Software for Payment Cards: Choosing Wisely

As consumers increase their use of non-cash payments via debit/credit/prepaid cards, financial institutions must improve their response times, strengthen their security, hone their future-readiness and enrich their business value. Selecting the best-fit packaged solution is a crucial element in meeting these objectives.

Executive Summary

As the use of card-based payments soars, CIOs face the growing challenge of providing a robust and secure platform for processing the rising tide of transactions. The issue is compounded by the fact that more channels are being made available to consumers, along with more regulatory attention to privacy – thereby intensifying the complexity of the software ecosystem. In this dynamic environment, the process of transitioning to a new cards-processing platform brings with it ever-changing and increasingly demanding requirements.

This white paper identifies the key elements involved in evaluating and selecting a cards software package that delivers on both short- and long-term business objectives. We will also explore three key factors that financial services companies should consider when navigating this process:

- The rise of card-based payments.
- The cards-processing ecosystem.
- Best-fit package considerations.

The primary points discussed here will provide financial services institutions with the insights they need to navigate the RFP selection process and the implementation of a commercial off-the-shelf (COTS) cards package within a given IT landscape.

The Rise of Card-Based Payments

Payments are an indispensable part of consumer and business interactions, whether business-to-consumer (B2C) or business-to-business (B2B) transactions. Among the various kinds of payment methods, those involving cards have been steadily rising over the last decade.

Changes in technology, consumer behavior, regulatory requirements and the rise of millennials – all have influenced the acceptance of payment cards. The tri-annual report published by the U.S. Federal Reserve in 2013 underscores this point (see Figure 1 on the next page).
Over time, non-cash modes of payment have grown — causing a significant jump in card-based payments (see Figure 2).

The Cards-Processing Ecosystem

To fully understand the complexities involved in selecting cards software, it is useful to understand the cards ecosystem and typical payment flow. For example, approximately 74.14 billion transactions were conducted in 2010\(^1\), the most recent date this data was made available. The usual network response time for such transactions is 130 milliseconds.

Depending on the nature and region of a transaction, a payment might have to pass through many points and networks, as depicted in Figure 3 on the following page. Some transactions, such as signature debit transactions (which occur on Visa, MasterCard and Discover networks) and credit transactions follow essentially the same processing route.

Figure 4 on page 4 shows the flow of the real-time processing steps involved in a transaction — from acquiring the transaction, through its approval and back. The clearing and settlement process falls outside this function and is not described here.


Figure 2
### The Cards-Processing Ecosystem

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merchant POS (point-of-sale devices)</td>
<td>The location where a transaction is initiated, acquired and approved by the card-issuing bank. Once the transaction is approved, the merchant uses an end-of-day batch process to provide the transaction information for the day to the clearing and settlement house.</td>
</tr>
<tr>
<td>ATMs</td>
<td>Machines that allow a cardholder to initiate a transaction, such as withdrawing cash, making inquiries about an account balance, etc. These transactions are routed to the card-issuing bank.</td>
</tr>
<tr>
<td>Local Payment Processors</td>
<td>This refers to the local payment provider, which usually has a monopoly in a specific geography. These providers have direct links to major local banks and aid in transaction routing.</td>
</tr>
<tr>
<td>International Payment Processors</td>
<td>Companies such as Visa/MasterCard/Discover, etc., are considered to be international payment processors.</td>
</tr>
<tr>
<td>Banks</td>
<td>These can be either an issuing or an acquiring bank.</td>
</tr>
</tbody>
</table>

### The Anatomy of Card Payment Processing

*Institutions where payments processing packages can be used.

