NATIONAL PAYMENT SYSTEMS AND THE BANGLADESH EXPERIENCE

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International environment

During the last two decades the world has seen significant changes in the way financial transactions are carried out. The need for change arises out of.

1. Economic growth and business requirements which demand more efficient and faster realization of funds; and
2. The need to deal with the risk factors affecting financial stability.

The new technologies which keep evolving provide new and better solutions to deal with these requirements. While regional groupings such as SAARC have concentrated on strengthening regional systems, each country is involved in developing their own systems for national and cross border transactions. Typically, Central Banks in many countries especially in the South Asian region have been the driving force for the development of National Payment Systems.

Any discussion on Payment Systems development cannot ignore the role of the Committee on Payment and Settlement Systems of the Bank for International Settlements (BIS) in Basel Switzerland. As per their declaration,

> "The Committee on Payment and Settlement Systems (CPSS) contributes to strengthening the financial market infrastructure through promoting sound and efficient payment and settlement systems. Created in 1990, CPSS serves as a forum for the central banks of the Group of Ten Countries (G-10) to monitor and analyse developments in domestic payment, settlement and clearing systems as well as in cross-border and multicurrency settlement schemes."

In the late 1990s, CPSS moved from a purely analytical body to a standards setting body. Some of the CPSS publications which deal with the standards for development of payments systems are

1. 10 core principles for large value payment system, published in 2001
2. General Guidance for National Payment Systems, published in January 2006

The core principles highlight the importance of a well founded legal basis, rules and procedures describing the importance of financial risk, and procedures for risk management in payment and settlement systems. It also stresses the need for the provision for final settlement and the timely completion of daily settlements. A high degree of security and operational reliability with contingency arrangements is considered essential. A national payment system must be adequately designed to minimize if not eliminate the associated risks. The risks are classified as;

1. Credit risk
2. Liquidity risk
3. Legal risk
4. Operational risk
5. Systemic risk.

Many countries follow these guidelines when implementing their national payment systems. However, the design of the payment system in a country should be appropriate for its geography, population distribution, and the infrastructure. The system must take into account the telecommunication, transportation and banking infrastructure. Hence what is right for one country may not be ideal for another.

While in the Asian region Hong Kong and Singapore were two of the early developers, India and Sri Lanka were early developers in the South Asian region. Bangladesh who used outdated fully manual procedures up to 2010, now have a cheque imaging and truncation system and a very modern electronic funds transfer system and are in the process of implementing a national payment switch for ATM, POS and other transactions.

Developments in Singapore

The development of the national payments and settlement systems, commenced very early in Singapore. The Monetary Authority of Singapore (MAS) formed the Singapore Clearing House Association (SCHA) in 1980. MAS and the Banks constituted its members

Singapore Automated Clearing House (SACH)   [Since 1981]

Interbank GIRO (IBG)   [1984]
Launched IBG, an interbank payments system which caters to
low-value bulk payments

Systems for Handling Interbank Funds Transfer (SHIFT)   [1985]
Launched SHIFT, an interbank funds transfer system similar to
CHIPS in New York and CHAPS in London

Book Entry System for Scripless Government Securities (SGS)   [1987]
Launched SGS, a centralised depository system to facilitate trading
in scripless Singapore Government Securities

Electronic Clearing System (ECS)   [1992]
Launched ECS, a system for the electronic transmission of cheque
information from the bank branches to the Singapore Automated
Clearing House for clearing.

Foreign Currency Cheque System (FCCS)   [1996]
Launched FCCS, a cheque clearing system for the clearance of
US dollar denominated cheques.

Image Clearing System (ICS)   [1997]
Launched ICS, an image-based cheque processing system that
captures the images and MICR information of cheques for
enhanced cheque clearing operations. This system also generates
CD-ROMs containing the cheque images for the banks' use.

