Best practices in payments infrastructure investment

Eric Campbell

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Bottomline Technologies, 325 Corporate Drive, Portsmouth, NH 03801, USA.
Tel: +1 603 501 4898; Fax: +1 603 501 4027; e-mail: ecampbell@bottomline.com

Eric Campbell *is Chief Technology Officer at Bottomline Technologies and an expert on global cash management, wholesale electronic banking, custody, SWIFT connectivity and the use of Service Oriented Architecture within banking applications. Eric has more than 30 years of industry experience in technology innovation in global cash management, securities and straight-through processing and is actively involved in helping many of the world's leading banks and financial institutions deploy software architectures for advanced treasury services. He was recently recognised for the third time in four years as one of* Global Finance *magazine's 'Who's Who in Treasury and Cash Management'.*

ABSTRACT

This paper explores how to invest strategically in payments infrastructure, identifying where the need is greatest and most urgent, with an explanation of the available options. For many companies, getting a solid payment processing foundation in place could mean more than simply saving money and eliminating fraud potential. The right foundation might actually enable business scalability or provide fundamental client satisfaction criteria affecting the overall success of the business. It is important to understand that the word 'payments foundation' is appropriate because it sets up a platform where continuous improvements can be made over time as part of an ongoing programme, where each phase will bring additional return on investment (ROI). The payments environment is constantly evolving, with new risks, compliance challenges and changes in standards occurring regularly. An organisation without a comprehensive payments foundation could find itself in a bad situation owing to factors completely out of its control; in a worst case scenario, the distribution of the problem may make it unsolvable in a timely manner. Getting the first project off the ground and laying down the foundation is critical. The right combination of problems must be identified in the first phase to yield an ROI. It is the intention of this paper to help the reader to identify that list of issues as well as provide a background for organisational buy-in and presentation of a successful business case.

Keywords: cash management, transaction banking, SWIFT, payments hub, payments

INTRODUCTION

Waking up each morning and thinking about how payments are executed from an enterprise perspective is not a normal activity for every key executive. As many organisations have grown and expanded their activities over the years, however, the IT infrastructure for payment processing may not have kept up with the complexity of today's banks, other diversified financial institutions and large corporations. This means that this space has become both a hidden gem for massive cost savings as

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well as a fertile ground for fraud, organisational risk and even catastrophe.

So who should be thinking about this and why? This paper's goal is to categorise the IT payments space and help readers to determine whether or not their organisations are candidates for change and, if so, to what extent.

It is first necessary to understand that there is no written 'cookbook' on how to proceed, but there are common drivers that can be easily identified and quantified. For some organisations, improvement may be as simple as choosing the right bank with the right payment initiation product, while for other organisations, a multi-phase, multi-million dollar project might be extremely appropriate and provide a surprisingly rich return on investment (ROI) or address a much more costly critical business problem.

CASE STUDIES

Over the past ten years, many corporations have focused on strengthening their enterprise payments strategies and have achieved a substantial ROI on the initial investment. More importantly, they have laid a foundation for a programme of ongoing improvement. Several case studies are included in this paper.

Case study 1: Retail brokerage

This organisation had a completely manual process in place for making payments on behalf of their clients. Wire instructions were faxed to the head office for manual approval, general ledger (G/L) and client account systems were manually updated, and bank workstations were used to initiate the payments. Creating and re-keying the transaction happened multiple times, and the confirmation process was completely manual. There were well over 1,000 remote offices which kept cheque books in their offices for servicing client account withdrawals. All the processes surrounding the cutting of cheques were manual: debiting the client's account, approving the payment and crediting the operating account G/L. Because cheques were manually written, it was impossible to generate positive pay transactions effectively, and the additional risk of distributed cheque stock remained.

Case study 2: A large financial institution

This client had multiple systems initiating payments to multiple banks using bank-provided software and host to host interfaces. In some cases, more than one solution was required per bank. The complications of maintaining multiple bank workstation technologies (some of which were deployed on early 1990s technology) was becoming increasingly risky and difficult to manage. Every bank required proprietary processes, and each occurrence had a different degree of compliance. In addition, bank-reported transactions had to be manually matched against outstanding mutual fund orders for settlement. This matching process involved cutting and pasting transactions into multiple spreadsheets and then emailing the spreadsheets to regional operating centres where the open fund orders could be settled or exceptions handled.

