



BANK OF ENGLAND

A Guide to the Bank of England's Real Time Gross Settlement System

October 2013

Contents

Contents	2
1. Introduction	3
2. History and Main Functions of RTGS	4
3. Settlement in RTGS	5
4. Benefits & Requirements	11
5. Main Technical Features of RTGS	14
6. Application Process	16
Stylised Application Process Flow Chart	19
7. Two case studies	20
8. More Information	21

1. Introduction.

This short guide describes how the Bank performs its role as settlement agent to the UK's main interbank payment systems. It includes an assessment of the benefits of having a settlement account in the Bank's Real Time Gross Settlement (RTGS) system – and of the responsibilities and costs associated with having such an account relationship. The document then summarises the main technical features of RTGS, and the process for applying to be a settlement bank in RTGS. Finally, there is a brief description of the experiences of some recent settlement bank applicants.

The Bank has recently encouraged a number of banks with significant payments values to open settlement accounts and settle their interbank obligations directly in RTGS as direct participants in payment systems.

The Bank would be happy to discuss the process and criteria for obtaining a settlement account with interested institutions: contact details are available at the end of this document.

2. History and Main Functions of RTGS

The Bank of England's role as settlement agent – providing the ultimate, risk-free means of discharging payment obligations between parties – emerged in the mid-19th century with the provision of settlement accounts for the banking sector. Since 1996, these accounts have been held within the Bank's Real-Time Gross Settlement (RTGS) system, which as the name suggests provides for real-time posting with finality and irrevocability of debit and credit entries to participants' accounts.

Institutions have accounts in RTGS so that they can participate:

- (i) as a settlement bank in any of the interbank funds transfer systems for which the Bank acts as settlement agent; and/or
- (ii) as a member of the Bank's Reserves Scheme (which since 2006 has been part of the operational framework for delivering the Bank's monetary policy decisions)

As regards the Bank's role as settlement agent, the RTGS system forms an integral part of two systemically important interbank funds transfer mechanisms: the CHAPS high-value payment system and the funds transfer mechanism supporting the CREST securities settlement system. These are described in more detail below [see section 3a].

Other major UK interbank payment systems also use RTGS to book member banks' multilateral net pay/receive obligations arising from payments exchanged during those systems' most recent processing cycles. The Bank provides a standardised service for handling such multilateral net settlements.

More information on the technical features of RTGS can be found in section 6 below.

3. Settlement in RTGS

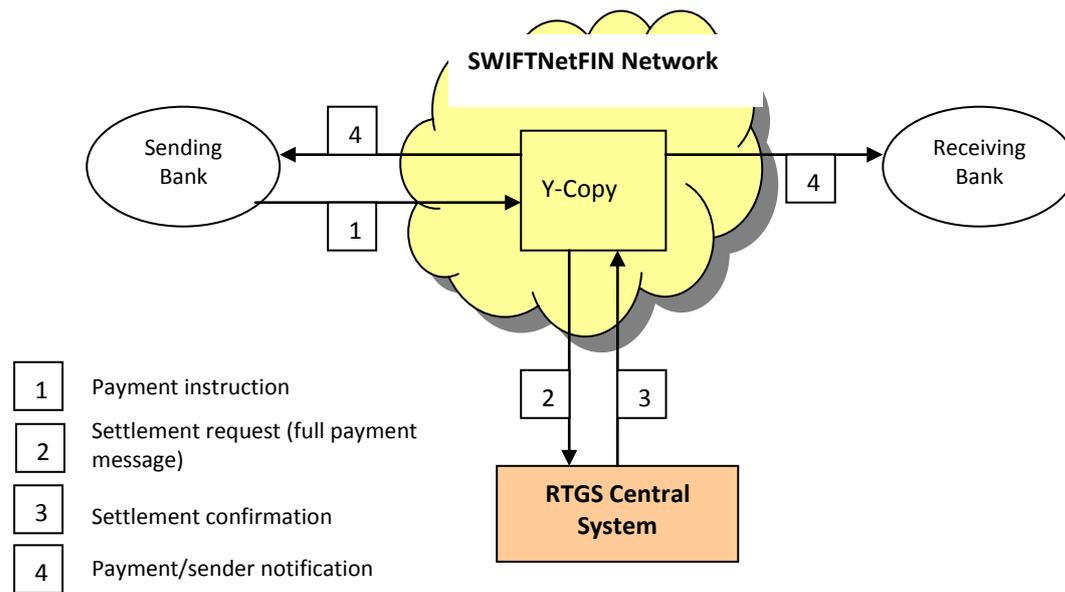
3a. Settlement of CHAPS and CREST transactions