BCS Certificate Authority (BCS CA)   [2001]
BCS CA was launched. A Public Key Infrastructure (PKI) that
comprises a Certificate Authority which issues digital Certificate
to subscribers. The PKI allows for authentication, access control
and confidentiality through digital signatures and encryption in
support of SACH services.

eGIRO   [2001]
eGIRO was launched to replace Interbank GIRO. This marked a
significant enhancement of the payments infrastructure in
Singapore. eGIRO is a web-based bulk payment system that
utilises internet-based technologies, including a Public Key
Infrastructure (PKI) and Virtual Private Network (VPN).

Cheque Truncation System (CTS)   [2003]
Launched Cheque Truncation System (CTS) in Singapore. CTS
supports and facilitates the clearing and settlement of Singapore
dollar and foreign currency cheques and related items. It is the
world's first nation-wide image-based cheque clearing system
whereby the physical cheques are truncated at the point of
deposit and a centralized National Image Archive set up to store
and facilitate retrieval of images of the cheques.

Developments in Sri Lanka

In Sri Lanka the first major development, in the area of national payment systems was the introduction of an automated cheque processing system by the Central Bank of Sri Lanka in 1988. The idea was initiated in 1984, with the expectation that it will be run by the Banks. There was not much progress as the Banks were hesitant to invest in a venture, the success of which was doubtful. Hence the Central Bank decided to proceed on its own. The Sri Lanka Automated Clearing House (SLACH) was formed in 1987 and it was owned and operated by the Central Bank. The project went live in March 1988 with MICR cheques and high speed reader sorters being introduced to Sri Lanka. This was followed by the implementation of a system for handling offline funds transfer for low value bulk payments (SLIPS), an RTGS system and a system for handling government securities (SGSS). All these were implemented by the Central Bank. The project was successful and profitable.

In February 2002, the SLACH changed ownership and LankaClear was formed.

LankaClear is owned by the Central Bank of Sri Lanka (CBSL) and all Licensed Commercial Banks operating in Sri Lanka with 48% of shares held by the CBSL and State owned Commercial Banks and 52% by Private Banks. The Company introduced the US Dollar Clearing System on 1st October 2003. The Cheque Imaging and Truncation System (CITS) for cheque clearing was introduced in May 2006.

As described in the LankaClear website:

Cheque Imaging & Truncation System (CITS) is an image-based cheque clearing system, which replaced the physical cheque with electronic information, flowing throughout the clearing cycle. This process eliminated the actual cheque movement in cheque clearing and reduced the delays associated with the physical movement of cheques. CIT system is designed to accept physical cheques or images and MICR data of physical cheques either submitted on CD-ROMs or by direct electronic transfer. Banks generate images of cheques for outward delivery and submit cheque data and images on CD-ROM.

The SLIPS system introduced in 1993 by the SLACH continued to grow in usage.:

SLIPS Statistics

Average Daily SLIP Volume
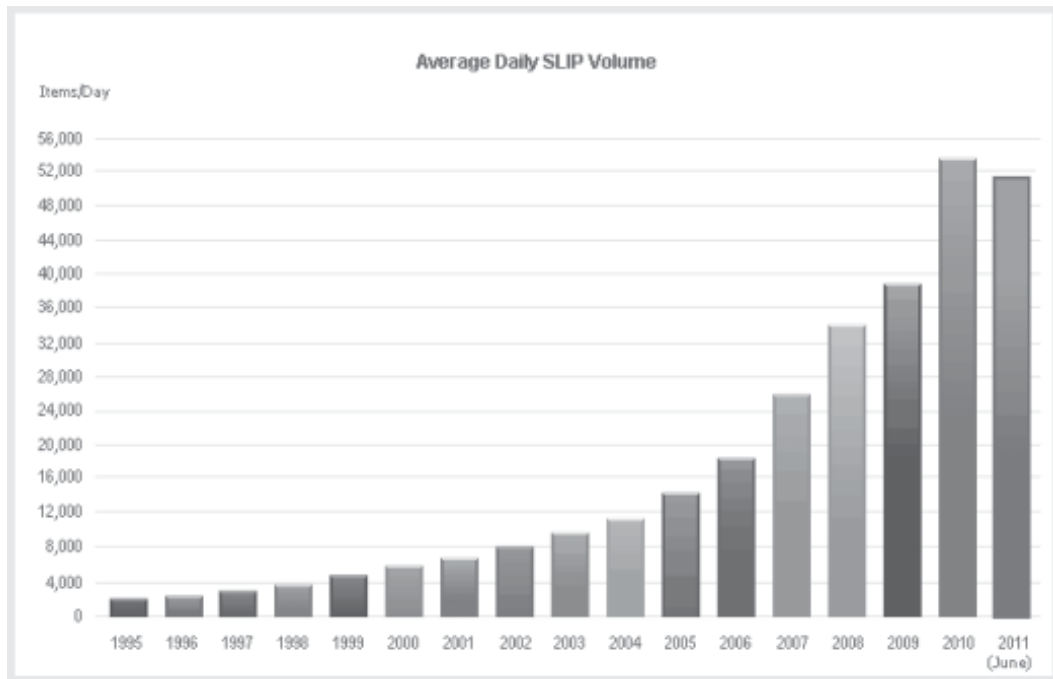
US$ Clearing

Main purpose of introducing the US Dollar Clearing System was to expedite realization and eliminate delays to obtain credit by the depositors.

Traditionally a US Dollar cheque/draft needed to be couriered abroad and the value credited to the Bank which required more than 3 weeks. Under the revised arrangement, depositors are able to obtain funds as early as the fourth working day, reducing the delay significantly. In both instances, it is the payee in Sri Lanka who benefits through the new US Dollar Cheque Clearing that was introduced.

The instruments covered include:
US Dollar cheques/drafts issued by commercial banks in Sri Lanka payable to Sri Lankan individuals and institutions.US Dollar cheques issued by Banks or Exchange Houses abroad drawn on commercial banks in Sri Lanka

Certification Authority

Recognizing this need the Central Bank of Sri Lanka requested LankaClear (Pvt.) Ltd. (LCPL) to be the financial sector Certification Service Provider (CSP). LCPL launched Sri Lanka's first Certificate Authority under the brand name LANKASIGN in accordance with the Electronic Transaction Act, No.19 of 2006 on May-22-2009. A CSP is an authority on a network that issues and manages security credentials and public-private key pairs for message signing and encryption.

Snapshot of Bangladesh

Bangladesh is a heavily populated country with nearly 80% of the population living in rural areas.

Independence	1971
Land area	133,910 sq km
Population	158.5 million
Currency	Taka (BDT)
USD/BDT	73.5 (appx.)
GDP per capita	609 USD (2010) – World Bank
GDP growth rate	6% (2010 est.)
Rate of inflation	8.1 % (2010 est.)
Major industries	Readymade garments Migrant worker
Share in GDP	22.0% 9.5%

Central bank	Bangladesh Bank
State Owned Commercial Banks	4
Specialized Banks	5
Private Commercial Bank	29
Foreign Commercial Bank	10
No. of Bank Branches	6629
Non Bank Financial Institutions	29
Payment Service Providing Companies	

Formal	All Banks, Post offices, Micro Finance Institutions
Informal	Courier services, Bus Transport Companies, Mobile phone operator

There are 48 commercial banks in Bangladesh with 4 of them being government owned. While there are 6629 branches only 13% of the population are account holders. In 2006, there were only 1000 online branches with 749 ATMs and 6944 POS terminals.

There was no Automated cheque Clearing, no EFT systems or RTGS.

