

# Real Time Gross Settlement and the development of the Exchange Settlement Account System (ESAS)

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## Summary

*At present New Zealand is served by payment systems that allow inter-bank payment system exposures to reach high levels. The exposures are such that should one bank fail, payment system debts of that bank are unlikely to be paid. The losses that would result could destabilise other banks and, if losses were severe enough, the banking system as a whole.*

*The Reserve Bank (the Bank) and the banking industry wish to ensure that payment system risks do not destabilise the banking system. To this end, the Bank is expanding its settlement account services by developing a real time gross settlement system (RTGS) called the Exchange Settlement Account System (ESAS). This system will enable settlement account holders to settle payment instructions when they are generated.*

*Initially, the system will operate between 12 and 18 hours a day. Settlement account holders will be required to use ESAS to electronically instruct the Bank to make payment in settlement cash to any other settlement account holder. ESAS will debit the settlement account of the paying bank and credit the settlement account of the receiving bank. There will be no other method of transferring settlement cash. The system will also provide on-line real time information regarding settled payments, queued payments, and the balances in the settlement accounts. ESAS is expected to be operating by the end of 1995.*

## I Introduction

On an average day, total transfers through all New Zealand payment systems are thought to exceed \$25 billion<sup>1</sup>. The banks involved in processing and arranging these transfers on behalf of their customers must provide value (or settle) by paying away cash held at the central bank (settlement cash). In New Zealand, banks settle for their customers on the banking morning following the day payment instructions are processed. This delay results in large inter-bank exposures when for example, receiving banks credit their customers with cleared funds although they themselves have not received those funds. If the paying bank should fail before the following deferred settlement the receiving bank would lose and potentially lose heavily. The scale of these flows, the size of the inter-bank obligations they generate before funds are received, and the possible knock-on effects of one bank's failure on other banks make sound clearing and settlement arrangements essential. The design of the payment systems both individually, and collectively, should not allow instability in one bank to spread to other banks.

One way to decrease inter-bank obligations is to introduce real time gross settlement (see box on next page.) These systems settle individual instructions on a continu-

ous (real time) intra-day basis - debiting the sending bank for the gross value of each and every payment and crediting the receiving bank in cleared central bank funds<sup>2</sup>. Real time gross settlement (RTGS) provides more legal certainty than end-of-day settlement (deferred settlement) and creates a sound basis for payment finality.

In recent years the New Zealand Bankers' Association (NZBA) and the RBNZ have discussed payment system risks in great detail and in 1993 agreed in principle to develop an RTGS system. This agreement is now being implemented. The Bank is developing the core Exchange Settlement Account System (ESAS), while the banks are developing an electronic system currently called the Position Management Module (PMM) which we understand will allow banks to control the entry of identifiable payment types to the ESAS system for settlement. PMM should increase bank control over the order and timing of intra-day payments. ESAS and PMM should be operating before the end of 1995 and payment systems should be progressively hooked up to ESAS allowing RTGS to take effect.

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1 There are currently few publicly available New Zealand statistics on payment instruments or systems. The figures in this article are rough estimates.

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2 Central bank funds are referred to as settlement cash or exchange settlement account balances in New Zealand.

## A simple explanation of real time gross settlement (RTGS)

In the New Zealand context RTGS would be attained by the introduction of an electronic system that holders of settlement accounts (currently banks) could use to transfer funds between each other.

The "RT" (real time) in RTGS refers to the almost instantaneous speed with which funds would be transferred. A payment instruction could be paid at the actual time that a debt or purchase was created or made by a bank or bank customer.

The "G" in RTGS indicates that instructions are made "gross". That is, transactions would be sent individually through the RTGS systems and instructions would not be netted against receipts as happens in most other payment systems. By sending instructions gross, it is easier to check on what has happened to an instruction. There are also several legal complications that have tended to make international and local experts nervous about the legal enforceability of some netting<sup>3</sup> arrangements.

