Payments systems Models

KEYS TO UNDERSTAND AND STUDY ANY PAYMENT SYSTEM
The payment universe is infinite. The types of payments, the players and stakeholders are numerous. Internet and technology have fostered innovation and many initiatives have led to amazing payment products. Regulators all over the world want more competition and innovation in the payment space. Customers and governments want the money to move faster and faster. The payment industry is undoubtedly undergoing a massive change worldwide.

You may work on the latest payment products like apple pay or on more classical payments instruments like cards or Credit Transfers. No matter on which payment product you are working, if you want to get the big picture, then understanding the payments systems models is of great help. It is essential to easily connect the dots.

All payments systems in the world operate essentially on two types of models: open loop models and closed loop models. After reading this guide, you will be able to explain what they are and what the key differences between them are. Let’s begin with the open loop models.

1. The open loop models

Open loop systems can be compared with a hub-and-spoke model. The system is connected to Banks, Payments Services Providers (PSP) or similar institutions which act as intermediaries. And the banks are connected to end parties, the senders and receivers of funds. So there is no direct connection between end parties and the payments system. The picture below depicts an open loop payments system.
The payments are sent from an end party to its bank or PSP, then from that bank to another bank through the payments system and finally the receiving bank delivers the payments to its end party customer. Open loop models yield the great advantage of allowing banks to transact with each other without direct relationships. When a bank joins the system, it can exchange transactions with all the banks that are already in the system and vice versa. This allows open loop systems to scale rapidly.

In an open loop system end parties can send funds to one another without having direct relationship to the same bank. All end parties are in a way connected to each other through the payments system and the intermediary banks.

You may wonder what is inside the payments system. How is it made up? Take a look at the next picture. Payments systems are composed of many interbank systems and a central bank system(s) in the middle. All the interbank systems are connected to the Central Bank system. Interbank systems allow bank to exchange payments instructions (without money) and clear them according to a defined frequency, in general daily. But this can happen many times during the day.

The transfer of funds is carried out only after the (multilateral) clearing. The multilateral clearing allows to spare the execution of a huge number of low value transfers and a better management of liquidity for all the participants. The transfer of funds is what is called settlement. You can read this article if you want deepen the subject of multilateral clearing.
Interbank systems are also called ancillary systems. They are ancillary to central bank system(s). While interbank systems are operate on multilateral clearing basis, central bank systems operate on RTGS basis. RTGS for Real-Time Gross Settlement system.

A gross settlement system is a system in which the settlement or funds transfer occurs individually after each payment transaction is processed in the system. Banks generally use this type of system to exchange urgent transfers or large amounts transfers. If the funds are not available, the transfer cannot be executed. However, when the funds are available, the instructions are executed almost instantaneously. That is why these systems are called RTGS. “Real-time” means that fund transfer happens right away if funds are available. In addition, when a fund transfer is made between two accounts at the central bank, it becomes final and irrevocable immediately after the transfer is made. The risk of default is therefore eliminated.

An RTGS system is a critical infrastructure for a country’s economy since it interconnects all the (participating) banks, PSPs and interbank systems and facilitates fast transfer of funds among them. RTGS systems are usually operated by the central bank of a country or monetary zone because the central bank plays the function of “Bank of banks” as overseer of the banking system. After the processing of each transfer, accounts of instructing and receiving banks with the central bank are respectively debited and credited.

Now let’s consider few examples.

Visa and MasterCard are open loop payments systems. If you possess either of these cards, you got it from your Bank and not directly from Visa or MasterCard. Your Bank is the intermediary between you and those payments systems. Merchants that accept Visa or MasterCard do not join them directly. They have to sign a contract with a Bank which is member of Visa or MasterCard.

The SEPA schemes (Credit Transfer, Direct Debit, Cards) are all open loop systems. If you look at how the credit transfers are processed in the country where you live, you will certainly see that it is an open loop payments system as well.

The open loop model is by far the most widespread and the one you should spend time studying and analysing to understand the payments system as a whole.

2. From the open loop models to the Four Corner Model

You may still wonder how all this is useful and how it relates to your current project. In this paragraph, I will help you make the links between open loops models and the Four Corner Model. You have probably heard or read about the Four Corner Model, if you have read SEPA rulebooks (In each rulebook, there is a chapter about the Four Corner Model).