In most countries, high-value or wholesale payments are settled on a Real Time Gross Settlement (RTGS) basis across accounts held at the central bank: payment instructions are submitted individually, and the paying bank is debited and the receiving bank is credited before the instruction continues on to the receiving bank. This means that the receiving bank can then go ahead and credit its client's bank account or pay the funds away in the certain knowledge that the original instruction cannot be revoked. In the technical jargon, 'receiver risk' is eliminated. In the UK, CHAPS transfers and interbank payments in respect of CREST transactions are settled on an RTGS basis.

CHAPS is the same-day electronic funds transfer service, provided by the CHAPS Clearing Company (which is owned by the commercial banks), that is used for high-value/wholesale payments but also for other time-critical lower value payments (such as house purchase). Individual CHAPS payment instructions are routed via the SWIFT network to the RTGS system and settled across the paying and receiving CHAPS banks' settlement accounts.

In a little more detail, the message from the sending bank is stored within SWIFT FIN Copy while a full copy of that message is sent to the Bank for settlement. Once the payment is settled in RTGS with finality (sending bank's account debited, receiving bank's account credited), a confirmation is returned to SWIFT and the full payment message is then forwarded on to the receiving bank who then processes the payment as required in its own payment systems.

The CHAPS system



Since mid-April 2013, the Bank has provided a Liquidity Saving Mechanism (LSM) within RTGS. This LSM contains a 'central scheduler' that enables the CHAPS banks to manage their payment flows centrally. In particular, banks can decide whether their CHAPS payments should settle via 'urgent' or 'non-urgent' streams. For most of the time, RTGS will only settle urgent CHAPS payments, one at a time and in much the same way as it has since RTGS was first introduced. However, every few minutes the LSM will suspend urgent payment processing and switch to a 'matching cycle' that will match and then simultaneously settle batches of offsetting non-urgent payments. Offsetting payments will still settle gross from a legal standpoint but the simultaneous nature of the settlement means that banks will economise on the use of liquidity.

Currently (October 2013) CHAPS has 19 direct members who settle their own, and several hundred indirect participants', CHAPS payments over their settlement accounts.