Case study 3: A multi-national corporation

This multi-national corporation (MNC) had multiple enterprise resource planning (ERP) applications which needed to initiate high-volume/low-value payments. These ERP systems connected to multiple banks using multiple 'host to host' bank proprietary solutions. A large number of bank workstations were also used for cash reporting and payment/money movement instructions. Daily cash forecasting was manually intense and required business

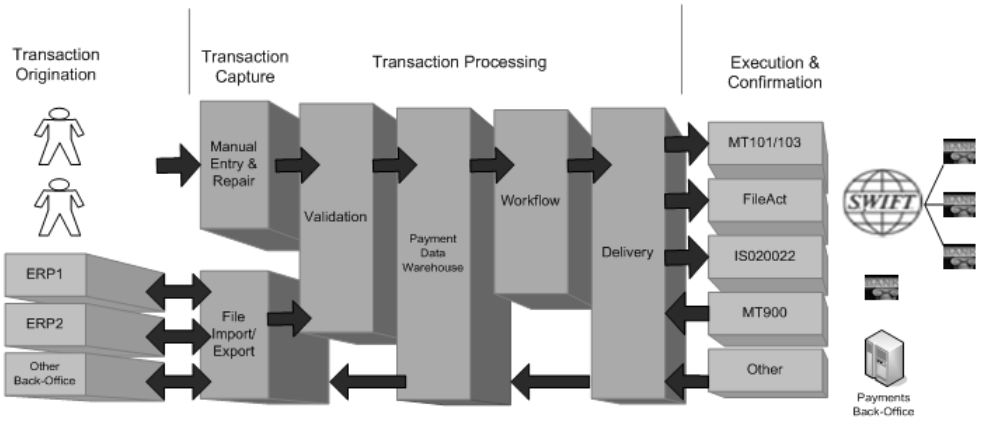

Figure 1 Model for building a solid payments processing foundation

units to submit daily and weekly forecasts. As actual transactions were executed, they had to be managed against the forecasts. This was complicated by the fact that they could occur multiple times in the payment execution life cycle and could only be counted once.

Case study 4: A large public entity

This government agency had over 30,000 suppliers who were being paid by cheque and paper remittance. Each payment's processing cost was estimated at US$4.25, for a total monthly cost of well over US$100,000. This was just to process the cheque payments.

A PAYMENTS HUB — SIMPLY DEFINED

At the heart of any enterprise payments initiative there needs to be some semblance of a 'payments hub', which simply defined is a conical payments data model which receives payments from any source and stores then in an efficiently designed database where various workflow tasks can be performed. Once a payment or batch of payments is ready for execution, they are dynamically routed, appropriately formatted and sent to the system or bank of execution. Some kind of confirmation, return or notice of change (NOC) message is matched against the original payment to complete the transaction life cycle. Subsequently, the payment is stored/archived for the required amount of time to allow audit trail enquiries as well as normal business as usual queries. The simple diagram in Figure 1 illustrates this proven model for building a solid payments processing foundation.

The left-hand side of the diagram shows systems and people originating payments, and the right-hand side shows the payment destinations, or payment execution. The hub's destination can be SWIFT for settlement across banks, a direct bank interface or a payments back-office application if the hub is installed at a bank or in a country where direct access to the clearing system by non-banks is allowed.

The validation rules imposed by the hub should directly mirror those required by the final clearing system and any rules imposed by applications/networks between the hub and the final clearing system. For example, a payment being passed through SWIFT to the Real Time Gross Settlement (RTGS) system in Australia must pass all SWIFT validation rules and Australian RTGS rules. It is

important to understand that these two sets of rules are completely independent. If FileAct is used across SWIFT for payment delivery, there are no validation rules imposed by SWIFT, and all the rules are handled by the FileAct Receiver and final clearing system only. Ideally, validation rules should be implemented as a service that can be shared by both systematic payment initiation as well as manual payment entry/modification/repair screens.

The data model holding the payments must be capable of handling any clearing method and be flexible enough to handle both batch and individual payment workflows. Once in the data model, the real value of a payments hub can be realised:

- Payment methods can be changed easily, allowing for transactions either to be routed to a lower cost method or, conversely, to be accelerated based on urgency.
- Anti-money laundering (AML) and other compliance functions can be centrally applied.
- Approval workflows which mirror corporate mandates can be universally applied.
- Dynamic limit checking can be imposed.
- Feeds to cash forecasting functions can be constructed to provide better cash management visibility.
- Positive pay transactions can be automatically generated in cases where the hub is managing cheques.
- Repair functions can be implemented to allow imported transactions to be fixed in a timely manner instead of reprocessing them in the system of origination.
- Duplicate checking can occur to prevent the same payment from being processed more than once.
- Additional approval workflow can be created for payments that are considered risky (ie keying on beneficiary country).
- Transactions with duplicate beneficiary data (often caused by systems that may be processing multiple independent payments for a given customer) can be consolidated.

There are obviously many more functions and benefits of a payments hub, but the goal of outlining those mentioned above is that readers should understand the value of the payments hub foundation and how it plays a role in a long-term programme of continuous improvement.

