OmniPayments Preauthorizes PROSA Transactions

PROSA is the largest provider of electronic transaction-switching services in Latin America. As part of its upgrade from ACI's BASE24 financial-transaction switch to BASE24-eps, PROSA moved its major transaction preauthorization functions off of BASE24 and onto Opsol Integrator's OmniPayments switch. This allowed PROSA to add functionality and to save costs and deployment time.

PROSA

The PROSA Network

The PROSA financial-transaction network routes Latin American credit- and debit-card transactions for authorization to the banks that issued the cards. Card transactions originate at ATMs or point-of-sale (POS) terminals at retail establishments and are captured by the acquiring banks that manage the ATM or POS-terminal networks. PROSA manages a combined total of over 200,000 POS terminals and its own ATM network. The acquiring banks transmit the card requests over the PROSA network to the issuing banks. Based on various parameters such as available credit and usage history, the issuing banks authorize or deny transactions. These determinations are returned to the ATMs or POS terminals to complete or void the transactions.

At the end of each day, PROSA sends all completed merchant transactions to the acquiring and issuing banks for settlement and clearing.

PROSA serves most of the banks in Mexico. Of the approximately fifty Mexican banks, PROSA serves forty of them. PROSA also serves other international banks in Latin America, including those in Guatemala, El Salvador, Columbia, Panama, Honduras, and Puerto Rico. PROSA is the largest provider of electronic transactions in Latin America. Its network handles over 200 million card transactions per month.

A specialized function provided by PROSA is preauthorization. PROSA's bank customers can enter a variety of rules that control whether a transaction is accepted or not. These are nonfinancial rules. Only if a transaction passes the rules is it forwarded to the card's issuing bank for financial authorization. Rule inserts and updates are made by PROSA's bank customers.

A daily batch run updates any changes to the network infrastructure, such as new or deleted ATMs and POS terminals.

The PROSA BASE24 Switches

To implement its network, PROSA deployed BASE24 switches from ACI Worldwide, Inc. The switches run on fault-tolerant HP NonStop servers. PROSA deployed two such switches to ensure network continuity in the event of a system failure. A six-CPU production system is located in Mexico City, and a four-CPU continuity system is located in the state of Querétaro.

Each system runs several BASE24 environments – one for PROSA's Mexican banking customers and others to address the needs of its international banking customers. PROSA's network is the largest BASE24 installation in Mexico.

Converting to BASE24-eps

The BASE24 NonStop Sunset

In 2008, ACI announced to its BASE24 customers that it would sunset its HP NonStop BASE24 switch by the end of 2011. To continue full ACI support, NonStop BASE24 customers would have to move to ACI's BASE24-eps, an entirely new product that requires a complex migration. Alternatively, customers could move to BASE24 on IBM z/OS mainframes.

PROSA made the decision to move to BASE24-eps for NonStop servers. Typically, BASE24 installations are heavily customized to meet the requirements of the particular network. This was certainly the case with PROSA, which now had to plan its migration from BASE24 to BASE24-eps.

Unfortunately, BASE24-eps as delivered could not meet PROSA's needs because it did not have the capabilities to meet the requirements of PROSA's business functionality for either its local or international customers. PROSA's banking customers had many special business requirements that had to be met. Thus, PROSA was faced with a massive job to customize the new BASE24-eps switch.

Customer Support Modules (CSMs)

The bulk of customization of a BASE24 environment is accomplished via Custom Support Modules, or CSMs. CSMs are program modules linked into the BASE24 software to add special functionality. PROSA's switches currently incorporate close to 700 CSMs. Its CSMs are all written in TAL (Tandem Application Language, the original C-like language supplied with Tandem computing systems, which later became HP NonStop servers).

Because of the complexity of implementing and maintaining its BASE24 switch, PROSA decided early on not to have a systems-development department. Instead, it uses a pool of providers. When PROSA needs a new feature, it creates a specification for that feature and issues it to a subset of its providers to get quotations. The providers are separated into specialty groups such as CSMs, screens, UNIX, database, and Web services. The selected provider develops the code and moves it into production Therefore, the new CSMs required for PROSA's BASE24-eps system had to be farmed out to PROSA's CSM providers.

In late 2010, when PROSA decided to move to BASE24-eps, it had about 300 CSMs. It contracted with ACI to modify these CSMs for BASE24-eps. Since that time, PROSA has added about 150 CSMs per year to meet its customer requirements. By earlier 2013, it had about 700 CSMs to convert. They are in the process of being distributed to PROSA's providers, including ACI.