The "S" (for settlement) in RTGS is a formal word for final and complete payment. When all the different characteristics represented by the letters in RTGS are combined in one package a legally robust and instantaneous method of banks making inter-bank payment results.

## II New Zealand payment system arrangements and payment system risks

In New Zealand, as in most developed economies, many types of payment system have grown up. Most payment systems target a particular market niche and so provide a particular set of payment instruments often to a particular type of customer.

Computer-based systems operating in New Zealand originally developed to simplify the handling of the large volumes of cheque payments that have traditionally characterised the New Zealand payment system. These systems are electronic in the sense that the systems handle information electronically. However, clearance of cheques still takes days, and cheque failure to settle arrangements allow banks to unwind (revoke) cheques that have not been cleared. Thus in theory at least, the receiving customer loses (and not the receiving bank) if a paying bank fails. The cheque related payment system debts of a failed bank are not thought to be large enough to threaten the solvency of other banks and so systemic risks may be small.

Cheques do not satisfy all customer payment needs. Changing business conditions, and in particular the need for rapid electronic payment have resulted in the development of alternative methods of making payment. Predominantly small value electronic payment systems that allowed very rapid receipt of cleared funds developed in the 1970s and early 1980s. Large value electronic instructions geared for the needs of the wholesale money markets followed in the late 1980s. There are now two large value electronic payment systems in New Zealand – the KITS and Austraclear New Zealand System.

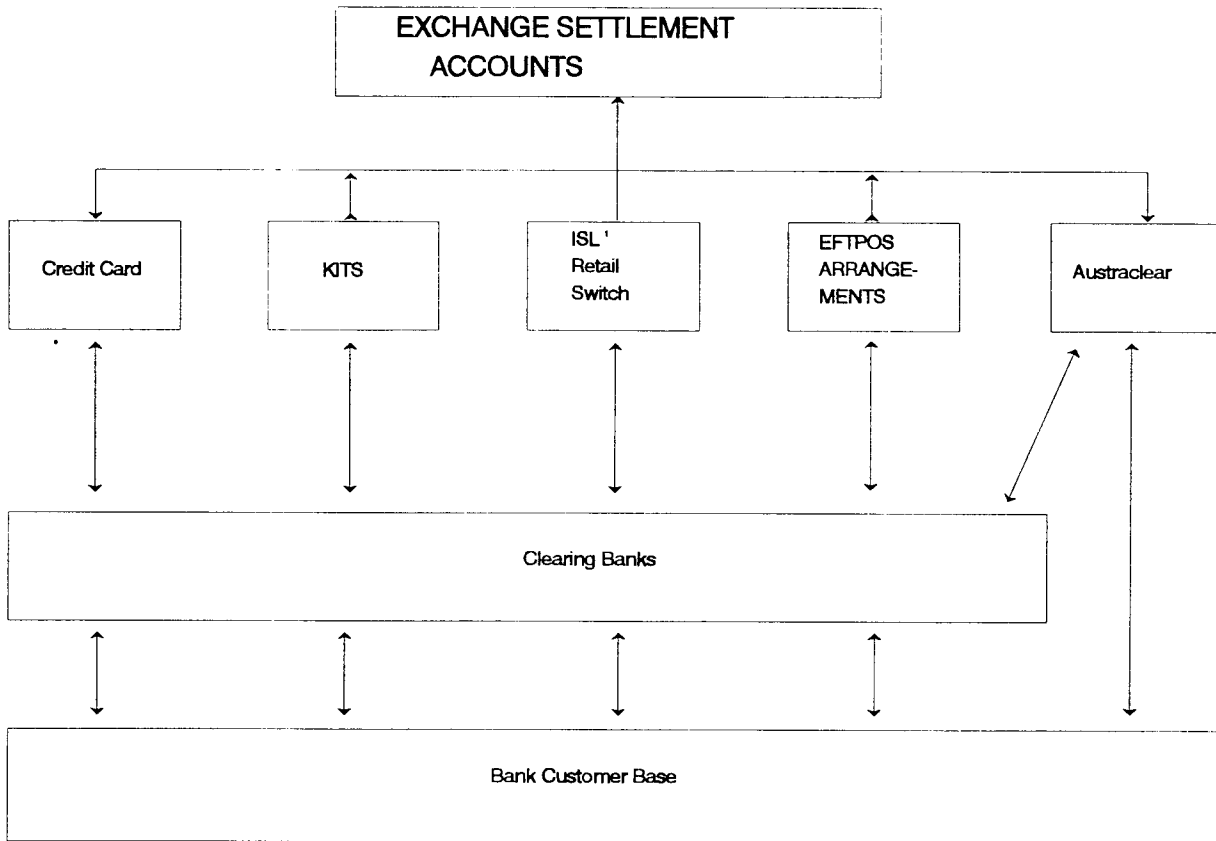
The four major banks began developing KITS in 1987 to allow members to make intra-day high value electronic transfers. Once an instruction is sent by the paying bank and received and accepted by the receiving bank it is thought to be irrevocable and guaranteed by the paying settlement bank. This occurs even though payment in settlement cash will not occur until the following banking morning. As a result, each member bank potentially incurs an exposure to other KITS members whenever it receives a payment instruction. The risk absorbed by receiving banks (receiver risk) through this system is high, perhaps approaching \$1.5 billion per bank from time to time.