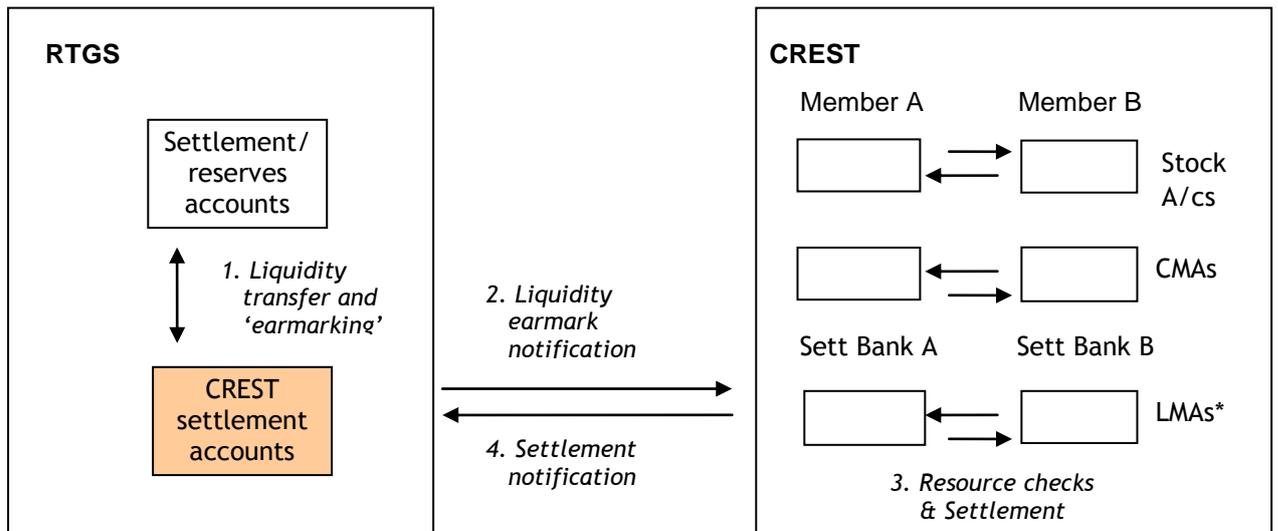
Each settlement bank provides liquidity to support the timely settlement of CHAPS payments in RTGS. Liquidity is primarily provided by holding balances on a settlement account (also known as 'reserves'), and can be supplemented through

additional intraday liquidity (IDL) via intraday repos of eligible securities between the CHAPS banks and the Bank. Currently, much of this IDL is generated automatically first thing in the morning before the CHAPS business day starts.

CREST is the UK's securities settlement system, operated by Euroclear UK & Ireland (EUI), which since November 2001 has provided real-time cash against securities settlement (referred to as 'Delivery versus Payment' or DvP) for its members. The CREST system settles securities transactions in a series of very high-frequency cycles through the day; after each cycle the Bank's RTGS system is advised of the debits and credits to be made to the CREST settlement banks' accounts as a result of the settlement activity performed by CREST in that cycle. There are around 35,000 CREST members, all with securities and cash accounts in the CREST system. Every CREST member must have a banking relationship with one or other of the 14 (as at October 2013) CREST settlement banks. This relationship is reflected in the members' cash memorandum accounts (CMAs) within CREST - against which all cash payments and receipts in respect of securities-related transactions are posted. Settlement banks set secured and unsecured credit caps to the CMAs of the CREST members that they represent, and which the CREST system operates on the settlement banks' behalf through the CREST business day.

CREST settlement accounts in RTGS have zero balances overnight. So before the start of CREST settlement each morning (and the sending of the first liquidity ' earmark' to CREST), settlement banks should transfer funds to their CREST settlement accounts. During the day (between settlement cycles), settlement banks can add to or reduce the balance on their CREST settlement accounts. At the end of the CREST day, balances are automatically swept back up to principal settlement/reserves account.

The CREST DvP process



* Liquidity Memorandum Accounts

As with CHAPS transfers, the Bank supports the real-time settlement process in CREST through the provision of intraday liquidity to the CREST settlement banks; and again this is provided via an intraday repo (under a procedure known as auto-collateralisation, which is carried out on the Bank's behalf by the CREST system).

3b. Settlement of other interbank payment systems

The Bank provides a settlement service in RTGS to the following payment systems:

- Faster Payments Service
- Bacs
- Cheque and Credit Clearing
- LINK

Direct members of these systems settle their obligations on a so-called deferred multilateral net basis because of the very high volumes (and generally low value) of payments involved. The Bank receives a settlement message via the SWIFT network each day (three times a day for the Faster Payments Service) from each of the relevant payment systems, containing single net pay/receive figures for each of the

systems' direct members¹. These amounts are then applied to the members' RTGS settlement accounts.