DIVIDE AND CONQUER

With any complex problem, the best place to start is breaking the problem down into categories. In this case there are three:

- *Direct cost takeout*: If cheques can be converted to low-cost electronic transactions, direct savings can be attained simply on the removal of the processing costs involved with the paper instrument, not to mention environmental concerns. Usually any float gains are offset by payment predictability and item cost, but that is an age-old argument not worthy of discussion here. There is general acceptance that a per item cost savings of US$3–5 can be attained whenever a paper instrument is converted to electronic. This is similar to bank repair costs — reduce failure rate, reduce cost.
- *Process efficiency*: Manual intervention, paper tickets, faxes, re-keying, etc. What can be saved by simply improving the factory? How can process improvements or best practices be engineered into the infrastructure, but be implemented only once and used across the board?
- *Fraud prevention*: Sometimes process effi-

ciency problems lead to fraud problems, but this category really focuses on topics such as board mandates, compliance for payment approval as well as creating end-to-end 'tamper proof' payment transactions. Even though positive pay services have been available for years, it is sometimes shocking to find out how many companies operate outside this protection.

Although there are three categories, they are often related. In order to apply a fraud prevention or direct cost takeout initiative effectively, process efficiency projects must be undertaken. Often, the key is prioritisation. Having a slow or error-prone payment process could cause a company to lose market share if it is a financial services company, so having a streamlined efficient process could be as important as an airline keeping its jets well maintained. Similarly, a highly publicised fraud case could cause extreme reputational damage, even if the actual dollar losses are minimal.

Direct cost takeout initiatives

There are two primary focus points for this category: cheques and wires (RTGS payments) (see Tables 1 and 2). Settlement purposes can sometimes drive the choice of needing a wire or a cheque payment, but moving to low-cost electronic payments (automated clearing house (ACH)), if possible, can offer significant cost savings

Wires

Case study 2 (the financial institution) focused on a repair function which could fix incorrect settlement information stored on the originating systems. Transactions with missing mandatory fields, incorrect beneficiary or intermediary banks or disallowed characters are now pushed into a repair queue within the organisation, avoiding a costly repair at the bank. The payment repair screens restrict modification only to the fields which affect the settlement: fields such as the beneficiary information or amount are not touched to avoid going through another round of approval workflow.

This financial institution achieved bank independence and eliminated bank repair fees. Infrastructure support costs associated with the bank proprietary software and manual intervention/re-keying were also eliminated.

Cheques

Case study 4 (a large public entity) joined a payment network which enabled the electronic migration of their cheque payments. By converting a significant portion of paper cheques to ACH payments with electronic remittance information, this organisation saw savings of more than US$500,000. An established network can provide upwards of a 50 per cent hit rate on vendors, hence providing almost instant on-boarding. The remaining vendors can be selectively on-boarded based on payment volumes. An advanced network can take over the entire vendor payment stream immediately, continuing normal cheque payments to those vendors who represent too low volumes to migrate onto the network. In this case study, about 45 per cent of the vendors were on-boarded, and approximately 35 per cent of the total cheque payments were converted within the first eight weeks.

Process efficiency initiatives

There are several key metrics and questions to look at when measuring payment process efficiency:

Manual origination

How many human payment originators are there? In other words, outside an ERP or other back-office system, how many users initiate payment requests each day? If there are a substantial number of origina-

Table 1: Wires (RTGS payments)

Cost takeout opportunity	*Obstacle*	*Solution*
Wire competitive pricing — wire payments are a high margin service with a very low fixed cost. Prices can vary from US$2 to US$30 for a domestic wire. Putting in a solution that allows an organisation to change destination banks for wire instructions will force banks into more competitive pricing, and pricing can be re-visited whenever there is an opportunity for improvement.	Wires are primarily done through bank proprietary software using proprietary formats.	Migrate to a SWIFT FIN or ISO20022 standard industry message format that could be used with any bank. MT103 FIN messages are used in the US for wires, and MT101 FIN messages are used everywhere else. Confirmation message with clearing reference information is returned in an MT900 which contains the original instruction reference number for easy matching. ISO20022 will probably be accepted by most banks within five years, but acceptance is patchy currently. It is strongly recommended that, if a company has a projected implementation target over the next two years, it uses the FIN standard instead of ISO20022. FIN will be an available format indefinitely.
	Banks have installed proprietary communication software for sending files.	Migrate all communications to SWIFT. The SWIFT Network can be used to send wire instructions to any SWIFT member bank. If an organisation is not some type of financial services firm, SWIFT membership will involve joining SCORE or a bank's Member-Administered Closed User Group (commonly referred to as a MA-CUG). With the Introduction of SWIFT Alliance Lite, SWIFT membership and communication has become easy and extremely affordable for corporations of varying sizes.
A wire that should have been an ACH. Paying dollars for payments when one could have spent cents.	Bank software is often packaged so that single ad hoc payments, when created, will result in a wire.	Some banks are now offering their users the ability to toggle between wire and ACH clearing methods. If a bank workstation is part of an ad hoc payment operation, make sure that this is available, and make sure that all the users are educated on the savings potential.

