image is merely illustrative. Each of these numbers will actually be different.**

### 5.4.1. ACH origination steps:

i. The Originator (individual or business account holder) initiates a payment order to the ODFI
ii. The ODFI transmits the payment information to the ACH operator
iii. The ACH operator receives data from the ODFI and sorts the entries by routing number
iv. The entry is transmitted to the RDFI
v. The RDFI receives, processes, and posts the ACH data to the receiver account on settlement day.
vi. ACH return items flow from the RDFI to the ACH Operator to the ODFI. The ODFI must notify the Originator of return items. Third party processors may become involved at any step in the process. They may prepare files and send them to the ACH Operator on behalf of ODFI or they receive them on behalf of the RDFI. Regardless of the role third party processors play, the responsibility for rules adherence and liability falls on the appropriate financial institution using the third party processor.

## 5.5. ACH Debits

No customer's account can be touched for funds without prior authorization. When a banker debits the customer for charges, this prior authorization had already been signed in the "Business Conditions" that are part of the account opening documentation.

ACH Debit involves pulling money from the account of payers. This has to be preauthorised.

Good examples of usage are:

✓ Insurance payments

- ✓ Utility bills such as: electricity, water, phone , etc.

### 5.5.1.ACH Debit steps:

i. The service provider (to whom payment has to be made) collects debit authorization from each client

ii. The debit authorization is also addressed to the banker of the payer

iii. The bank takes note and updates systems for the debit which will eventually come

iv. The service provider will electronically send bills to the customers and to their banks

v. The banks operating the prior authorization will raise debit on customers through the ACH

vi. Amounts will be debit to customer account and credited to service provider's bank account

See the routing data across the USA for Bank of America as an example:

**Bank of America Routing Numbers**

| States | Ordering Checks | Direct Deposit | Wire Transfer |
|---|---|---|---|
| Northern California | Retail | | LVPS *(USA: Fedwire)* |
| Southern California | | | |
| Illinois | | 081904808 | 026009593 |
| Eastern Florida | 063000047 | 063100277 | 026009593 |
| Western Florida | 063100277 | 063100277 | 026009593 |
| Georgia | 061000052 | 061000052 | 026009593 |
| Maryland | 052001633 | 052001633 | 026009593 |
| Nevada | 122400724 | 122400724 | 026009593 |
| Northern Texas | 111000025 | 111000025 | 026009593 |
| Southern Texas | 113000023 | 111000025 | 026009593 |
| Washington | 125000024 | 125000024 | 026009593 |
| | Routing numbers for Checks: can be different for the same state | Routing numbers for ACH: different for different states | Single Routing Number across USA |

Routing numbers are called differently in different countries. Their field length may also be different. Here is a tabulation of that:

| | | | | | |
|---|---|---|---|---|---|
| UK | CHAPS | "Sort Code" (6 digits) | EU | TARGET2 | "IBAN: BICplusIBAN" |
| USA | Fedwire | "Routing Number" (9 digits: one nationwide number) | INDIA | RTGS | "IFSC Code" (11 alphanumeric characters) |
| SINGAPORE | MEPS + | "MEPS Account Code" (4 digits) | HONG KONG | CHATS | "Clearing Code" (6 digits) |
| JAPAN | BOJ - Net | "Zengin Code" (7 digits) | AUSTRALIA | RITS | "Bank State Branch Number"/ "BSB" (6 digits) |

## You should now be able to:

- ☑ Name the non-large value electronic payment systems
- ☑ Describe the situations appropriate for ACH Debit usage
- ☑ Describe situations appropriate for ACH Credit usage
- ☑ Describe the working steps and information needs associated with these

## Concept Check

A. Insurance premium payments are best enabled by:

- ☐ Checks
- ☐ ACH Credit
- ☐ ACH Debit
- ☐ Fedwire

B. Pension distributions are best enabled by:

- ☐ Checks
- ☐ ACH Credit
- ☐ ACH Debit
- ☐ Fedwire

C. Which of the following requires 4-way operational arrangements :

- ☐ Checks
- ☐ ACH Credit
- ☐ ACH Debit
- ☐ Fedwire

D. Which of the following requires the payer to simply instruct its banker:

- ☐ Checks & Fedwire
- ☐ ACH Credit & Fedwire
- ☐ ACH Debit & Fedwire
- ☐ Fedwire: it is the only one which has this feature

# 6. Credit & Debit Cards

## Chapter Overview

Cards are an important part of the payments systems. This is not just because people have cards and use them. It is also because the usage has changed and increased. The card has become a via media for shopping on the internet and internet transactions. This chapter covers cards and its usage.

## Table of Contents for Chapter 6

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## 6.1. Credit Cards as a Retail Payment System

**Card accounts**:

i. A credit card account allows a customer to purchase goods and services from any merchant who has entered into an arrangement with the card issuer. The card issuer acts as a third party, guaranteeing payment to the merchant and recovering the resulting debt directly from the borrower. In return for this payment guarantee, the merchant pays a fee, usually between 1 and 4 per cent of the value of the goods. The card issuer allocates each borrower a maximum credit facility, or credit line, up to which they can spend without the need for further negotiation.

ii. Credit card accounts represent one of the most complex forms of consumer credit agreement, and the detail of their operation is not well understood by a large proportion of users. This is mainly because of subtle differences in the way different lenders calculate interest and apply charges, with different rates and charges applied to different parts of the balance depending on whether it originated from a balance transfer, retail purchase, cash withdrawal or some other type of transaction.

iii. Most credit card accounts represent an unsecured form of credit. However, some lenders, particularly in the US, will offer high risk customers credit cards secured against cash deposited in an account controlled by the credit card issuer. The credit line on the card is then set to be equal to the value of the deposited funds. After the customer has demonstrated good repayment behaviour for a period of time, the issuer may allow the account to transfer to an unsecured status with the credit limit increased beyond the value of the secured funds.

iv. If the merchant makes a sale of 100, it receives only this value less a discount amount. If we assume that to be 3/-. This 3 is shared between issuing bank, POS machine bank and the interchange company.

v. The interest charges on the credit card outstanding are for the loan given and belong completely to the card issuing bank.

## 6.2. Steps in the Card Process:

i. Bank issues customer a credit card after a credit assessment process

ii. Bank updates card information on the database of the interchange company: Visa / MasterCard

iii. The customer receives the card with pin to operate it

iv. Customer uses the card at a merchant location

v. The pin / charge slip signed indicates satisfactory receipt of product / service

vi. The merchant sends charge slips to interchange company to receive funds

vii. The interchange company sends data to the bank

viii. The bank bills the customer

ix. The customer repays card balance as per convenience and within terms of the issuance of the credit card

## 6.3. Debit Cards

Everyone that opens a checking account at the bank receives a linked debit card. It operates similar to the credit card with the following differences:

i. There is no lending involved in debit cards: therefore no credit risk

ii. Interchange fees are lower

iii. The legal framework for debit cards and credit cards are different

iv. A debit card transaction will fail if there is no bank balance in the linked checking account

v. Legal protection for merchant failures are more in credit card than in debit cards

## You should now be able to:

- ☑ Describe how the Credit Card works
- ☑ Describe how the Debit Card works

## Concept Check

A. If a person wanted to transaction on the internet, she would need:

- ☐ Her debit card, credit card or use net banking
- ☐ Net banking access; nothing else will work
- ☐ Her debit card; nothing else will work
- ☐ Her debit card; nothing else will work

B. Which of the following cards can be used to draw cash at an ATM:

- ☐ Only a Debit Card
- ☐ Only a Credit Card
- ☐ Either a Debit or a Credit Card of the particular bank that has placed that ATM machine
- ☐ Either a Debit or a Credit Card operating on the same card system as that ATM machine

C. A Credit Card represents an unsecured personal loan which is used when

- ☐ The card is issued
- ☐ The card is used at a merchant establishment only
- ☐ The card is used at a merchant establishment or an ATM
- ☐ The card is used at an ATM only

# 7. Large Value Payment Systems

## Chapter Overview

This chapter is designed to help the participants get a sound understanding of the Large Value Payment Systems. Specifically, you will learn about the various Large Value Payment systems Fedwire, etc. We will get to know about the role of clearing houses in the LVPS. We will have a fair knowledge about the CHIPS and how it works. TARGET2 will be another LVPS we will get to know about.

## Table of Contents for Chapter 7

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## 7.1. Clearing Houses for Large Value Payment Systems

In the United States, payment and securities settlement systems consist of numerous financial intermediaries, financial services firms, and non-bank businesses that create, distribute, and process large-value payments. The bulk of the dollar value of these payments are processed electronically and are generally used to purchase, sell, or finance securities transactions; disburse or repay loans; settle real estate transactions; and make large-value, time-critical payments, such as payments for the settlement of interbank purchases and sales of federal funds, settlement of foreign exchange transactions, or other financial market transactions.
There are two primary networks for interbank, or large-value, domestic, funds transfer payment orders. The first, Fedwire® Funds Service, is operated by the Federal Reserve Banks, and is an important participant in providing interbank payment services as well as safekeeping and transfer services for U.S. government and agency securities, and mortgage-backed securities. In addition, Fedwire3 Funds Service and the Federal Reserve's National Settlement Service (NSS) are critical components used in other payment systems' settlement processes. The Clearing House Interbank Payments Company L.L.C. (CHIP Co.) operates the second, the Clearing House Interbank Payments System (CHIPS).

Processing large-value funds transfers involves two key elements: clearing and settlement. Clearing is the transfer and confirmation of information between the payer (sending financial institution) and payee (receiving financial institution). Settlement is the actual transfer of funds between the payer's financial institution and the payee's financial institution. Settlement discharges the obligation of the payer financial institution to the payee financial institution with respect to the payment order. Final settlement is irrevocable and unconditional. The finality of the payment is determined by that system's rules and applicable law.

In general, payment messages may be credit transfers or debit transfers. Most large-value funds transfer systems are credit transfer systems in which both payment messages and funds move from the payer financial institution to the payee financial institution. An institution initiates a funds transfer by transmitting a payment order (a message that requests the transfer of funds to the payee). Payment order processing follows the predefined rules and operating procedures of the large-value payment system used. Typically, large-value payment system operating procedures include identification, reconciliation, and confirmation procedures necessary to process the payment orders. In some systems, financial institutions may contract with one or more third parties to help perform clearing and settlement activities on behalf of the institution.

The legal framework governing payment activity and the regulatory structure for financial institutions that provide payment services is complex. There are rules for large-value payments that are distinct from retail payments. Large-value funds transfer systems differ from retail electronic funds transfer (EFT) systems, which generally handle a large volume of low value payments including automated clearinghouse (ACH) and debit and credit card transactions at the point of sale.

## 7.2. Fedwire Funds Service

Fedwire Funds Service is a real-time gross settlement system (RTGS) enabling participants to transmit and receive payment orders between each other and on behalf of their customers. Real-time gross settlement means that the clearing and settlement of each transaction occurs continuously during the processing day.

Payment to the receiving participant (payee) over Fedwire Funds Service is final and irrevocable when the Federal Reserve Bank either credits the amount of the payment order to the receiving participant's Federal Reserve Bank reserve account or sends notice to the receiving participant, whichever is earlier.

Fedwire Funds Service participants must maintain an account with a Federal Reserve Bank. Because of this requirement, non-financial organizations are not permitted direct access to Fedwire Funds Service, although these entities may use these services indirectly as customers of deposit-taking financial institutions.

Certain payment and securities settlement systems, such as CHIPS and CLS, also rely upon Fedwire Funds Service to allow participants or its correspondents to provide necessary funding.

Financial institutions sending a Fedwire Funds Service payment order irrevocably authorise their Federal Reserve Bank to debit (charge) their Federal Reserve account for the transfer amount and to give credit in the same amount to the payee. Only the originating financial institution can have funds removed from its Federal Reserve account using the Fedwire Funds Service. Depository institutions that maintain a reserve or clearing account with a Federal Reserve Bank may use Fedwire Funds Service to send payments to, or to receive payments from, other account holders directly. Once the Federal Reserve Bank credits the receiving institution's account, it will not reverse the transaction at the request of the originating institution.

Financial institutions may access the Fedwire Funds Service via high-speed direct computer interface (CI), FedLine, or with off-line telephone connectivity with a Federal Reserve Bank. Financial institutions may also access certain Fedwire Funds Service inquiry information via FedLine for the Web. On-line participants, using either a CI or FedLine PC connection to Fedwire Funds Service; require no manual processing by the Federal Reserve Banks. Off-line participants provide funds transfer instructions to one of two Federal Reserve Bank customer support sites by telephone, and after authenticating the participant, the Federal Reserve Bank enters the transfer instruction into the Fedwire Funds Service system for execution. The manual processing required for off-line requests makes them more costly and suitable only for institutions processing a small number of funds transfer payment orders.

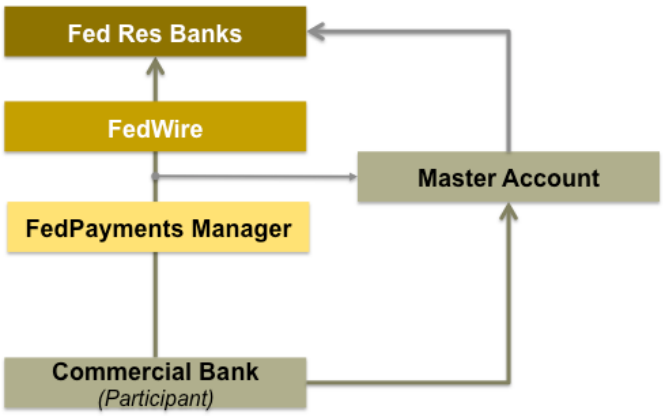
The Federal Reserve Bank's FedLine for the Web currently offers access to low-risk Federal Reserve Bank financial services. FedLine Advantage, allows depository institutions access to additional Federal Reserve financial services, including the Fedwire Funds Services and the Fedwire Securities Service, via a secure Internet Protocol (IP) gateway to Federal Reserve Bank financial services. Residing on a secure Web server, FedLine Advantage will be accessible to customer financial institutions with authenticated credentials using digital certificates.

They cover:

i. Large and small payment transactions
ii. U.S. dollar foreign exchange settlements
iii. Financial settlements (e.g., Loan and interest payments)
iv. Commercial payments
v. Off shore investments

### 7.2.1. Structure of the Fedwire System

The chart shows how commercial banks use Fedwire to move money when making payments. The communication with the Fedwire is through the FedPayments Manager. A separate Master Account is maintained with the Federal Reserve to supply the money needed to make a transfer to the recipient's bank.



### 7.2.2. Fedwire Business Day & Timelines

The FRB's commitment is to process payments within the Fedwire business day. The Fed's business day:

- ☑ Starts at 9 p.m. Eastern Standard Time on a given day
- ☑ Goes past midnight into the next calendar day
- ☑ Remains open till 6.30 p.m. on that next day

This means it effectively stays open for 21.5 hours. It shuts at 6.30 p.m. only to reopen 2.5 hours later.

It also means that the commitment to process a payment may go beyond the calendar day for instructions received after 9 p.m.

### 7.2.3. Fedwire Pre-funding

There is no pre-funding requirement in the Fedwire system. The balance at opening is the carry forward of the closing balance of the previous cycle.

## 7.3. TARGET 2

TARGET 2 (Trans-European Automated Real-time Gross settlement Express Transfer) is the Euro system's interbank funds transfer system, which is designed to support the Euro system's objectives of defining and implementing the monetary policy of the euro area and promoting the smooth operation of payment systems, thus contributing to the integration and stability of the euro area money market. While the first TARGET 2 system was made up of RTGS (real-time gross settlement) systems in all participating countries and the ECB payment mechanism (EPM), connected by an interlinking component, TARGET2 is a single centralised system, offering the same level of service to all TARGET2 users. It has been designed and built to meet the highest standards of robustness and operational reliability.

The system has been designed in such a way that it is able to **process cross-border payments** denominated **in euro** as smoothly as if they were domestic payments. TARGET2 processes only transfers denominated in **euro.** The aim is to allow payments, especially **large-value payments** such as those relating to **foreign exchange** and **money market transactions,** to be made throughout the euro area at low cost with high security and very short processing times.
As it is a RTGS system, payments are handled individually. Unconditional payment orders are automatically processed one at a time on a continuous basis.
Thus, TARGET2 provides immediate and final settlement of all payments, provided that there are sufficient funds or overdraft facilities available on the payer's account with its central bank. There is no set minimum amount for a payment made through TARGET2.

### 7.3.1. TARGET2 structure

**Governance structure**

The management of TARGET2 is based on a three-level governance scheme. The tasks are assigned to the Governing Council (Level 1), the Euro system central banks (Level 2) and the SSP-providing central banks (Level 3).

**Technical Structure**

From a technical point of view, TARGET2 is structured as described below:

i. The single shared platform (SSP) with the payment and accounting processing services systems (PAPSS) and the customer-related services systems (CRSS);
ii. the PAPSS with the payments module (PM), the standing facilities module (SF), the reserve management module (RM), the home accounting module (HAM), the static data module (SD), the contingency module (CM) and the information and control module (ICM);
iii. The customer-related services systems for central banks only (CROSS, CRAKS and CRISP);
iv. The central banks with a proprietary home account (PHA), reserve management and intraday credit;
v. The banks are connected via SWIFT;
vi. The ancillary systems are connected via SWIFT.

## 7.3.2. Organisational structure at ECB / NCB

The sole contact point for TARGET2 users is the national service desk at their respective National Central Bank (NCB). Within the Euro system, the national service desk is represented by the settlement manager. All settlement managers are interlinked by means of a standing teleconference facility. Each NCB also has a crisis manager who is informed via the respective settlement manager and is involved in the case of problem escalation. The crisis managers are also interlinked via a standing teleconference facility.

## 7.3.3. Types of payment

TARGET2 offers its participants settlement services in euro, with settlement in central bank money.

- ☑ Every euro payment that is to be settled in real time and in central bank money can be settled via TARGET2.
- ☑ Direct TARGET2 participants can submit the following payment and SWIFT message types:
  - ☑ Credit transfers (MT 103, MT 103+, MT 202)
  - ☑ Direct debits (MT 204)

As a general rule, payments are executed immediately if there is sufficient liquidity on the RTGS account of the participant. In order to have payments settled according to priority, the participant can assign the following priorities:

- ☑ Priority level 0 = highly urgent payments
- ☑ Priority level 1 = urgent payments
- ☑ Priority level 2 = normal payments

Each priority level has special characteristics. Some priority levels can only be used by certain participant groups.

**Customer payments**

Customer payments are defined as credit payments in the SWIFT MT103 and SWIFT MT103+ formats (standard and STP). Customer payments can be processed in TARGET2 from 07:00 until 17:00.

**Interbank payments**

Interbank payments are defined as credit payments in the SWIFT MT202 format and in MT202COV format, and direct debit payments in the SWIFT MT204 format. These messages are sent by or on behalf of the ordering institution

either directly or through any correspondent(s) to the financial institution of the beneficiary institution.
Interbank credit payments MT202 are payments, such as the payment leg of money market, foreign exchange and derivatives transactions, which take place between credit institutions or between NCBs/the ECB and credit institutions.

MT202COV are interbank payments that “cover” underlying customer payments and contain fields for the originator and beneficiary of the credit transaction.
Direct debits MT204 in TARGET2 are intended for wholesale purposes only and are restricted to interbank transactions. In any case, the respective TARGET2 users have to agree with the parties allowing the debiting of their accounts on the terms and conditions for using this service. The TARGET2 user authorises another TARGET2 user to issue a direct debit order. The TARGET2 user also has to inform its central bank, which is responsible for recording and administrating the pre agreements. Interbank payments can be processed in TARGET2 from 07:00 until 18:00.

### 7.3.4. Payment settlement

In TARGET2, each individual payment submitted is processed entirely in real time. This means that the individual payment is taken into account in each stage of processing. This includes the possibility of checking the status of the payments in the Information and Control System and changing important control parameters of individual payments (eg their position in the queue).

In TARGET2, all incoming payments are settled on a gross basis, which means the following:

- ✓ Cover principle Settlement in central bank money
- ✓ Immediate, real-time booking

Settled payments are booked immediately on the RTGS account and are then irrevocable. Payments that have not been settled remain in the queue until no longer than the end of the business day.

Depending on the payment type, the participant's payments in the queue are settled in a liquidity-saving way using high-performance settlement algorithms.
The following rules apply.

In the case of highly urgent and urgent payments, an event-oriented check is performed as to how they can be settled. This check occurs in the following cases.
Each new inflow of liquidity
Change to the sequence of highly urgent and urgent payments
Recall of a highly urgent or urgent payment
Change of payment type

In the case of normal payments, there is a continuous settlement process. This involves all highly urgent, urgent and normal payments in the queue under consideration of the set limits and the reserved liquidity.