The Bank also manages collateral pools for Faster Payments, Bacs and the Cheque and Credit clearings to which those systems' direct members contribute. The collateral is in place to cover an event of settlement default by a system member or members such that they have insufficient funds on their settlement account to meet a net pay obligation in one of the system settlements.

A direct member of a deferred net settlement payment system who is also a CHAPS settlement bank will use its settlement account for settlement of its net obligations in those net settlement payment systems.

3c. Reserves Accounts

The Bank of England also offers reserves accounts (held in RTGS) to eligible institutions as part of the framework for its operations in the sterling money markets, which in turn are designed to, on the one hand, implement monetary policy and, on the other, meet the liquidity needs of the banking system as a whole.

The reserves account balances play a key role in ensuring that the Monetary Policy Committee decisions about Bank Rate are transmitted through to market interest rates. Reserves account balances, which are remunerated at Bank Rate², also count towards an institution's liquid assets buffer as laid down by the Prudential Regulation Authority's liquidity regulations.

¹ It is possible for payment systems to have categories of direct member who are ineligible for an RTGS settlement account. In such cases, those members will use the services of one or other of the direct members who has such an account, and who will then be responsible for settling the net obligations of the non-settlement members for whom they act.

² Currently, as part of the Bank's approach to Quantitative Easing, all reserve balances are remunerated at Bank Rate. Under the normal system of reserves targets and averaging, interest penalties are applied if a scheme member holds an average level of reserves over the maintenance period that is higher or lower than the specified range.

There is a different application process for acquiring a reserves account³. An institution does not need to be a settlement bank in order to open a reserves account. However, in most cases settlement banks will be required to become members of the Reserves Scheme (if otherwise eligible for the Scheme), and the balances on their settlement accounts at the end of the day represent their reserves account balances.

³ details of which can be found on the Bank's external website at:
<http://www.bankofengland.co.uk/markets/Pages/money/applications.aspx>

4. Benefits & Requirements

There are a number of benefits arising from being an RTGS account holder, and in particular a direct payment system member, not least of which is the security inherent in being able to perform settlement in central bank money, the ultimate risk-free asset. Naturally however, there are also a number of initial and ongoing costs that will have to be supported in order to reap these benefits.

4a. Benefits

+ Reduced Credit Risks

The implementation by central banks of RTGS for interbank high-value systems throughout the world was driven by the goal to remove risk from the settlement process.

Using the services of a CHAPS and/or CREST settlement bank to settle your own (and your clients') high-value transactions entails the managing of a banking relationship with that settlement bank, and the risks that that could entail. Becoming a direct CHAPS/CREST settlement bank means that, *inter alia*, the relationship moves to the central bank: payments are settled in central bank money with finality and irrevocability; and settlement account balances are risk-free.

In addition, having a direct relationship with a payment system (whether for wholesale or retail payments) means that, for example, you are kept fully informed about any operational difficulties that might impact your and your customers' payment traffic as they happen.

+ Increased independence

Becoming a direct settlement member of any payment system - rather than relying on an existing direct member - will provide an element of increased independence in terms of how that bank manages its (and its clients') payment business. This is likely

to be the case for CHAPS and CREST payments especially, where the managing of payment flows through to the end of the business day is closely related to an institution's treasury management.

+ Community/Network

As well as a more direct operational and business relationship with the Bank, direct payment system membership brings a bank into the cooperative space that exists within the community of system members.

Thus, as a CHAPS/CREST settlement bank, your institution is represented on the CHAPS Board/ CREST Settlement Bank Committee and the Liquidity Managers Group – bodies that together help shape the strategic direction for the wholesale payment and settlement landscape in the UK.

4b. Requirements

- Technical investment costs

The scale of the investment required in hardware and communications links (for example, the Bank's Enquiry Link service enabling RTGS account holders to monitor their accounts and manage their CHAPS payment queues within the RTGS central scheduler) will depend very much on the size and scale of the payments traffic for which the applicant wants to act as settlement bank. Applicants will also be required to show (through testing and trialling) that their technical capacities and capabilities meet the RTGS system requirements. On this latter point, it should be noted that the same operational staff that manage euro payment flows in the context of the TARGET2 euro RTGS system should also be able to manage CHAPS sterling payment flows.

