

Background

A national payment system consists of financial institutions and service providers, a set of payment instruments (for example, cheques and credit cards), and systems and procedures, which enable people to move funds and make payments. A banking industry initiative to reform the South African National Payment System was launched by the Governor of the South African Reserve Bank, Dr Chris Stals, in April 1994. The project was aimed at addressing the payment system at a national level and at formulating a strategy to bring the South African payment system in line with the needs of the domestic economy and developments in the international community. It was envisaged that such a strategy would enable South African banks and other intermediaries in the payment system to move forward in unison.

In May 1994, a strategy-formulation team, consisting of representatives of the Reserve Bank and the large banks, as well as individuals nominated to represent the other banks, was established. A collaborative consensus building approach was adopted. This implies that most of the strategy formulation was done as an interactive team in multiple work sessions. The Reserve Bank acted as facilitator, and it took approximately 14 months to produce the first draft of the strategy document. This document became the topic of intense discussions between the many stakeholders before it was finally tabled at the South African Council of Banks (COSAB), for approval.

The document, entitled the *South African National Payment System : Framework and Strategy*, which has become known as the *blue book*, is widely recognised as a product of the South African banking industry and is accepted as the official strategy for the reform of the payment system. The document provides all stakeholders and intermediaries with a clear description of the envisaged South African National Payment System (NPS) encompassing:

The goal and objectives of the NPS

A vision describing the attributes of the ideal payment system for South Africa

Fundamental principles guiding the evolution of the payment system

Critical success factors

Strategies for addressing the shortcomings of the present system

The roles, structures and responsibilities of the different role players

A high-level implementation plan

The implementation of the NPS reform initiatives started in January 1996, after the formal acceptance of the strategy document on 15 November 1995. A large number of projects were initiated in order to move from the current scenario to the envisaged framework.

Development of a new interbank settlement system

One of the key projects and the cornerstone of the new payment-processing infrastructure was a project to implement a new electronic interbank settlement system. The South African Multiple Option Settlement (SAMOS) system, introduced on 9 March 1998, was developed over a period of two years as a collaborative venture between the Reserve Bank, banks and technology suppliers. The system will usher in a new era in electronic payment and settlement in South Africa and have a major impact on the national payment system. Furthermore, the system has enabled the Reserve Bank to introduce new operational procedures for the execution of monetary policy. Under these arrangements, banks will participate in a tendering system, based on repurchase agreements (repos), to obtain funds from or repay funds to the Reserve Bank. To this end, the SAMOS system will be the vehicle that will facilitate payment flows, resulting from repo transactions, between the Reserve Bank and banks.

Participation and contributions

The NPS and the SAMOS development project with its multi-organisational nature and tight deadlines have been described as ambitious, optimistic and awesome by international observers. The South African banking industry has, however, shown that it has the capacity, both in terms of business knowledge and technology skills, to match what is available internationally. From the original strategy-development phase of the project, through business specification, system development and implementation, the co-operation between the banks has been excellent. Banks have not only

contributed skills, but have also had to make substantial investments in new systems and technology in order to enable them to participate in the new system.

The Reserve Bank went to tender in December 1995 in order to select a technology partner to assist in the development of the Reserve Bank component of the SAMOS system. The contract was awarded to Persetel, which has since become PQ Holdings. An excellent working relationship developed between the Reserve Bank development team and the PQ technical experts. The contributions made by the various PQ subsidiary companies include the development of the network architecture (OutSource), the development of the security architecture (Nanoteq) and the development of a certification authority for the authentication of system participants (SACA).

A number of other technology suppliers also made significant contributions and provided skills, system components and services. These suppliers included IBM, Swift, STT, CSSG, the AST Group, Computer Associates, Supported Software, Tandem, Software Futures and Telkom.

Last but not least the effort and dedication of the Reserve Bank staff in this project was immense. They took to the stiff challenge and under the leadership of Mr Edward Leach on the business side and Mr Hugo Smit on the technology development side, they succeeded in delivering the SAMOS system on time and within budget. Considering the complexity and multi-organisational nature of the project, this was indeed a remarkable achievement.

The implementation schedule

The system will be implemented in a number of phases. The major implementation milestones are presented in table 1.

Cost

The establishment cost of the system was shared between the Reserve Bank and the participating banks. The Reserve Bank carried the cost of establishing SAMOS whilst the banks shared the cost of creating the settlement network. The banks also carried the cost of modifying their systems to link to SAMOS. The operational cost of the system will be recovered from the system users according to their usage.