TARGET2 supports the settlement of time-critical settlement payments that the participant has to make to other clearing procedures (e.g. CLS, EURO1). The following functions are available in this case:

- ☑ Reserving liquidity
  - ✓ Prioritising payments
  - ✓ Setting execution time

### 7.3.5. Payment Flow

The customer interface between TARGET2 and its direct participants is based on SWIFT. The SWIFT FIN Y copy service and a dedicated SWIFT closed user group are used for the payment flow via TARGET2. The use of the Y copy service allows participants to address their payments as they would in correspondent banking. The addressing of TARGET2 payments is supported by a TARGET2 directory (directory of all banks that can be addressed via TARGET2).

## 7.4.Comparative Systems Across the Globe

There are similar systems in all principal economies of the world. The following table gives the names of some the main Large Value Payment Systems in the world. They all work similarly with the following differences which you should check if you have to work with any system:

- ☑ Pre-opening time
- ☑ Pre-funding requirements
- ☑ Customer transaction opening time
- ☑ Funding lines available from the Central Banker
- ☑ Customer closing time
- ☑ Interbank closing time

| | | | |
|---|---|---|---|
| UK | CHAPS | EU | TARGET2 |
| USA | FedWire | INDIA | RTGS |
| SINGAPORE | MEPS + | HONG KONG | CHATS |
| JAPAN | BOJ - Net | AUSTRALIA | RITS |

**You should now be able to:**

- ☑ Describe how Large Value Payment Systems work
- ☑ Name LVPS in the principal economies of the world

## Concept Check

A. Fedwire opens at :

- ☐ 9 a.m EST
- ☐ 6.30 a.m. EST
- ☐ 9 p.m. EST
- ☐ 10 a.m EST

B. A Fedwire payment instruction given at 11 a.m. is committed by the FRB to be processed before:

- ☐ 6.30 p.m EST on that same day
- ☐ 9 p.m EST on that same day
- ☐ 6.30 p.m EST on the next day
- ☐ 9 p.m EST on the next day

C. Target2 operates in:

- ☐ The EU for Euro only
- ☐ The EU for Euro plus all currencies of EU countries not using the Euro
- ☐ The UK for GBP & Euro
- ☐ The EU for Euro & GBP

Even though slightly dated, this excellent US Fed research document will be of great use to students in understanding the underpinnings and issues that an LVPS must address to be considered reliable!

# 8. Cross Border Payments

### Chapter Overview

This chapter will deal with cross border payment systems which will cover the general principles, need for CLS and its importance in today's world. We will also get to know about the Nostro & Vostro accounts. CLS will be dealt with in fair detail.

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## 8.1. Cross border payments - General Principles

Cross border payments have to be considered separately from domestic payments for the following reasons:

- ☑ The currency of one country never actually crosses the borders as a means of settling dues to a person in another country. The notes we encounter at money changers at airports and other locations are for travel purposes and to put it in context, constitute a very small / minuscule percentage of all money paid.

- ☑ The resident of a country needs his own country's currency to make local payments for items of consumption like purchases, rent, utility bills, salaries and wages and so on. Foreign currency, even if more valuable and treated as an appreciating asset is of no use in meeting obligations in those situations described above.

- ☑ To reach money to a Recipient you have to reach money to the Recipient's Bank.

- ☑ If the Recipient's Bank is in another geography, either the paying bank should be present in that geography; or the Recipient Bank should have a branch in the Payer's geography.

- ☑ The required account of the Recipient Bank in the Payer's country is the Recipient's Nostro Bank Account.

- ☑ Alternatively the required account of the Payer Bank in the Recipient's country is the Payer's Nostro there.

- ☑ Finally, to take a basic principle from payments in general, If a payer reaches money to a Recipient's Bank, whether by crediting Recipient's Nostro in paying country or by debiting Payer's Nostro in recipient's country then and only then can a payment be effected. Paying a Recipient also means paying the Recipient's Banker.

## 8.2. Nostro and Vostro Accounts

All internationally active banks maintain accounts in those currencies in which they have large volumes of dealings.

The account of a bank in a foreign currency maintained in that foreign currency centre is termed as a Nostro Account. Nostro literally means "our account with

them". It therefore implies one bank's foreign currency account with a particular bank in that other location.
However, this literal meaning is neither valid anymore nor is it useful in promoting our understanding.

For instance, the foreign currency account might be in "my own" bank's branch in London, UK. It would still be a Nostro even there is no "them" involved in the literal sense. It is best understood as a foreign currency account in the commercial centre for that currency/country.
For US Dollars the Nostro account would be a dollar denominated bank account in New York, USA. For Pounds Sterling Nostros are in London, UK. For the Euro in either Frankfurt or Paris, possibly Amsterdam. For the Australian Dollar in Sydney. For the Indian Rupee in Mumbai, India and so on.

The concept of Vostro literally means "their account with us". This necessarily implies that the paying bank maintains an account in the local currency with our bank. The Paying Bank may ask for payments to be made out of this account "with us". However, operationally, equally the Paying Bank may ask for payments to be made out of a Nostro Bank account they maintain in the Recipient Bank's country. So Vostro needs to be interpreted narrowly in the context of the account necessarily being 'with us'.

Nostro is a broader concept and is more useful in promoting our understanding of cross border payments in general terms. Every bank which deals in a particular currency will have a dedicated Nostro account for that currency. Given a number of currencies in which a bank may deal it has to have a Nostro account for each currency.

Thus, a bank will have a string of Nostro accounts and typically the following currency Nostros are almost always maintained by every bank: US Dollar Nostro, Euro Nostro, Pound Sterling Nostro, Australian Dollar Nostro and Japanese Yen Nostro. As China increases its role in international trade and starts to conduct its trade in Yuan, banks will also need a Chinese Yuan Nostro.

**An example:** assume that John in London wishes to make a payment to Joe in New York.

A. Firstly, John in London has GBP but Joe in New York should receive USD.
B. Either John's bank in London should have a USD Nostro account. In this case John's UK account will be debited and from the Nostro account in NY, USD will be transferred to Joe's account.
C. Alternatively, Joe's bank in New York should have a Vostro account with John's bank. John's bank can then credit the Vostro with GBP by debiting John's account. Joe's bank will then transfer the corresponding dollars to Joe's account.

In this example, it is sufficient if either John's bank has a Nostro in NY. Or if Joe's bank has a Vostro with John's bank in London.

**Principle 1:** Each counterparty's account gets touched in the local currency only .

Example: If a Payer is in USA: only the USD account can be debited.
Example: If a Receiver is in Mexico: only the MXN account can be credited.

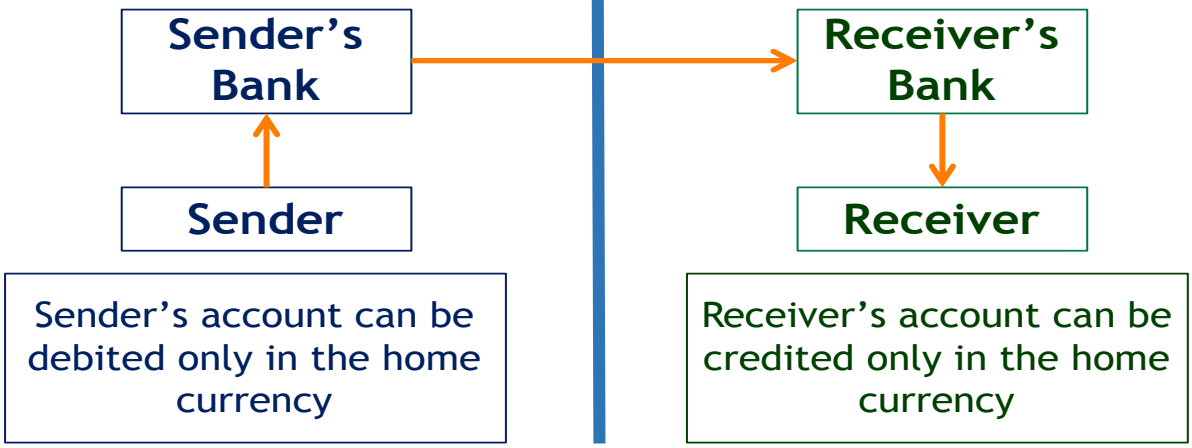
**Sender**

Sender's account can be debited only in the home currency

**Receiver**

Receiver's account can be credited only in the home currency

**Principle 2: Money moves through banks only.**




**Principle 3: Either bank needs to be active in the other Currency Zone**

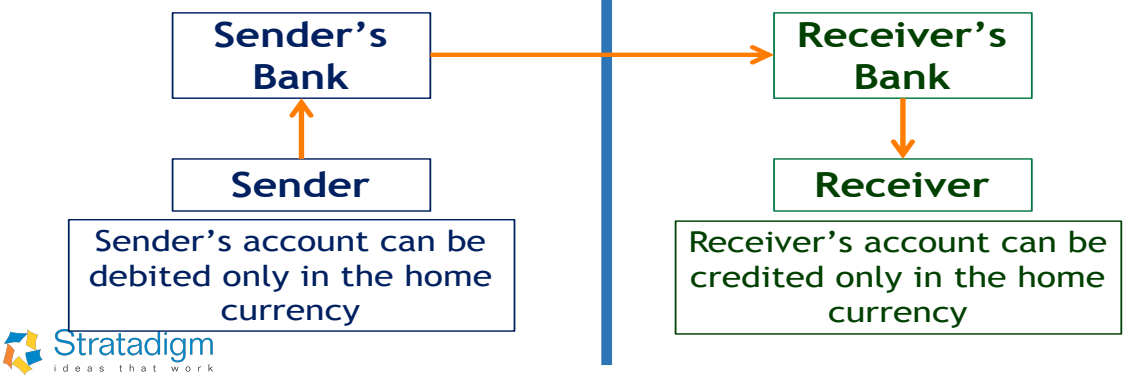
To receive: Receiver Bank should have an account in this currency zone to receive into.

*This is called the Nostro Account of the Receiver.*

OR

Sender Bank should have a bank account in this Currency Zone to pay from

*Before this bank parts with money, it will want to receive money from Sender Bank*



## 8.3. Correspondent Banking

All banks are not present everywhere. Yet, to receive money from another country either the Recipient Bank needs to be present in that other country (via Nostros / Vostros). Alternatively, the Payer Bank needs to be present in the Recipient Country.

The solution is in Correspondent Banking, whereby a bank which needs to be present in a location but is not present there, has a tie up with another bank which is indeed present in that location. This tie up is known as Correspondent Banking and the bank offering access is called the Correspondent Bank. Correspondent Banks earn fees and volumes for services rendered. The customer bank gains access to the banking system of the Correspondent Bank's country.

It should be noted that Correspondent Banking exists in domestic situations as well. If a bank is not a member of a particular clearing system but has a need to offer benefits of that clearing system to its customers, it will enter into a Correspondent Banking relationship.
In this situation one of the benefits to the customer bank is that it does not have to fulfil membership obligations of that clearing house. Such obligations include fees and volume commitments. Fees may not be affordable if the customer bank is small. Volumes may not be achievable at all. Correspondent Banking helps in these situations.

### 8.3.1. Risk Management in Correspondent Banking Relationships

Correspondent banking is globally recognised as an inherently high risk business because of the following characteristics:

- Provides access to the global financial system
- Cross border/high volume/third party transactions
- Products offered support high speed movement of funds
- Differing regulatory regimes, levels of enforcement and multi-lateral agency cooperation
- By nature, correspondent banks have a symbiotic relationship requiring some reliance on their client bank's programs

Money launderers exploit vulnerabilities to successfully legitimize illicit funds. Vulnerabilities in correspondent banking come in many forms. Identifying these vulnerabilities or risks is critical if a financial institution is to mitigate and manage them. Banks have many considerations when deciding to establish correspondent banking relationships, including credit and operational risk. The risks associated with money laundering or terrorism financing (ML/TF risk) should be an integral part of this process and the main risks are outlined here.

### 8.3.2. Inadequate Due Diligence Risk

The degree of due diligence exercised by some banks appears to be determined by whether credit is being granted in the correspondent relationship, with more due diligence carried out where credit is being granted. The failure of banks to include measures to detect money laundering or terrorism financing when undertaking due diligence on correspondent accounts exposes them to ML/TF risk. Banks are exposed to greater risk on correspondent accounts if:

- ✓ The correspondent bank provides services to banks that are not physically present in any country(shell banks)

- ✓ A correspondent bank establishes a relationship with a respondent bank that permits the opening of accounts for carrying out transactions with shell banks
- ✓ The respondent bank has a relationship with a third-party bank (nested accounts)
- ✓ The country of the respondent bank has not implemented AML / CfT regulations
- ✓ The correspondent bank has not reviewed the respondent bank's existing AML / CfT practices before establishing the relationship
- ✓ The respondent bank does not apply KYC controls to identify existing and non-established customers
- ✓ The respondent bank has a reputation of a poor financial position
- ✓ The respondent bank has been subject to regulatory action
- ✓ The respondent bank does not conduct regular audits
- ✓ The respondent bank does not employ a monitoring system designed to identify and report suspicious activity/transactions
- ✓ The respondent bank does not screen new account activity against lists of known or suspected terrorists.

### 8.3.3. Payments

Payments or funds transfer systems may represent a heightened degree of risk, depending on factors such as:

i. The number and dollar volume of transactions
ii. Whether cash is involved
iii. The geographic location of originators and beneficiaries
iv. Whether the originator or beneficiary is a bank customer
v. Whether the customer has been identified
vi. Whether the source of the funds has been established.

### 8.3.4. Payable through accounts

Banks should be particularly alert to the risk that correspondent accounts might be used directly by third parties to transact business on their own behalf; for example, by using payable through accounts.

Payable through accounts typically involve a foreign bank providing its local customers with a full range of banking services (including deposits, withdrawals and check accounts) at the local bank through the foreign bank's correspondent account. Payable through accounts are also known as 'pass through accounts' or 'pass by accounts' and such customers are referred to as 'sub-account holders'.

Payable through account activities should not be confused with traditional correspondent banking relationships, whereby a foreign bank's customers can transact through a domestic bank but they do not have direct access to the correspondent account at the domestic bank. A payable through account arrangement actually provides sub-account holders with direct access to the domestic bank to independently transact.

### 8.3.5. Examples of Possible Suspicious Correspondent Account Activity

i. In some circumstances, the following activities, none of which per se constitutes Suspicious Correspondent Account activity, may be indicative of Correspondent Account activity that may require further investigation and a closer review:
ii.
iii. Wire transfers in large dollar amounts, where the Correspondent

Account has not previously been used for similar transfers;

iv. Unusually large numbers of wire transfers;
v. Transactions conducted in bursts of activity within a short period of time;
vi. Unexplained repetitive or unusual patterns of wire transfer activity;
vii. Unusual volume of the Respondent Bank's own bank check or dollar draft activity.
viii. Unusually high numbers of returned or rejected items;
ix. A request by a Respondent Bank to establish a relationship with, or route a transaction through, a financial institution that is not accustomed to doing business with Foreign Banks and that has not sought out business of that type;
x. The routing of transactions involving a Respondent Bank through several jurisdictions and/or financial institutions prior to or following entry into the Bank without any apparent purpose other than to disguise the nature, source, ownership or control of the funds;
xi. Frequent or numerous wire transfers originating from or for the benefit of Shell Banks or High Risk Respondent Banks;
xii. Frequent or numerous wire transfers either to or from the Correspondent Account of a Respondent Bank originating from or going to a Non-Cooperative Jurisdiction;
xiii. Beneficiaries maintaining accounts at Foreign Banks that have been the subject of previous suspicious activity reporting due to suspicious wire or other wholesale product activity.
xiv. Reappearing beneficiary banks based in offshore locations, the account of at least one of which has been closed by the Bank due to overall suspect activity.
xv. Large currency or bearer instrument transactions either into or out of the Correspondent Account of a Respondent Bank;
xvi. The deposit or withdrawal from a Respondent Bank's Correspondent Account of multiple monetary instruments (e.g. traveler's checks, money order, bank drafts) just below the reporting threshold on or around the same day, particularly if the instruments are sequentially numbered;
xvii. Issuance of large volumes of cashier's checks or bank drafts against the Respondent
xviii. Bank's Correspondent Account, particularly when the face amounts are less than local reporting requirements.
xix. High-value deposits or withdrawals, particularly irregular deposits or withdrawals, not commensurate with the type of Correspondent Account or business of the Respondent
    i. Bank;
xx. Wire transfers to accounts of individuals identified by law enforcement agencies as being suspected of engaging in money laundering or terrorist activities; and
xxi. An inquiry by or on behalf of a Respondent Bank regarding exceptions to the reporting requirements of the Bank Secrecy Act (for example, currency transaction reports and suspicious activity reports) or other rules requiring the reporting of suspicious transactions.

## 8.5. Information Requirements for Payments


Electronic payment systems and all cross-border payment systems are Payer initiated. The payer must ask his bank to make the payment to the recipient. To do so, the Payer needs to provide significant and specific information covering the Recipient and the Recipient's

Bank.

It is logical that the Payer can get this data only from the Recipient. If the Recipient leaves any gaps in information there is no way for the Payer to know.

Perfect transaction processing (Right First Time as a process objective) requires that the Payer Bank makes it absolutely clear to the Payer as to what all information is needed from the Recipient.

The matter is further complicated by the fact that the Recipient needs to furnish information from Recipient Bank which is one more 'data transfer layer'. The information requirements are as follows:

**Recipient Data:**

i. Recipient Name
ii. Bank account number
iii. Recipient Bank name

**Recipient Bank Data:**

iv. Recipient Bank's Nostro Account Number
v. Address of Recipient Bank at Nostro location
vi. Fedwire number/RTGS details/ABA number (country equivalent) of Recipient Bank
vii. Recipient's SWIFT Address

Where a Correspondent Bank is involved the same information as listed for Recipient Bank needs to be provided for the Correspondent.

Where a payment is routed through a series of such arrangements then information for every bank in the link needs to be provided. Since this data is needed at initiation of payment the route the money is going to take needs to be previously ascertained; and all related information needs to be provided upfront.

We can now examine different payment systems always keeping in mind that the Payer aims to hit (credit) the Nostro of the Recipient Bank so that onward credit may be passed to the Recipient.

## 8.6. CHIPS The Clearing House Interbank Payment System

**This system is used by all international banks that have a requirement to settle one leg of a foreign exchange transaction in US Dollars.**

### 8.6.1. Time Lines:

- A CHIP is available from 9:00 a.m. until 5:00 p.m.
- CHIPS regular cutoff occurs daily at 5:00 p.m. (ET). Approximately thirty minutes before cutoff each participant is notified of the scheduled cutoff time.
- At cutoff, CHIPS transmits to participants the net amounts due to them, or due from them, for the day.

### 8.6.2. Settlement Type:

CHIPS is a real-time final settlement system (RTFS) with a risk profile similar to that of real-time gross settlement (RTGS) system.

Yet it calculates and settles Net Basis at frequent Intervals.

### 8.6.3.CHIPS – Connectivity:

A communication line to CHIPS is assigned virtual circuit numbers on which the clearing participants send and receive messages, much like the L-terms on the FRB line.

### 8.6.4.Chips Identification Codes

- **UID** – Universal Identifier:
  - A database of identification numbers that verifies and matches customers to their bank account information
  - Unique six digit identifier on the CHIPS database for an institution that holds an account with one or more CHIPS participants
  - Each Customer is assigned a identifier – Universal Identifier
- **PN** – Participant Number
  - Unique four digit number assigned to an institution that sends and receives payments through the CHIPS clearing house (i.e., is a clearing house member).
  - Maximum amount that can be processed is One Cent less than 10 billion dollars ($9,999,999,999.99)
  - Messages input to CHIPS should not exceed 12,200 characters.

## 8.7. CHIPS - Key words:

- **PSN** - Payment Sequence Number – 7 Digit Numeric number to be assigned by the sender. Each payment from a sender is uniquely identified by the number.
- **ISN** – Input Sequence Number (Issued by CHIPS) (6-Digit), Assigned by CHIPS on receipt of the message from a sender.
- **OSN** - Output Sequence Number (Issued by CHIPS) (6-Digit)
- **RSN** – Resolved Sequence Number (issued by CHIPS) (6-Digit)
- **SSN** – System Sequence Number (7-Digit), Assigned by CHIPS on receipt of the message from a sender.

## 8.8. CHIPS Operation Environment

- ✓ Participant, with CHIPS approval, becomes a party to the CHIPS Pre Funded Balance Account at FRBNY
- ✓ FRBNY holds all funds in the Chips Pre Funded Balance Account for joint benefit of all participants
- ✓ During the day, payment messages released by CHIPS are recorded in its systems books, not FRBNY
- ✓ FRBNY neither takes any action during the day to reflect the payment messages released by CHIPS
- ✓ Nor does any participant have a separate individual claim against FRBNY for any balance.

## 8.9. Settlement Cycles

Settlement is tiered, with 20 settling participants, 10 members of the New York Clearing House and 10 non-members. The settling participants settle both for themselves and for

non-settling participants. Each non-settling participant must designate a settling participant to settle for it. Settlement is completed when all settling participants owing funds have made payments to the special account and funds have been transferred from the special account to CHIPS-settling participants due funds.

For example, suppose a London bank wants to transfer $1 million from its account at one New York correspondent bank "A," to an account at second New York correspondent bank "B." Banks "A" and "B" are both CHIPS participants.