For CHAPS banks especially, there is also an ongoing commitment to participate in the testing and trialling of subsequent RTGS system upgrades and in SWIFT releases, as well as in the CHAPS scheme's programme of contingency testing. Similarly,

CREST settlement banks have to participate in CREST's regular annual testing of contingency procedures.

It is also a requirement of the CHAPS scheme that its members have a remote back-up site where they can handle their CHAPS payments in the event of operational problems; and CREST settlement banks are expected to have dual connectivity to the CREST system.

- Liquidity/collateral requirements

Applicants will be required to provide the necessary *intraday liquidity/collateral* to support their settlement business. For those banks joining one of the net settlement systems (FPS, Bacs, Cheque & Credit clearings) this will include contributions to the relevant collateral pools that the Bank manages on behalf of the systems. However it is worth bearing mind that it is quite likely that, even as an indirect participant bank using the payment services of a direct member bank, you will be required to provide collateral to your settlement bank or prefund your account to cover your payment flows.

It is also worth bearing in mind that for CHAPS and CREST purposes, settlement banks can mobilise a range of non-sterling collateral (including euro cash) in exchange for intraday sterling liquidity from the Bank of England.

- Joining fees/costs and transaction tariffs

The Bank of England operates the RTGS system on a full cost recovery basis. Costs are recovered in a number of ways:

- CHAPS and CREST settlement banks must pay an annual RTGS account management fee.
- CHAPS and CREST settlement banks also pay a per transaction tariff. This is reviewed with the settlement banks each year.
- There is also an annual charge (shared equally amongst the settlement banks) for each of the net payment systems that the Bank settles for. These charges are also reviewed annually.

Individual payment systems may also have their own joining and annual membership fees, and/or contributions to the system's own costs.

- Legal costs

Another important element of a new applicant's start-up workload will relate to

- The process of reviewing and then signing the relevant legal agreements. These will include both agreements with the Bank and with the relevant payment systems/members.
- The provision of independent legal opinions to the Bank, and where necessary to the payment system, regarding the applicant's ability to enter into the necessary contractual relationships underpinning participation as a settlement member.

5. Main Technical Features of RTGS

The *RTGS Processor* is host to all the accounts held in RTGS and carries out all the postings made to those accounts.

To ensure the smooth and uninterrupted operation of RTGS, the RTGS Processor runs on fault tolerant computers. The processing hardware and software at the prime site are duplicated in a remote standby site and changes to the prime site database are copied automatically to the standby site. Similarly, the system control function is run from two separate sites.

Within the RTGS Processor is a *Central Scheduler (CS)* through which all CHAPS settlement instructions have to pass before actual settlement. CHAPS banks use the CS to control the rate and order in which their instructions proceed to settlement, and in particular to distinguish between urgent and non-urgent CHAPS payments.

In order to improve further the resilience of RTGS, some central banks have invested in a third site, remote from the prime and standby sites. However, the Bank has adopted a different strategy and is currently working with SWIFT, the international financial messaging provider, in the development of a simple generic RTGS system hosted by SWIFT⁴ as a contingency option. This will be geographically remote from the UK and run on different technology to the Bank's existing RTGS service.

All account holders (including reserve account holders) must have access (via a terminal) to the secure, SWIFT-based *Enquiry Link* service, owned by the Bank. This enables account holders to monitor activity on, and receive information about, their account(s) in the RTGS Processor, and in certain circumstances to transfer funds between accounts.

The RTGS Processor also has:

- an *interface* with the SWIFT network so as to be able to settle CHAPS payments;
- a *dedicated link* to the CREST system, to support the real-time DvP settlement process;
- an *interface* with the Bank's Intra-Day Liquidity System, to enable CHAPS banks' settlement accounts to be credited with the proceeds of IDL operations.