Table 1: Wires (RTGS payments) (continued)

Cost takeout opportunity	*Obstacle*	*Solution*
	Payments are getting approved late because of inefficient invoice approval processes.	Look for invoice approval automation solutions which can remove paper invoices from the process and streamline the workflow. The right solution can also bring the much more substantial benefits of realising vendor early payment discounts and optimising working capital.
Wire Repair fees can be extremely costly.	Settlement information, especially any required intermediary banks may be incorrect or incomplete. There is no validation when the information is entered.	Reference information providers as well as some banks can validate that the intermediary bank is the correct one for the chosen beneficiary bank. If a business involves many ad hoc wires, this type of service needs to be a critical factor when choosing its wire bank or end to end wire process. Use of payment templates on a centralised payments platform — independent of the back office or ERP can enable more efficient management of vendor/counterparty directories while maintaining the correct standing settlement instructions. Many source systems may not have the necessary fields to provide final settlement and ensure straight through processing (STP).
Erroneous or duplicate wires. Unlike ACH, wires are irreversible, so there is inherent higher risk using a final settlement instrument such as a wire.	Wires can accidentally be created multiple times owing to a breakdown in a manual or systematic process.	Implement inbound/outbound duplicate checking into the enterprise payments environment. Outbound duplicate checking (wires leaving the enterprise payment system) is relatively straightforward, inbound duplicate checking (checking fuzzier logic on payments originating from different sources) can require some business-specific analysis, but can usually be leveraged across all payment methods — not just wires.

Table 2: Cheques

Cost takeout opportunity	*Obstacle*	*Solution*
Vendors and service providers are being paid by cheque with paper remittance. Converting a cheque to an ACH payment can yield between US$3 and US$5 per item, depending on how efficient the existing cheque process is. Much of the float 'benefit' used as an excuse to continue with cheques has gone away based on the introduction of Check 21. This is particularly true in times of low interest rates, such as today. It is also key to understand that a vendor/supplier cheque conversion strategy is not an 'all or nothing' proposition. Low volume or one-off vendors can remain on cheque payments.	Vendors and service providers do not want to share their account and bank information.	In some markets, such as most of Europe, vendors and suppliers always provide their account/IBAN information to their customers for electronic payments. This, however, is not the case in North America. Therefore an electronic payment network can be used where the vendors can be on-boarded and authenticated to the network, and the paper cheques can be replaced with ACH payments while the vendor banking details are kept private by the network provider.
The successful payment networks can come with over 50 per cent of the vendors and suppliers already enrolled allowing for almost instant conversion.	There is no clean way to provide the remittance information along with the payment.	The electronic network provider will communicate the remittance information to the vendors/suppliers electronically. These vendors can provide services to populate CTX addenda to accompany the actual ACH payments, but they can also provide secure vendor access to the remittance data, which can include a wide variety of translation/mapping services to streamline the processes to both counterparties.
Managing account signatories.	Physical signatures must be maintained by the bank to support cheque processing — this is also cumbersome when opening accounts.	Digital signatures on electronic payments will eliminate the need to have a potentially large number of payment originators on file and managed by the bank. Banks are supporting the electronic opening of accounts (EBAM), and adoption of the SWIFT ISO20022 messages for account openings has been in practice since 2008.

tors against a high volume of payments, chances are this is an area where improvements are very achievable. In a pure straight-through processing (STP) environment.

- The payment originator would request a payment, attaching a level of detail enough to allow an approver to perform the function quickly. The originator would be able to enter all the payee details, where validation rules would be readily available to ensure that the correct information is captured at creation. Repetitive payments could be created from pre-established/approved templates.
- The approver(s) would be assigned based on the mandates provided by corporate governance, and they would be alerted in a timely manner.
- The correct operational debit account would be automatically assigned or assigned by treasury before the payment was sent to the bank.
- Approved payments would pass unattended to the paying bank, where executed confirms would be matched back with any additional routing information tagged to the payment.