The Austraclear New Zealand System is provided by the Registry Department of the Reserve Bank. It allows

3 Netting involves the offsetting of receipts against payments so that a party to a netting arrangement need only pay the net position at regular intervals. For example, if a netting arrangement is in existence between two banks, then the two banks would keep a running net position, or at regular intervals add up all the receipts and payments that fall within the ambit of the netting arrangement. The bank which had the largest total value of payments since the last time the payments were settled, would then pay funds to the other member bank to cover the net amount due. Multilateral netting extends the above general netting principles and coverage of netting to a number of participants. In this situation, all payments amongst members may be netted, so that each member absorbs an overall net exposure to all the members of the netting agreement. For further information on netting refer to the Bank of International Settlements publication, "Report on Netting Schemes" (February 1989).

Figure 1

## CURRENT PAYMENT SYSTEM ARRANGEMENTS



1. Interchange and Settlement Limited

ES/95

money market dealers and other Austraclear members to settle security transactions and to make cash transfers. Settlement banks provide cleared funds for their customers' positions on Austraclear. However, settlement banks cannot settle inter-bank exposures until the following banking morning, and are owed funds for transactions until then. Austraclear transactions can generate large receiving bank exposures to paying banks.

Besides these two high value transfer systems, there are several retail level payment systems which are provided by groups of banks (see figure 1). Some of these systems generate payment system risks similar to Austraclear and KITS. However, the sizes of these exposures and risks are thought to be low compared to the risks generated in the larger value systems.

In total the receiving bank system risks generated in the two large value payment systems often exceed a billion dollars for large New Zealand banks. There are also other forms of payment system risk that rest on receiving customers and on paying banks and paying customers. These other payment system risks are significant and add to the

complexity and total level of risk that the system and the economy faces as a direct result of banks and their customers making payment.

### III Controlling payment system risk

At present Austraclear provides paying banks with the ability to manage exposures to their customers. KITS provides functionality that paying banks may use to manage exposures to correspondent bank customers. Although these limit facilities allow management of paying bank exposures to their paying customers, neither system provides information on receiving bank exposures to paying banks. Banks are not provided with tools that can be used to control payment system exposures to each other.

In contrast, clearing houses in many other countries allow members to control inter-bank risks. For example, the United Kingdom large value system called the Clearing House Automated Payment System (CHAPS)

allows banks to limit the extent to which the value of incoming CHAPS instructions from another member can exceed the value of its outgoing instructions to that bank. In this way, banks can control the net inflow of funds from any single settlement bank for which it is obliged to give same-day value to its customers.