⁴ The system will be called MIRS: the Market Infrastructure Resiliency Service

6. Application Process

In most circumstances, an institution wishing to have an RTGS settlement account must also already have, or be in the process of acquiring, a reserves account at the Bank. As mentioned in Section 3c, there is an entirely separate application process for acquiring such an account.

The application process for acquiring settlement bank status will usually begin with an exploratory meeting between that institution seeking to become a direct payment system member and the Bank, at which the implications, benefits and requirements of becoming a settlement bank are discussed.

If, following this initial discussion and any similarly informal soundings made of the payments system in question, the institution decides that it is still interested in pursuing its application, then it should:

- formally approach the company which operates that system, as well as any other relevant counterparties, to initiate discussions on the process going forward.
- Submit to the Bank a formal application for a settlement account. This is required whether the applicant has a reserves account already or is in the course of applying for one.

Whilst the Bank's Settlement Account Policy⁵ details the eligibility criteria for a settlement account, access to such an account remains at the Bank's sole discretion. An agreement to provide such access will be an agreement in principle and subject to the applicant meeting satisfactorily the detailed technical and legal requirements laid down by the Bank and by the relevant payment system(s). At this point the Bank will also formally advise the applicant's financial regulator.

5

<http://www.bankofengland.co.uk/markets/Documents/paymentsystems/boesettlementaccounts.pdf>

At this point, more detailed meetings with the Bank of England will commence, to discuss the technical, operational and legal requirements surrounding the opening of a settlement account (including more detailed costs implications); and the applicant will engage formally with the new member programme(s) of the relevant payment system(s). This is likely to involve a degree of iteration, as well as close cooperation with the Bank, the relevant payment system(s), and other counterparties concerned (for example, the applicant's existing payment bank).

A future 'go live' date will be agreed by all the parties involved (Bank, payment system and applicant), allowing sufficient time for technical and legal work, and for new member testing and trialling.

Once the Bank's testing and trialling has been completed satisfactorily, and legal agreements signed, and provided all of the payment system's own requirements have been met, then the new member's RTGS account will be enabled for settlement and its role as a settlement bank for the payment system in question will commence.

The duration of the application process, from initial approaches to 'go live', will depend on the individual institution and their particular capacity to progress through the various technical and legal stages.

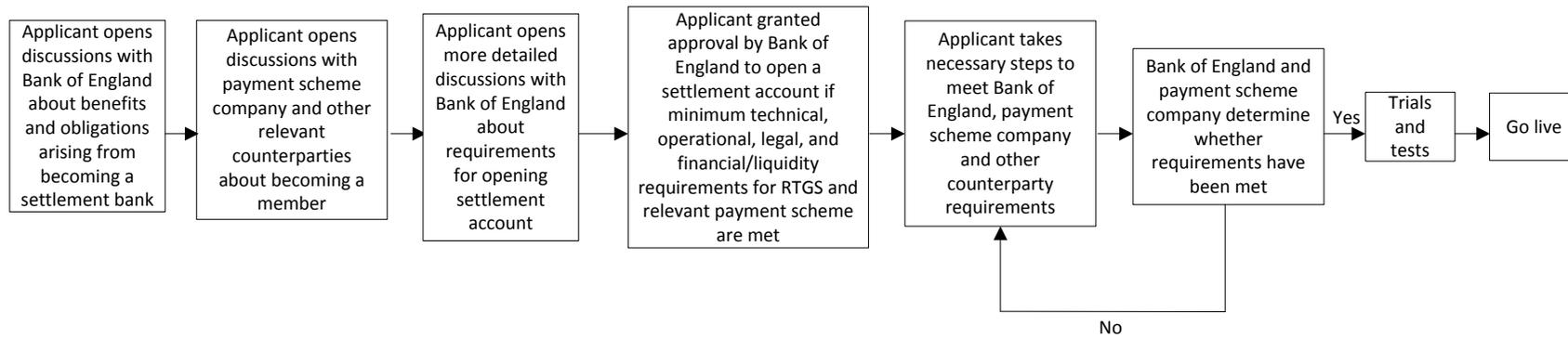
The move to CREST settlement bank status is perhaps the most complicated. This reflects the fact that (a) the CREST embedded payment system is provided jointly by the Bank and EUI, with each organisation having its own operational and legal requirements; and (b) the move to CREST settlement bank status will more than likely involve the development within CREST of the necessary operational and contractual framework so that the new settlement bank can provide services to other CREST members.