The London bank sends bank "A" a payment instruction by telex or through the SWIFT system. Bank "A" verifies the London bank's message and prepares to enter it into CHIPS, providing the identifying codes for the sending and receiving banks, the identity of the account at bank "B" which will receive the funds, the amount of the transaction and any other pertinent payment information.

Bank "A" then releases the message. The CHIPS computer verifies that the transaction is within "A's" net debit cap and does not exceed "B's" bilateral limit for "A" and, if within these limits, transmits the message to "B". If either limit is exceeded, the message is rejected. Upon transmission, the CHIPS computer also makes a permanent record of the transaction and makes appropriate debits and credits for the CHIPS records.

When bank "B" receives a CHIPS credit message for one of its respondents, bank "B" notifies the bank that the funds are being credited to its account.

Immediately following the closing of the CHIPS network at 4:30 p.m. (Eastern time), the CHIPS computer produces a settlement report showing the net debit or credit position of each participant.

A separate settlement report shows the net position of each settling participant. The net position of non-settling participant is netted into the position of its correspondent settling participant.

The settling banks have one hour to determine whether they will settle the net position of those participants for which they settle. If none refuse to settle, the settling participants with net debit positions have until 5:30 p.m. (Eastern time) to transfer their debit amounts through Fedwire to the CHIPS settlement account on the books of the New York Fed.

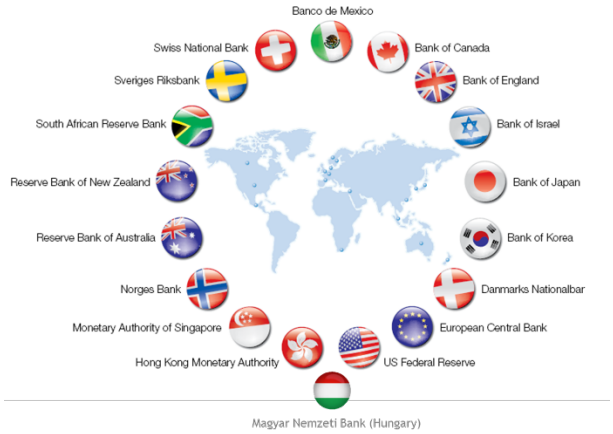
When this procedure has been completed, the Clearing House transfers those funds via Fedwire out of the settlement account to settling participants with net credit positions. The process usually is completed by 5:45 p.m. (Eastern time). Like all Fedwire transfers of funds, transfers into and out of the CHIPS settlement account are final and irrevocable upon receipt.

## 8.10.Continuous Linked Settlement

Continuous Linked Settlement (“CLS”), which went live on 9th September 2002, is a key development in the banking industry in recent years.

Continuous linked settlement (CLS) is the only global payment system that operates on payment versus payment (PvP) basis for cross-border settlements in 18 currencies.

| | EUR | | USD | |
|---|---|---|---|---|
| | **Debit** | **Credit** | **Debit** | **Credit** |
| | 100 | | | 125 |
| | | 200 | 245 | |
| | 150 | | | 185 |
| Total | **250** | **200** | **245** | **310** |




The “continuous” means that the settlement runs continuously in the specified time-window until all the currency time zones are covered; and the “linked” means that the payment made for sold currency is linked to the payment to be received for bought currency.

Either both of them are settled or none of them is settled. Continuous linked settlement is different from trade guarantee. In the latter, the settlement is guaranteed; in the former, the principal amount is guaranteed, but not the settlement. If the settlement fails, the non-defaulting party will not lose the principal but has to replace the trade at the prevailing market price, which is subject to the loss of replacement cost.

Currently, six instruments are settled in each CLS currency: FX spot, FX forward, FX swap, FX option premium and exercise, non-deliverable forward (NDF) and credit derivatives. The first three involve settlement in two currencies on PvP basis. The last three involve payment in a single currency, which does not require PvP requirement, but CLSB provides value-added services (e.g. automated confirmation/exercise notice) in the instruments. In each of the CLS currencies, CLSB makes and receives payment with its members in the RTGS system through its accounts with central banks. CLSB has two types of members: settlement member and user member.

### 8.10.1.Settlement Members:

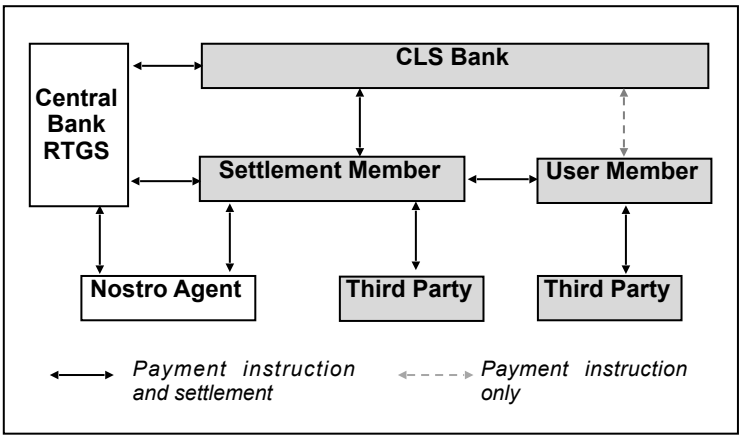
They maintain a single multi-currency account with CLSB and assume responsibility for settlement risk and providing liquidity. For this reason, only large financial institutions can be settlement members, and CLSB has prescribed certain qualifying criteria.

### 8.10.2.User Members:

They maintain a single multi-currency account with a settlement member, but can submit settlement instructions directly to CLSB, which are settled by the settlement member with CLSB. User member does not assume responsibility for settlement risk or liquidity support.

Members access the CLSB systems through SWIFTNet InterAct, which is an automated and interactive messaging system of SWIFT. There are two more parties in the CLS operations: third parties and Nostro agent. Third parties are users of the CLS, but not its members. They settle transactions through either user members or settlement members.

Nostro agents are neither users nor members of the CLS: they are facilitators. Since CLSB makes and receives payments only through RTGS systems, settlement members, too, must have access to them. If they do not have direct access to RTGS systems, then a Nostro agent will establish the connectivity between the CLSB and settlement members. In general, most settlement members have direct access to the RTGS system. The following exhibit shows the relations between various parties.




## 8.10.3.Submission of Settlement Instructions

Settlement instructions are submitted by settlement members and user members to CLSS via SWIFTNet. They can be submitted as soon as the trade is executed and up to 06:30 CET on value date. However, the best practice is not to submit the instruction after 00:00 CET on value date. In other words, cash value date trades are settled outside the CLS system.

## 8.10.4.Matching

After comparing the settlement instructions from both the parties, CLSS will assign the following trade status, which is made available to the members in real time.

| Status | Description |
|---|---|
| REJECTED | Possible duplication |
| INVALID | Not a CLS currency or a business day |
| SUSPENDED | Trade does not pass risk management tests |

| | |
|---|---|
| UNMATCHED | Settlement instruction not received from counterparty |
| MATCHED | Eligible for settlement |

Matched instructions can be cancelled or modified up to 00:30 CET on value date unilaterally and up to 06:30 CET on value date bilaterally.

### 8.10.5.Settlement and Funding

CLSS makes a distinction between settlement and funding. Settlement refers to the book entries in the settlement member's account with CLSB and is on *gross* basis. Funding is the pay-in in central bank RTGS funds and is on *net* basis. The following example illustrates the settlement and funding for three transactions in EUR/USD as follows. (Sale = Debit; Purchase = Credit.

CLICK ON THE NUMBER TO GO TO THAT PAGE

**Settlement** (in the settlement member's account with CLSB)

Settlement member pays EUR 250 and receives EUR 200; and pays USD 245 and receives USD 310. It is on *gross* basis. Funding (between CLSB and settlement member in RTGS funds)

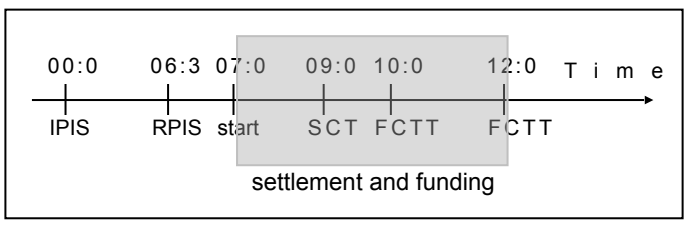
| EUR | | USD | |
|---|---|---|---|
| **Debit** | **Credit** | **Debit** | **Credit** |
| 50 | | | 65 |

Settlement member pays EUR 50 and receives USD 65. It is on *net* basis.

## 8.10.6.Multi-lateral netting

Multi-lateral netting before pay-in, results in, on an average, the reduction of 95% in funding and 99.75% in the number of transactions, which improves liquidity management and lowers transaction costs. The following is the timeline for various activities, which are summarised in exhibit below:

- 00:00 CET: Initial pay-in schedule (IPIS) after multilateral netting is issued; this is also the deadline for unilateral cancellation or amendment.
- 06:30 CET: Revised pay-in schedule (RPIS); this is also the deadline for bilateral cancellation or amendment.
- 07:00–12:00 CET: This is the five-hour settlement cycle time window, during which settlement will be completed in the first two hours while the funding takes place continuously.
- 09:00 CET: Settlement completion TARGET 2 time (SCTT)
- 10:00 CET: Funding completion TARGET 2 time for Asia-Pacific currencies (FCTT1)
- 12:00 CET: Funding completion TARGET 2 time for other currencies (FCTT2)



### 8.10.7.Processing Queue

Before the pay-in schedule is issued, settlement instructions are filtered based on certain risk management criteria (discussed in the next section). Since the funding takes place continuously, a large payment amount in the early stages may block all other payments and result in a total pay-in failure. To prevent such a situation, large amounts are split into smaller amounts to facilitate early pay-ins. After the pay-in occurs in the RTGS funds, CLSB completes the corresponding pay-out to the settlement member or its Nostro agent. The unsettled trades at 12:00 CET are removed from the queue, and the counter-parties will decide whether to settle them in CLS on the next day or settle it outside CLS on the same day.

**You should now be able to:**

- ☑ Describe the account structure needed for cross border payments
- ☑ Describe the routing of money for an overseas transfer
- ☑ Discuss the cautions in dealing with Correspondents
- ☑ Describe the working of CLS Bank

**Concept Check**

A. For a USA based company receive funds in Japan efficiently its banker should have:

- ☐ A nostro account in Tokyo that will be US Dollar denominated
- ☐ A nostro account in Tokyo that will be denominated in Japanese Yen
- ☐ A vostro account in Tokyo that will be US Dollar denominated
- ☐ A vostro account in Tokyo that will be denominated in Japanese Yen

B. CLS Bank operates in :

- ☐ 16 currencies
- ☐ 17 currencies
- ☐ 18 currencies
- ☐ 19 currencies

C. If MyBank is not present in a particular country:

- ☐ MyBank customers cannot transact there
- ☐ My bank's customers may force us to open a branch there
- ☐ MyBank can operate through a correspondent bank there
- ☐ MyBank will not survive in the long run.

Correspondent Banking volumes have been declining over risk considerations and the BIS published research on it, here, if that is an area of inerest to you!

# 9. Trailblazing trends in global payments

## Chapter Overview

This chapter covers certain broader trends seen in the global economy that are changing attitudes and driving behaviour in different ways. These changes in behaviour are both opportunities and threats to banks engaged in the payment business.

## Table of Contents for Chapter 9

## 9.1. Background

Diverse trends are driving deep structural changes across the global payments industry. On the retail side, consumers' use of mobile devices to shop both online and in-store is pushing merchants to adopt increasingly complex and powerful technology. On the corporate side, a new generation of solutions raises hopes among corporate treasurers of improved transparency and predictability of payments and the steady reduction of costly obstacles, especially in cross border payments, where liquidity is trapped in document-heavy processes.

To put these trends in perspective, 16 predictions and observations distilled from the payments arena around the globe. Each topic will help shape the payments arena and should figure in the strategic thinking of banks, card companies, processors and technology providers as they determine the best path and the right partners. Depending on size, client base and market position, their strategy will aim to defend core business, mount a charge of creative destruction, or strike a balance between the two.

## 9.2. With In-app, digital payment displaces cash

Multichannel shopping puts the consumer front and centre, and creates new sources of value for merchants. Mobile devices have become the "digital container" of our daily lives—communications, planning, shopping, health, transportation—making "in-app" the new battleground for both online and in-store shopping. The persistent strengths of cash—convenience (cash is versatile and widely accepted), control (cash is final and Spend is limited to cash in wallet) and value (it's free, at least in appearance)—vanish in a digitising world:

- ☑ **Convenience:** Stored preferences and account information enable both the automation and personalisation of payments, which can be initiated anytime, anywhere, with virtually no geographic boundaries.
- ☑ **Control:** Smart tools to control expenditures, increase savings and improve budgeting afford much broader control and stronger financial management than cash.
- ☑ **Value:** Repetitive interaction enables merchants (usually in cooperation with their payments and data analytics partners) to extend offers and services tailored to a consumer's location and needs.

## 9.3. Multichannel solutions win as channels converge

As consumers increasingly use their phones, tablets and computers to shop anytime, anywhere, merchants need to keep track of individual consumers across channels—Online, mobile, proximity—to ensure a consistent consumer experience. In order to stay in touch with the consumer at each step of the search-evaluate-buy-bond cycle, most merchants will forge partnerships and alliances with data analytics specialists and digital innovators.

To keep up with merchant requirements, payments companies must, therefore, be prepared to deliver integrated, multichannel solutions that combine, for example, preauthorisation, split payments and customer analytics across channels.

This will require expanded capabilities and strategic partnerships. Digital wallets have a key role to play in multichannel convergence, and in order to stand out from the competition, some wallets will incorporate multiple loyalty programs in order to determine the best deal by weighing card offers (e.g., extended warranties, special financing), store coupons and loyalty points, among others. While users value a unified, ubiquitous experience, data ownership and privacy have become major strategic considerations for consumers and merchants alike, as illustrated by Apple Pay's insistence on not collecting payments data.

CLICK ON THE NUMBER TO GO TO THAT PAGE

## 9.4. Migration to EMV ignites mobile payments

The migration to EMV standards across multiple regions outside Europe requires most parties to invest in chip technology. While issuers and acquirers bear the largest part of migration costs (converting all cards and acceptance technology from magnetic strip to EMV chip), merchants who fail to install chip readers assume huge financial risks in the form of liability for fraudulent transactions.

Some merchants are still oblivious to the new standards; however, many others are using the conversion as an opportunity to implement mobile payments solutions, including wallets, mobile payments terminals (e.g., Square, iZettle) and QR-payment applications (e.g., Zapper, LevelUp). As a result, mobile payments solutions will see exponential growth in specific regions and verticals, such as gas stations, events and ticketing, and health and beauty.

## 9.5. Non-banks will continue to lead in peer-to-peer

Peer-to-peer (P2P) payments remain a stronghold for cash in most markets, as many incumbent banks, being risk-adverse or unprepared to cannibalise traditional sources of income, have yet to make an airtight business case for P2P solutions. By contrast, digital innovators, including Pay-Pal, Alipay, TransferWise and Venmo, have realised benefits from P2P payments far beyond authorization, clearing and settlement and threaten to displace traditional banks from this important category of payments.

The main sources of value in P2P include:

- ✓ Cross-sell opportunities with related services (e.g., through booking, ordering, shopping, gifting, donating)
- ✓ Marketing insights derived from payments and browser data (e.g., used for event-based offers, promotions and marketing)
- ✓ High margins among small and medium sized merchants with consumer-like behaviours
- ✓ Attractive currency exchange margins on cross-border remittances

## 9.5. Big & Smart Data asks for Big, Smart Capabilities

Knowing how to extract value from data is the core competitive requirement in multichannel commerce. Data-rich solutions use powerful technology to capture and process data across channels and along each step of the value chain in order to provide real-time insights into the needs and preferences of retail consumers, SMEs or large corporations.

Traditional payments companies, burdened with legacy systems and a chronic deficit of top digital talent, must adapt to a new era of cloud-based data warehousing, application program interfaces (APIs), faster solutions development and launch, and periodic reliability-testing (e.g., hackathons) to reap the potential of big data in three areas:

Dynamic business steering, adjusting aggressiveness in specific customer segments at specific moments of time (e.g., risk appetite, pricing, payments conditions)
Insights- and behaviour-driven marketing, including micro-campaigning, cross-selling, retention
Data-rich consumer and enterprise applications, simplifying onboarding and servicing, reducing fraud and risk, and enabling spend comparisons

## 9.6. Loyalty enters a new age

Digital loyalty programs have become crucial for merchants to understand the needs and Behaviour of their customers and to maintain market share. As a result, merchants are increasingly turning to payments companies to integrate loyalty features with payments services, either as turnkey solutions or by supplementing merchants' proprietary solutions. Depending on the markets they serve, payments service providers should support one or more of the four main types of loyalty programs:

- ✓ Segment-oriented programs, enabling micro-segmentation with tailored offers and service levels (e.g., Amazon Mom, myWaitrose) or segment-specific platforms with tailored campaigning features (e.g., LevelUp, Belly)
- ✓ Personalised offers, leveraging consumer purchase patterns to craft specific offers tailored to individual needs and behaviours (e.g., Tesco Club card, BankAmeriDeals)
- ✓ Geo-targeting, offering benefits linked to repeat purchase and consumer location (e.g., Groupon, Starbucks)
- ✓ Multi-merchant coalitions, where consumers can earn and redeem loyalty currency across a network of merchants (e.g., Air Miles, PayBack)

## 9.7. New regulations prompt new service offerings

Spurred by new regulations, depository institutions and third-party processors (TPPs) will compete directly for transactions and customer data. In Europe, for example, regulations cap interchange fees and open the European Economic Area for cross-border acquiring. Similarly, the new Payment Services Directive (PSDII), now close to final approval, will enable TPPs to access accounts for information (e.g., balance information) and payments initiation.
Partnering with data analytics specialists and digital innovators, TPPs will be able to complete directly with banks for consumer and corporate transactions and the associated data. To fend off the attack, leading depository institutions will need to integrate more diverse financial services on their digital platforms. This will likely entail not only full functionality (account opening and closing, customer service, loan applications) on retail and commercial banking apps but more competitive rates on financing (on the basis of more accurate credit scoring), seamless access to mortgage applications and servicing, mutual funds and stock trades and comprehensive financial planning tools.

## 9.8. Cloud-based POS enables further specialization

Increasingly, merchant point-of-sale (POS) applications operate in the cloud, reducing the need for bulky hardware and enabling faster roll-out of new solutions. In addition, recent acquisitions by terminal hardware manufacturers such as Ingenico (which acquired Ogone and GlobalCollect) or Verifone (which acquired Point Signal) the strategic importance of pushing merchant offerings beyond the limits of POS hardware.

Commerce is too vast for a single provider to address specific needs in multiple merchant verticals, and specialised providers such as Micros in the restaurant and hospitality segment demonstrate the relevance of vertical specific value propositions (e.g., table booking and mobile payments for restaurants). processors also recognise the value of owning both the payments platform and merchant interface, while allowing other service providers to broaden the offering by using APIs to integrate their services with cloud-based applications.

## 9.9. New revenue models strengthen fee income

The current low interest rates in major markets challenge the economics of what has been the prevailing model for the payments business: interest income on daily balances. Taking a cue from digital companies, where consumers may buy a licence, pay a subscription fee or allow access to data in return for using a service for free, banks are adopting pricing models that will build more stable revenue

## 9.10. Digital Banks Establish Shift in the Trust Paradigm

Digital-native banks, such as Atom Bank (the first to receive a full banking license in the UK) challenge the deeply rooted assumption that physical branches are necessary to generate trust. There is little question, however, that in time consumers and corporate decision-makers will prefer the enhanced convenience, control and value of digital banking to bricks and mortar. Digital banking apps have already become a standard offering across the globe, functioning in some cases as a “control tower” for customer relationships.

While established providers gradually expand the functionality of their banking apps (from view-only information to internal transfers, bill pay, external transfers, etc.), a new generation of digital-native banks is bringing improved standards of cost-efficiency to the industry.

**You should now have:**

- ☑ A good sense of the trends in behaviour that are sweeping the world and their impact on payments

# 10.Chapter Overview Bitcoins & Blockchain

## Chapter Overview

This chapter lays out the building blocks and details of the newer technologies that promise disruptions in the payment world.

### Table of Contents for Chapter 10

## 10.1.Understanding Bitcoins & Cryptocurrencies

Bitcoins and Cryptocurrencies have become front page news! This field has also spawned the concept of Blockchains and Distributed Ledgers which promise to change the financial landscape in significant ways. We will understand the entire field in a way that will make it our own. And allow us to follow every twist and turn of this still evolving area.

To do that, let's start at the beginning. Do you Understand Money? Then you can Understand Bitcoin easily! Let's understand one and then the other in parallel.

## 10.2.Money and Bitcoins

We know money as Dollars, Pounds, Euros, Yen etc. Bitcoin is one more such attempt to set up currency. How is Conventional Money held? How are Bitcoins held? All money is held at the Central Banker (the US Fed for US dollars, the Bank of England for pound sterling, the European Central Bank for Euros, and the Bank of Japan for Japanese yen, etc.). All Bitcoins are held at a central server.

