



Banco do Estado do Rio Grande do Sul – Banrisul

Smart Card Alliance Latin America (SCALA) Case Study

Banrisul Case Study

Introduction

This Smart Card Alliance Latin America (SCALA) case study illustrates a real-world example of a successful smart card implementation for secure payments using the EMV specification and a public key infrastructure (PKI) in Latin America.

The Banco do Estado do Rio Grande do Sul, **Banrisul**, case study is a clear demonstration that the migration to integrated circuit chips in bank cards was not only done to improve security, but also to use the chip's capabilities for supporting additional applications on the card to add benefits to implementation's business case.

Banrisul issues multi-application smart cards to its customers to enable them to access:

- **The “Banricompras” network** – an EMV debit and credit payment network with more than 75,000 affiliated merchants and 54 million transactions per year.
- **Home and office banking** –secure Internet banking channels that process more than 68 million transactions per year.
- **Secure banking automation services** – ATM access (e.g., for cash withdrawal, transfers) and third party website access (e.g., for tax declaration, exchange contracts).
- **Digital signatures, workstation logon and other services** – access based on the “ICP-Brasil” Brazilian national PKI standard.

Banrisul's implementation demonstrated that the smart card could hold multiple applications without risking the security of financial payments transactions. This allowed the bank to develop new partners to use the existing platform and to offer "real estate" on the card to provide additional products and services. The result was increased use of the single identity and payment card.

Project Overview

The Banrisul multi-application EMV and PKI smart card runs two applications: an independent EMV application – a “private label” EMV – that allows the use of off-the-shelf EMV terminals such as point-of-sale (POS) terminals and PIN pads; and an ICP-Brazil-compliant PKI application that allows the card to be used in Internet banking channels and with a number of third party applications such as tax declaration, contract signing, Microsoft Windows logon, and e-mail signing.

Banrisul has migrated its three million existing customers to the chip card with PKI technology. The vast majority of Banrisul's terminals (more than 100,000 POS, PIN pads and ATMs) are already able to conduct full-grade EMV transactions. The impact of this roll-out is not only the complete elimination of fraud on channels protected by chip, but also increased usage of Banrisul's electronic channels (that help to reduce the operational costs associated with attended operations) and several intangible benefits such as customers feeling more secure when



performing high-value transactions on the Internet and Banrisul's increased association with technology and security.

Project Background

Banrisul was founded in 1928 as the state bank of Rio Grande do Sur to provide real estate loans to local farmers to purchase the land they were farming. As the state grew so did the products and services of the state bank of Banrisul. This helped the bank maintain its business through various periods of economic crisis and national hyperinflation. Today Banrisul is a privately and publicly held company linked to the State of Rio Grande do Sur, currently considered one of the most developed states in Brazil with approximately 81 percent of the state's population holding bank accounts.

In 2001, Banrisul chose MULTOS as the technology platform for its card. This choice was very important in the face of the movement that happened in the EMV payments smart card market. As a public institution, smart card bureau independence was important for the bank to promote and develop the technology in Brazil.

In a short time, Banrisul made an agreement with ICP-Brasil, the Brazilian national PKI standard, to have both EMV and PKI applications in the same card. The two applications were very important for the primary business issues: eliminating fraud and increasing the bank's capabilities to support new payment schemes securely (such as online banking and Banricompras network).

The bank's strategy was to create an identifiable differentiator among other banks in Brazil that would be recognized both in their portfolio and by their clients. The process was to first migrate merchant POS terminals to ensure that the acceptance infrastructure was in place, and then gradually roll-out EMV/PKI cards to the renewing customer base. The MULTOS operating system was used due to concerns about security and the lack of security controls in other platforms at the time of implementation.

The decision to use smart card technology was based on it being the only technology available at the time that provided the flexibility for adding multiple applications through different applets on the card, without jeopardizing the bank's security requirements and concerns.

Banrisul's EMV migration project was started in 2001 to combat increasing fraud rates and internal/external security threats and to expand the overall safety of the financial system in the State of Rio Grande do Sul. The factors evaluated by the organization included ensuring the security of customers' accounts, financial servers, networks, and payment terminals.