Preauthorization

The Preauthorization CSM

Preauthorization is a major CSM (Figure 1). PROSA provides a service that preauthorizes transactions based on nonfinancial criteria specified by each of its customers. The preauthorization rules can apply to individual cardholders, groups of cardholders, individual retailers, groups of retailers, or any other classification of transaction sources such as individual cards.
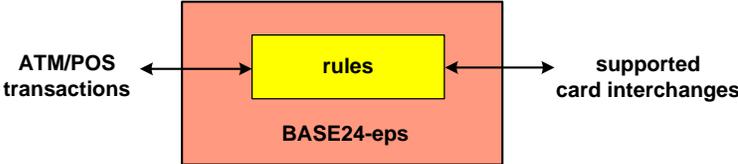
BASE24 Preauthorization
Figure 1

A banking customer can specify rules that govern a transaction's validity before the transaction is passed to the issuing bank for financial authorization. Typical rules might include:

"Accept no transactions from a particular retailer over the weekend or between 11 PM and 5 AM."
"Decline all AMEX transactions."
"If customer goes to same store three times in three days, decline the fourth transaction."
"Accept no transactions from this customer."

Only if a transaction first passes the preauthorization rules is it sent to the issuing bank for authorization based on the bank's financial rules (credit limit, etc.) Otherwise, the transaction is rejected; and a rejection reply is returned to the ATM or POS device by the PROSA switch.

Preauthorization rules are sent to PROSA daily by each of its banking customers and must go into effect the next day. With millions of card holders, hundreds of thousands of terminal devices, and numerous customer banks, the volume of new preauthorization rules to be entered into the system is massive. These rules are batched every day and are entered into the BASE24 system via a large batch run at night. Also included in this batch run are additions and deletions to the ATM and POS network infrastructure – added terminals, deleted terminals, new functionality of certain terminals, and so on.

Moving to an External Preauthorization Engine

The Preauthorization CSM was so large and so complex that PROSA opted not to migrate it. In addition, PROSA wanted to add significant functionality that could not be supported easily by BASE24-eps. It therefore decided to move the preauthorization function to an external preauthorization engine.

PROSA chose the OmniPayments financial-transaction switch from Opsol Integrators to provide the preauthorization function.
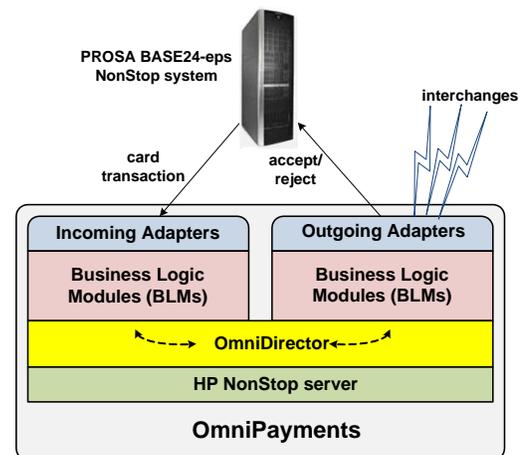
What is OmniPayments?

Opsol's OmniPayments financial-transaction switch is shown in Figure 2. OmniPayments is a layered architecture and is built upon the fault-tolerant HP NonStop server.

The core layer of OmniPayments is Opsol's OmniDirector Enterprise Service Bus. OmniDirector services include data transformation, encryption, intelligent routing, and communication-failure recovery. OmniPayments also provides adapters to support those protocols required to communicate with PROSA's BASE24-eps system and with other card-interchange networks.

Business logic modules, or BLMs, supply the business functions of OmniPayments. They implement PROSA's preauthorization services as well as the interfaces with other card interchanges not serviced by PROSA's BASE24-eps system. BLMs were written to support the rules functionality needed for preauthorization.

OmniPayments Financial-Transaction Switch
Figure 2

OmniPayments provides complete logging of all transactions. The logs contain the transaction information needed at the end of each day for clearing and settlement.

OmniPayments includes a settlement batch-processing module that reconciles transactions between parties at the end of each day. Other modules include OmniCrypto and OmniDash. OmniCrypto handles all security functions, including PINs, key exchanges, and encryption/decryption. OmniDash is a digital dashboard and administration console that allows PROSA to configure OmniPayments and to display drill-down, real-time message-flow statistics and system status via tabular and graphic displays.
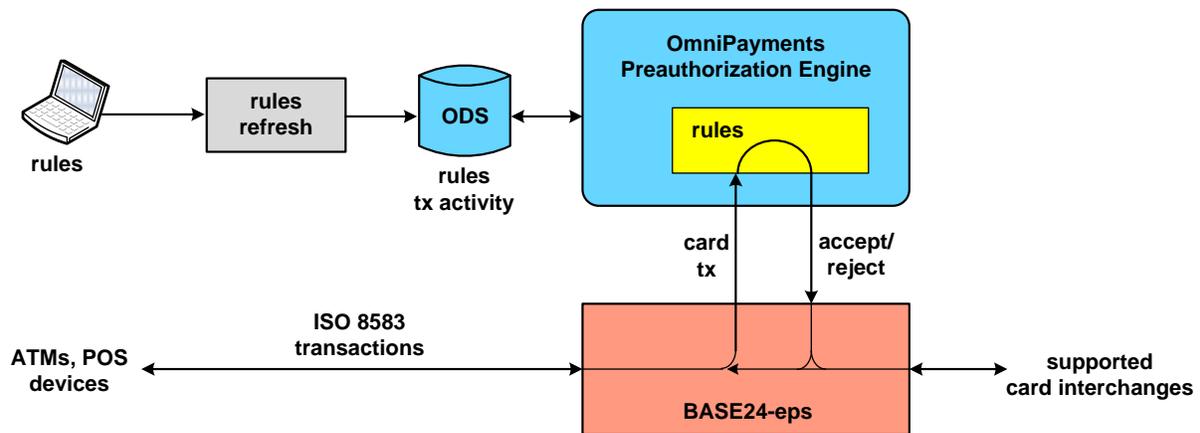
OmniDash currently runs on the same NonStop server as OmniPayments but can be moved to a separate Linux/MySQL server to offload the NonStop server.