Implementation of cheque clearing in Bangladesh

The Central Bank of Bangladesh, namely Bangladesh Bank (BB) decided on modernizing and automating its operations and commenced procedures for the same. In 2004 tenders were evaluated for installing core banking including the automation of cheque clearing. This tender had to be cancelled due to some technical reasons. Bangladesh Bank decided to call for a separate tender for automation of cheque clearing in order not to delay this project. During the tendering cycle and the process being cancelled and repeated the consultants and the donor changed. By June 2008, the requirements for Bangladesh Automated Clearing House (BACH) too changed.

In 2006 the British Government initiated a project called the Remittance and Payments Partnership Project. This was mainly to support the economy and its migrant labour force which is a very high contributor to the GDP. The project had defined areas. One was a program directly targeting the migrant labour force working together with IOM. Another was called the challenge fund and concentrated on giving loans to banks and other organisations to develop their own systems to serve the poorer Bangladesh population. The third was to create the back bone necessary to support growth and stability in conducting payments.

This project was to build a Bangladesh Automated Clearing House (BACH). What was originally intended to be an automated cheque processing system was changed in scope to the implementation of a fully electronic cheque clearing system with all banks connected to the BACH for cheque truncation and the transmission of images and data. The requirement specification also included the implementation of an electronic funds transfer network for interbank funds transfers between banks. The two systems were referred to as the Bangladesh Automated Cheque Processing System (BACPS) and Bangladesh Electronic Funds Transfer Network (BEFTN).

The requirements took into consideration the accepted international standards and best practices. The regulations and operations guidelines were formulated with the assistance of consultants who had many years of hands on experience in the developed world. Network and security features were defined in keeping with standards accepted and used internationally, and all banks informed of their responsibility in this new implementation with online connectiion to the BACH for a fully electronic payment system. BACH had Reader Sorters installed to deal with any contingency situation sufficient to sort cheques of banks if required. In the event of any network problem the system was built with the ability to accept and create clearing data files on CDs. While the main clearing house BACH was located at the BB, the DR site was located in Mirpur in Dhaka but away from the BB. Each Bank had two links to BB and to the DR site provided by two different network providers.

The success of the project depended on how BB carried out their responsibilities and on how each of the 48 banks fulfilled their responsibility. While the first was a big task to be carried out by BB staff who had no prior experience, the second was even a bigger challenge with only the international banks having the exposure to such systems. While a few of the domestic banks had core banking and other systems installed for their own work most banks used manual and outdated procedures. Hence, most of their staff was not comfortable in the use of modern technology. Since the cheque clearing project had delayed a couple of times the commercial bank management too was not ready to accept that this time BB was moving ahead and moving fast towards this implementation.

The key dates in the project implementation process are:

Tender awarding	22 September 2008
System Setup	August 2009
User Acceptance Testing	September 2009
System Integration Testing	January 2010
Live Simulation Test	July 2010
Live Day Simulation	Aug.4 to Sep.23
Go Live at Dhaka	07 October 2010

Initial Preparation

Very early in the project implementation BB selected a special team of young talented officers and assigned them to the payments system division (PSD). A BACH program manager was appointed at each of the commercial banks and he/she was expected to coordinate the project in their Bank and liaise with the BB. The BB management was given progress reports every month and it was followed up with BB management meeting the top management of all banks regularly to highlight road blocks and set time frames and targets for tasks to be performed.

One of the fundamental tasks was to decide on the new Magnetic Ink Character Recognition (MICR) code line, issue guidelines to the Banks and get the new cheques issued. Without the saturation of MICR cheques in the market, the project could not go live. While many banks took a long time to order the new cheques due to tedious tender procedures, Government ministries made no progress at all for a long time. BB officials went from meeting to meeting with hardly any progress. However they too printed their MICR cheques with the intervention of the BB top management. There was a team of BB staff who kept monitoring the MICR cheque circulation and these reports were sent to all Banks highlighting the defaulters.