Figure 3
Real-time Card-Transaction Processing

**Step** | **Description**
--- | ---
1 | The consumer selects a card for payment. The cardholder data is entered into the merchant’s payment system, which could be the POS terminal/software or an e-commerce Web site.
2 | The card data is sent to an acquirer/payment processor, whose job is to route the data through the payments system for processing. With e-commerce transactions, a “gateway” provider may provide the link from the merchant’s Web site to the acquirer.
3 | The acquirer/processor sends the data to the payment brand (e.g., Visa, MasterCard, American Express, etc.), which forwards it to the issuing bank/issuing bank processor.
4 | The issuing bank/processor verifies that the card is legitimate, not reported lost or stolen, and that the account has the appropriate amount of credit/funds available to pay for the transaction.
5 | Once the card is verified, the issuer generates an authorization number and routes this number back to the card brand. With the authorization, the issuing bank agrees to fund the purchase on the consumer’s behalf.
6 | The card brand forwards the authorization code back to the acquirer/processor.
7 | The acquirer/processor sends the authorization code back to the merchant.
8 | The merchant concludes the sale with the customer.

**Figure 4**

PIN (personal identification number) transactions require an additional step if the merchant and issuing banks belong to different networks. In these cases, the transaction passes through the acquiring processor, then on to a gateway processor that acts on behalf of a national EFT (electronic funds transfer) network, such as Visa’s Interlink or MasterCard’s Maestro. These national networks serve as a bridge between the regional ones. With the gateway processor, the transaction is then routed in the same way to the issuing bank’s processor, then on to the issuing bank for authorization. The response is relayed back via the same route in reverse – all the way back to the initiating device.

**Considering a Best-fit Package**

Given such a complex ecosystem and time constraints, selecting the right packaged solution for a cards-processing platform is of paramount importance. Figure 5 on the following page lists some key considerations.
## Evaluation Criteria for Cards-Processing Software

<table>
<thead>
<tr>
<th>Category</th>
<th>Consideration Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td>Compliance</td>
<td>Should be compliant with security standards and international/local card schemes.</td>
</tr>
<tr>
<td></td>
<td>Migration</td>
<td>Should offer ease of migration from an existing in-house or COTS solution.</td>
</tr>
<tr>
<td></td>
<td>Market Reputation</td>
<td>Provider’s reputation for after-sale services, as well as the experience of existing clientele.</td>
</tr>
<tr>
<td><strong>Functional</strong></td>
<td>Authorization</td>
<td>Ability and flexibility needed to authorize transactions, either by communicating with authorizing banks or acting as a stand-in.</td>
</tr>
<tr>
<td></td>
<td>Clearing and Settlement</td>
<td>Ability to provide information for CSM processing, as well as receive CSM batch files for final settlement with various other banks/processors.</td>
</tr>
<tr>
<td></td>
<td>Issuing Management</td>
<td>Support for omni-channel and multi-channel fraud detection/management.</td>
</tr>
<tr>
<td></td>
<td>Acquisition Management</td>
<td>Support for acquisition channels with flexible pricing models.</td>
</tr>
<tr>
<td><strong>Non-Functional/Technical</strong></td>
<td>Architecture</td>
<td>Ability to fit within the existing IT landscape, with scalability options.</td>
</tr>
<tr>
<td></td>
<td>Network Support</td>
<td>Should provide support for communication channels such as TCP-IP, HTTP, etc., and work with industry-leading messaging middleware solutions.</td>
</tr>
<tr>
<td></td>
<td>Device Hosting</td>
<td>Should support hosting of multiple devices and related communication protocols.</td>
</tr>
<tr>
<td><strong>Risk Management</strong></td>
<td>Fraud Detection and Prevention</td>
<td>Ability to detect fraud in real time, with provisions for preventing future suspicious transactions.</td>
</tr>
<tr>
<td></td>
<td>Ease of Configuration</td>
<td>Ability to perform online actions to modify limits, block accounts, execute geography-specific blocking and provide various types of reporting. In short, a parameterized product that gives the power to the business users, rather than doing everything by scripting/code modifications.</td>
</tr>
<tr>
<td><strong>Ability to Execute</strong></td>
<td>Implementation Capability</td>
<td>Ability of the package owner to be a reliable system integrator.</td>
</tr>
<tr>
<td></td>
<td>Time to Market</td>
<td>Ability of the package to foresee market changes and remain compliant with the latest market standards.</td>
</tr>
<tr>
<td></td>
<td>Cultural Fit</td>
<td>Soft-skills aspect of the vendor/institution relationship.</td>
</tr>
</tbody>
</table>