TABLE 1 : SAMOS IMPLEMENTATION PHASES

DATE	PHASE
9 March 1998	Introduction of electronic end-of-day settlement through SAMOS
	The SAMOS system and the interbank settlement network SARBLLINK will be utilised to facilitate the end-of-day settlement process as from 9 March 1998. Although the system will be fully functional and the banks will be able to transfer funds during the day, settlement finality will be achieved at end of day only. The timing of the end-of-day process will remain the morning following the transactions for the time being.
9 March to 3 October 1998	Determining the liquidity impact of real time gross settlement
	The banks will use the system during this period to determine their liquidity requirements prior to the introduction of intraday finality. Banks will also be able to bring their back-office systems in line with SAMOS in order to enable them to capitalise on the opportunities provided by the new settlement options.
5 October 1998	Introduction of immediate intraday finality
	The switch to intraday finality will mean that all settlement instructions received by the SAMOS system will become final and irrevocable if processed successfully. The main implication of this step will be that banks would need to monitor their positions in the SAMOS system carefully and ensure at all times that they have sufficient funds or financial instruments available to process their settlement instructions.
To be decided	Move of the end-of-day settlement process to same day
	To bring the South African settlement practices in line with international best practice the final end-of-day settlement process needs to be effected on a same day basis. The date of this change will be negotiated with the banks taking due consideration of the impact this would have on their customers and operations.

ADDITIONAL BACKGROUND INFORMATION

OVERVIEW OF THE SAMOS SYSTEM

The *South African National Payment System Framework and Strategy* document presented a vision of an integrated network of payment networks, capitalising on the technological infrastructure already existing in South Africa, in order to provide a new infrastructure for effecting payments.

Payment system of the future

The key to establishing the envisaged architecture would be to create a highly secure and efficient settlement network between the Reserve Bank and banks. The settlement network would enable banks to transfer funds to one another, through their accounts at the Reserve Bank, in real time and would enable the expansion of the national payments infrastructure by interlinking their payment networks to the settlement network. This could enable corporate customers of banks, for example, retailers, to link their networks to the national payment infrastructure. Other institutions such as the Post Office or any other entity wishing to provide payment services to the public could, through the intermediation of a bank, link their technological infrastructure to the national network. This could

theoretically allow a member of the public frequenting a point-of-sale device of a payment-service provider to transfer funds and make payments to any other authorised participant who has access to the infrastructure.

The introduction of such an integrated payments network would represent a major step towards safe and secure payments for the broad public and would enable the modernisation of the financial system in South Africa.

Interbank funds transfer and settlement process

The introduction of the new interbank settlement system, named the South African Multiple Option Settlement (SAMOS) system, represents a major re-engineering of the way in which banks exchange value amongst themselves. In order to explain this change this document will (1) outline the process used prior to the introduction of the new system, (2) give a brief description of the features of the new system and (3) sketch the impact that the new system will have on the financial system of South Africa.

1. Process used until 9 March 1998

Although South Africa has an effective and efficient national payment system certain limitations and shortcomings have become apparent. Particularly the process used to facilitate interbank settlement and the lack of appropriate risk reduction measures have become obstacles to payment product innovation and financial system modernisation.

The system used in the Reserve Bank for settling interbank obligations resulting from the millions of payment transactions of bank customers did not keep pace with technological developments and business requirements. Although the Reserve Bank system was automated internally, the process of receiving settlement instructions from the banks and making transfers across their accounts needed manual intervention.

As part of the daily clearing process payment instructions issued by bank customers (for example, cheques) are forwarded by banks to clearing houses. Within the clearing house operation the payment instructions are sorted per bank and are exchanged between the banks to enable them to complete their customer accounting processes. At the same time the clearing house determines financial obligations forthcoming from the clearing process. A position for each bank relative to every other bank is determined and the settlement figures are forwarded to the Reserve Bank in order for it to effect final settlement in its role as banker of the banks. The process of clearing customer payments between banks in South Africa is a highly efficient process and close to a million cheques are processed by the Automated Clearing Bureau (ACB) each day.

Most of the clearing-house processing takes place overnight and the settlement figures are forwarded to the Reserve Bank only early the next morning. The Reserve Bank then passes the necessary book entries and, depending on the previous day's activity, some banks receive funds, whereas others pay away funds. Banks requiring additional funding in order to cover their settlement obligations then had the opportunity to obtain accommodation from the Reserve Bank, at the discount window. This settlement process required a lot of manual intervention and did not provide the participating banks with any intraday information.

Furthermore, the interbank settlement process did not take due cognisance of increasing exposures and risk. As a result of the exponential increase in the values and volumes of transactions, the interbank settlement exposures grew menacingly large. A more discomfoting factor was that neither banks nor the Reserve Bank knew what the settlement exposure of any particular bank would be. Since the settlement exposure was determined to a large extent by the payment transactions of the customers of banks, with the processing being an after-the-event affair, banks had no way of determining what their settlement obligations would be. In other countries, the problem was addressed by removing all large-value payments from the batch-orientated clearing process and processing those payments electronically on a gross basis, in real time, through high-value payment systems.

Since the interbank settlement process was fairly cumbersome it could practically be effected only once a day. This implies that a payment made today will be finalised between the banks tomorrow morning. A more serious problem with this after-the-fact process is that the large settlement exposures resulting from trading in financial instruments and in the foreign exchange market could thus also be effected only once a day, at the end of the day, thereby increasing the settlement risk burden.

Because of the nature of the settlement process, the system was ultimately dependent on the Reserve Bank for settlement. In the event of any bank not being able to meet its settlement obligations at the time of settlement, the Reserve Bank would have to step in to ensure that the system completed the processing cycle. Failure to square off the system at that late stage in the process would cause chaos in the financial system.