In the United States, members of the Clearing House Inter-bank Payments System (CHIPS) can set bilateral credit limits on other members and the clearing house applies a limit on the net debit position of each member. Net debit limits are also found in the Zengin System in Japan.

As well as various limits on exposures, some payment systems require members to arrange collateral and sign agreements to fund the system should a member fail to settle their payment system obligations. Such failure to settle arrangements for deferred payment systems are a method of pooling the risks that remain following netting and limit management. In total these arrangements can deliver near certainty that a receiving bank will be paid. However, they are relatively complicated and sometimes difficult to establish. RTGS is a more practical solution for New Zealand.

#### **IV International developments**

The introduction of RTGS and ESAS in New Zealand is part of a broad international trend towards eliminating payment and settlement risk. There is real time gross settlement within the Federal Reserve's Fedwire system in the United States, and in the SIC system in Switzerland. All European Union countries plan to introduce RTGS soon, and already systems are operating in Italy, Germany, Denmark, Finland and Sweden. Several countries in Asia are moving quickly in this direction: these include Hong Kong, Thailand, South Korea and China, all of which are planning to have systems installed by 1997.

#### **V The New Zealand RTGS framework**

The New Zealand RTGS programme differs from other countries' programmes in line with our institutional arrangements and banking industry. The core of RTGS will be the ESAS system, which will provide simple

settlement account update services to all banks holding settlement accounts<sup>4</sup>. Commercial payment systems will be connected electronically to ESAS and banks will use PMM functionality to control the progression of classes of payments to ESAS for settlement individually. The RBNZ will retain control of ESAS as this system will be the core of the RTGS payment system. The banks, through their own use of individual systems and through PMM, will control the timing of inter-bank settlement as well as the processing and interchange of their customers' instructions. In the longer term, however, the Bank may provide non-banks with access to settlement accounts and ESAS.

After the introduction of ESAS, bank customers and banks themselves will continue to generate instructions, and the current payment systems will continue to process them (see the lower section of figure 2). For example, a member of KITS will probably still use KITS to deliver payment instructions. To settle payments gross (as is required by RTGS) it is likely that the identity codes of the paying and receiving bank; the amount involved; and the administrative details will be copied from the payment instruction and will then be forwarded to PMM (see the top section of figure 2). PMM will list all payments awaiting settlement, and we expect that bank treasurers will be able to use PMM to release sets of payment types to ESAS for settlement (see the top section of figure 2). An instruction may be withdrawn by the issuer or instructing bank at any time prior to payment by ESAS.

Once ESAS has accepted a payment instruction, the system will check to see that the paying bank has sufficient funds in its settlement account. If there are sufficient funds, the Bank will settle the instruction by debiting the account and crediting the receiving bank's settlement account. After settlement the ESAS system will notify the source payment system which is then expected to release the full underlying payment instruction to the receiving bank as finally and irrevocably paid (see the middle section of figure 2). The receiving bank will have already received settlement cash and will then be able to pass on cleared funds to receiving customers without incurring risk.