There may be cases where payment systems have categories of direct member who, according to the Bank's Settlement Account Policy, would not be eligible for an RTGS account at the Bank (ie would not be eligible for a reserves account). In such cases,

the institution would need to secure the services of an existing member who does have an RTGS account at the Bank and who is prepared to act as that institution's settlement bank.

Again, there is a separate application process for institutions that are only looking to have a reserves account relationship with the Bank of England.

Stylised Application Process Flow Chart



7. Two case studies

There follow short descriptions of the rationale and experience of two very different settlement bank applications.

JP Morgan Chase NA

JP Morgan Chase (JPM) had traditionally settled their CHAPS and CREST payments using the services of other settlement banks. In 2008, JPM took a strategic decision to become both a CHAPS and CREST settlement bank in their own right.

Given the amount of technical and legal work involved, the Bank recommends that this process be taken forward on a staged basis. Normally, applicants will look to become a CHAPS settlement bank first and then later become a CREST settlement bank. However, it suited JPM's particular business model to reverse this order; they duly became a CREST settlement bank in October 2009 - at the same time achieving reserves account holder status - and then progressed to becoming a CHAPS settlement bank in June 2010.

As a non-UK incorporated entity, JPM had to provide assurance, in the form of a legal opinion, that they could enter into the contractual relationships necessary to support settlement bank status.

State Street Bank and Trust Company

The financial crisis brought into sharper focus the need for the Bank of England to encourage a wider direct membership of the CHAPS and CREST payment systems. Following the crisis, the Bank worked with the CHAPS scheme company to identify a number of 'second tier' CHAPS banks whose substantial payment values warranted their becoming primary settlement banks with their own accounts in RTGS.

One such bank, State Street, became a CHAPS settlement bank in September 2012. A number of other banks will be following them. State Street also have a substantial presence in CREST, and are on track to become a CREST settlement bank in April 2014.

Discussions are underway with other 'second tier' banks that have significant CREST business with a view to them also becoming CREST settlement banks.

8. More Information

- a. To discuss opening an RTGS settlement account, contact the Head of Market Services Division at the Bank of England
email: toby.davies@bankofengland.co.uk

- b. To discuss becoming a member of CHAPS, contact the Managing Director of CHAPS Clearing Company Ltd
email: phil.kenworthy@chapsco.co.uk

- c. To discuss becoming a CREST settlement bank, contact Euroclear UK & Ireland
email: ian.dowglass@euroclear.com

- d. To apply for a reserve account, see:
<http://www.bankofengland.co.uk/markets/Pages/money/applications.aspx>

- e. To discuss becoming a member of the Bacs payment scheme, contact the Managing Director of Bacs
email: michael.chambers@bacs.co.uk

- f. To become a member of the Faster Payments Service, contact the Managing Director of Faster Payments
email: craig.tillotson@fasterpayments.org.uk

- g. To discuss becoming a member of LINK, contact the Head of Delivery, LINK Scheme
email: swallace@link.co.uk

For a more detailed analysis of the role of the RTGS infrastructure, how it operates, and how it reduces risk in the UK financial system, see the article in the Bank of England's September 2012 *Quarterly Bulletin*:
<http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120304.pdf>