Staff Training

At the same time the BB team assigned to PSD were being sent abroad for rigorous training. They went to many automated clearing houses in Asia and the middle east. These trips gave them an understanding of how these systems work in different environments and made them grow in stature and confidence resulting in BACH having a core group of officers who were extremely competent in carrying out the responsibilities of the BB BACH implementation.

System Installation

The hardware was installed by the Vendor (Dataedge Ltd). The equipment offered in the tender was best of breed hardware. The software was also purchased from an internationally well experienced vendor and it was customized in Scotland. The BACPS software consisted of two parts, one for processing cheques scanned at the BACH (BB cheques are scanned and processed at the BACH). and the other part dealing with the clearing and settlement of interbank cheques. One key feature of the software was that a common interface called the Participant Bank Module (PBM) was given free to all the Banks. All Banks needed to communicate with the BACH through this module which was completely synchronized to the centre. Since this was a new piece of software, it went through many cycles of development. The system also provided for a live archiving of all data processed with the ability to store it online for 6 years and offline for 20 years. Banks were also provided access to their items through a web interface. The BACH site was very well equipped, aesthetically designed and is today a showpiece for the BB with large LCD screens displaying the status of work and the statistics. In addition to the BACH site in Dhaka, eight regional centres were also built and made ready for operation. The project implementation plan was to implement the Dhaka clearing house and the DR site first and then gradually roll out to the regions.

All the commercial Banks also signed contracts with vendors to provide cheque processing software. They installed desktop scanners, hardware and software required and the network to link to the BACH main site and DR site. All the required specifications for preparing the outward files and receiving the inward files online was given by the BB. The specifications for the network including those for the security module (HSM) were also issued by the BB. Banks also had to purchase the specified hardware and software to install the PBM. Hence a very controlled and standardized environment was built upgrading the Bangladesh payment systems infrastructure covering all banks.

The system was set up with two clearing cycles, one for high value clearing giving same day credit and the other for regular value giving T+1. It is possible to set up more clearing windows if required.

PBM

The Participant Bank Module (PBM) is a logical extension to the central clearing and settlement software component of BACPS (CHM). It provides a local, standardised interface to the CHM and distributes some of the key functionality to the participant banks. Distributing this key functionality helps minimise network throughput by implementing the main validation components from the centre to the PBM at the commercial bank end.

The PBM handles a variety of BACH-related tasks on behalf of the participant banks: it is the gateway between the participant bank and BACPS and provides for the validation and interchange of information between the participant and BACPS.

The main features of the PBM are:

1. Obtain and maintain processing parameters
2. Validation.
   The PBM provides extensive validation facilities in order to minimise the amount of invalid information interchanged with BACPS. This, in turn, minimises unnecessary network traffic. The validation is done in compliance with the functional specification. Basic file viewing facilities are provided to authorised supervisor operators. No editing or processing facilities are provided.
3. Encryption.
   Encryption is done prior to transfer of information to BACPS either by direct communications, via the network, or on removable media, should the network be unavailable.
4. Digital signing,
5. File interchange between the PBM and the BACPS CHM
6. Interactive queries to BACH for status and research purposes.
7. Image Quality Assurance
   Image Quality Assurance tests are undertaken by the PBM at the presenting bank as part of the Outward Clearing Forward Presentment validation tasks.

In general, the flow of information through the PBM requires no significant operator interaction. The PBM is fundamentally an unattended system in normal clearing operations; however, it does provide a number of operational features for suitably authorised personnel.