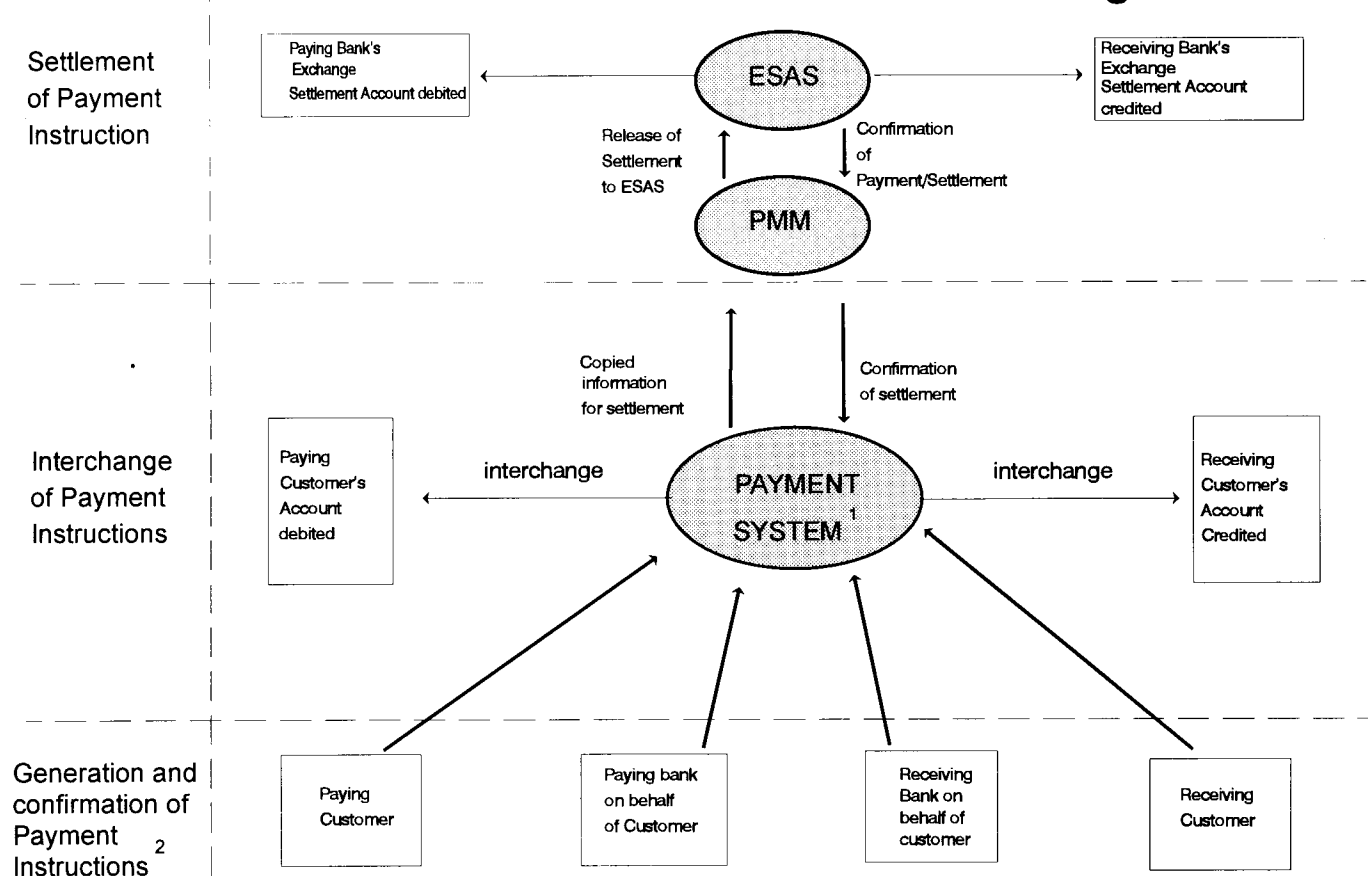
While ESAS is operating, ESAS members will be able to forward large numbers of transactions to the ESAS system for settlement. However, should an instruction arrive at ESAS while there are insufficient funds to make payment, the instruction will be set aside in a queue. The ESAS system will store queued instructions within ESAS by account holder and will later attempt to pay the queued instructions on the basis of first in first out (FIFO) order. If an instruction is not paid by the end of the day it will be removed from ESAS.

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<sup>4</sup> At present only banks hold exchange settlement accounts. However, the Reserve Bank may reconsider the provision of settlement accounts to non-banks once RTGS has been introduced.

Figure 2

## RTGS Settlement and Interchange



1. This oval refers to all payment systems (for example, Austraclear, KITS) operating in New Zealand.

2. Payment systems receive instructions from either the paying customer, paying bank, receiving customer or receiving bank. The instruction may then be confirmed/matched by other parties to the payment. For example, Austraclear payments are generated by the receiving and paying customers. They are then matched and funds are confirmed by the paying bank.

