



Continuous linked settlement: **The great FX fix**

Case study

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Executive summary

The Continuous Linked Settlement system was created in 2002 by the world's largest foreign exchange banks in response to central bank concerns about the impact of potential foreign exchange settlement failures on the international financial system.

Box 1: Payment-versus-payment

Payment-versus-payment is a mechanism in a foreign exchange settlement system to ensure that a final transfer of one currency occurs only if a final transfer of the other currency or currencies also takes place.

This is not to be confused with delivery-versus-payment (DVP), which is used in the securities. DVP is defined as a securities delivery arrangement which the deliveries of securities takes place as soon as payment is made for the securities and confirmed final and irrevocable.

The advent of continuous linked settlement has prevented FX settlement failures from turning into a general global financial catastrophe. Will Spinney (The Treasurer) explains how the system works.

Designed to settle foreign exchange (FX) transactions and eliminate settlement risk in a market that had not traditionally settled payment-versus-payment (see Box 1), Continuous Linked Settlement (CLS) is a delivery system rather than a payment system. But before describing CLS, let's take a look at Herstatt risk, which is named after the event that triggered the development of CLS.

Herstatt Risk

One of the characteristics of the FX market is that it involves a bilateral exchange of funds: one currency in exchange for another. If these two events do not happen simultaneously (in the jargon, payment-versus-payment), then there is settlement risk.

One of the most well-known examples of settlement risk is the failure of a small German bank, Bankhaus Herstatt, in 1974. Herstatt risk (also known as temporal risk) refers to risks which span more than one market or time zone, and usually involve foreign exchange or securities instruments.

Bankhaus Herstatt was ordered into liquidation during the banking day but not before a number of counterparties had paid in deutschmarks to the bank during the day in settlement of deutschmark/dollar foreign exchange transactions, expecting the countervalue in US dollars to be paid to their accounts in New York when New York opened.

But after the liquidation order, Bankhaus Herstatt's New York correspondent bank suspended all outgoing dollar payments from Herstatt's account, leaving its counterparties fully exposed to the value of the deutschmarks they had paid the German bank earlier on in the day. This incident almost caused the collapse of the international banking system. In more recent times the collapse of US investment bank Drexel Burnham Lambert in 1990, Bank of Credit and Commerce International the following year, Barings in 1995 and Lehman Brothers in 2008 are all examples of Herstatt risk, although losses in the case of Lehman were limited by the use of CLS. A more descriptive name for Herstatt risk might be FX settlement, counterparty or cross-currency settlement risk.

The only way to eliminate settlement exposure of this nature entirely is to settle both transactions, payment-versus-payment, using a real-time settlement system. It was for this purpose that the hybrid CLS system was designed, to eliminate Herstatt risk in the foreign exchange market.

The CLS system

CLS was created by the world's largest foreign exchange banks in response to central bank concerns about the impact of potential foreign exchange failure on the international finance system. Following the publication of the Bank of International Settlements' report on foreign exchange risk, the 20 largest foreign exchange banks (G20) decided to set up the CLS system.

CLS eliminates Herstatt risk from the international bank-to-bank FX markets through the simultaneous settlement of both sides of an FX payment instruction through a single, trusted, creditworthy intermediary.

Live since September 2002, CLS now has more than 71 shareholders (before taking into account the effects of the recent shake-up in the financial services industry) based in the US, Europe and Asia-Pacific. Together, they execute more than 55% of the world's FX transactions. In the long run, it is expected that CLS will process and settle up to 85% of all FX transactions worldwide.

CLS Bank provides payment-versus-payment settlement for payment instructions arising from FX transactions in eligible currencies. It is a US-based Edge Act bank (banks operating under the Edge Act are permitted to undertake only international business in the US; they are not allowed to compete for US domestic banking business) and is regulated by the Federal Reserve Bank.

CLS Bank acts as the common counterparty between all participating banks, with settlement taking place during a five-hour window when all the relevant real-time gross settlement (RTGS) systems are open and able to make and receive payments. Because the clearing occurs in advance of settlement, settlement is on a real-time net basis.

CLS settles on average over \$5 trillion a day, which accounts for 95% of the daily traded values in the 17 currencies traded. The Bank for International Settlements estimates that CLS eliminates over \$4 trillion of FX settlement risk per day. Operations are conducted from London, which gives the maximum window of opportunity for the processing of foreign exchange transactions between the different international currency centres (Asia-Pacific, South Africa, Europe and North America).