Testing

Subsequent to installation of the system at the centre and the installation of the PBM and the cheque processing software at the banks the system was ready for testing. Considering the critical nature of the application a process of extremely comprehensive testing was carried out. BB staff of 5 officers carried out User Acceptance Testing (UAT) to ensure that the system performed all the tasks as per the functional specification document. Whenever, a discrepancy was noted it had to go through a change control procedure and all tasks had to be re tested with

each and every system change. The commercial banks too were doing their own system testing at this time. Their software had to interface with the PBM for sending and receiving files to and from the BACH and also link to their back office/ core banking system for internal processing. The progress at each bank was continuously monitored by BB. Once the UAT was completed and the banks ready to test with BACH, System Integration Testing (SIT) was carried out. The BACH program manager at each bank proved to be the very useful one point of contact. The BACH then moved to Live Simulation Testing (LST) and compared the figures with the same days manual clearing. This task was a difficult one for the commercial bank's staff as they had to go through two cycles of clearing for the same items on the same day. Although some Banks did not send the total outward clearing cheques through the BACH, it was helpful to identify faulty operational procedures done by bank staff. It was then decided to suspend the Dhaka manual clearing house for one day thus forcing the Banks to submit their cheques and handle returns through the BACH. This one day test was called Live Day Simulation (LDS) and was first carried out on the 4th of August 2010. In spite of all the prior tests the LDS confronted the Banks with many operational issues. These tests were carried out through the Disaster Recovery site as well. Banks were also requested to test their disaster recovery site and the alternate network connection.

Go Live

On 7th October 2010 the Dhaka manual clearing house ceased operation and BACH commenced live operation. Initially only about 1000 cheques were presented to the high value cheque processing cycle but it soon increased to over 3000 per day, higher than during manual operation. Around 100,000 cheques were cleared during the regular value clearing window.

Electronic Funds Transfer Network

Parallel to the implementation of the BACPS the BB team together with the consultants worked with their vendor to install and implement the BEFTN. This application for conducting straight through processing of interbank financial transactions was built according to the electronic payments association or NACHA (formerly National Automated Clearing House Association) rules. The BB continuously worked with the Banks and their vendors to install the required software at the banks' end. While there was an additional module at the BACH to handle the EFT the same clearing and settlement module and the same PBM handled the EFT as well.

The BEFTN system went live on the 28th of February 2011. Thirty two banks were able to successfully send and receive files on the first day. The usage of the system is currently progressing slowly with some banks using the system to transfer thousands of dividend warrants through the EFT network.

BB also successfully rolled out the clearing system to six out of the eight regional branches of the BB by 27th July 2011. The other two are scheduled to be completed shortly. Most banks have now linked their regional branches online to the head office or are in the process of connecting. All branches of all banks will communicate with the BACH through the PBM installed at the clearing centre of that bank.

Conclusion

With the fast and efficient implementation of this project the whole payment systems environment in the Country has changed. The BACH provided a streamlined efficient and secure system for cheque processing and EFT transactions. While cheques in the Dhaka region could be cleared faster the reduction in clearing time for inter regional cheques would be from anything up to 20 days in the past to around 2-3 days currently. This project and the BB directives pushed the Banks to install core banking and thereby upgrade their own internal operation. Before 2010, Bangladesh banking environment was heavily manual and archaic, not lending itself positively to changing environment in payment systems all over the world. With this implementation and considering all the features of the system installed, Bangladesh is now on par with some of the developed countries and ahead of many countries in the region.

The British Government Funding agency – DFID's objective was to provide a fast, secure and cheaper mode for remittances specially of the poor migrant labour force. This project provided the back bone to achieve this objective. The better environment in banking operation in the Country will be a positive factor for economic growth. Finally the well trained human resources who can handle the day to day operation and deal with any contingency proves that there has been a knowledge transfer and Bangladesh possesses the skilled resources to take the Country forward. The BACH has a staff of eighteen in all running this 24 hour operation. Eight operators perform the tasks required for processing BB cheques. The other ten officers manage and run the day to day operations. Of these ten, one is the team leader acting as the manager, seven officers (including 2 newly posted as backup) manage the operations and two persons manage the network side.

From one of the least developed payments systems to one of the most modern installations, Bangladesh has leapfrogged and caught up on lost time. The way forward for Bangladesh should also focus on developing Mobile Banking since only about 17 million people are the banked population while around 50 million are mobile phone users.