Automating wire initiation was considered low-hanging fruit for three of the above-mentioned case studies. All three used SWIFT for bank communication and were able to stop using bank-proprietary software anywhere within the wire transaction life cycle. The retail brokerage case study actually automated all the accounting with interfaces into both the G/L as well as the client account systems. In addition, clients' transactions were routed to the appropriate account management group for approval, and treasury assigned the debit account number on all the approved wires. The brokerage firm's client would have the settlement information verified on the spot, so that issues could be resolved at point of capture, and a Fed wire confirmation is now in hand within minutes. The MT103/MT101 messages (depending on servicing bank) were routed (by setting the destination BIC) to the appropriate bank based on the account selected by treasury, and in most cases the wires were confirmed with MT900 debit confirmations (including the Fed reference number in field 72) in under five minutes.

One would expect this to be a reasonably easy process to implement, but there are many obstacles (see Table 3).

ERP or back-office origination

Do multiple ERP or back-office systems need to communicate with multiple banks for multiple payment methods? In a pure STP environment, any system originating a payment could provide those instructions in a single format that would be pre-validated and routed to the correct destination bank without any human intervention. Confirmations and/or rejections would be passed back and matched against their unique reference assigned by the origination system (see Table 4).

The Financial Institution and MNC case studies had multiple systems which needed to create payments. It was not at all practical to put settlement interfaces on all the originating systems, nor was it practical to choose one of those systems to be a settlements hub. A payments hub which sat between the originating systems and the delivery channel (in both cases SWIFT) was clearly the best alternative. The payments hubs maintained the settlement information for some of these systems, particularly those that were designed and built before IBANs were introduced and did not maintain the appropriate settlement information. Therefore, the payments hubs had to maintain payment

Table 3: Process efficiency initiatives

Obstacle	*Problem*	*Solution*
Treasury does not want the originators to access the bank's payment origination system and the operational debit account is a mandatory field.	A manual alternative method is used to request the payment from treasury. The payment is then re-keyed by treasury where any problems have to be resolved by treasury instead of the Originator. Alternative methods such as fax or e-mails open the door for fraud and errors.	The payment origination message should only require debit G/L information in addition to the payee details. Treasury should be able simply to tag the payment with the desired operating account on the way out.
Bank-specific browser products must be used to originate many payment types.	Payment details must be keyed into each bank's system. Bank system may or may not be able to provide an approval workflow that meets corporate approval mandates.	A bank independent payment origination system needs to be deployed which can provide an entry screen for the required payment details, provide clearing validation rules, meet approval mandate requirements, and communicate payment instructions to any bank via SWIFT.
Remote locations need to originate and approve payments.	Many payment origination systems operate on older client server applications or browser-based solutions which can only safely operate within a LAN environment.	The payment application must be totally Web based, allowing secure connection even from the public Internet.
Originators need a way to supply detail about why the payment is being made so that the approver can make an informed decision.	There is no clean way to associate the payment instruction directly with the invoice or vendor data.	The payment system should allow for attachments of vendor invoices or detail so that the approver has direct access.
Remittance detail cannot be effectively passed on to the payee.	Clearing systems do not have sufficient capacity to pass enough detail, and certainly no 'attachments' are allowed.	The payment system must provide alternative ways to pass remittance detail to the payee. There must be multiple options, including e-mail, fax and Web-based solutions for the vendor.

templates keyed by a client ID which could resolve the settlement information upon payment import. To allow this, the payment templates needed to go through a similar approval workflow to any free-form payment with the same level of mandated approval compliance.

Managing cash positions

Does the company have issues managing daylight overdrafts, or optimising daily cash positions? This is perhaps one of the most difficult process efficiency problems to solve, because it tends to be specific to each organisation. One major company

Table 4: ERP or back-office origination

Obstacle	*Problem*	*Solution*
Bank-specific host to host products must be used.	Each bank requires its own communication protocol and/or formats.	A bank-independent payment origination system needs to be deployed which communicates payment instructions to any bank via SWIFT in ISO format.
Multiple ERP/back-office applications need to provide automated payment instructions to multiple banks where each bank channel is unique.	Each ERP must have a specific interface created for each bank and potentially for each payment method. Every time a bank changes, every system must change that requires that interface.	Implement a hub that can receive payments from any source, map it to a single data model, and then extract it to the appropriate destination bank. Using this methodology, the number of interfaces will be drastically reduced,[a] and the ERP/back-office applications are insulated from external changes created by bank counterparties.[b]
ERP systems do not have the required clearing validation rules.	Payments originating in ERP system have to be augmented or repaired.	ERP payments can reference payment system templates so that settlement instructions can be managed in a single place. An enterprise payment infrastructure needs to be able to publish Web services for payment validation from any system needing to originate instructions so that they can be validated at source.
Reconcilement between payments and reported transactions can be manual and time consuming.	Many of the bank's host to host products do not provide adequate confirmation files — particularly for low-value payments.	The payment system needs to be able to track payments based on status and return to the origination system a reconcilement file that matches the outgoing reference number (from the originating system) to the payment status and clearing reference number (if one exists). Any NOC, return or other such file received from the bank must be processed and passed back, notifying the origination system of the problem. Payments that do not fail should have the option to be 'auto confirmed'.
Remittance detail cannot be effectively passed on to the payee.	Clearing systems do not have sufficient capacity to pass enough detail.	The payment system must provide alternative ways to pass remittance detail to the payee. There must be multiple selections including e-mail, fax and Web-based solutions for the vendor.