Participants

Major participants in CLS can be categorised as follows:

- » **Shareholders** CLS Group Holdings is owned by 71 of the world's leading financial services institutions. Collectively, they are responsible for more than half of the value transacted in the global FX market. Each shareholder has an equal vote in the governance of CLS Group Holdings. Membership in CLS Bank is generally limited to these shareholders and their affiliates. Central banks are eligible to become CLS members without owning shares.
- » **Settlement members** These CLS participants can submit settlement instructions directly to CLS Bank on behalf of themselves or their customers. The status of each instruction can be monitored directly by the settlement member. Each settlement member has a multicurrency account with CLS Bank that lets it move funds as required. As part of their agreement with CLS Bank, settlement members are allowed to provide a branded CLS service to their third-party customers. To qualify as a settlement member, a financial institution must be a shareholder of CLS Group and have adequate financial and operational capability as well as the ability to provide sufficient liquidity to meet any CLS commitments.

- » **User members** These CLS participants are allowed to submit settlement instructions for themselves and their customers, but, unlike settlement members, they do not have an account with CLS Bank. Instead, they are sponsored by a settlement member who acts on their behalf. To be eligible for settlement, each instruction submitted by a user member must be authorised by a designated settlement member. A user member may submit instructions relating to its own FX transactions as well as the FX transactions of its customers. In all cases, the sponsoring settlement member is responsible for all funding obligations relating to the user member's instructions. Settlement occurs via the designated settlement member's account. CLS currently has 3,336 user members.
- » **Third parties** These CLS participants are customers of settlement and user members. They have no formal relationship with CLS Bank and can only access the service through a user or settlement member. Third parties include thirdparty banks, custodians, non-bank financial institutions and multinational corporations. Most of the recent interest and growth in third-party participation has come from the investment management industry.
- » **Liquidity providers** These CLS participants are major settlement members that have agreed to guarantee liquidity in case a bank is unable to meet its liquidity obligations under CLS. In line with the Lamfalussy recommendations on settlement systems, there are two liquidity providers per currency zone (the area in which the currency is domiciled).
- » **Nostro agents** These participants play a vital role in CLS as they have to process swiftly payment instructions received from settlement members before the pay-in deadline via the respective RTGS systems in which the settlement members do not participate directly. Nostro agents often act for several settlement members. They also receive funds from CLS Bank for credit to the account that the settlement member maintains with the nostro agent. Given these strict requirements, nostro services are generally provided by the large commercial banks in each of the currency zones. Nostro agents have no formal relationship with CLS Bank or with the user members or third-party clients of the settlement member.
- » **Third-party service providers** These CLS participants are settlement members and user members that offer CLS related services to their customers, so that the customer may achieve the benefits of CLS as a third party.
- » **Central banks** CLS Bank links to the RTGS systems of the central banks in whose currencies CLS Bank offers settlement. CLS Bank holds an account at each eligible currency's central bank through which funds are received and paid.
- » **Vendors** The vendor community that provides software and services to CLS members.

Box 2: A fistful of FX

CLS Bank currently handles transactions in 17 currencies:

- » Australian dollar (AUD)
- » Canadian dollar (CAD)
- » Danish krone (DKK)
- » Euro (EUR)
- » Hong Kong dollar (HKD)
- » Israeli shekel (ILS)
- » Japanese yen (JPY)
- » Mexican peso (MXN)
- » New Zealand dollar (NZD)
- » Norwegian krone (NOK)
- » Singapore dollar (SGD)
- » South African rand (ZAR)
- » South Korean won (KRW)
- » Swedish krona (SEK)
- » Swiss franc (CHF)
- » UK sterling (GBP)
- » US dollar

CLS processing cycle

CLS Bank holds RTGS settlement accounts with each of the participating central banks. In addition, each of its settlement members has multicurrency accounts with CLS Bank. CLS Bank, settlement members, the national RTGS systems and third parties communicate via SwiftNet. Using this infrastructure, CLS settles transactions simultaneously in real time, but participants fund their settlement accounts on a net basis.

CLS is set up to overlap the working day in the currency centre of each currency processed. In practice, this means that all transactions are conducted within a five-hour window (although parts of Asia-Pacific have a three-hour window).

Following an FX transaction, members submit instructions to CLS, which matches the instructions and stores them in the system until the value date for processing. Only matched transactions are stored.

At the start of the settlement day — at 00:00 Central European Time (CET) — CLS Bank calculates a provisional pay-in schedule for each member based on the instructions due to settle that day. This schedule includes the minimum amount of each currency to pay and the times by which the payments must be made.