To ensure that instructions continue to flow smoothly and gridlock is avoided, the Bank has agreed to provide additional liquidity to settlement account holders (ESAS members). A settlement account holder can use ESAS to obtain intra-day settlement cash by selling assets to the Bank under same-day sale and repurchase agreements (Repos). The Bank has agreed at the very least to purchase government securities, and Reserve Bank bills and will consider other assets if needed. Members can enter into and repurchase Repos any time during the banking day.

On the banking morning following the end of the banking day, each ESAS member must ensure that it has sufficient funds in its settlement account to pay any queued transactions in ESAS and to repurchase any outstanding Repos. The successful repurchase of all Repos will withdraw the additional liquidity required by the introduction of ESAS, and in effect will allow the RBNZ to continue to operate monetary policy as now on the basis of inter-day (overnight) settlement cash balances. Monetary

policy<sup>5</sup> will continue to target inter-day settlement cash balances and banks will continue to discount to obtain inter-day liquidity from time to time.

In the event that large lumpy payments cause gridlock in ESAS, the Bank can use a "Freeze Frame" facility in ESAS. This facility will allow ESAS to settle specially flagged transactions as long as the settlement of all flagged instructions at the same instant would not result in any of the settlement accounts moving into overdraft. This facility will only be used when it is clear to the Bank that gridlock has occurred and banks cannot obtain sufficient liquidity to arrange settlement in reasonable time.

5 The Bank intends writing about monetary policy and liquidity management under RTGS in the December *Bulletin*.

## VI Changes to commercial banking and payment systems

The move to introduce ESAS is a major change which will have ripple effects through out the payment system and banking industry. Commercial banks and the Reserve Bank are planning to introduce the infrastructure necessary for real time settlement. Payment systems will also need to make changes to receive and send payments and payment related instructions to PMM or ESAS.

The introduction of ESAS will provide the means to eliminate payment risk from some payment arrangements and reduce it very significantly in others. ESAS will potentially allow settlement of both legs of a transaction at the same instant. For example, buyers of Australian dollars may be able in future to settle at the same instant the Australian dollars are received.

ESAS will allow banks and payment systems to coordinate payment with full and final settlement of securities. This is done by allowing systems to coordinate the transfer of securities held in a depository with the receipt of settlement account balances. The debiting of the security purchaser's bank/system account (paying customer's account), and the paying bank's settlement account on ESAS, will occur at the same moment full and final ownership of the security are received by the buyer/payer. Systems which coordinate payment and receipt in this way are referred to as delivery-versus-payment (DVP) systems using final central bank funds. The advantages of such arrangements<sup>6</sup> are well known.

The linkages of all electronic payment systems to ESAS has the potential to enable banks to provide improved payment services to their customers intra-day without risk. For example, after the introduction of ESAS, banks will receive and make payments intra-day, and so when funds are received real time, banks will be able to pass those cleared funds on to receiving customers immediately without incurring any risk. We believe that competitive pressures on banks to offer fast, safe and low risk payment services will encourage the development of real time settlement services for bank customers.

## VII Conclusion

RTGS will provide the banking industry with the means to improve the security and speed of payment services and to eliminate payment system risk in both large and small value payment systems.

RTGS requires the Reserve Bank to provide real time access to the exchange settlement accounts to allow final irrevocable settlement. ESAS is being developed by the Bank for this purpose. A number of changes are also planned by payment systems and banks, including the PMM system which will be used by bank treasurers to manage the intra-day timing of particular classes of payment instructions. Payment systems will need to consider many factors before providing RTGS related services including interfaces to PMM/ESAS, security, confirmation of settlement and changes to the timing of interchange.

There is much work to be done. However, once these changes are up and working together, they should provide the settlement infra-structure needed to ensure that the banking industry in New Zealand can provide settlement services of the highest international standard. ■

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<sup>6</sup> DVP is discussed in detail in the Bank of International Settlements publication, "Delivery versus Payment in Security Settlement Systems", (September 1992)