[a]If five ERP systems required five bank interfaces, it would mean 25 total interfaces. With five ERP interfaces to a single data model, and five bank interfaces from that data model, the total number of interfaces would be only ten.

[b]A change in the bank interface to the single data model would not affect any of the ERP interfaces to the data model.

Table 5: Managing cash positions

Obstacle	*Problem*	*Solution*
Cash decisioning is accomplished by manually populating highly tailored spreadsheets.	The data collection can be incredibly time consuming.	Inclusion of daily cash projections by dynamically populating cells within a spreadsheet from multiple sources, such as accounts payable and accounts receivable. Using database query tools, transactional and balance information can be retrieved from multiple systems. To facilitate this type of external data source for Excel, groundwork and additional views need to be configured within the data source databases. It is recommended that a 'Data User' maintenance function be established which will automatically provide read-only access, as well as provide a means for setting up data access restrictions based on G/L accounts or other organisational parameters so that the access views can easily be re-used across the organisation. Multiple third-party industry tools are available to support this functionality of dynamically populating cells within a spreadsheet from multiple database sources.
The same data can appear from multiple sources.	Critical transactions can be included more than once.	When combining outgoing payment information with bank intra-day reporting for a real-time cash position, the outgoing payment needs to flip from one source to the other when it appears in the intra-day bank reported data. This process must rely on matching the client reference, which should under most circumstances be included within the incoming cash reporting messages.
Information held managed within the spreadsheet must be acted upon in a timely manner — possibly near real time.	Excel does not create money movement or payment transactions.	When deploying a cash decisioning tool using Excel, there needs to be an automated way to execute money movement instructions once the data have been collected and position decisions have been determined. The payment IT infrastructure should be able to recognise the payment instruction type needed automatically, based on the debit account, credit account, amount and value date. Hence, the one file with the money movement instructions could translate into wires, book transfers, account transfers, multi-bank MT101, etc., depending on the relationship between the two accounts.

was managing their cash position with a series of calculators (for tracking outgoing wires) in association with six different bank workstations to track balances and incoming wires.

It is not a coincidence that Excel is used to manage this process for most companies; the rules need to be easily configured and changed, and Excel provides a good tool for some organisations. The problem is populating Excel with the right information as automatically as possible. Many organisations which ultimately use Excel as the final decisioning tool have to deploy incredibly complex and manual data collection processes in front of it (see Table 5).

In the MNC case study, the organisation needed to manage its cash positions closely with maximum up-front visibility so that the daily positioning strategy could be as effective as possible. Every night, business units report their cash forecasts for the following day and for the week ahead. In the morning, the daily cash projections are updated by each unit as the day starts. As real payments start to hit the payments hub, they are matched first against the forecasts to avoid double counting, and again as the payments get reported by the bank in current day transaction reporting. At a certain point of the day, operating accounts are swept and topped based on all the transactions in the system (forecasts, payments that have not been reported back by the banks yet, and payments that have come through a current day BAI feed from the banks). If any exceptions occur after the sweep, adjustments can be made to the cash positions, and there is full visibility to what has occurred or perhaps what has not occurred.

Fraud prevention initiatives

This section identifies areas which, if left unnoticed or unaddressed can cause significant risk to the organisation (see Table 6). Often those addressing the exposures produce an instant successful business case for IT funding.

By incorporating cheques into their payment hub, the retail brokerage in case study 1 was able to automate the cheque initiation processes completely, leveraging the exact same services and approval workflow used to support the wire initiation process. This demonstrates how a strategy combining all payment methods into a single payments hub foundation can allow deployed services to be leveraged across the board, once they are created. These types of payment processing services are almost always payment-type agnostic. Taking a generic perspective on payments is extremely important so that the services can easily be reused.

The deployed software allowed the remote offices to enter the cheque details and manage the MICR cheque printing process *on plain paper stock*, using only a browser. Positive pay files were then automatically generated with all the beneficiary detail. These two functions eliminated two huge fraud risk factors.

Tamper-proof transactions

Sometimes payment processing can be similar to the Great Wall of China. The same way in which the immense wall was compromised by bribing the right guard on the inside, apparently very secure processes often have very exposed back door vulnerabilities (see Table 7).