Banks are the link between Citizens and the Central Banker. With bitcoins, there is no linking agency. Citizens hold their money with /at banks. Citizens hold their Bitcoins in "Wallets"

### 10.2.1.Bank Accounts and Wallets

You probably know what a bank account is! The Equivalent in bitcoin world is a Wallet. To get paid in Bitcoins you need a Wallet. You have a choice of wallets, each with their own advantages and limitations:

- ✓ Desktop Wallets accessed from computers
- ✓ Mobile Wallets accessed on mobiles
- ✓ Web Wallets on the cloud

### 10.2.2.How is money or bitcoin earned?

Employers and workers maintain Bank Accounts. So do Customers and Vendors. When goods, services or work is delivered. Customers and employers pay into the accounts of employers and workers. Similarly, employers, workers, customers and vendors need to maintain wallets in the bitcoin world. Bitcoin's first definition of work: Deliver IT work: which is what is mining. Nowadays you can: deliver goods, services or any other work and it requires a bitcoin exchange to facilitate this. More on this later in relation to Bitcoin Exchanges

### 10.2.3.The importance of the Account / Wallet

In the event that a worker or a vendor does not have a bank account payment could be made in cash

But if a worker or vendor in the bitcoin world does not have a wallet there is no way to make a payment. The nature of work and what if you do not do it? If you do not work, you do not get money. If you do not do IT work, you could not ever have gotten Bitcoins. Inheritances and theft are just some of the ways to get money without working. For bitcoins, it brings in the concept and need for Bitcoin Exchanges.

### 10.2.4.Getting Cash into a bank Account or a Wallet

The account holder just goes to the bank and deposits cash in the bank. In the bitcoin world, the person who wants a bitcoin can transfer cash to a bitcoin exchange and It will transfer the bitcoin to the wallet. Of course, the person needs to have a wallet to receive bitcoins, as we saw before. A Bitcoin Exchange is ANY entity that is willing to exchange real money for Bitcoins.

### 10.2.5.Getting money from a bank Account or Wallet to Cash

Account holders can go to the bank or an ATM and withdraw cash. A bitcoin holder needs to give in the bitcoins to an exchange and money will be transferred to the person's bank account. Originally designed as a peer-to-peer system Bitcoins, by themselves, do not actually need an exchange. Wallet to wallet transfers are possible.

## 10.3.Working Aspects of Bitcoin

### 10.3.1.Validating Transfers

Mr. X gives an instruction to his banker to pay Mr. Y. (bankers call such instructions a 'Negotiable Instrument') On the back of that paper instrument, the blank reverse side of this piece of paper, Mr. Y, who now holds the paper, asks Mr. X's banker to in turn pay Mr. Z (bankers call this endorsement). Mr. Z can in turn ask for Mr. X's banker to pay Mr. A; writing all this below Mr. Y's writing. (still called an endorsement). Please note that Mr. X's banker has still not made any payment to anyone. It is just the paper instrument which is changing hands.

The signatures of each of these persons, listed on the reverse side of the paper instrument, has to be verified by the bankers or someone authoritative who can testify that the signature really belongs to that person.

Bitcoin transfers involve the whole chain of owners:
*FROM:* The Original owner of the Bitcoin
*TO:* The last owner who is the Person who is now transferring the Bitcoin

ALL signatures of the in-between owners are required for transferring the Bitcoin to the next person. In Bitcoin, all signatures are digital. EACH TRANSFER involves the full chain of digital signatures for the owner of that Bitcoin. This is what is called the BLOCKCHAIN.

### 10.3.2.Controlling the length of signatures to verify

Let us say that a bitcoin was transferred 19 times previously. All 19 digital signatures, going back to the Original Owner, need to be stored. This occupies computer space. The length of the blocks can be compacted using IT processes. Bankers find it difficult to verify the signature of every person in a chain of endorsers, transferors, payers. One of the principle reasons is that a given bank may not know or recognise the signatures of those who are not its customers. Every bank which checked a person's signature signs off on the signature, affixing its own seal. This helps downstream bankers.
Controlling the length of multiple signatures is not easy. One way to do it is for a person to exchange the instrument for a check issued by a banker. And then endorsing that, so that the total number of signatures to verify is shortened.

Bitcoins can be combined into larger lots so that each coin need not be tracked separately in a Block Chain. That is: One Blockchain might contain more than one Bitcoin. Similarly, bitcoins can be split into smaller lots. The processes used are based in IT and similar in effect to compacting. Bankers as a rule dislike having a long chains of transferors, payers, and endorsers to check; and are suspicious of too many such endorsement.

### 10.3.3. Variations in Signature and Fraudulent Transfers

Fudge the signature on the check. Fudge the digital signature. Some natural variation in the handwriting of the person is natural. Bankers assess the difference on merits. Passing a signature with variations is not without risk. There is some “natural” variation that can happen in digital signatures. This is called a “bug”. Exploitation of this bug is “hacking”. In bitcoin world, this is called TRANSACTION MALLEABILITY. The exploitation of Transaction Malleability requires IT expertise.
The exploitation of the possibility for frauds in signatures requires expertise, too. The Hollywood movie “Catch me if you can” is an interesting one featuring an expert forger of checks.

### 10.3.4. Accounts and Wallets; Banks and Exchanges

Central bankers Allow banks to link up to the Central Banker. Only then do Citizens try to open accounts with that bank. Citizens can open wallets. They can Use wallets for peer-to-peer transfers
Some citizens use a Bitcoin Exchange to enter the Bitcoin world. Just anyone with an IT system and the cash, bitcoins and credibility to back the exchange Can be a bitcoin exchange. Wallets Can link to a Bitcoin Exchange. The Bitcoin Exchanges brought Bitcoin into the mainstream economy by opening access for non-IT citizens.

### 10.3.5. Money Laundering

Banking and the economy copes with Money Laundering. It is a challenge. It is a subject by itself.

Banks are regulated and have to follow anti-money laundering (AML) rules and have AML strategies.

Bitcoin is a parallel universe. Money launderers can:

- ✓ Sell drugs for Bitcoin
- ✓ Convert Bitcoin to cash at a Bitcoin Exchange
- ✓ They can also use the Bitcoins through peer-to-peer wallets to buy the goods and services they need and enjoy the spoils of crime.

### 10.3.6. Initial Coin Offerings

In an Initial Coin Offering: a company issues “COINS” in Exchange for real cash. The ICO Subscriber Subscribes to an Initial CO by paying cash. He then Gets the Newcoin that is being issued. Of course, he needs to open a wallet which can receive the New coin. This has led to many new issuers of such coins, now known by the generic name cryptocurrency. Bitcoin is just the first one of several cryptocurrencies now. What does an IPO Applicant expect from a new company going public? That the company will set up a project and earn profits for the investor. But What does an ICO Applicant expect from a new company issuing a cryptocurrency?

## 10.4. Blockchains: An Introduction

You should already have looked at Bitcoins to Understand concepts that go into the Blockchain. You will recall that in the bitcoin example discussed elsewhere all previous

transactions going back to the original owner in the chain need to store, tracked, compared. That is the starting point of the concept called BLOCKCHAIN.

A Transaction is done with the original owner selling the asset to a buyer. Let's call him Buyer 1. The Custodian records the Asset as now belonging to Buyer number 1. The details are encrypted and locked: There you have it! The FIRST Blockchain! This one has only One block. Distributed Ledger Technology requires that everyone participating in the system has a copy of this Blockchain It further says NO further transaction is possible unless EVERYONE agrees that is, there has to be a Consensus.

After the 1st, let us say a second transaction is to take place. "Consensus" requires that everyone marked with the orange tick agree. Let us say that they do. We will understand Consensus in further detail later. The data is encrypted and locked. That is the second block of the Blockchain. We will understand encryption in further detail later. Both together are the Blockchain. This is now a SINGLE piece. Now when we say any transaction requires the Blockchain and Consensus we mean this chain of blocks.

What does each buyer want? A Buyer wants to know that the Seller got it legitimately. The BEST way to know that is to know that all previous owners in the chain had ownership legitimately, too. A crook hacks the Blockchain. OR tries to fake a transaction. In a Blockchain the entire string of blocks need to be unaltered for the system to generate a Consensus. Block # 2 is now fudged. When a transaction is attempted. Distributed Ledger Technology requires everyone be involved. Each has a copy of the Blockchain. If even one does not match, the transaction will fail. In this instance, NONE of the participants will agree – issue consensus - for the presented chain because Block 2 is mismatched.

In this example, a transaction involves only 3 persons: why should EVERYONE get involved? We can see sense in some people being involved in agreeing to the transaction. Why does someone like Seller number 1, who is no longer in the picture need to agree? We are ALL Interested in Secure, Low-cost, Efficient Technology Implementations! The BIG Financial Institutions together dominate 90% of trades anyway. Every industry member has a vested interest in making this work smoothly.. Every industry member has a vested interest in making this work smoothly. In any case, the time needed to compare records is minimal; the benefits are immense.

Distributed Ledger Technology is:

- ✓ Distributed amongst market participants.
- ✓ Near Real Time
- ✓ Immutable, that is not hackable.
- ✓ Digitized
- ✓ There is NO "Central Trusted entity" in the Blockchain world

A distributed ledger is a consensus of replicated, shared, and synchronised digital data geographically spread across multiple sites, countries, and/or institutions. Distributed Ledger Technologies or DLT are technologies used to implement distributed ledgers. These entities might be big banks that have their own proprietary systems. Every bank using its own system for processing: so, there is a need for hand-over and reconciliations in the current method of transaction processing. Blockchain & Distributed Ledger Technology does not involve any one system; or indeed any central system. The struggle to interoperate between systems is resolved. When a transaction is completed and the NEW, revised Ledger is Distributed to ALL participants. Each gets a record of transaction done which is the LAST added Block in the Blockchain. Those that need to update records, complete accounting and other processes can do so as soon as they receive the new Blockchain.

## 10.5.Blockchains working aspect

### 10.5.1.How are the details Encrypted?

INPUT, that is Any Data or Information is put through a hashing algorithm, which is a mathematical process. This gives an OUTPUT of Fixed Length. This output is The

Hash Or “The Cryptographic Hash Function”. Two different inputs can NEVER have the same Hash. An algorithm is a specific, defined computation that generates an output. Bitcoin uses Secure Hashing Algorithm 256: known as SHA 256.

### 10.5.2.Encryption: Implications

If any part of the input data is changed: that is, if even one bit of DATA is modified. The resultant, new, HASH is going to be different. The NEW HASH will NOT tally with the OLD HASH. In a Blockchain System all the participants have the OLD HASH: they compare it with the HASH of the incoming record: if it is same: then an “OK’, or consensus is published. Or Else – the transaction will be rejected! An existing record of ownership or any agreed transaction details CANNOT be modified without detection through the comparison of hashes across the Distributed Ledger.

### 10.5.3.What is Consensus?

Everyone agreeing on some issue is CONSENSUS! In the Distributed Ledger Technology (Blockchain System), EVERYONE refers to all the participants of the system. Consensus is all participants agreeing that the Blockchain presented for consensus matches with all the copies of the Blockchain with each participant in the Distributed Ledger

### 10.5.4.NODE

A Node is a Computer at a Financial Institution that carries out the Consensus Process, playing its part in the Distributed Ledger Technology system. A Node connects to other Nodes to share and validate information in the Blockchain.

**How many Nodes should a participant have?**
A Node carries out the Consensus Process for ALL requests. That is for ALL requests – even if they do not have anything to do with transactions, assets or customers of this Financial Institution. Quick, timely processing requires ALL participants to have sufficient transaction processing power. Latency is the time lag that it takes for a transaction to be consensus-approved and included in the Blockchain – updated with a new block, the new transaction. Some Nodes may be dedicated to Consensus processing for the Distributed Ledger. Dedicated Nodes may be maintained for “own” Transactions.

**Are all Nodes SIMILAR?**
All Financial Institutions do not have the same status, as we know from banking and markets in general. So, the Node of one participant may be allowed in the Consensus Process for certain transactions or within certain limits only. A participant may have more than one Node. Certain Nodes may handle certain transactions, customers, have specific limits etc.

### 10.5.5.Design Considerations

Each entity through its node has database management responsibilities. To reiterate: the DL is a full history of all transactions and in some cases ALSO of ownership. All Nodes are NOT the same. A Node may be authorised to read certain info and not some other info. Each Node may have a different role and access related only to that role. The Distributed Ledger may not contain certain types of proprietary information regarding participants.

#### 10.5.5.1.Consensus & Nodes

Consensus is when all Nodes accept the new version of the Distributed Ledger. Consensus: is when HASH calculation of ALL Nodes in a Distributed Ledger match with each other. IF any input is tampered or wrong: at that Node a

WRONG Hash will generate resulting in a mismatch: therefore, there is NO Consensus.

#### 10.5.5.2.What is DOUBLE PAY?

A double pay can happen if two nodes initiate a transaction at the exact same time. An algorithm decides which of the two transactions will go through and which will be rejected.

Consensus Algorithms help to:

- ✓ Prevent invalid transactions from being accepted.
- ✓ Make the ledger more tamper resistant.
- ✓ Trigger additional valuation: transfers over a certain threshold

Rules are essential. But – they slow down the rate of processing. What works smoothly in Bitcoin world cannot directly be used in financial markets!

## 10.6.Permissioning in Blockchain

If any Participant without the application of any admission criteria is allowed to perform any and every function: it is a permissionless system. If a Participant must fulfil admission criteria or is allowed only specific function of functions: it is a permissioned system. A Participant may only be allowed to issue assets. That would be an Issuer of securities. Another may only be allowed to make asset transfers. That would be a registrar. Some maybe allowed to validate transfers. Cryptocurrency systems – Bitcoins for example are permissionless in nature.

### 10.6.1.Permissioned System

The Financial Sector prefers a permissioned system.
In permissioned systems, The Proof of Stake consensus algorithm requires nodes to tie up, also referred to as “bonding”, a certain amount of digital assets to validate and add new blocks onto the blockchain. The more digital assets are bonded, the higher the probability that a node will validate the block the fastest and get the incentives.
In permissioned systems, you must participate in the consensus algorithm by proof of stake.

Examples of permissioned systems are, Hyperledger and Any Financial Industry project.

### 10.6.2.Permissionless System

In Permissionless systems, The Proof of Work consensus algorithm has a number of “full nodes” in the network that voluntarily validate the data.
Incentives, generally a certain form of digital asset, will be given to the node that is the fastest to finish the validation by finding the hash value.
Examples of permissionless systems are Bitcoin and Other Initial Coin Offerings.

### 10.6.3.Open or Closed Distributed Ledger Technology System

A Financial Institution may want to be part of a system: and that might not be automatic. Open systems allow anyone to join. Closed systems allow Financial Institutions to join based on qualifying criteria. They are: The Entity’s creditworthiness . The Ability to access liquidity resources, The Entity’s ability to meet any contractual obligations to the arrangement And To have proper business licenses to conduct business.

The Closed System is the preferred method in the financial markets and systems. Permissionless systems require NO trust. There are NO trusted participants and NO Central Counterparty. Permissioned systems is a Privately shared system Between trusted

parties who Need permission to access the system. Thus, as we move into the financial system we find that the concept of Blockchain and Distributed Ledgers is adapted to use in the Financial System: within larger existing protocols and systems.

There can be Fintech attackers and disruptors born in the permissionless section. But for them to make economy wide impact and achieve regulatory acceptance they will have to move to the current financial system with its existing protocols and checks and balances!

A distributed ledger is a decentralized database accessible and collectively controlled by multiple users. These users are referred to as the “nodes” of the decentralized database network.
Users participating in the network as “full nodes” have the ability to enforce all the rules of the decentralized database network. Other users participating in the network as “lightweight nodes” are passive participants in the network. Any update of the data is validated by full nodes who come to an agreement about the state of the ledger through a specific consensus mechanism. Permissioning exists in conventional markets too: in the form of counterparty credit risk!

## 10.7.Tokenisation

Tokenisation is needed to bring securities and cash into the blockchain world. A TOKEN is used as the ASSET in the Distributed Ledger Technology or Blockchain world. The token represents a REAL ASSET in turn. Such as securities, cash, gold or any asset. The System Works if a Token can in fact be exchanged for a real asset when needed. Tokens need to be issued within the DLT, by the DLT to trade in real assets that are held in custody externally. Tokens & trading cannot exceed the quantity of underlying assets. Who will check? Tokenisation transforms assets into Tokens enabling Distributed Ledger Technology Processing. De-Tokenise to get money to deploy in the broader economy.

De-Tokenise to get securities to deal in markets that are outside a Distributed Ledger Technology system. The current financial system carries out traditional transaction processing using real assets such as money and financial securities. The distributed ledger financial system converts real assets into tokens which are then traded, transacted or exchanged inside the DL system. The real world is a larger, wider concept than this. Ownership of an asset can be stored on a ledger within the DLT arrangement. In this example the Blockchain has only one single block. In DLT, an asset can exist without a Central Party. That idea is notional. There is a central party for an asset like equity or debt. This party, the issuer has an obligation to the investor / subscriber. While DLT is based on the idea that there may not be a centrally trusted party, this basic concept from the financial world / markets cannot be dispensed with.

## 10.8.Smart Contracts in Blockchain

A SMART CONTRACT is A Self-Executing Software Code That Cannot be Back tracked. A Series of Commitments is exactly what a financial asset is. It is Coded in software and Encrypted; And Locked into a Blockchain. It cannot be modified: the question of consensus does not arise. The issuer is committed as promised at the time of issue. Any attempt to tamper with the prior commitment will be equivalent to a hack. Transfer of Ownership can happen in Blockchain – but not in the commitment part of the Smart Contract

Let us take A Fixed Income Example of smart contracts. The Series Of Commitments coded into the smart contract is what you would expect to see in a Fixed Income Instrument). A Fixed Income security commits to:

- ✓Repay principal
- ✓Pay coupons on due dates
- ✓If it is a Floating Rate instrument the reference rate source is specified

A Transfer of Ownership can happen. Any attempt to modify commitments will be rejected as participants will not “consensus”. These payment and repayment commitments will be Executed routinely without intervention. As with all securities, payments go to owner on record date

A payment example in smart contract usage. An example of a payment Commitment is a posting for settlement on a future value date. There are a number of situations in the financial world, where it is known that a sum is payable on a date in the future. An amount has to be paid on Monday.

It can be set up as a smart contract on Friday to be executed on Monday without human intervention, eliminating the risk of delay. Any attempt to modify this will be rejected as participants will not "consensus". Unless the recipient / beneficiary of this payment is also agreeable to a change for good reason. Of course, money has to be available to make the payment; but that is the same in the current financial system, too.

### 10.8.1. Some DLT-world examples of Smart Contract usage

In Ethereum (or other similar DLT System, or cryptocurrency system: users can send 10 ether (tokens) to a friend on a certain date using a smart contract.

Smart contracts can:

- ☑ Function as 'multi-signature' accounts, so that funds are spent only when a required percentage of people agree
- ☑ Manage agreements between users, say, if one buys insurance from the other
- ☑ Provide utility to other contracts (similar to how a software library works)
- ☑ Store information about an application, such as domain registration information or membership records.

## 10.9. Centralised and Distributed Ledgers

A stock exchange is a centralised, financial institution. The following are examples of such financial institutions: Banks, Sell-side firms, brokers, broker-dealers, market brokers etc. who engage in trading in financial instruments of any kind. We also have ONE central, "Financial Market Infrastructure".

This is an all-inclusive term that covers all industry level entities, which are commonly used by all financial market participants in a location or country. Examples of this are: exchanges, clearing corporations; securities depositories, payment systems; central clearing counter-parties etc. The discussion focuses on trades between financial institutions that use FMI. i.e. it excludes bilateral or OTC trades. That is an exchange through which trades happen. It has a Centralised Ledger: the MASTER Record of ALL trades that happened on the exchange.

Each institution (bank) has a record of ALL its trades; some went through this exchange; others went through other platforms. Each is handled by the financial institution separately. The exchange only processes trades done through the exchange. Clearing & Settlement requires that data in the FI's ledger match with the Exchange's Ledger financial institutions 'reconcile' their ledgers at various stages in the Trade Lifecycle to make sure everything is perfect: from trade to final accounting entries.

At each stage: clearing, settlement, accounting, reporting: checking, reconciling, affirmations are carried out before actions are taken. That is how an exchange system looks if described in "ledger" terms. Centralised Ledgers have Jurisdictional Limits. Trades on exchanges are settled only within the country where the exchange is located. There are exceptions which are ignored so we can focus on the example.

Decentralized Ledgers can work across borders. One of the steps that facilitates this is Tokenisation. It breaks down national boundaries. This sounds convenient... But, what will a National Regulator think of this?