Up until 06:30 CET, members can submit settlement instructions directly to CLS Bank for processing. Members are able to review their net pay-in totals at any time before the start of the settlement day. Between 00:00 CET and 06:30, CLS identifies and calculates any intraday swap opportunities between different members. By implementing so-called in/out swaps (intraday swaps of two equal and opposite FX positions), CLS reduces members' overall intraday liquidity requirements while leaving their FX positions unchanged. A simplified example of how an in/out swap works is provided in [Box 3](#).

At 06:30 CET members receive their final pay-in schedule for that settlement day. As payment requirements are based on the net position for each currency rather than on a gross transaction-by-transaction basis, funding requirements are substantially reduced. Each settlement member pays in the required currency amounts either directly via an approved payment system if they are participants, or by using nostro agents. Once the first funding is paid in, the settlement cycle starts at 07:00 CET. Members track their positions continually to avoid operational errors. While the members' overall accounts need to remain positive, they can use surpluses in any currencies to settle other currencies.

CLS Bank settles the instructions that have been validated and matched after checking that both settlement member accounts are in credit and that settlement of the instruction will not cause either settlement member to exceed its limits. Instructions that fail this check are queued for the next cycle. They are continually revisited until they settle. If trades fail to meet the settlement criteria by the end of the working day, they are not executed and no funds are exchanged.

This cycle is repeated every few minutes with a completion target time for all instructions of 09:00 CET. Between 09:00 and 12:00 CET all short and long positions are paid out so that no outstanding funds are left in the settlement accounts.

Implications for banks

CLS provides several benefits for participating banks: It reduces the risks associated with settling high-value FX transactions using international fund transfers.

- » It reduces the cost involved with such transactions. Like any netting system, it considerably reduces the number of bank-to-bank payments.
- » Unlike traditional netting systems, it operates throughout the transaction window, providing for faster settlement of transactions.
- » It does not require the deposit of collateral, as most RTGS systems do, to cover daylight overdrafts at each central bank.
- » It gives banks the opportunity to reengineer their liquidity management to take advantage of the fact that less money is tied up in the system either as collateral in the form of money market instruments or as central bank balances. This re-engineering of liquidity management is vital as the just-in-time payment processes of CLS shorten the foreign exchange trading cycle and impose greater demands on a bank's intraday liquidity.

Implications for corporates

- » While initially focused on the interbank market, CLS is gradually extending its reach to other markets. One of the most important areas is the securities market, where CLS is working with the world's leading custodians to facilitate fund managers' FX transactions. In the long run, CLS could have a major impact for corporates by:
 - » offering treasurers greater certainty in terms of trade execution and hence allowing them to improve their cash management;
 - » eliminating risks associated with using different banks and different settlement systems;
 - » offering advantages in terms of straight-through processing and reporting opportunities for each of the participating currency zones; and allowing multinational companies to rationalise their correspondent banking arrangements and further improve their global cash management.

Box 3: How a CLS in/out swap works

Settlement members are required to fund their multilateral net short positions in each currency in central bank funds by a specified time. It is usual for these banks to have a long position in one currency and a short position in another. CLS Bank recognises settlement members with matching but opposite positions (for example, one bank may be long on euros and short on dollars while another is short on euros and long on dollars), and informs them of the opportunity to do an in/out swap. An in/out swap is a swap transaction; the first leg settles inside CLS (the in part of the swap) and the second leg settles outside CLS (the out part of the swap). The effect of the swap is to reduce the net short position that settles within CLS and, therefore, the funding required by each participant in the swap.

Step 1 Pay-in schedule is advised on the following positions (both banks are settlement members with CLS):

- » Bank A is 2 billion long in euros and 2 billion short in dollars and will have to pay in based on the dollar short position.
- » Bank B is 1.2 billion short in euros and 1.2 billion long in dollars and will have to pay in based on the euro short position.

Step 2 CLS informs Bank A and Bank B of the in/out swap opportunity. Banks A and B agree to an in/out swap for \$1 bn against euros.

- » The inside leg of the swap: Bank B pays \$1 bn to Bank A; Bank A pays €1 bn to Bank B.
- » The outside leg of the swap: Bank A pays \$1 bn to Bank B; Bank B pays €1 bn to Bank A.

Step 3 The revised in-CLS position is now:

- » Bank A is 1 billion long in euros and 1 billion short in dollars and has to pay in less on the reduced dollar short position.
- » Bank B is 0.2 billion short in euros and 0.2 billion long in dollars and has to pay in less on the reduced euro short position.

Note: These two banks now have an exposure outside CLS as a result of the outside leg of the swap, but a small one compared with the overall total position traded in CLS.

Summary The FX positions of each settlement member have not changed but each bank has had a substantially reduced pay-in to CLS as a result of the in/out swap.

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