Now consider the picture below carefully.
You certainly recognize the previous picture (Figure 2). In this figure, all banks except two have been removed. The two remaining banks are connected to the same interbank system and the central bank. You probably see the point already. The open loop model can be presented in a simpler way: it is called for Four Corner Model. But why is it called the Four Corner Model? Because of the four players in the different corners.

Figure 3: Simplified open loop model

Figure 4: The Four Corner Model
Each end party is customer of a Bank. In a payment transaction, one end party is the sender and the other one the receiver. However, the Clearing and settlement Mechanisms are crucial in the whole system and we can hardly imagine a system without them. By convention, the simplified open loop model is called the Four Corner Model. That is easier to remember and easier to analyze too. But we should never forget the CSM in the middle and the critical role they play.

Now we can look at few payment instruments and see how the Four Corner Model applies to each of them.

**Example 1: Cards payments**

![Figure 5: The Four Corner Model for Cards Payments](http://www.paiementor.com/the-four-corner-model-for-card-payments/)

I refer you to this article [http://www.paiementor.com/the-four-corner-model-for-card-payments/](http://www.paiementor.com/the-four-corner-model-for-card-payments/) on the blog if you are interested in the details about the Four Corner Model for Cards Payments.

**Example 2: Cheque payments**
I refer you to this article (http://www.paiementor.com/the-four-corner-model-for-cheque-payment/) on the blog if you are interested in the details about the Four Corner Model for Cheque Payments.

**Example 3: SEPA Credit Transfer**

I refer you to this article (http://www.paiementor.com/the-four-corner-model-of-the-sepa-credit-transfer/) on the blog if you are interested in the details about the Four Corner Model for SEPA Credit Transfer.

So you see, the open loop model (or the Four Corner Model) is fundamental to understand how almost any payment instrument works. Now we will look at closed loop models and highlight the main differences between them and open loop models.
3. Closed loop models

Closed loop payments systems connect end parties directly to each other without banks as intermediaries. The end parties, merchants and consumers, join the payments system directly. It is also referred to as the three corner model in its simplest form and is used mostly in cards payments or online payments systems like Paypal. Cryptocurrencies like the Bitcoin operate on closed loop models. One of their main goals is to get rid of banks or any intermediary and allow participants to transact directly among themselves. The figure below depicts a closed loop model.

As we see, there is no intermediary layer. The architecture of closed loop systems is therefore quite simple. End parties just join the payments system and then they can transact with each other. It can be consider as a centralized system with one entity operating it. Changes and new services can be implemented and delivered pretty fast to all the end parties. This is an advantage of these models.
Details about the three corner model are available in this article. (http://www paiementor.com/the-three-corner-model-in-card-payments/)

Initial American express network is an example of a closed loop system. The cardholders fill in a form and send it directly to American express. The merchants that want to join the system must do the same. Both merchants and consumers deal directly with American Express. Paypal operates a close loop payments system as well. To pay with his paypal information (email and password), a consumer first has to register with paypal. And merchants can accept payments via paypal only if they join the system. However, it is interesting to note that both AMEX and Paypal heavily rely on open loop systems to transfer funds to their end parties as we can see in the picture below.

In the physical world, closed loop payments systems do not grow as rapidly as open loop systems because merchants and consumers must join the system itself. This may sound a bit counter-intuitive. But it comes from the fact that setting up a distribution network to address consumers directly is expensive and lengthy. But in the online world, things are different. Growing a close loop system can happen pretty fast.

In an open loop system, customers of the systems are the banks which distribute the payment instruments related products to their own customers, the end parties. In closed loop systems, customers are the end parties. That makes a big difference at the end in terms of growth.

4. Conclusion

If you want to get the big picture on a particular payment instrument and understand how it works, then go through the following steps:

1) Draw the underlying payment system model
2) Identify the main players, their roles and what they do. In payments, you always have a debtor, a debtor bank, a creditor, a creditor bank, the clearing and settlement mechanism (CSM) interconnecting the banks. They may take different names under different payments instruments, but at the end of day an end party is either debited or credited.

3) Look at the part you are mostly interested in and how it relates to the whole.

This is a pretty simple exercise and does not require a lot of time but it is very helpful to get the big picture.

So spend some time studying and analysing the payment systems models.

I hope this was useful. If you have any question, please send me an email at contact@paimentor.com or use the contact form on the blog.