**You should now be able to:**

- ☑ Describe how blockchains works

## Concept Check

A. Tokenisation is a :

- ☐ A conversion of US dollars (for example) into cryptocurrency tokens by the agency floating the cryptocurrency
- ☐ A conversion of US dollars (for example) into cryptocurrency tokens by the Fed
- ☐ A conversion of cryptocurrency tokens into US dollars (for example) by the agency floating the cryptocurrency
- ☐ A conversion of cryptocurrency tokens into US dollars (for example) by the Fed

B. DLT stands for

- ☐ Divided Ledger Technology and is based on the concept originally found in Bitcoins
- ☐ Divided Ledger Technology and is based on the concept originally found in Bitcoins
- ☐ Distributed Ledger Technology and is based on the concept originally found in Bitcoins
- ☐ Distributed Ledger Technology and is based on the concept originally found in fiat currency

C. A Smart Contract:

- ☐ Is a contract in which one of the parties cannot lose money
- ☐ Is a contract in which neither of the parties cannot lose money
- ☐ Is self executing piece of software which can be modified after creation by anyone smartly
- ☐ Is self executing piece of software which cannot be modified after creation

**Additional Resource:** If you are interested in more on how the central bankers of the world view innovations such as bitcoin you can read more here.

Interested in a Reuters report on The USA plan on Fedcoins?
Read it here!

# 11.The Payment Services Directive 2 [PSD2]

### Chapter Overview

The EU's PSD2 has ushered in the concepts of API usage and open banking. This chapter covers that; but also the core aspects of OSD2 in relation to strong customer authentication (SCA) in payments.

### Table of Contents for Chapter 11

CLICK ON THE NUMBER TO GO TO THAT PAGE

## 11.1.Introduction

Customers should enjoy choice. That is what the European regulation MIFID and MIFID two achieve, among other things. PSD 2, or Payments Service Directive 2 aims to provide a vibrant ecosystem of choices in the payment's world in Europe. The Payment Services Directive precedes PSD 2. Thematically, here are the concepts underlying PSD2.

All of the EU should operate as a single payment market. When a payment from one part of EU to another part takes 7 days, it does not feel like a single market. The PSD makes it illegal to offer credit beyond T+1 for a payment initiated on T-0. Payment Market infrastructure like The UK Faster Payment System (which operates only within UK) is a response to meet the legal obligation under the PSD to offer max T+1 credit. Similarly, The EU Single European Payments Area (SEPA payment system) ushers in the operational goals of PSD. PSD also enforces other aspects, notably the regulation of charges for payment services by banks. PSD kills / killed paper checks. Some technology fixes help countries cope with residual volumes of paper instruments: (And link through to Step1, Euro1, Target2).

## 11.2.The Payment Services Directive 2

A customer buys goods. That could be online in a web-based transaction or offline, at a shop. The merchant, website or shop traditionally routes the transaction through its own bank using its processing capability. Through other interchange processes the merchant gets the money from the customer's bank. Sometimes, smaller banks use a larger bank's processing capability. In some scenarios a third party's processing capability might also be used. However, all such entities have tie ups with each other. Without such a prior tie up, no one can use another entity's processing capability.


Post PSD2, the necessity to compulsorily go through the merchant's bank or a third party that is integrated with the merchant's bank goes away. A merchant could potentially direct route the payment transaction to the customer's bank. This DIRECT ACCESS needs a tech fix called an Application Program Interface or API.

## 11.3.Application Program Interface (API)

Imagine two systems, System A and System B. An API allows one system to talk to another
In this visualisation, the Owner, the designer of System A makes available an API that allows other Developers to easily building an application that works “on top of” System A. It does not mean that System A has API access to System B; it does not mean that A can develop an application “on top of” System B.

Let us imagine System A to be the New York Stock Exchange. It runs a system called a stock exchange.
It has several moving parts. NYSE has APIs made available to brokers. A broker can tie up with NYSE and gain access to the connectivity APIs to provide seamless access to the exchange, for use by its own customers. When customers log on to the broker, they could see the NYSE trading screen if the broker designed it that way. This is enabled by the API provided by NYSE to its brokers. The tech-minded can go to the address show to access more information on how the NYSE APIs enable brokers.

Let us look at APIs in the payment market infrastructure. The USA has a variety of payment systems (Fedwire, NACHA, CHIPS). Each of these payment systems provide APIs to Bankers. Banks can use the Fedwire API to provide customers seamless connectivity to the payment backbone. The tech-minded can go to the address show to access more information on how the Fedwire APIs enable banks.

## 11.4.APIs

To understand The API Visualised in PSD 2 let us take a simplified view of the bank. It has two distinct parts. That associated with Data which contains all the customer information such as account numbers, customer name and balance.

The bank has a core banking platform that enables the functionality of banking such as creating loans, deposits and processing payment transactions. PSD2 mandates that The Bank must provide API access to other developers.

In terms of the PSD2 mandate the API must provide access to customer data that the bank possesses. The other aspect of the mandate requires access to some part of the functionality of the bank. This allows money to be debited from the account of the customer without specific intervention or processing by the bank. Using these two the external, third party developer may develop an application that adds some more features using these inputs from the bank.

The Developer ADDS other functionality on top of the CORE functionality of a Bank.

For example: The third-party application could use data from the bank to Aggregate financial data & analyse behaviour. The add-on layer might allow customers to plan budgets. And then, using data from the actual bank account present a Plan vs. Actuals statement to the customer.

If the third-party application connects to many banks using similar APIs from each of those banks, then it could analyse the money held by the customer across banks; and suggest a strategy to manage that money better, using certain rules. Further, it could Pipe or direct money from these various banks to various investment options available in the market. These features taken together make the third-party application a Financial Planning Product developed by a non-bank using APIs provided by the banks themselves.

## 11.5.The PSD2 Mandate

Banks must provide API. An open API must provide equal access to ALL merchants wanting to access the_customer’s bank. Merchants must be enabled to link their sites/stores can link through to banks. They may use 3rd party solution-providers for integration. Some examples of vendors that provide such APIs are seen here.

There are Two Types of API-users Defined in PSD2.

i. An Account Information Service Provider (AISP) acts as an aggregator of data relating to a Payment Service User's accounts held at one or many different Banks (or Payment Service Providers)
ii. Such AISPs operate only on or with the Data layer.

iii. Payment Initiation Service Provider (PISP) handles the data and the actual act of making the funds transfer, i.e., the payment. PISPs operate with the Data layer as well as the Core functionality of the bank. Both AISPs and PISPs are visualised in PSD2. The Risks and therefore, the themes are easily arrived at.

It is obviously a big risk for banks to allow just anyone to access the bank through its API. PSD2 has various other provisions intended to manage this 'open' architecture well.

### 11.5.1.Register, Regulate New Players

XS2A: is an acronym for "Allowing Access to Accounts" for technology players. So, Payment Initiation Service Providers are enabled. These include non-banks. Customer permission is however needed to initiate contact with the bank before accessing customer data.

### 11.5.2.Strong Customer Authentication

Validating that it is indeed the customer who has authorised contact requires a high standard of authentication. We will go into the details of this in a following section.

### 11.5.3.Fraud Reporting

The regulator wants to keep a close eye on frauds. It asks processors and banks to Report Frauds initiated AND executed: twice annually. The fraud reporting is required for All types of payments; in every mode. Where the payment was made to an overseas beneficiary, it must be reported in Euros by converting the currency.

### 11.5.4.Risk & Compliance

All banks and payment processors must have an Internal control model with sufficient authority, independence, resources to control and manage risks. They must have direct reporting to management. Each organization must have Three lines of defence necessary to control risks.

### 11.5.5.Complaints Procedure

Beyond all the protection visualised for consumers, they must have Channels to register complaints on violations with a feedback and resolution mechanism.

## 11.6.Access to Accounts: XS2A

Access is to be provided by banks, through APIs, but only to registered service providers. A potential Service Provider applies to its **Own** country's Banking Authority (for example: In Germany: BaFin, In France: Banque de France; and there are totally 28 banking regulators in the EU, one for each country. Three more regulators belong to the countries that are part of the European Economic Area.)

The application goes through an approval process. If approved, a unique reference number is allotted. The name will then be updated in the Register Of The Banking Authority. Thus, any bank can check if the service provider is approved for XS2A. The register of the umbrella banking regulator for the entire EU, the European Banking Authority is also updated.

The provider may then apply for what is known as 'passporting'. This is necessary to get permission to offer the product across the EU. Once permission is given the provider, whether an AISP or PISP or PSP can now operate across the EU. Without "Passporting" an Operator can offer products only in county of registration.

PSD2 results in an Open payments environment. A customer ends up authorising an AISP or PISP who is NOT the customer's bank. This allows that third party to access customer information from the bank and initiate a payment. That sounds risky! Therefore, PSD2 mandates Strong Customer Authentication.

PSD2 describes three dimensions of an individual.

1. The first is knowledge. Something that only the Customer could know examples of that are: PIN, Password, Secret Codes or other codes.
2. The second dimension is possession. What only the Customer could hold: For example, A card, a phone or any other device.
3. The third is something inherent only to a human. A human quality or aspect of the Customer: Examples of this are Iris scanning, Voice recognition, any other biometric.

CLICK ON THE NUMBER TO GO TO THAT PAGE

**Any two** of these dimensions have to be used to Validate that the instruction originates from Payer. This is an Action to be completed by Payment Service Provider (which could be a Bank or other third party. The bank will then generate an authentication code and send it to a phone or address that only the customer can access. That code should be used by the Payer to authenticate the PAY instruction.

So, the **First Factor Of Authentication** are the two dimensions used to determine that the person initiating the pay is in fact the owner of the account.

The **Second Factor Of Authentication** is specific to the transaction and is the use of a code accessible only by the account owner.

PSD2 mandates Two-Factor Authentication. This is called Strong Customer Authentication under PSD 2.

## 11.7. Exemptions from Strong Customer Authentication

- ✓ Contactless payments at point of sale: Each transaction should be less than Euro 50. After 5 transactions OR Crossing Euro 150 cumulatively, an SCA is required.
- ✓ Payments for Transport and parking fares are exempt: Payments to trusted beneficiaries and recurring transactions are exempt. They have to be previously identified and approved recipients; the transaction must be for the same amount each time.
- ✓ Payments to self from one account to another are exempt
- ✓ Low-value transactions are exempt from SCA: Each transaction must be less than Euro 30. After 5 transactions OR Crossing Euro 100 cumulatively, an SCA is required.
- ✓ Remote Card Transactions / Credit Transfers are exempt as per following limits based on
- ✓ Fraud-experience of that provider.
- ✓ Business to business payments are exempt.
- ✓ Remote Card Transactions / Credit Transfers per following limits based on Fraud experience of that provider, as shown here: Lower the experienced fraud rate, higher the exemption thresholds. If providers have fraud rates worse than this, then clearly there is no exemption from Strong Customer Authentication. So, if the fraud experience is higher than 0.13% for Remote Card Based Transactions; or higher than 0.015% for Credit Transfers then SCA is a must.

## 11.8.It has already happened!

Look at what **Bank of America** says as far back as three years ago!

"We are a leader in payments via Zelle®. While some 60 financial institutions are in the Zelle ® network, a third of all transactions in 2017 were conducted by Bank of America customers. Our P2P transactions more than doubled in 2017."

The Zelle® capability is integrated into Bank of America's mobile app and allows our customers to make payments easily and securely, and even split payments to different recipients. The rapid adoption of Zelle® enhances the customer experience and also helps us reduce the costs and risks associated with paper checks and cash transactions.

Here is what **Wells Fargo** had to say which uses the *same platform:*

"Zelle®, a fast, person-to-person payment option embedded in our mobile and online banking experiences; and new transaction-level receipt imaging on mobile devices for commercial customers.

These offerings are, in many cases, the first of their kind. And our customers are using them! For example, since March 2017, our customers have conducted more than 5 million card-free ATM transactions. And since June 2017, our customers have used Zelle® to transfer $10 billion in person-to-person payments. "

So, what does that make Zelle?

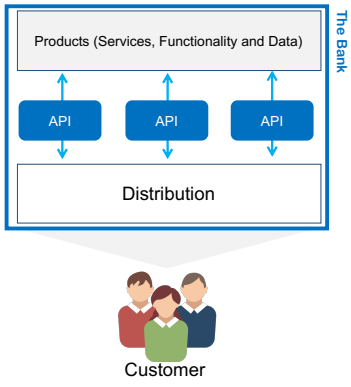
- ✓ A Payment Initiation Service Provider
- ✓ An Account Information Service Provider

… except that those definitions do not apply in the USA where Zelle has been innovated. A customer might have multiple accounts. Let's say one with BankAm and another with Wells Fargo.

An app like Zelle provides:

- ✓ A Single View of the two Accounts
- ✓ A way Plan & Track Expenses
- ✓ A platform Make payments from either account
- ✓ And other value-added services like investing!

## 11.9.From PSD2 APIs to Open Banking: the Leap




The Bank as We See It is a single entity. We can reimagine the bank has having Products, Services, Functionality and Data. Those are connected through a large number of APIs to distribution, which makes products available to customers.

The range of capabilities that a bank possesses may be made available to a wider market. Anyone can sell the bank's offering of products and services by linking through APIs. The bank has its own salesforce, its own web-based portals. But it can also offer its products through any other website portal or application. That is open banking.

## You should now be able to:

- ☑ Describe core PSD2 requirements
- ☑ Describe what an API is
- ☑ Describe Open Banking

## Concept Check

A. SCA stands for:

- ☐ Simple Customer Authentication and involves two factors
- ☐ Strong Customer Authentication and involves two factors
- ☐ Simple Customer Authentication and involves three factors
- ☐ Strong Customer Authentication and involves three factors

B. A customer using Zelle as a payments app:

- ☐ Should be banking at BankAm only
- ☐ Should be banking at Wells Fargo only
- ☐ Should be banking at BankAm and Wells Fargo both
- ☐ Could be banking at any bank

C. In PSD2, API stands for

- ☐ Application Program Interface and allows the bank access to a FinTech's customer details
- ☐ Application Program Interface and allows an external party access to a bank's customer and account details
- ☐ Authorisation Program Interface and allows the bank access to a FinTech's customer details
- ☐ Authorisation Program Interface and allows an external party access to a bank's customer and account details

# 12.SWIFT

**Chapter Overview**

In this chapter we will get to know in detail about SWIFT. WE will get familiar with various Message Types. We will learn the Message Types and how it is useful in Payments. This chapter also deals with the usage of SWIFT for STP. We will deal in detail with some important MTs.

## Table of Contents for Chapter 12

## 12.1.Swift solves a communication problem

- ✓ Banks need to communicate with each other.
- ✓ Communication is needed between branches of the same bank
- ✓ Communication is also needed between different branches of the different banks

Generally speaking, financial communication involves asking the other bank / branch to do something. It will answer to one of the following **Key Words:**

- ☑ Pay
- ☑ Send
- ☑ Remit
- ☑ Transfer
- ☑ Give
- ☑ Credit
- ☑ Debit
- ☑ Advice etc

The other bank / branch will respond to the requesting bank / branch. It will involve one of the following key words:

- ☑ Confirm
- ☑ Validate
- ☑ Reconfirm

Banks also exchange other 'normal' / 'non-critical' information exchange.

## 12.2.The need for Secure Communication:

If instructions received are to be acted upon, receiving bank/branch should be confident that the message is:

- ✓ Really from the sender
- ✓ Has not been tampered
- ✓ Can be reliably acted upon
- ✓ Whoever is benefiting from the action is entitled to benefit.

It means this communication needs to be:

- ✓ Secure
- ✓ Authentic
- ✓ Tamper Proof

### 12.2.1.The Use of Fax Machines

- ☑ Fax machines at sender bank needs to be accessible only to certain people.
- ☑ Actually: many can access.
- ☑ Fax machines at receiver bank needs to be accessible only to certain people.
- ☑ Actually: many can access.
- ☑ Faxes are essentially 'photocopy' type image transmitted over communication lines. They may be unclear. The original could be a forgery and then faxed. The paper on which faxes are sent in many machines tends to fade away in about 6 months.

### 12.2.2.The Use of Telex Machines

Telex is old technology: older than fax. Similar to faxes there were machines at both the sender and the receiver. Operating telex required an operator who could punch the message on a tape. The tape was then fed into the transmitting machine. Errors in coding were a possibility. There was no way of knowing authenticity or accuracy of an incoming machine.

## 12.3.The SWIFT Solution

SWIFT interconnects all the banks and financial institutions of the world. SWIFT terminals still need to be kept secure. But messages cannot be tampered. They are secure and authenticated; and can be acted upon.

However, SWIFT started very differently from what it has become today. There is a lot of detail to how SWIFT has become effective.

We will look at the history and the detail and mechanics of SWIFT as we go forward.

## 12.4.What is SWIFT

SWIFT is short for the **S**ociety for **W**orldwide **I**nterbank **F**inancial **T**elecommunication.

It provides a network that enables financial institutions worldwide to send and receive information about financial transactions in a secure, standardised and reliable environment. SWIFT also sells software and services to financial institutions, much of it for use on the SWIFTNet Network, and ISO 9362. Business Identifier Codes (BICs) are popularly known as "SWIFT codes".

The majority of international interbank messages use the SWIFT network. As of September 2010, SWIFT linked more than 9,000 financial institutions in 209 countries and territories, who were exchanging an average of over 15 million messages per day (compared to an average of 2.4 million daily messages in 1995). SWIFT transports financial messages in a highly secure way but does not hold accounts for its members and does not perform any form of clearing or settlement.

SWIFT does not facilitate funds transfer; rather, it sends payment orders, which must be settled by correspondent accounts that the institutions have with each other. Each financial institution, to exchange banking transactions, must have a banking relationship by either being a bank or affiliating itself with one (or more) so as to enjoy those particular business features.

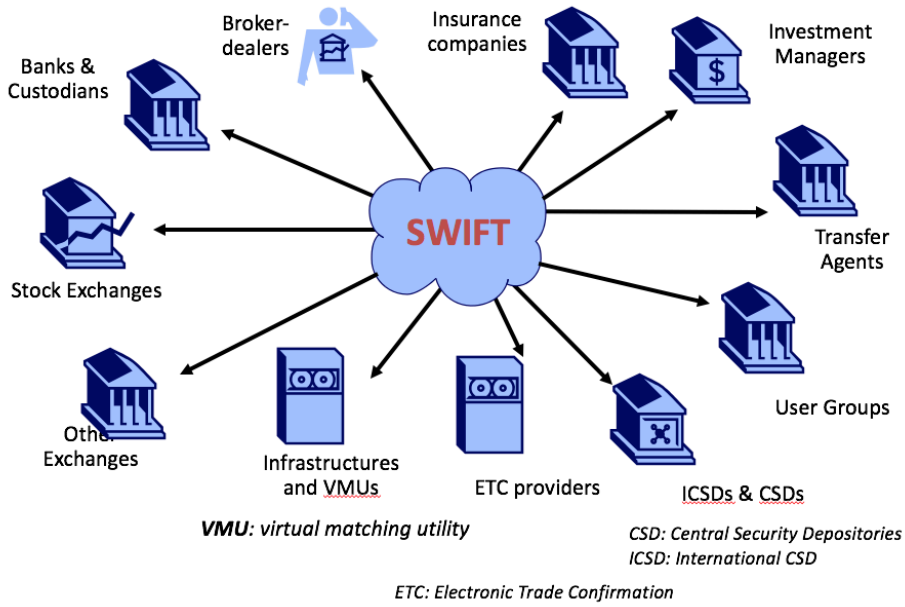
SWIFT has become the industry standard for syntax in financial messages. Messages formatted to SWIFT standards can be read by, and processed by, many well-known financial processing systems, whether or not the message travelled over the SWIFT network. SWIFT cooperates with international organizations for defining standards for message format and content.

SWIFT is a combination of three things:

1. A community of financial institutions;
2. A network of the highest security and reliability;
3. A standards-setting body for electronic financial messaging;

As banks and branches kept getting added to the SWIFT network SWIFT becomes universally installed and enabled. The legacy implies that every financial institution has an address, the hardware, the software, connectivity and personnel that know and operate SWIFT. It

proliferates from banking-type communication needs to include securities and all forms of communication needs. So we now have SWIFT interconnecting all manners of institutions:




## 12.5. SWIFT Architecture / Structure

i. Connectivity: It is a solution: terminals at both ends; enabling software; encryption; security and tamper proof.

ii. Secure Log-On: Protocols and technology for signing on to a terminal.

iii. Message Typology: A Message Type is to be used only for a specific Transaction Type

iv. Message Structure: Every field in a message is meant to be used in a particular way. The Message Structure also has 5 Blocks of Data Structures

v. Secure Transmission: it operates on dedicated infrastructure.

vi. Any violation of these rules means the Message is non-standard: Recipients will disregard the message as not being standardised.

## 12.6. Establishing Connectivity

When a bank joins the network, the new terminal “shakes hands” with all other terminals around the world.

- ✓ The Relationship Management Application (RMA) filters traffic between two correspondents
- ✓ **WHO** can send traffic IN
- ✓ **WHAT** type of traffic FIN MT correspondents can send IN
- ✓ **WHEN** MT can be sent IN
- ✓ Prevents unwanted traffic
- ✓ Any correspondent not given permission cannot send IN unwanted FIN traffic.

✓ FIN messages can NOW be exchanged between Bank of America New York with an id: BOFAUS3N & Deutsche Bank with an id: DEUTDFF.