It has become industry best practice to protect payments from an electronic banking system with hash-based message authentication codes (HMAC). The transactions generally come from well-funded accounts, and hence the risk of generating a high-value fraudulent transaction is high given the power of an internal database administrator (DBA). Similarly, companies deploying a payments hub internally

Table 6: Fraud prevention initiatives

Fraud risk	*Problem*	*Solution*
Blank cheque stock can be stolen and forged.	Many companies still manage pre-printed cheques.	Browser and client/server software can print MICR cheques on plain stock eliminating printed cheque inventories. MICR printers are available in a very wide range of prices, and browsers can print MICR cheques as easily as travellers print boarding passes today.
Without a positive pay interface to the bank, fraudulent cheques can be paid.	If cheques come from pre-printed stock or use a de-centralised process, it can often be impossible to capture the cheque information to send to the bank.	A centralised cheque management system will capture all cheque information and manage the positive pay interfaces to the bank to guarantee that all cheques have positive pay on them.
A physical signature is too easily compromised.	Approvals are done by signing cheques, tickets, forms, letters, etc.	Payments now need to be approved electronically with two-factor authentication. If the originator is internal, the need for an actual digital signature for non-repudiation is probably minimal, but having a secure single-use password or USB device protected by a PIN or password is an important safeguard that the correct person is actually approving the transaction. In conversations, some executives have stated in the past that 'I sign any piece of paper that my secretary puts in front of me, and if I'm in a rush, I many not look at it at all'. Having electronic approval, with a timely e-mail/SMS alerting mechanism, is a key way to build the right culture for executives in a payment approval role. If the originator of the payment is outside the organisation, done by someone who is duly authorised on the payment account, then it is essential that a digital signature be calculated from the payment digest, stored with the payment details, and subsequently usable to ensure non-repudiation by that third party originator or customer.

Table 7: Tamper-proof transactions

Fraud risk	*Problem*	*Solution*
Payment files that are dropped onto a network drive for execution are not secure.	Systems often pass files by dropping files in a directory for another system to pick up and execute.	Unless the key fields are put into a secure digest or HMAC and checked by the receiver of the file (the bank), there is little guarantee that the file did not get tampered with. Encryption is often used to try to secure these files, but it must truly be industrial strength, with excellent key management, to be an effective means of payment detail integrity.
DBA can create fraudulent transactions.	By definition, the DBA has access to a database with complete freedom to change fields.	This is a huge exposure to the payment process, since payments generally pass through one or more database tables as part of their life cycle. Similar to the HMAC process on the file drops, transactions can be protected from the DBA by calculating an HMAC from the key fields, storing that HMAC with the transaction, and then comparing the stored HMAC against the current calculated value whenever the transaction is accessed. This methodology will not protect the transaction from being changed, but it will recognise that the transaction was changed, and stop it in its tracks. It will also passively identify where there is a serious internal issue, so that it can be effectively dealt with.

should make this a security requirement for the initiative.

BANKS AND CORPORATE HOST CONNECTIVITY

One of the key issues facing the banking industry over the past ten years has been the resistance to embracing SWIFT as a channel to support the initiation of payments. This was caused by a number of factors:

- Banks viewed their legacy 'host to host' products as being 'sticky', and end of lifing them ran the risk of offending a strategic client. As a result, many corporations ended up with literally dozens of host to host links — sometimes to the same bank.
- Ironically, many banks in the US and UK viewed corporate SWIFT access as a threat, believing that it commoditised payment services. This perception was not shared by their European counterparts, who embraced it — probably because in those countries multi-bank payment services have been part of the

banking landscape for years.

- Banks are often organised in stove pipes. Cash management specialists at the banks were completely taken off guard when a large client asked about sending transactions via SWIFT. The established SWIFT teams were totally focused on supporting correspondent banks, and this change required a cross-organisational team (sometimes people who had never met each other) to satisfy an enquiring client.
- The 'plumbing' simply was not there. There was no connection from the bank's SWIFT interface to the ACH back-office or DDA system where the corporate accounts were maintained. Many times, this created a 'sneaker brigade', which was often discovered by large clients sending test transactions with text intentionally transposed. By receiving a confirmation that was corrected, it ensured that someone at the bank had manually re-keyed it somewhere in the process.

During the initial roll-out of SWIFT corporate access projects, it was difficult to get good information. Some banks claimed to provide a certain payment service — such as BACS payments in the UK — only to find out later that they did not have this capability once the lack of 'plumbing' was discovered. In one particular case, a financial institution client was told by their bank that they simply could not take wire instructions from them via SWIFT, since 'they were set up on the Corporate DDA system that did not have an interface with SWIFT'; this was said despite the fact that the requesting financial institution was a full SWIFT member.