The OmniPayments Preauthorization Engine

The architecture of the OmniPayments Preauthorization Engine and its relation to PROSA's new BASE24-eps switch in shown in Figure 3.

Transaction Flow

OmniPayments Preauthorization Engine
Figure 3

The new PROSA BASE24-eps switch routes all financial transactions acquired by PROSA's customer banks and their retailer customers to the OmniPayments Preauthorization Engine for preauthorization prior to submitting the transactions to the issuing banks for final authorization. This amounts to about 98% of the more than 200 million transactions per month (administrative transactions such as logon/logoff are not sent to OmniPayments).

The OmniPayments Preauthorization Engine replaces the massive Preauthorization CSM used by PROSA's older BASE24 system. Opsol developed a new, simpler CSM that provides the rerouting function to send pertinent transactions to Opsol's Preauthorization Engine.

Incorporated into the OmniPayments Preauthorization Engine are the preauthorization rules established by PROSA's customers. The Preauthorization Engine applies the pertinent rules to each incoming transaction. If the transaction satisfies the rules, the Preauthorization Engine returns an "accept" indication to PROSA's BASE24-eps system. This allows BASE24-eps to forward the transaction to the issuing bank for financial authorization. If the transaction passes the financial tests of the issuing bank, the bank returns an "accept" indication to BASE24-eps, which forwards it to the initiating ATM or POS device to allow it to complete the transaction. If the issuing bank denies the transaction (for instance, if the transaction exceeds the customer's available balance), the bank will return a "reject" indication to BASE24-eps. This response will be returned to the ATM or POS terminal to abort the transaction.

On the other hand, if the Preauthorization Engine finds that the transaction violates one or more of its rules, it will return a "reject" indication to BASE24-eps, which will send it to the ATM or POS terminal to abort the transaction. The transaction will not be forwarded to the issuing bank.

Transaction Database

In order to apply many of the customer banks' rules, the Preauthorization Engine must maintain a history of transaction attempts. For instance, if a rule says that a cardholder cannot make more than four transactions per day, the Preauthorization Engine must keep track of how many transaction attempts that cardholder has made.

This historical data is maintained in an Operational Data Store (ODS) by the Preauthorization Engine. The ODS is also used to hold the preauthorization rules.

Customer Rules Interface

PROSA's bank customers now manage their rules directly through a GUI interface provided by the OmniPayments Preauthorization Engine. Each rule is applied online and can specify one or more cardholders, credit- or debit cards, or retailers. A rule can be established by PROSA's bank customers whether they are acting as an acquiring bank or as an issuing bank for the cardholders, cards, or retailers involved in the rule.

PROSA provides several levels of rule-entry functionality via its GUI terminals to its customers at varying costs. Each customer bank can select the level of functionality that it needs for its purposes.

Summary

PROSA is not replacing its BASE24 system with Opsol's OmniPayments Preauthorization Engine. Rather, OmniPayments is coexisting with BASE24-eps. Certain functions that are better implemented or that are more cost-effective on OmniPayments are being migrated to the Preauthorization Engine. All of the classic functionality remains the responsibility of the PROSA BASE24-eps switch.

Opsol Integrators

With successful implementations at many customer sites, OmniPayments is just one member of the Opsol family of solutions for the financial industry. Opsol Integrators specializes in NonStop mission-critical applications and is HP NonStop's largest system integrator.

OmniPayments offers customers all the requisite functionality to manage credit-card and debit-card transactions. Based on SOA architecture, it is easily expandable to provide additional functionality when needed.

OmniPayments supplies complete security functions for every financial transaction that it handles, including encryption-at-rest and encryption-in-flight. Available around the clock, OmniPayments will survive any single fault, requires no downtime for maintenance or upgrades, and supports a range of disaster-recovery solutions.