## 12.7.BIC CODE

BIC CODE is the BIC associated through the name and address (that is, physical association) to the NATIONAL ID. However, financial institutions often issue the IBAN together with the BIC of their headquarters / processing centre to their customers rather than the BIC corresponding to its location. It is the IBAN BIC CODE, collected by SWIFT to provide a better match in the scope of SEPA, because using correct IBAN and BICs (that is, the IBAN BIC CODES) offers a considerable reduction in cross-border transaction charges in SEPA.

UNIQUE BIC CODE is the same as the BIC CODE, but is used for search purposes. Indeed several National IDs with a different value may be matched to the same BIC. If a bank wants to convert such a BIC into a national code, they are not able to do so as they would get several values. This is why we have set the UNIQUE BIC CODE, to be able to return a single value of national code (a kind of "primary" national code).

ROUTING BIC CODE is meant for SWIFT messaging purposes. When the IBAN BIC CODE is a non-connected BIC (also called a BIC1), the ROUTING BIC CODE is filled to provide an addressable code on the SWIFT network.

Here are some SWIFT BIC Code examples:

| | | |
|---|---|---|
| JPMC NY | JPMorganChase | CHASSUS33 |
| BofA NY | Bank of America | BOFAUS3N |
| Lloyds, London | LLOYDS BANK | LOYDGB21 |
| SBI, Mumbai | State Bank of India | SBININBB |
| ANZ, Sydney | ANZ We live in your world | ANZBAU3M |
| BTM, Tokyo | The Bank of Tokyo-Mitsubishi, Ltd. | BOTKJPJT |

## 12.8.SWIFT Message Types

Banks need to communicate with each other.

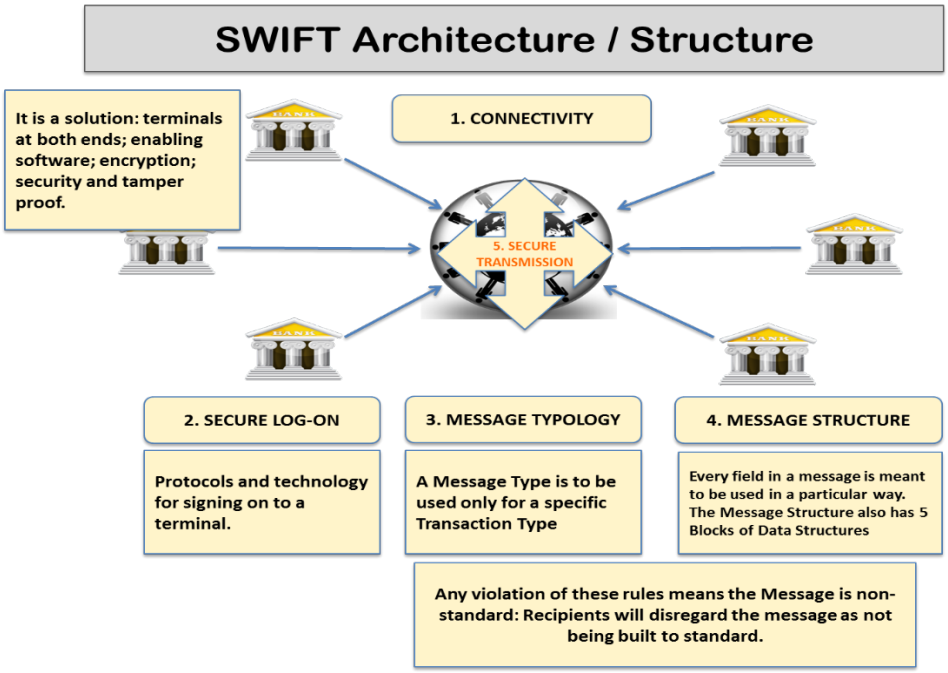
One Bank is:

- Trying to tell the other bank something
- Get the other bank to do something

Communication in this regard (like ALL communication) needs to be PRECISE, unambiguous. Clearly state what you want done. All information relating to what you want done should in that message

The Financial World is also moving / has moved to STP: the information received from one bank should be of sufficient quality for IT systems at the recipient bank to receive and process data as it is, without manual intervention.

ALL data necessary to process the transaction / message should be received by the downstream bank. Clearly state what you want done. All information relating to what you want done should in that message.

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ALL data necessary to process the transaction / message should be received by the downstream bank. Clearly state what you want done. All information relating to what you want done should in that message.

The SWIFT Message Types (MT) help banks achieve that standard of completeness and accuracy. Let us understand MT and its structure.

| SWIFT: Message Categories/ MT # | |
|---|---|
| Customer Payments & Cheques | MT 1xx |
| Financial Institutions Transfers | MT 2xx |
| Treasury Markets – Foreign Exchange, Money Markets & Derivatives | MT 3xx |
| Collection & Cash Letters | MT 4xx |
| Securities Markets | MT 5xx |
| Treasury Markets – Precious Metals / Syndications | MT 6xx |
| Documentary Credits & Guarantees | MT 7xx |
| Travellers Cheques | MT 8xx |
| Cash Management & Customer Status | MT 9xx |
| Common Group Messages | nxx |

## 12.10.Typical Explanation of Fields in Block 4:

***Status*** will be either:

M: Mandatory: the field must compulsorily be filled for that particular Message Type (MT)
O: Optional: this field is optional and may or may not be used depending on need.
Sometimes if an “O” field is used, certain other fields: previously “O” now become “M”.

***Validation Rules*** provide rule-sets for particular combinations of Fields as well.

***Tag*** is the Field Number

***Field Name*** is the description of the Tag

***Usage Rule*** describes what are valid ways of inputting that Field including ‘Codes’ and what they mean.

## 12.11.SWIFT Messages for Customer Payments

**Category 1 – Customer Payments & Cheques**

| MT | MT Name | Purpose |
|---|---|---|
| 101 | Request for Transfer | Requests to debit a customer's account held at another institution |
| 102 / 102+ | Multiple Customer Credi | Conveys multiple payment instructions between financial institutions |
| 103 / 103+ / 103 REMIT | Single Customer Credit | Instructs a funds transfer |
| 104 | Direct Debit and Reques | Conveys direct debit instructions and requests for direct debits between financial institutions |
| 105 | EDIFACT Envelope | An envelope which conveys a 2k EDIFACT message |
| 106 | EDIFACT Envelope | An envelope which conveys a 10k EDIFACT message |
| 107 | General Direct Message Request for Debit Transfer | To order the debit of a debtor's account and to collect payment from this account |
| 110 | Advice of Cheque(s) | Advises or confirms the issuance of a cheque to the drawee bank |
| 111 | Request for Stop Paym | Requests the drawee bank to stop payment of a cheque |
| 112 | Status of a Request for Stop Payment of a Cheque | Indicates action(s) taken in attempting to stop payment of a cheque |
| 121 | Multiple Interbank Fund | Contains an EDIFACT FINPAY message |

The following are the MT associated with Customer Payments:

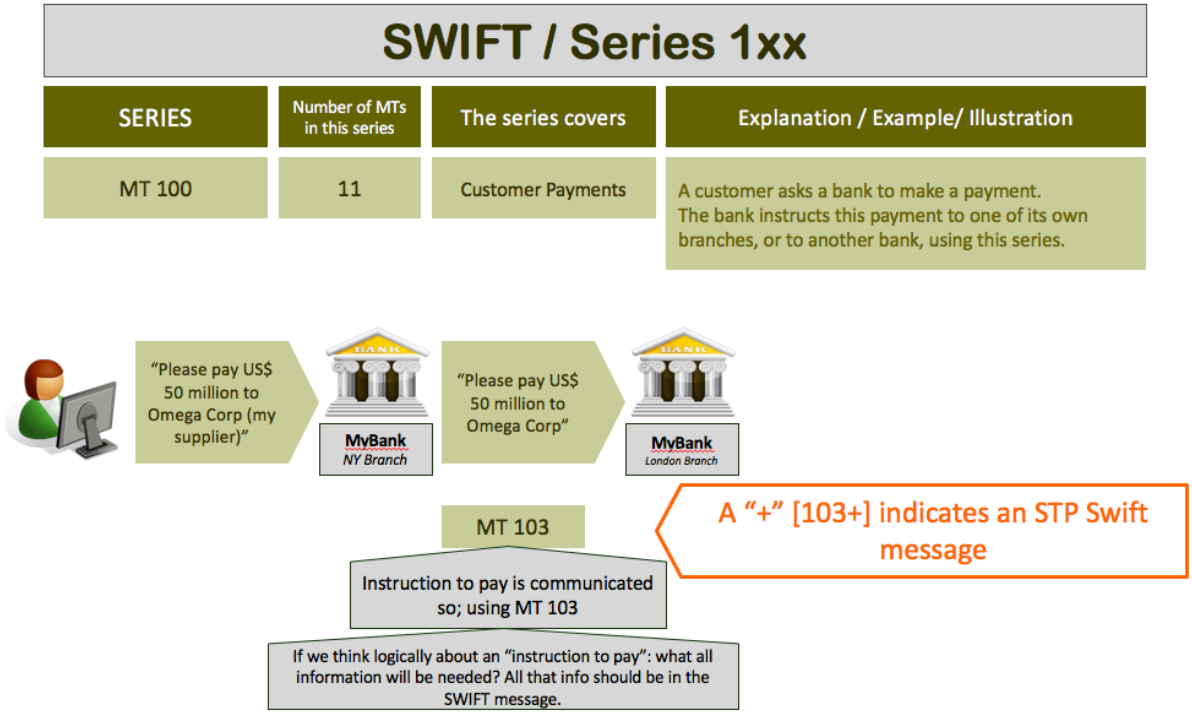
### 12.11.1.Overview of the MT 103 Format

## Overview of a MT103 format

| Status | Tag | Field name | STP standards |
|---|---|---|---|
| M | 20 | Transaction reference number | 16x |
| M | 23B | Bank operation code | CRED |
| O | 23E | Instruction Code | Code words like CORT and INTC can be accepted. |
| M | 32A | Value date, payment code, inter-bank settled amount | 6!n3!a15d |
| O | 33B | Debit account currency/ instructed amount | 3!a15d |
| M | 50K | Ordering Customer | Option K |
| O | 52A | Ordering Institution | Option A with BIC code must be used |
| O | 56A | Intermediary bank institution | Option A with BIC code must be used |
| O | 57A | Account with institution | Option A with BIC code must be used<br>Option D may be used bilaterally agreed as long as the Bank Name and City you supply exactly match those in the SWIFT BIC directory and are unique to the bank/branch of the beneficiary. |
| M | 59A | Beneficiary customer | Option A or no letter option |
| O | 70 | Remittance information | 4 lines by 35 characters |
| M | 71A | Details of charges | BEN, SHA, OUR |
| O | 72 | Bank to bank information | Code words like/ACC, /INI, /INS and /REC can be accepted. |

*Status: M = Mandatory, O = Optional*

Here is how the workflow of a customer instruction to pay works:

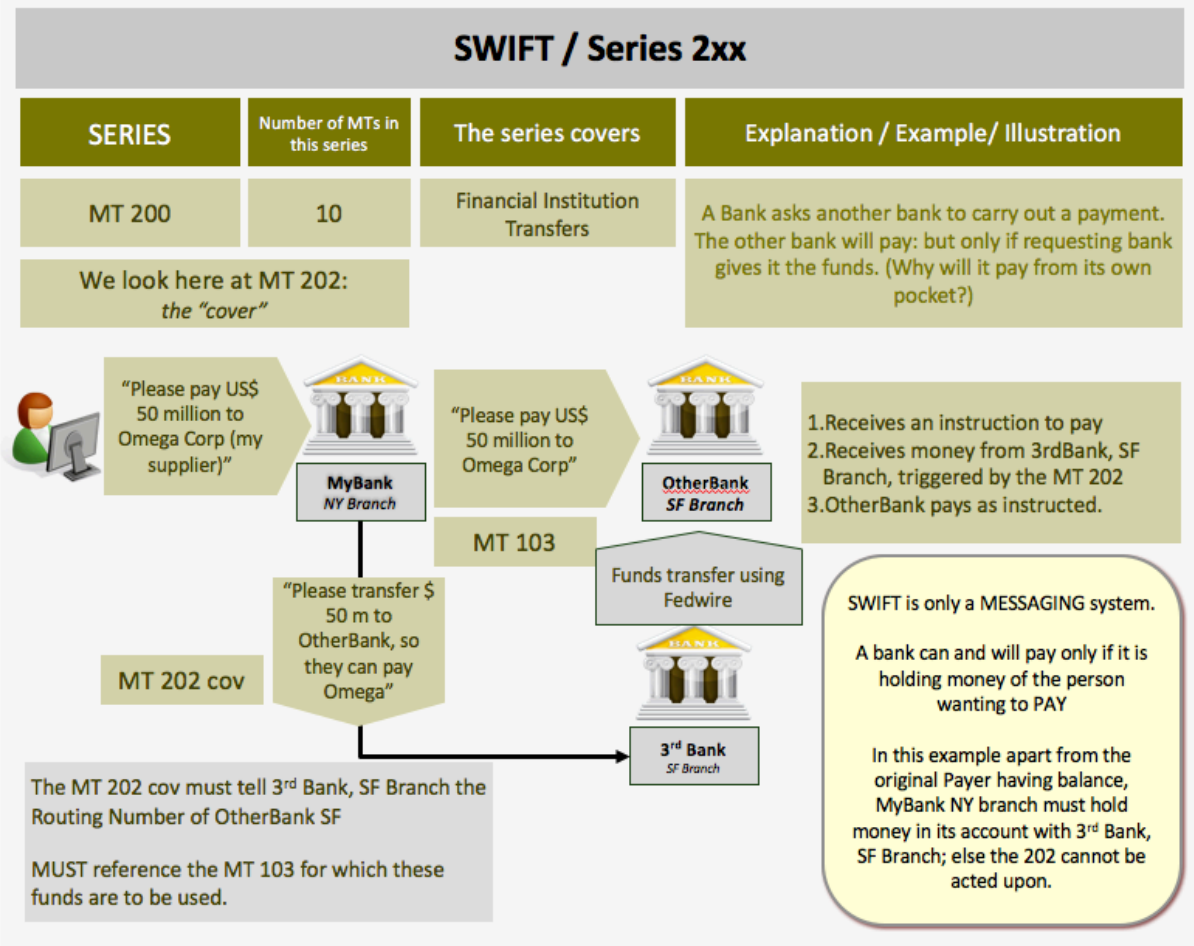


# 12.12.MT 2xx Financial Institutions Transfers

**Category 2 – Financial Institution Transfers**

| MT | MT Name | Purpose |
|---|---|---|
| 200 | Financial Institution Transfer for its Own Account | Requests the movement of the Sender's funds to its account at another financial institution |
| 201 | Multiple Financial Institution Transfer for its Own Account | Multiple of the MT 200 |
| 202 | General Financial Institution Transfer | Requests the movement of funds between financial institutions |
| 203 | Multiple General Financial Institution Transfer | Multiple of the MT 202 |
| 204 | Financial Markets Direct Debit Message | Claims funds from SWIFT member banks |
| 205 | Financial Institution Transfer Execution | Further transmits a transfer request domestically |
| 206 | Cheque Truncation Message | Conveys information on one or more truncated cheques in order to debit or obtain credit under usual reserve |
| 207 | Request for Financial Institution Transfer | Requests to debit an ordering financial institution's account held at the receiving financial institution or the account servicing financial institution |
| 210 | Notice to Receive | Notifies the Receiver that it will receive funds for the Sender's account |
| 256 | Advice of Non-Payment of Cheques | Informs the Sender of one or more previously sent MT 206s of non-payment of one or more truncated cheques. It may also be used to specify dishonoured items that result in reversing a previous payment settlement |

Here is how COV 202 operates:



## 12.13.Payment Messages: Fields & Business Usage

CLICK ON THE NUMBER
TO GO TO THAT PAGE

| Status | Tag | Field Name | Business Usage |
|---|---|---|---|
| M | 20 | Sender's Reference | Reference used for communication, identification, reconciliation and in account statements. |
| O | 13C | Time Indication | Time Codes used to indicate the time for settlement under CLS or TARGET. |
| M | 23B | Bank Operation Code | Codes used with respect to Service Level Agreement. |
| O | 23E | Instruction Code | Code with respect to how the Payment must be executed with regards to value date, intra-company payment, foreign exchange deal, securities transaction. |
| O | 26T | Transaction Type Code | The information given is intended both for regulatory and statutory |
| M | 32A | Value Date/ Currency/ Interbank Settled Amount | This field specifies the value date, the currency and the settlement amount. |

| Status | Tag | Field Name | Business Usage |
|---|---|---|---|
| O | 33B | Currency / Instructed Amount | This field specifies the currency and amount of the instruction. |
| O | 36 | Exchange Rate | This field must be present when a currency conversion or an exchange has been performed on the Sender's side. |
| M | 50a | Ordering Customer | This field specifies the customer ordering the transaction. |
| O | 52a | Ordering Institution | This field specifies the financial institution of the ordering customer. |
| O | 53a | Senders Correspondent | Absence of this field implies that there is a unique account relationship between the Sender and the Receiver |
| O | 54a | Receivers Correspondent | When the funds are made available to the Receiver's branch through a financial institution |
| O | 55a | Third Reimbursement Institution | This field specifies the Receiver's branch, when the funds are made available to this branch |

| Status | Tag | Field Name | Business Usage |
|---|---|---|---|
| O | 56a | Intermediary Institution | This field specifies the financial institution, between the Receiver and the account with institution, through which the transaction must pass. |
| O | 57a | Account with institution | This field specifies the financial institution - when other than the Receiver - which services the account for the beneficiary customer. |
| M | 59a | Beneficiary Customer | This field specifies the customer which will be paid. |
| O | 70 | Remittance Information | This field specifies the details of the individual transaction or a message containing the details which are to be transmitted to the beneficiary |

| Status | Tag | Field Name | Business Usage |
|---|---|---|---|
| M | 71A | Details of Charges | This field specifies which party will bear the charges for the transaction. |
| O | 71F | Senders Charges | This field specifies the currency and amount of the transaction charges deducted by the Sender and by previous banks in the chain. |
| O | 71G | Receivers Charges | This field specifies the currency and amount of the transaction charges due to the Receiver. |
| O | 72 | Sender to Receiver Information | This field specifies additional information for the Receiver |
| O | 77B | Regulatory Reporting | This field specifies the code for statutory or regulatory info required by the authorities in the country of Receiver or Sender. |

### 12.13.1. Fields Relation to Charges

**71A: Details of Charges One of the following Codes must be used**

This field specifies which party will bear the charges for the transaction.

- ☑ BEN All transaction charges are to be borne by the beneficiary customer.
- ☑ OUR All transaction charges are to be borne by the ordering customer.
- ☑ SHA Transaction charges on the Sender's side are to be borne by the ordering customer, transaction charges on the Receiver's side are to be borne by the beneficiary customer.

## 12.14. MT 9XX: Cash Management / Customer Status

**Category 9 – Cash Management & Customer Status**

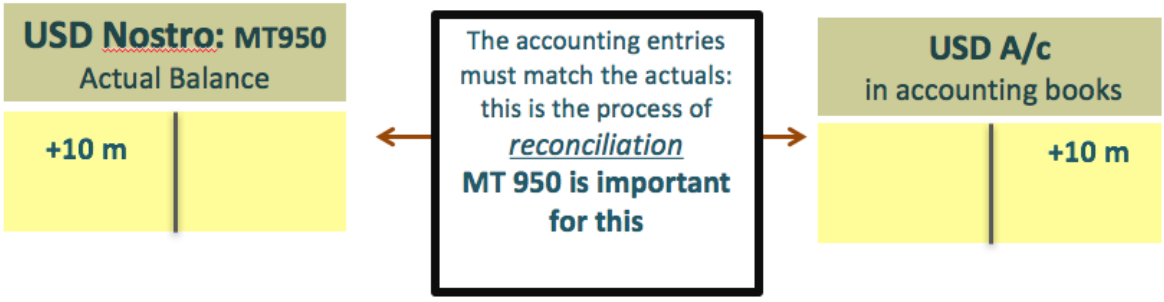
| MT | MT Name | Purpose |
|---|---|---|
| 900 | Confirmation of Debit | Advises an account owner of a debit to its account |
| 910 | Confirmation of Credit | Advises an account owner of a credit to its account |
| 920 | Request Message | Requests the account servicing institution to send an MT 940, 941, 942 or 950 |
| 935 | Rate Change Advice | Advises the Receiver of general rate change(s) and/or rate change(s) which applies to a specific account other than a call/notice loan/deposit account |
| 940 | Customer Statement Message | Provides balance and transaction details of an account to a financial institution on behalf of the account owner |
| 941 | Balance Report | Provides balance information of an account to a financial institution on behalf of the account owner |
| 942 | Interim Transaction Report | Provides balance and transaction details of an account, for a specified period of time, to a financial institution on behalf of the account owner |
| 950 | Statement Message | Provides balance and transaction details of an account to the account owner |
| 960 | Request for Service Initiation Message | Initiates a Bilateral Key Exchange (BKE) process |
| 961 | Initiation Response Message | Acknowledges receipt of an MT 960 |
| 962 | Key Service Message | Contains a bilateral authenticator key for another financial institution |
| 963 | Key Acknowledgement Message | Acknowledges receipt of the bilateral key sent in a previous MT 962 |
| 964 | Error Message | Responds to an MT 960, 961, 963, 966 or 967 if an error has been detected to report that error |
| 965 | Error in Key Service Message | Responds to an MT 962 if an error has been detected and reports that error |
| 966 | Discontinue Service Message | Discontinues one or several bilateral authenticator keys already in existence between the Sender and Receiver |
| 967 | Discontinuation Acknowledgement Message | Acknowledges receipt of a previous MT 966 and confirms discontinuation of the authenticator key(s) specified in the MT 966 |
| 970 | Netting Statement | Provides balance and transaction details of a netting position as recorded by a netting system |
| 971 | Netting Balance Report | Provides balance information for specified netting position(s) |
| 972 | Netting Interim Statement | Advises interim balance and transaction details of a netting position as recorded by a netting system |
| 973 | Netting Request Message | Requests an MT 971 or 972 containing the latest available information |

***Of these, the important ones are MT 940 and MT 950.***

### 12.14.1.MT 950 Account statements:

Interbank for reporting nostro/vostro account statements and balances. This is the one which gives the bank its nostro account statement and balances.