The good news is that these trail-blazing 800 pound gorilla corporations paved the way for everyone else. Banks were practically forced into bolstering their corporate SWIFT STP capability because their largest clients threatened to do business with their competition if they did not. In conjunction with industry initiatives such as SCORE and a vastly simplified SWIFT membership process, SWIFT is the right bank connectivity alternative for any payments hub initiative.

MULTI-CHANNEL SUPPORT

One of the more obvious industry needs is for banks to provide a unified, Web-based application which looks across all payment initiation channels. Today, if a corporation submits payments via host to host channels or SWIFT, there is rarely visibility to those payments (before execution) on the Web channels. Corporate clients can only view the Web-initiated payments within the Web-based channel. This shortcoming is usually a result of siloed bank organisational structures for the different channels. As banks take a more client-centric approach to product management, this gap will probably be eliminated over the coming years. In the future, host-submitted payments (via either SWIFT or direct file channels) will be reviewed, approved, repaired and monitored directly on the bank's Web channel.

PAYMENTS IT SCORECARD

The purpose of this scorecard is to measure the likelihood that opportunities may exist within an organisation for improving its payments IT infrastructure (see Figure 2). The higher the score in the various focus areas, the greater the need for attention. This should help to establish priorities for possible investment.

CONCLUSION

The payments IT infrastructure of many organisations, both large and small, have

Figure 2 IT scorecard

Focus area	*Scoring method*	*Score*
Direct cost opportunity		
Percentage of total payments that are done by cheque	0–10 per cent (0), 11–40 per cent (1), 41–60 per cent (2), 60 per cent+ (3)	
Do you use bank proprietary software for 'host to host' transmissions?	No (0), One interface (1), More than one interface (3)	
The number of wire payments originated every day	0–5 (0), 6–20(1), 20–50 (2), 50+ (3)	
Direct cost opportunity score (0–9)		
Process efficiency opportunity		
The number of human payment originators not using an ERP or back-office application	0–5 (0), 6–20 (1), 21–50 (2), 50+ (3)	
Number of back-office systems that originate payment instructions	0 (0), 1 (1), 2–5 (2), 6+ (3)	
Number of bank counterparties receiving payment instructions	1(0), 2 (1), 2–5 (2), 6+ (3)	
Do you have a home-grown payment system in use that is over two years old?	No (0),Yes (3)	
Rate the efficiency of your daily cash position manual management process and problematic. Add up to 3 more points if you feel this is a critical function within your business based on the amount of cash involved.	Rate yourself (0) hands free and accurate, (3)	
Do you have comprehensive payment approval mandates that are not being complied with because of ERP or bank software limitations?	No (0),Yes (3)	
Do payment instructions come into your treasury area via fax or e-mail?	No (0),Yes (3)	
Do you use pre-printed cheque stock?	No (0),Yes (3)	
Are all your cheques covered by Positive Pay services?	Yes (0), No (3)	
Do you have multiple geographic locations that require payment approval from other geographic locations?	No (0),Yes (3)	
Are your payments being approved by having a signed ticket or paper form?	No (0),Yes (3)	

Focus area	*Scoring method*	*Score*
Do payment instructions come into your treasury area via fax or e-mail?	No (0), Yes (3)	
Process efficiency opportunity score (0–36)		
Fraud prevention opportunity		
How comfortable are you with any 'file drop' security you have in place for files containing payments?	Rate yourself (0) very comfortable, (3) not comfortable	
Have you thought about and planned for a rogue DBA compromising a payments database? address the issue (3)	Yes, and there is protection in place (0), No or Yes and nothing has been done to	
Do payment instructions come into your treasury area via fax or e-mail?	No (0), Yes (5)	
Do third parties or customers create payment instructions without a digital signature for non-repudiation?	No (0), Yes (3)	
Are your electronic payments being approved by having a signed ticket or paper form?	No (0), Yes (3)	
Do you use pre-printed cheque stock?	No (0), Yes (5)	
Are all your cheques covered by Positive Pay services?	Yes (0), No (5)	
Fraud prevention opportunity score (0–27)		

often evolved into a fragmented and overly complex but critical piece of plumbing. This paper was aimed at helping to heighten awareness and potentially providing input into a business case to make improvements. After a discussion at SIBOS (Swift International Banking Operations Seminar) a couple of years ago, a large corporation realised that, after a series of bank acquisitions over the past ten years, they actually had 40+ interfaces in one bank which they were actively maintaining. Things that work — or appear to work — are easy to ignore. What would be the cost of taking out or reducing those interfaces to one? If no one is taking the time to look at it, the costs will simply continue. Asking the right questions and performing the analysis is the critical first step. In many cases, the opportunity for reduced cost, improved efficiency and heightened security is well worth the investment, given the right approach and advice.