### General Considerations

When selecting a cards software solution, the following general points should be kept in mind:

- **Compliance**
  - **Data security standards.** Data security standards are critically important, given that institutions routinely deal with customers’ private and confidential data. Any compromises to this data can have serious financial and reputational impacts, affecting both firms and their customers. Hence, a software solution should be compliant with:
    - A leading data security standard, such as PCI DSS (Payment Cardholder Industry Data Security Standard).
    - Local/international standards imposed by law in the area of operations.
• **Card schemes.** A cards processor needs to interact with various interchanges or networks to ensure that customers can receive expected levels of service throughout the world. Hence, a solution should support various card schemes, such as MasterCard, VISA, RuPay, Maestro and American Express.

**Migration**
Migration is extremely significant in a situation where an institution has an in-house or COTS product already in place and chooses to adopt a new software package. In these cases, the following considerations must come into play:

• Ease of migration to the new product.
• Support of package vendor in setting up governance model for migration.
• Big-bang or phased approach with detailed timelines.
• Impact on current business.

**Market Reputation**
A software package’s market reputation should be studied before it is selected, since this information can offer more insight regarding:

• The actual capability of the package in all aspects of transaction processing.
• Practical difficulties and problems during use.
• Existing clienteles’ experience with the package.
• Agreements regarding after-sale services.

**Functionality**
Every payments-processing institution will have its own functional requirements, based on its core business requirements. A software package should be able to readily fulfill these needs, with minimum customization. Among the core functional aspects to be considered are:

**Authorization**
This is a core step in transaction-processing. The factors that come into play include:

• **Flexibility.** Since authorization rules are very dynamic and change according to business rules and regulations, it is very important that the software package be able to accommodate these fluctuations – in less time, and with minimum impact on the business and its customers.

• **Ability to authorize transactions using all types of cards.** The product should be capable of supporting authorization of processed transactions using different types of cards, such as magnetic stripe cards, contactless cards and EMV (EuroPay, MasterCard, Visa), for example.

• **Ability to authorize transactions performed at all types of terminals.** Card-based transactions can be performed on different types of terminals – ATMs, POS, EMV-capable and contactless payment terminals. Thus, a solution must be equipped to handle transactions originating from a wide variety of terminals.

The software should be able to act as a stand-in for authorization in the event the destination host is down. It should also be able to connect to multiple hosts in situations such as mobile recharge, which requires the solution to connect to the bank for balance approval while simultaneously connecting to the telecom service provider to conduct a balance top-up.

• **Support multiple authorization types and flows.**

  ▶ Different types of transactions may need different types of authorization, depending on the business need (pre-screening, balance approval, limits and usage checks).

  ▶ Special transactions may need to be sent to different destinations (multiple hosts, fraud management systems, etc.). Consequently, the package should be capable of supporting these systems, and split or limit different types of authorizations across multiple destinations.

**Clearing and Settlement**
The ability of an institution to clear and settle transactions helps to control its exposure to financial risks. A cards software package should thus be capable of supporting the various functions associated with this process – quickly, and with minimum customization. Key considerations include:

• Reporting of matched and unmatched transactions.
• Creating bookings for transactions to be settled and sent to host if needed.
• Creating customized reports based on current business needs.
• Configurable reversal of unsettled transactions.
• An interface for the institution’s staff to view individual transactions and correct them if needed.
• Configuration of clearing and settlement flows based on types of transactions.
• Configurable fee schemes based on type of transaction, issuer, acquirer, etc.

Issuing Management
An institution must provide its customers with the services they expect. Likewise, customers must manage the risk arising from those services. A COTS software package should help an institution support these objectives. Key considerations include:
• Support for multilingual, multicurrency and multinational customers.
• Support for multiple card products, such as mobile cards, contactless cards, etc.
• Configurable risk-management solutions such as fraud scoring, at various levels – customer, card or type of transaction.
• Ability to interact with an external card management system if needed.