When Nostro reconciliation is discussed, it is the MT950 Account statement which is being compared with the books of account of the bank.



### 12.14.2.MT 940 (Customer Account Balances)

This needs additional information important for a bank's corporate clients which MT 950 does not provide space for. MT 950 is a subset of MT 940. Everything in an MT 950 can be reported in MT 940 in terms of completeness.

## 12.15.SWIFT & STP

Straight-through-processing (STP) is all about automation, right from the initiation of a transaction to its settlement. The idea behind STP is to build a workflow that has a number of steps that have been pre-defined. During processing, the system automatically moves through each of the steps.

The ideal aimed for by SWIFT is for input to conform to standards whereby all entities /systems can process the transaction without manual intervention. Repairs occur when these standards are not met. It's a REPAIR.

Investigations are needed when any transaction falls out of the STP queue or fails to settle / complete.

Exceptions and Repairs refer to transactions that fail to meet STP standards or fail in STP.

### 12.15.1.What is a Repair?

Generally speaking a transaction is expected to be processed in a straightforward manner; one does not expect any problems if certain standards are met.

To meet this expectation, there is a need to establish:
- Standards
- Ensure that those standards are followed.

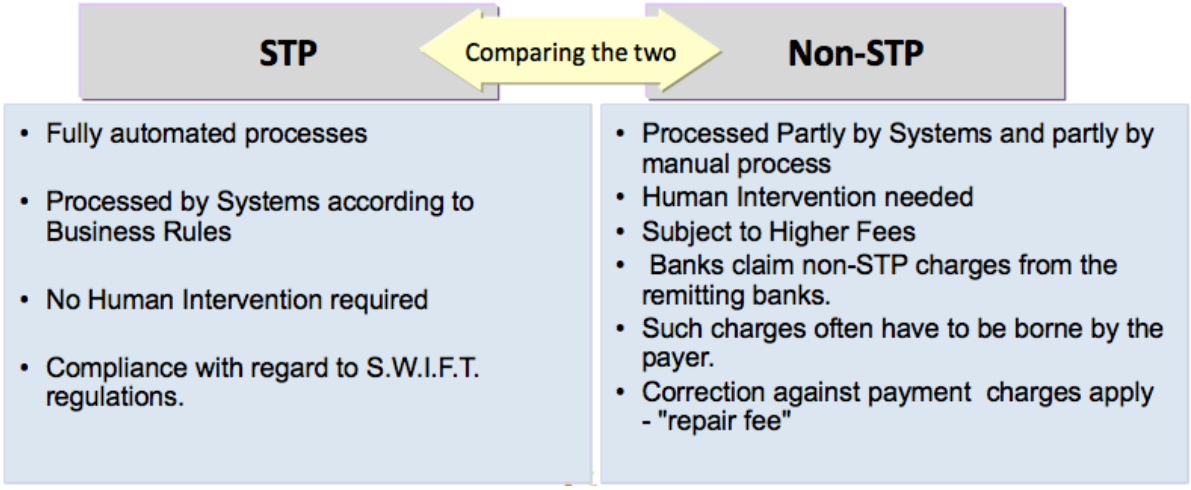
A related idea is that if the inputs are to standard, then processes can be automated *across banks* (STP) and outputs of the system will be as per expectation.

STP implies the absence of manual intervention. A Repair implies the need for manual intervention.

### 12.15.2.Standards and Repairs in a SWIFT Environment?

SWIFT has published STP Guidelines which set the standards for the use of fields in the MT formats (MT 103, 202COV , etc.). Also, the Messages need to be as pre-agreed standards between institutions.

If the usage is per standard, transactions will get processed straight-through; manual intervention is not needed.




## 12.15.3. Adherence to Standards

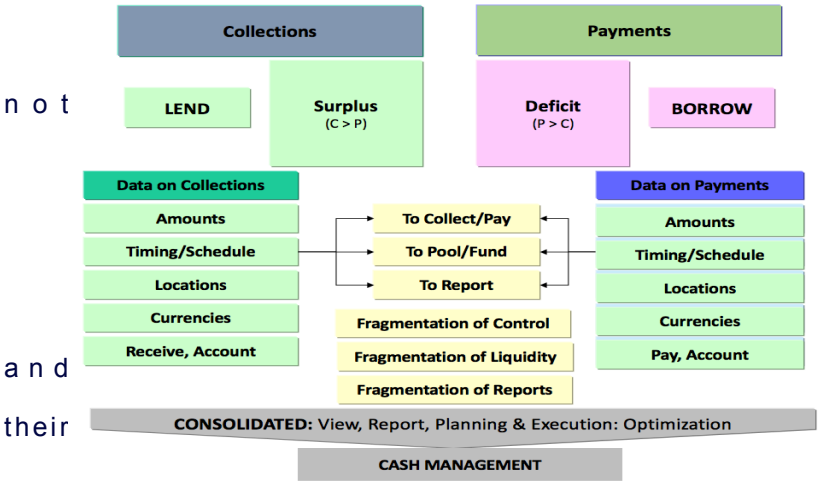
In ongoing banking relationships (as between Correspondent Banks, for instance), the Originator Bank of a message to pay has to be tuned in to the SWIFT STP Standards of the Receiving Bank.

In relation to the codes used in certain key fields, some banks are very particular about codes they will accept and codes which they will not act upon. The following fields in relation to payments are used to illustrate the point:

- ☑ Field 23E: Instruction Code
- ☑ Field 72: Sender & Receiver Information
- ☑ Field 50 Ordering Customer Details
- ☑ Field 71: Charges

**Field 23E: Instruction Code**
Originator Bank can use any one of the following codes in its MT 202 COV as per SWIFT's message standard.

| | |
|---|---|
| SDVA | Payment must be executed to the beneficiary with same day value. |
| INTC | The payment is an intra-company payment, i.e., a payment between two companies belonging to the same group. |
| REPA | Payment has a related e-Payments reference. |
| CORT | Payment is made in settlement of a trade, e.g., foreign exchange deal, securities transaction. |
| HOLD | Beneficiary customer/claimant will call; pay upon identification. |
| CHQB | Pay beneficiary customer only by cheque. The optional account number line in field 59 must not be used. |
| PHOB | Please advise/contact beneficiary/claimant by phone. |
| TELB | Please advise/contact beneficiary/claimant by the most efficient means of telecommunication. |
| PHON | Please advise account with institution by phone. |
| TELE | Please advise account with institution by the most efficient means of telecommunication. |
| PHOI | Please advise the intermediary institution by phone. |
| TELI | Please advise the intermediary institution by the most efficient means of telecommunication. |




Certain Recipient Banks do handle instructions **HOLD, CHQB, PHOB, TELB, PHON, TELE, PHOI, TELI** make it explicit to not and their correspondents. Despite this if such instructions are sent, the recipient will not act on the instruction. You can see that these are contact-intense instructions. And yet, for premiere client relationships an institution may do these and more. However this may not be so in correspondent banking arrangements.

**Field 72: Sender to Receiver Information**
Originator Bank can use any one of the following codes in its MT 202 COV as per SWIFT's message standard.

ACC Instructions following are for the account with institution.

INS The institution which instructed the Sender to execute the transaction.

INT Instructions following are for the intermediary institution.

REC Instructions following are for the Receiver of the message.

*A Recipient Bank may specify the following to Originating Banks with which it has regular dealings:*

Please be informed that the usage of this codes (except 'INS') will cause Third Bank / REPAIR Charges.

Originating Banks need to take note of such specifications.

**Field 50: Ordering Customer's Details**

This is a Money Laundering related requirement, which if not fulfilled can hold up the remittance:

Field 50 Option K (50K) requires complete name, address & account number.
Field 50 Option F (50F) requires one of the following codes regarding identity document is to be used:

| | | |
|---|---|---|
| ARNU | Alien Registration Number | The code followed by a slash, '/' must be followed by the ISO country code, a slash, '/' and the Alien Registration Number |
| CCPT | Passport Number | The code followed by a slash, '/' must be followed by the ISO country code, a slash, '/' and the Passport Number. |
| CUST | Customer Identification Number | The code followed by a slash, '/' must be followed by the ISO country code of the issuer of the number, a slash, '/', the issuer of the number, a slash, '/' and the Customer Identification Number. |
| DRLC | Driver's License Number | The code followed by a slash, '/' must be followed by the ISO country code of the issuing authority, a slash, '/', the issuing authority, a slash, '/' and the Driver's License Number. |
| EMPL | Employer Number | The code followed by a slash, '/' must be followed by the ISO country code of the registration authority, a slash, '/', the registration authority, a slash, '/' and the Employer Number. |
| NIDN | National Identity Number | The code followed by a slash, '/' must be followed by the ISO country code, a slash, '/' and the National Identity Number. |
| SOSE | Social Security Number | The code followed by a slash, '/' must be followed by the ISO country code, a slash, '/' and the Social Security Number. |
| TXID | Tax Identification Number | The code followed by a slash, '/' must be followed by the ISO country code, a slash, '/' and the Tax Identification Number. |

Again, certain Recipient Banks may be prohibited by their national law from processing transactions where the sender is an alien in that country (ARNU) or who is identified by Passport Number alone. (CCPT). Transactions wherein Field 50 does not satisfy the Recipient Bank are not likely to be processed.

**Field 71: Charges**
Charges can be indicated by any of the following codes which have the assigned meanings:

**71A:**

| | |
|---|---|
| BEN/SHA | All transaction charges are to be borne by the beneficiary customer. |
| SHA or OUR and /SPLIT/ | In Field 72 causes charges will be debited to your account, all the other to the beneficiary's account. |
| OUR | All transaction charges are to be borne by the ordering customer. |

**71F:**

Sender's charges are specified in this Field/ sub-option F

**71G:**

Receiver's charges are specified in this Field/ sub-option G

**72:**

/Split? + 71A: SHA:Charges of ordering customer institution by Ordering Customer; all other charges to Beneficiary

STP standards require that if 71A specifies BEN/SHA then only 71F should be used; else it should be blank. If 71A: OUR, then 71G should be used; else blank. Violation of these practices causes STP to fail.

The above sample gives some of the rules which a bank specifies.

## 12.16.To Sum It Up:

The Originating Banks (Upstream systems) must ensure adherence to STP Guidelines set by SWIFT.

It must also adhere to the accepted codes of the Receiving Bank / Downstream systems.
Both of these are essential to achieving Straight Through Processing, the avoidance of repairs and the resultant repair charges.

**EXAMPLE OF SWIFT MT FORMATTED FOR STP**

MT103 – SWIFT Massage
ABC is a Singapore-based company that would like to transfer JPY4, 000,000 to XYZ Company's JPY account in Mizuho Bank (account number: 8765389) on 16 February 2009. The SWIFT message should be constructed as follows:

| Meeting STP standards | |
|---|---|
| TAG 20 | BS02001 |
| TAG 23B | CRED |
| TAG 32A | 090216JPY4,000,000 |
| TAG 50K | /123456789<br>ABC COMPANY<br>ADDRESS 1<br>ADDRESS 2 |
| TAG 57A | MHBKJPJT |
| TAG 59A | /8765389 |
| | XYZ COMPANY |
| TAG 70 | BEING PAYMENT FOR<br>EXP RPT DD 01/02/09 |
| TAG 71A | SHA |

TAG 20: Transaction reference number that will be reported on the end of day statement.

TAG57A: It is recommend that BIC codes are used as party identifiers. Nonetheless, other identifiers may be appropriate on certain occasions: e.g. Fed numbers, ABA numbers , etc.

| Not meeting STP standards | |
|---|---|
| TAG 20 | BS02001 |
| TAG 23B | CRED |
| TAG 32A | 090216JPY4,000,000 |
| TAG 50K | /123456789<br>ABC COMPANY<br>ADDRESS 1<br>ADDRESS 2 |
| TAG 57D | **MIZUHO BANK LTD<br>GINZADORI BRANCH<br>SWIFT: MHBKJPJT** |
| TAG 59A | /8765389<br>XYZ COMPANY |
| TAG 70 | /INVI/PT269037,484,271312,318 |
| TAG 71A | SHA |

In the example above: For a SWIFT transaction, Tag 57 should be formatted with Option A with BIC code used. In this example, SWIFT BIC should be directly formatted using Tag 57A ie MHBKJPJT.

## 12.17.The MT202: STP & Repair Example

## Overview of a MT202 format

| Status | Tag | Field name | STP standards |
|---|---|---|---|
| M | 20 | Transaction reference number | 16x |
| M | 21 | Related reference | 16x |
| M | 32A | Value date, payment code, inter-bank settled amount | 6!n3!a15d |
| O | 52A | Ordering Institution | Option A with BIC code must be used |
| O | 53A | Sender's correspondent | Option A with BIC code must be used<br>Option B can be used for including the debit account number in case multiple accounts in the same currency are being maintained. No separators should be used. |
| O | 56A | Intermediary bank institution | Option A with BIC code must be used |
| O | 57A | Account with institution | Option A with BIC code must be used |
| M | 58A | Beneficiary institution | Option A with BIC code must be used |
| O | 72 | Bank to bank Information | Code words like /ACC, /BNF, /INT, /INS and /REC can be accepted. |

*Status: M = Mandatory, O = Optional*

Example of a *correctly* formatted MT202 – SWIFT

| Meeting STP standards | |
|---|---|
| TAG 20 | BS02001 |
| TAG 21 | BS02001 |
| TAG 32A | 090216GBP40,000,00 |
| TAG 53B | /143456769001 |
| TAG 57A | MIDLGB22CLS |
| TAG 58A | /57921116<br>MIDLGB22 |
| TAG 72 | /BNF/REF:MSNY-00 |

In 57A always indicates the BIC Code.

| Not meeting STP standards | |
|---|---|
| TAG 20 | BS02002136 |
| TAG 21 | TRANSFER |
| TAG 32A | 090216SGD156,000,00 |
| TAG 53B | /123-456789-010 |
| TAG 57A | MASGSGSG |
| TAG 58D | /7153<br>JPMORGAN CHASE BANK,<br>SINGAPORE |
| TAG 72 | /BNF/FX |

In TAG 53B marked in red above: account number should be expressed as a continuous string of numbers. No separators should be used.

For an RTGS (LVPS) transaction, Tag 57A should not be formatted with MAS BIC. In this example, the MEPS Participant BIC should be directly formatted onto Tag 57A ie CHASSGSG.

In TAG58D: The use of BIC code as the beneficiary institution is always encouraged as compared to using LCC – Local Clearing Code. (The example of CHASSGSG versus SG7153.)

Example of a particular bank's acceptable code words:

## Acceptable code words for MT202 in Tag 72

| Tag | Message type | Code word |
|---|---|---|
| 72 | 202 | ACC |
| 72 | 202 | BNF |
| 72 | 202 | TELE |
| 72 | 202 | REC |
| 72 | 202 | INS |
| 72 | 202 | INT |
| 72 | 202 | TELEIBK |
| 72 | 202 | PHONBEN |
| 72 | 202 | CLSTIME |
| 72 | 202 | PHONIBK |
| 72 | 202 | TELEBEN |
| 72 | 202 | PHON |

An example of a bank's requirement to disclose Originator information:

| Tag | Field name | STP standards |
|---|---|---|
| 50K | Ordering/Originator customer account number | SGHSBC149085709001 |
| | Ordering/Originator customer name | FAIRCHILD SEMICONDUCTOR (PHILS.) |
| | Ordering/Originator customer address | MACTAN EXPO PROCESSING ZONE 1, LAPU LAPU 119 MANILA, PHILIPPINES |

- **Important!**
- When a MT does not conform to the standards mentioned – STP will fail.
- *Fails cost money!*

### 12.18.SWIFT & CLS BANK

SWIFT's CLS Connectivity Solution

The new CLS member connectivity solution will allow CLS members to communicate with CLS using one of the following communication channels:

A new straight though processing XML channel. Allows members to exchange ISO 2 0 0 2 2 XML messages with CLS using the SWIFTNet InterAct store-and-forward messaging service.

A new Browse channel. Allows end users to access a web-based user interface, manually using the SWIFT Browse messaging service.

Subscription to these new channels is required for all CLS members as part of the CLS Member Gateway Elimination project and must be coordinated with CLS based on the selected migration phase.

To ensure correct and consistent traffic routing across all CLS members, the traffic routing section will be automatically built, based on your connectivity selection.

CLS members using multiple BICs to access the CLS service, must place a separate order for each BIC.

## 12.19.MT to MX Migration

In this chapter we will deal with the MT to MX migration to ISO 20022. We will get to know the MT to MX equivalents. We will also look at how MX adoption has to be done.

### 12.19.1.MT to MX: MIGRATION TO ISO 20022

This migration completed in 2017.

### 12.19.2. ISO 20022 Overview

ISO 20022 is a universal financial industry message framework and is the platform proposed for developing all financial messages, as put forth by ISO.

ISO 20022 is a multipart standard, developed and maintained by the ISO Technical Committee responsible for standardisation in the field of banking, securities, and other financial services.

ISO 20022 describes a common platform for the development of standardized messages using:

i. **A modelling methodology** (based on UML) to capture the business transactions and associated message flows across financial business areas in a syntax-independent way.
ii. **A central dictionary** of business terms commonly used in communications between financial institutions.
iii. **A set of XML design rules** to convert the messages described in UML into XML schemas. It should be noted that XML is not a prescribed message syntax, but it is often preferred and is the syntax used in this article.

### 12.19.3. ISO 20022 Framework

### 12.19.4.Reasons and Momentum Around ISO 20022

### 12.19.5.MT to MX Equivalents

| FIN MT messages | | ISO 20022 MX equivalent | |
|---|---|---|---|
| **Name** | **Message Identifier** | **Name** | **Message Identifier** |
| Customer Payment | MT 103 | FIToFICustomerCreditTransferV03 | pacs.008.001.03 |
| Customer Payment | MT 103+ | FIToFICustomerCreditTransferV03 _STP | pacs.008.001.03 (STP) |
| Financial Institution Credit Transfer | MT 202 | FinancialInstitutionCreditTransferV03_GENERAL | pacs.009.001.03 |
| Financial Institution Credit Transfer Cover | MT 202 COV | FinancialInstitutionCreditTransferV03_COVER | pacs.009.001.03 (COV) |
| Financial Institution Debit Transfer | MT 204 | FinancialInstitutionDirectDebitV01 | pacs.010.001.01 |
| Debit Notification | MT 900 | BankToCustomerDebitCreditNotificationV03_DEBIT | camt.054.001.03 (DEBIT) |
| Credit Notification | MT 910 | BankToCustomerDebitCreditNotificationV03_CREDIT | camt.054.001.03 (CREDIT) |

### 12.19.6.Following MTs are not Migrated to MX

| FIN MT messages | |
|---|---|
| **Name** | **Message Identifier** |
| Customer Statement Message | MT940 |
| Statement Message | MT950 |

| MX Identifier | Description |
|---|---|
| acmt.xxx.xxx.xx | Account Management |
| admi.xxx.xxx.xx | Administration |
| camt.xxx.xxx.xx | Cash Management |
| defp.xxx.xxx.xx | Derivatives |
| pacs.xxx.xxx.xx | Payments Clearing and Settlement |
| pain.xxx.xxx.xx | Payments Initiation |

Payments splits to two different groups: pacs and pain; Currently 1xx & 2xx.

| | |
|---|---|
| reda.xxx.xxx.xx | Reference Data |
| seev.xxx.xxx.xx | Securities Events |
| semt.xxx.xxx.xx | Securities Management |
| sese.xxx.xxx.xx | Securities Settlement |
| setr.xxx.xxx.xx | Securities Trade |
| trea.xxx.xxx.xx | Treasury |
| tsmt.xxx.xxx.xx | Trade Services Management |

Securities splits to four different groups: seev semt sese setr
Currently 5xx.