By its very nature, the interbank settlement system did not provide much support to banks in the provision of irrevocable payment instruments to their customers. The implication was that, if banks wished to give their customers finality relating to a payment received from a customer of another bank, prior to end-of-day settlement, they would have an exposure to the other bank for that day. This is not a big problem with small value payments, but the large payments made in today's economy could present a sizable risk to a bank.

The *National Payment System Framework and Strategy* identified the lack of a sophisticated electronic settlement process as a major shortcoming in the South African payment system. To this end a strategy was formulated to introduce an online central bank settlement system to enable banks to effect interbank fund transfers electronically and in real time, when required.

2. Features of the new system

The new interbank funds transfer and settlement system, SAMOS, will provide participating banks with a range of additional functions and business opportunities, including:

a. Online real-time link between participating banks

All banks wishing to participate in the new system will be able to link to an online real-time network provided by the Reserve Bank. These banks will be able to link to the Reserve Bank service either directly or via Swift, the highly secure international funds transfer mechanism. This will enable banks to exchange payment messages with the Reserve Bank and, through the Reserve Bank, between themselves.

b. Secure high value fund transfers between participating banks

The SAMOS system will process all fund transfer messages received by the Reserve Bank. SAMOS will enable banks to effect their payments in real time through a fully auditable and robust system. The system will provide a highly secure vehicle for interbank payment flows and ensure the authenticity and non-repudiation of all transactions. All fund transfers will be final and irrevocable successfully by the system. This will be accomplished by effecting payment transactions directly on the settlement accounts of banks held in the Reserve Bank.

c. Settlement risk reduced by prefunding

The risk of settlement failure by any participating bank is avoided through application of the principle of prefunding. A request to transfer funds will therefore be carried out by the system only if the bank issuing the fund transfer instruction has sufficient funds in its settlement account, otherwise, the instruction will be rejected. This implies that banks cannot build up exposures to one another within the system. All funds transferred are irrevocable, and the underlying transactions can thus be finalised during the course of the business day, as and when the bank and the customer require.

d. Collateral managed dynamically

The system operates on the principle of full collateralisation of all intraday loans. Banks can reserve financial instruments to be used as collateral should they require additional funding during the day. These instruments have to be in electronic form, that is immobilised at either the Central Depository (CD) or in the Financial Instrument Register (FIR) of the Reserve Bank.

Should a bank not have sufficient funds in its settlement account to carry out a fund-transfer request, the system will automatically determine whether the bank has any financial instruments available to be pledged as collateral for a Reserve Bank loan. If this is the case, the system will automatically raise a loan of the required amount against this collateral and transfer the funds necessary to process the fund-transfer instruction from the bank's loan account into its settlement account. The SAMOS system will now be able to effect the transfer of funds to the receiving bank's settlement account. This process will be completed without any manual intervention.

The introduction of the new system will have a significant impact on the payment, clearing and settlement system in South Africa. Numerous changes have already been made to existing practices, processes, arrangements and agreements and many will be made during the implementation phases of the system. Banks, clearing houses, other payment system intermediaries and corporate customers of banks will need to modify and enhance their systems if they wish to capitalise on the new payment processing architecture.

3. Impact on the financial system

The new settlement arrangements and the SAMOS system have placed the South African settlement practices on par with international best practice and presents many new challenges and opportunities to the banking and non-banking sector. Major changes include:

a. Increased participation

In line with the philosophy of the new NPS, the interbank settlement system has been opened to enable more participation. All registered South African banks are eligible to participate in SAMOS. This has already taken effect, in that the number of participating banks in the settlement process has increased from 11 banks in the old system to 21 banks in the new system. Indications are there that the number of participants will increase significantly over the next few months.

b. Exposures monitored in real time

A participating bank can monitor its balances in the SAMOS system in real time. In other words, the effect of any payments made or received by a participant will immediately be reflected on the banks' position monitor. The bank will thus be fully informed at all times of the position in its settlement account, intraday-loan account and the utilisation of collateral provided. The Reserve Bank will be able to monitor the positions of all participating banks and the system as a whole.

c. Early warning signals of potential systemic crisis

Various system indicators will enable the Reserve Bank to ascertain whether a bank is experiencing difficulty in making payments. This will enable the Bank to take pro-active steps to address a potential systemic crisis before it destabilises the payment system.

d. Synchronisation of payment and delivery

The fact that the SAMOS system can provide intraday finality of settlement between banks will enable the financial markets to introduce delivery versus payment. The finality of payment achieved through SAMOS can be synchronised with the delivery of immobilised scrip, thereby providing safe and secure financial market transactions.

e. Customer-to-customer funds transfers in real time

Finally, the implementation of the SAMOS system and the interbank settlement network provides a key building block in the enhancement of the payment services and products available to business and the general public. The new technological architecture introduced provides a vital link which could enable the interlinking of payment networks and services on a national basis in future, thereby creating endless permutations of payment services and products. The opportunities for banks and non-banks to co-operate and collaborate in order to exploit the potential of SAMOS heralds the dawning of a new era in the provision of payment products and services in South Africa.