Acquiring Management
An institution’s ability to be lean and efficient while providing support for multiple acquiring channels helps increase its competitive advantage in the acquiring market. Hence, a card software package should offer support for:
• Multiple acquiring channels like ATM, POS, NFC terminals, etc.
• Multiple pricing schemes for customers.
• Loyalty programs.
• Configurable reporting formats for customers.
• Multiple issuer routing.

Non-Functional/Technical Considerations
The non-functional aspects of a COTS package are equally important when making a selection, since the software must fit into an institution’s existing IT applications landscape.

Architecture
The package should be compatible with the IT architectural principles of the institution. There should be minimum or no impact on the current architecture. Key considerations include:
• Multi-platform support.
• High availability and performance.
• Scalability and dynamic load balancing.
• Manageability.
• Security.
• Easy integration with external systems.

Network Support
Communication is an important consideration. A cards software solution should be able to integrate and communicate with external systems using a wide variety of network protocols. Consequently, the package should support:
• Multiple communication protocols, such as TCP-IP, HTTP and UDP.
• Multiple messaging middleware.
• Secure communication channels.

Device Hosting
The package should support multiple devices and accommodate required communication protocols in order for them to function properly. These capabilities encompass:
• ATM and CDS hosting.
• Support for key management and key loading of hosted devices.
• Support for multiple types of transactions from hosted devices.

Risk Management Considerations
For institutions handling payments, risk management is a primary weapon for combating fraud. Given the continuous flow of news surrounding data theft and increases in card-not-present fraud, managing risk becomes even more critical. The following points should be top of mind:

Fraud Detection and Prevention
Detecting fraud is the first step in preventing it. Hence, the software package should be able to:
• Support multiple fraud-detection algorithms.
• Integrate with real-time/near real-time fraud detection systems.
Ease of Configuration
Fraudsters use a variety of techniques. They are very dynamic. To combat fraud, the software package should be flexible enough to enable the following:

- Intuitive selection of fraud-detecting algorithms.
- Easy configuration of any new algorithms.
- Simple configuration of general limits and usages for preliminary checks.
- Geographical blocking and maintenance of blocking rules.

Ability to Execute
The selected cards software package might have all the capabilities an institution needs; however, if the vendor does not have the skills and experience needed to install and operationalize the solution, the firm’s business can be seriously affected. The following criteria can shed the necessary light on a vendor’s or systems integrator’s capabilities.

Implementation Skills and Services
The vendor/system integrator should offer:

- Knowledgeable, experienced resources for package deployment and implementation.
- Support and documentation for implementation and maintenance.
- Training for existing IT operations and business process owners.
- Services to maintain customer-specific modifications if needed.

Faster Time to Market
Institutions gain an advantage over their competitors when they are ahead in deploying new products and bringing new services to market. Hence, an implementation partner or vendor should be able to:

- Provide solutions for quickly resolving production problems.
- Deliver any changes/improvements to the software package ahead of schedule.
- Follow any mandates from interchanges as or before needed.
- Provide easily configurable and implantable solutions for business evolution.
- Be the first to address any modifications to the BIM (bank interchange message) or other standards that are widely adopted in local/international markets.

The Right Fit
How a package vendor’s organization serves and communicates with the client organization – from helping to choose the software, to guiding the client through the implementation process, to regularly communicating with project sponsors – is a fundamental component in any successful, future-focused implementation.

Looking Ahead
As with any COTS product, an outdated solution with its own in-house, custom-built applications can significantly increase transaction-processing expenditures, escalate maintenance costs, slow time-to-market and result in lost business opportunities.

No off-the-shelf cards software product is a “buy-and-implement” proposition. However, equipped with a well-designed, well-implemented solution supported by a qualified vendor, institutions will be better positioned to increase their agility and flexibility, improve how they control risk, and provide their customers with a secure platform for successfully managing their card transactions.

References
Footnote

1 According to The Nilson Report, 74.14 billion transactions were conducted with payment cards in 2010. (See The Nilson Report, Issue 985, page 10. December, 2011).

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