Banrisul decided to use smart cards to take advantage of capabilities of the card's embedded chip to support multiple applications. Smart card technology had a proven track record of fraud elimination using the EMV standard and also provided capabilities for conducting offline transactions.

Banrisul was the first large-scale, independent EMV implementation in Latin America and the first to support full-grade EMV transactions. It is considered by many to be the most secure debit implementation in Brazil. The cards can perform all of the latest EMV security features including Combined Dynamic Data Authentication (CDA) and offline enciphered RSA PIN transactions.

The additional uses of the Banrisul EMV/PKI smart card helped to increase its acceptance by bank clients due to the perceived additional benefits of workstation logon, online banking, e-commerce transactions, secure mobile payments, offline transactions, government tax ID, contract signatures, and others without affecting payment security.



The migration process required the involvement of the card manufacturers, the bank network, and the POS providers. Migration required merchants to have EMV-enabled POS terminals and the bank needed the ability to issue new smart cards to bank clients.

The PKI implementation needed to interface with the customer's browser and changed the way that the Internet banking server authenticated the customer. The PKI application is also stored inside the card.

The EMV implementation required the development of the smart card EMV application, the migration of the merchant POS infrastructure to accept the Banrisul smart card, the implementation of a communication protocol that supported the EMV transaction and authorized the transaction. Authorization of the transaction changes involved integrating with the mainframe solution that originally worked with magnetic stripe cards.

Implementation Description

The Banrisul smart card project could be considered two projects inside the same card, each one with its own challenges and difficulties. The EMV project involved the POS rollout, authorization system changes and card application development. The PKI project involved Internet authentication infrastructure changes and card application development. In addition to these, the project also needed a service bureau with the capability to supply cards with MULTOS technology and to load the Banrisul applications during production.

Starting with the smart card EMV application, Banrisul developed a private label solution; it was not possible to use an application from the market, because these, in general, were developed by the main credit card network brands that compete with the Banricompras network. After choosing MULTOS as the card operating system platform, Banrisul implemented, tested and loaded every command, protocol and format defined in EMV specifications.

In implementing the new POS infrastructure and network communications, Banrisul specified and certified the application that was developed for the merchants' POS equipment. The main challenge was the large number of different solutions, companies and hardware in this market.

At the end of EMV process is an authorization system. For Banrisul, authorization is done with a mainframe application that is very robust and that manages the customer's account. The mainframe application was developed to work with magnetic stripe cards and needed to be modified to accept chip cards. Data preparation was necessary for this process. The EMV data and process are very different from those used with magnetic stripe cards, requiring private keys, data from customer and an interface with bureau system.

The PKI solution was completely different. Starting with the card application, the challenges were similar to the EMV migration. Banrisul implemented the X.509 standard inside the chip card. In addition to chip application development, the interface between the customer's browser and the card application needed to be developed; this interface needed to operate using the PKCS#11 and CSP standards.

Implementation Timing

Banrisul is migrating its three million customers to chip cards. The vast majority of Banrisul's terminals (more than 100,000 POS terminals, PIN pads and ATMs) are already able to conduct full-grade EMV transactions. The home and office banking products are ready to operate under a PKI, using a certificate loaded inside the customer's smart card.



Benefits/Value Propositions/Cost-Benefit Analysis

The impact of this roll-out is not only the complete elimination of fraud on channels protected by chip, but also increased usage of Banrisul's electronic channels (that help to reduce operational costs associated with attended operations) and several intangible benefits such as customers feeling more secure when performing high-value transactions on the Internet and Banrisul's increased association with technology and security.

Lessons Learned/Recommendations

During the time that Banrisul was implementing this project, the smart card market, security procedures and credit cards brands continued to move. At the beginning of the project, Banrisul's goals looked crazy to some Brazilian banks. The use of a multi-application card with both PKI and EMV applications is now recognized as the best solution for a bank's customers. Banrisul attributes the project's success to the selection of MULTOS, a chip platform that supports multiple applications and offers a strong security implementation and the infrastructure to load applications dynamically.

It is common in projects to spend many years in the process of implementation. If a good technology platform is selected, the project will survive even when the market and standards change.

Conclusion

Banrisul encountered many challenges with the use of new technologies and concepts. However, the choice of the correct technology platform provided more potential for growth and a better final solution that will survive for many years.