#### 12.19.6.1.The Use of DN: Distinguished Name – akin to BIC

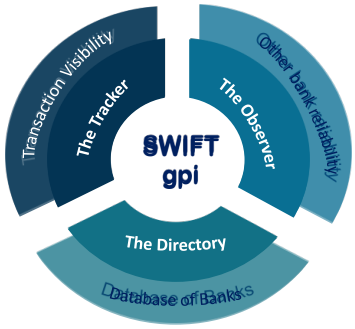
A DN is a unique identification of a bank entity
For every BIC, there is a corresponding Distinguished Name (DN) on SWIFTNet.
This Distinguished Name is a unique identifier in the X.500 notation in the form o=<bic8>, o=swift.
For example, if the BIC is ALGEDEFF, then that BIC's DN is: o=algedeff, o=swift

#### 12.19.6.2.Identifying Departments and People within the DN

Institutions sometimes define more DNs on SWIFTNet to identify departments or geographical locations, applications or individuals. These DNs have one of the forms:

i. cn=<name>, o=<bic8>, o=swift
ii. or
iii. ou=<name>, o=<bic8>, o=swift
iv. or
v. cn=<name>, ou=<name>, o=<bic8>, o=swift.

For example, if the institution's BIC8 is ALGEDEFF, and the user's UserID is JOHN, then that user's DN will be: *cn=john, ou=users, o=algedeff, o=swift*

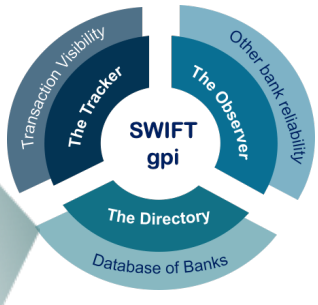


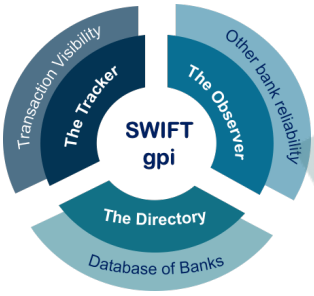

**The Directory / Details Banks**

- ✓ Those that send / receive gpi payments
- ✓ Listed by BIC,
- ✓ In which currencies,
- ✓ Through which channels and
- ✓ Cut-off times for acceptance

It outlines whether or not a bank acts as an intermediary for gpi payments.

A wide variety of formats and automated delivery channels are available.




**Look-Up**

A global view of other gpi banks' adherence to the SLAs.

Creates a basis for 'smart' collaboration / improvement.

**The Tracker Database**

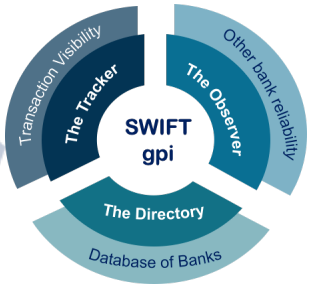
On the Cloud: meaning accessible from anywhere, through any API / interface

On SWIFT's server

Can track transactions:

- Status of 'sent'
- Has Stop and Recall features
- Efficient recall of payments credited

Users can update the database using FIN / via API



## You should now be able to:

- ☑ Describe the nature and use of SWIFT
- ☑ Describe the use of SWIFT for payments
- ☑ Describe STP and the role of SWIFT in it

## Concept Check

A. SWIFT is a

- ☐ A messaging system that can be used for all financial communication
- ☐ Domestic payment system
- ☐ An international payment system
- ☐ A messaging system used only for international payments

B. In an MT 202Cov:

- ☐ MT stands for Money Type and the 202cov is used inter bank
- ☐ MT stands for Message Type and the 202cov is used inter bank
- ☐ MT stands for Message Type and the 202cov is used by customers
- ☐ MT stands for Money Type and the 202cov is used by customers

C. STP is achieved through:

- ☐ Adherence to dealing standards; its failures are expensive
- ☐ Adherence to dealing standards; its failures are inconsequential
- ☐ Adherence to data standards; its failures are expensive
- ☐ Adherence to data standards; its failures are inconsequential

# 13. Importance of Client On-boarding

### Chapter Overview

This chapter covers the importance in properly onboarding a client. This has implications for transaction efficiency. It also has significant implications if the bank fails to comply with Anti-Money Laundering initiatives under the US Patriot Act.

### Table of Contents for Chapter 13

## 13.1.Background

This is the phase in which the client is completely new to the organization and the account is being setup.

Failure to set up the account correctly results in the following possible situations or consequences at a later stage:

i. A late discovery of a compliance failure: Apart from general banking laws and internal policies and procedures, of specific note are the obligations under the US Patriot Act, the Office of Foreign Assets Control and the international Financial Action Task Force.

ii. A need for additional documentation leading to delay in transaction processing: if the account set up does not consider obvious needs and some of the potential situations that are likely to arise in the client account, then the documentation needs can delay the transaction.

## 13.2.Wrong processing of the transaction

Charges and costs not previously communicated to the client or unacceptable to the client
Service commitments being made which are outside the purview of the bank's policy or revenue plan

Different stakeholders will respond as follows:

**i.** Customers can get upset for delays and failures
**ii.** Revenue might be missed or account servicing costs may be higher than revenue planned
**iii.** Employees might be exposed to consequences of compliance failure
**iv.** The wider community is let down by a failure to prevent money laundering and the financing of terrorism.

Many of these situations can be avoided / mitigated if client on-boarding is done is a considered and appropriate manner.

The key considerations in client on-boarding are:

- ✓ Is the basic documentation complete?
- ✓ Is the key data needed for account set up provided by a properly filled up account opening form?
- ✓ Does it pass the standards for the Client Identification Program including suitable identification documents?
- ✓ Is our Customer Due Diligence up to the mark and do we really know our Customer?
- ✓ Have we completed a database check for Specially Designated Nationals and other similar databases?

These checks are the mandatory level of checks needed. Failure to adhere to these standards are a compliance failure.

In other words, **not adhering to these standards is not an option.**

In this regard an employee must be fully guided by the appropriate internal policy and process document. The enumeration here should be treated as comprehensive from a compliance perspective.

## 13.3. Enhanced On-Boarding

If the client meeting was really so comprehensive and meaningful and we really completed a KYC in the spirit of knowing our customer, is there a chance we know exactly how his account will be operated.

Many business managers and client managers will answer that with a “Yes!” I know how my customer’s business works and I can visualise how he or she will operate his/her account.

IF that be the case, it is possible to check whether available documentation covers every transaction type the customer might undertake.

We call this Enhanced on-boarding where the customer is asked to fill additional documentation upfront.

In this manner transactions, as and when they arise, are handled seamlessly, efficiently and without documentation hold-ups; in other words: customer joy! We improve the probability that our service delivery is unmatched by any competitor.

The key processes which can fulfil enhanced on-boarding is:

i. List the possible account usage patterns
ii. Pick and assemble the set of forms which meet these usage needs
iii. pre-fill contracts, agreements, bar-codes and forms based on information available from other documentation
iv. Get the client to complete remaining blank fields

## 13.4. Advantages of Structured Onboarding

**1. Properly considered Account Set-up**

- ✓ There can be no challenges to the nature and operation of the account at a later point in time if the account set-up is exact.
- ✓ A stream-lined process creates a favourable impression of the organization to the client in initial interaction.
- ✓ Internal databases are clean and aligned across different databases within the bank. Information too is consolidated and present in a single place.
- ✓ Ensuring proper knowledge of the customer’s business is an enabler for up-selling, product innovation and identifying new revenue streams.

**2. Compliance with regulation**

- ✓ “Know Your Customer” and “Anti-Money Laundering” requirements are now very important.
- ✓ Compliance with these regulations and the Patriot Act and OFAC requirements are expected on an on-going basis.
- ✓ It is important to remember that such compliance is to be observed in respect of those that the client might deal with as well.

- ✓ For certain regulatory reporting accuracy of data and timelines are important.
- ✓ Audit trails need to be maintained to justify decisions taken earlier about on-boarding on the basis of data obtained.

**You should now be able to:**

- ☑ Appreciate the need for the payment system in a modern economy
- ☑ Understand the role played by the payment system

## Concept Check

A. The payment system at the economy level is operated by:

- ☐ The Clearing House
- ☐ The Banks
- ☐ The Fed
- ☐ The Government

B. The prevention of hacking of the payment system at the national level addresses:

- ☐ Security
- ☐ Efficiency
- ☐ Soundness
- ☐ Cost management

C. When the Central Banker improves the time in which a payment is processed it is focusing on:

- ☐ Security
- ☐ Efficiency
- ☐ Soundness
- ☐ Cost management

# 14. Virtual Account Management & Billing

### Chapter Overview

This chapter covers the management of the client relationship as well as bank profitability through the adoption of an efficient billing process. This has different considerations in choice of billing and those are discussed here. We also cover some high-level client expectations which go beyond simple payment processing.

### Table of Contents for Chapter 14

## 14.1.Client Billing

Clients can be sorted based on:

The Value of transactions they do with us
The Volume of transactions they do with us

Multiplying Value with Volume helps us group customers into brackets of importance. Having done that, an approach can be taken to billing.

The table below shows the various approaches:

| VALUE | VOLUME | AGGREGATE *(value x volume)* | BILLING |
|---|---|---|---|
| LOW | LOW | LOW | Per transaction HIGH |
| LOW | HIGH | MED – to - HIGH | Per transaction Lower |
| | | | Alternate: Charge on Volume |
| HIGH | LOW | MED – to HIGH | On value as % |
| HIGH | HIGH | MED – to HIGH | On value as % Lower |
| | | | On aggregate as % |
| | | | Per txn: flat Negotiated |
| | | | Per txn: flat etc ***Billed Monthly*** |

Sliding scales allow clients to enjoy benefits of better pricing if / as and when volumes / aggregates build up. In this customers start at a higher price bracket and graduate to improve pricing as the volumes / values build up to preferred pricing.

## 14.2.Per Transaction Billing

### 14.2.1.Bank perspective

#### 14.2.1.1.Advantages

More profitable: tend to be higher because customer cannot track each transactions charges



#### 14.2.1.2.Disadvantages

More laborious to process: though automation in billing can handle that

### 14.2.2.Client perspective

#### 14.2.2.1.Advantages

Client can track cost per transaction

#### 14.2.2.2.Disadvantages

- ✓ Not sure about overall cost efficiency
- ✓ Reconciliation: transaction may be for 10,000: may show up as 9955 (less charges).This by itself can be difficult to identify

## 14.3.Advantages of Monthly Billing

### 14.3.1.Bank perspective

#### 14.3.1.1.Advantages

Saves effort on transaction billing

#### 14.3.1.2.Disadvantages

Less profitable as client tracks costs better

### 14.3.2.Client perspective

#### 14.3.2.1.Advantages

- ✓ Reconciliation is smooth
- ✓ Accounting for costs (bank charges) in one single entry

#### 14.3.2.2.Disadvantages

Cannot match costs to transactions where the client has to recover from its own client: though there are workarounds to that.

## 14.4.Bank Service Billing

- ✓ An international services billing statement in an ISO 20022 standard, electronic format known as camt.086
- ✓ Used to transmit bank balance, service charge, tax, currency & adjustment data from a bank to its commercial customers or to another bank
- ✓ Uses billing codes to standardise identification of bank services.

### 14.4.1. Why Companies look forward to BSB

Corporations don't know with any degree of accuracy what is being paid to international banks for their services because:

i. Analysis of bank fees is labor intensive
ii. No way to provide management with global bank relationship metrics
iii. No way of accurately verifying international bank fees
iv. International cash management fees are decentralised with few controls in place
v. Current billing provides little or no transparency
vi. BSB provides a treasure trove of MIS data, payments mix and business vitality metrics

### 14.4.2. BSB: The Bank's Perspective

Why are banks involved, interested in BSB? Because:

- ✓ Standards are the more efficient approach for all involved. Standards need full representation of all categories of participant in a process to be complete.
- ✓ Our clients said they want it.

- ✓ Current state – BSB is supported by many banks and tech cos, used by a growing number of corporates.
- ✓ Future state – The ISO 20022 version of this standard incorporates additional features, fixes.

## 14.4. Virtual Account Management

### 14.4.1. Understanding Fragmentation of Liquidity

**Case Study: Client Perspective**

Advance Auto Parts (AAP) headquartered in Roanoke, Virginia is the second-largest retailer of automotive replacement parts and accessories in the USA. AAP was founded in 1932 and had 2008 sales of approx. $5.1B. AAP operates 3,540 stores in 40 US states and employs over 51,000 Team Members across all operations.

The company has collections across that many locations and maintains multiple bank accounts. The company has main accounts in eight locations and the bank balances (as of today) in those eight locations are as given.

California (USD 23.5 million); Florida (USD 14.75 m); Illinois (USD 6.25 m); Michigan (USD 12.75 m); New York (USD 22.5 m); Ohio ( USD 11.5 m); Pennsylvania (USD 8.25 m); Texas (USD 13. 5 m).

Today the company, at its headquarters in Roanoke is in urgent need of USD 58.5 million to pay suppliers. The central bank account at HQ has no surplus cash. The company is going to overdraw on its accounts with its bank.

It takes a certain number of days to get money in from the eight regional bank accounts into Virginia. California (8 days); Florida (6 days); Illinois (2 days); Michigan (4 days); New York (7 days); Ohio ( 4 days); Pennsylvania (3 days); Texas (4 days).

Is the company overall cash surplus or cash deficit?

The company is overall surplus. Cash in bank accounts: USD 113 m. Outflow required is USD 58.5 m. The surplus is USD 54.5 million

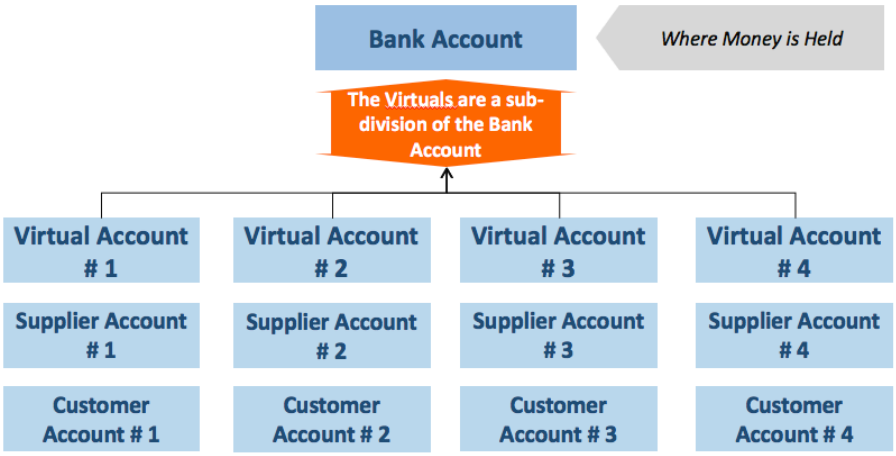
Assume that Advanced Auto Parts pays down its overdrawing as and when money is moved in from the regional bank accounts to the central bank account in Virginia. What is the total interest that AAP would pay by the time it brings the overdrawing down to zero if the bank charges 3.5% p.a.? Assume a year has 360 days for calculation purposes. You can round off the interest amount as well for the purpose of this exercise.

| Amount collected on day # | Amount | Overdrawn for # days | Overdrawn amount | Interest thereon in $ m. |
|---|---|---|---|---|
| | | 2 | 58.5 | 0.013 |
| 2 | 6.25 | 1 | 52.25 | 0.00581 |
| 3 | 8.25 | 1 | 44 | 0.00489 |
| 4 | 37.75 | 2 | 6.25 | 0.00139 |
| 6 | 6.25 | | 0 | |
| | | | Total Intt | 0.02508 |
| On day 6 account goes into surplus of | | | USD 8.5 m | |

**Is this interest payment justified?**

Since the overall position is positive, no, the interest payment is not justified.

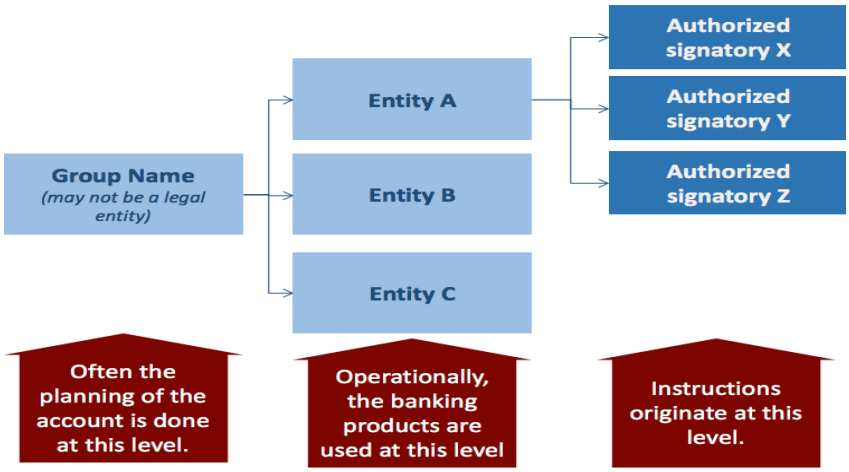
## 14.4.2. Virtual Account Management Structure




First, credits / debits are passed in the Bank Account

Then the transactions are captured in Virtual, Supplier and/or Customer accounts again.

## 14.4.3.Legal structuring of a client's business:




All entities in the client organization may not (or may) engage in all transaction types.

Each authorised signatory is authorised for certain products. Depending on level, authority amounts vary.

## 14.4.4.VAM: Setup Steps

i. The bank provides its corporate client, the payment beneficiary, a range of virtual account numbers that it can assign to its individual trading associates.

ii.

iii. Then: The client can give those account numbers to its trading associates as payment accounts.
iv. When a trading associate makes a payment, it uses that unique reference number.
v. When the payment arrives at the bank, it is 'tagged' to the virtual account aligned to the trading associate.
vi. The cash is deposited into the beneficiary's bank account and can be put to use immediately: without waiting for payment reconciliation.

### 14.4.5.VAM: "Straight Through Reconciliation"

Virtual account numbers can be used to identify remitters automatically so that a bank client receiving payments doesn't have to rely on the quality of remittance details provided in a payment reference field.

The ability that banks have to help with matching and reconciliation is dramatically advanced using virtual accounts because the bank knows the identity of the remitter and how much was paid. Companies gain faster liquidity in addition.

Virtual Account Management requires payers to adopt electronic means of remittance: and a move away from paper remittance.This is automatically advantageous, if the remitters do in fact make an accelerated transition.

These advantages are in addition to the improved liquidity access mentioned earlier.

## 14.5. Benefits of Centralising Cash Management

The customer wants to deal with all inflows and outflows in a highly organized fashion. The bank organises this as follows:

**Payments**

i. Who to pay?
ii. What amount?
iii. What date?
iv. Project outflows
v. By which payment method are amounts to be paid?

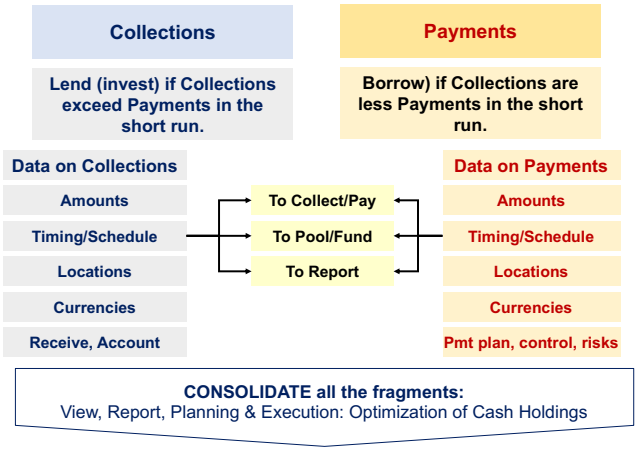
**Collections**

i. Who paid?
ii. What amount?
iii. What date?
iv. What is the current account balance?
v. By which means was the amount remitted to us?

### 14.5.1. The Client Perspective

The nature and extent on information and control that the Corporate Treasurer seeks to have is seen in the chart below:

**You should now be able to:**




- ☑ Describe different methods of billing clients
- ☑ Describe a superior manner of client fulfilment beyond plain-vanilla payment processing

## Concept Check

A. Which of the following billing methods minimises reconciliation needs:

- ☐ Deduct charges from receipts
- ☐ Add charges to payments
- ☐ Skip charges for clients ,totally
- ☐ Debit for charges separately and allow transaction amounts to remain unchanged

B. In Virtual Account Management

- ☐ Real money becomes virtual money
- ☐ The account is managed through a virtual digital assistant
- ☐ The banks accounts may be several: but amounts are notionally pooled to aggregate negative and positive balances
- ☐ The bank accounts are merged to aggregate negative and positive balances

C. In order to achieve operational efficiency clients should:

- ☐ Manage receipts at one bank; payments at another; and treasury at a third bank
- ☐ Manage receipts and payments at one bank; and treasury at another bank
- ☐ Manage receipts and treasury at one bank; and payments at another bank
- ☐ Manage receipts, payments and treasury all at one bank, preferably at MyBank!