

PROTEROS DATASYSTEMS



Frurion™ Product Overview

Confidentiality Statement

All information contained in this document is provided in confidence for the sole purpose of adjudication of this document and shall not be used for any other purpose, and shall not be published or disclosed wholly or in part to any other party without Proteros Data Systems Ltd's prior permission in writing and shall be held in safe custody. These obligations shall not apply to information that is published or becomes known legitimately from some other source than Proteros Data Systems Ltd.

Trademarks

All brand names and product names are trademarks or registered trademarks of their respective owners.

Copyrights

Under the copyright law, neither Proteros Data Systems Ltd's software nor documentation may be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine readable form, in whole or in part, without the prior written consent of Proteros Data Systems Ltd.

License Conditions

Please read your license agreement with Proteros Data Systems Ltd carefully and make sure you understand the exact terms of usage. In particular, for which projects, on which platforms and at which sites, you are allowed to use the product.

You are not allowed to make any modifications to the product. If you feel the need for any modifications, please contact Proteros Data Systems Ltd.

Disclaimer

This document is provided "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or no infringement. This document could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the document. Proteros Data Systems Ltd may make improvements of and/or changes to the product described in this document at any time.

Contact

If you wish to obtain further information on this product or any other Proteros Data Systems Ltd product, you are always welcome to contact us.

www.proteros.co.uk

TABLE OF CONTENTS

- 1. Card-Payment Introduction.....5
- 2. Transaction parties.....5
 - 2.1. Cardholder.....5
 - 2.2. Merchant.....5
 - 2.3. Acquiring Bank.....5
 - 2.4. Issuing Bank.....5
 - 2.5. Open and Closed loop Schemes5
- 3. Transaction flow6
 - 3.1. Flow diagram.....6
 - 3.2. Authorisation6
 - 3.3. Clearing.....6
 - 3.4. Settlement6
- 4. Frurion™ Product Overview7
 - 4.1. Test Data Preparation7
 - 4.1.1. Message Definition.....7
 - 4.1.2. Data Definition8
 - 4.1.3. Excel Interface8
 - 4.2. Test Execution8
 - 4.2.1. ISO8583 for Scheme testing8
 - 4.2.2. APACS PoS testing8
 - 4.2.3. ISO8583 PoS testing9
 - 4.2.4. Data File Generator9
 - 4.3. Utilities.....9
 - 4.4. Summary9

1. Card-Payment Introduction

The aim of this section is to identify the various parties involved in transaction processing and explain how they interrelate. When a card is used in a transaction to purchase merchandise or obtain a cash advance, the transaction moves through a process that involves authorisation, clearing and settlement. Each step of the process involves an exchange of transaction data and monies which eventually need to be settled and balanced.

2. Transaction parties

In any card transaction there are primarily four entities involved in the process. The acquiring and issuing bank can be the same institution but carry out distinct roles in the transaction process.

2.1. Cardholder

The cardholder is the person who has been issued with the credit/debit card and has a certain amount of purchasing power. For debit cards it is the amount of money in the cardholder's account (plus any overdraft). For credit cards, it is the amount of money that the card issuer is prepared to lend him (the credit limit).

2.2. Merchant

The merchant is the entity selling the merchandise and where the sale occurs. This is usually a retail outlet which also has a Point of Sale terminal to interact with the card.

2.3. Acquiring Bank

The acquiring bank acquires the debt on behalf of the merchant and guarantees payment to the merchant while it, in return waits for payment from the card issuer.

2.4. Issuing Bank

The issuing bank issues the card to the cardholder and, in the case of a credit card, allocates the credit limit available. The issuing bank facilitates the clearing of funds movement based on successfully transaction activity.

2.5. Open and Closed loop Schemes

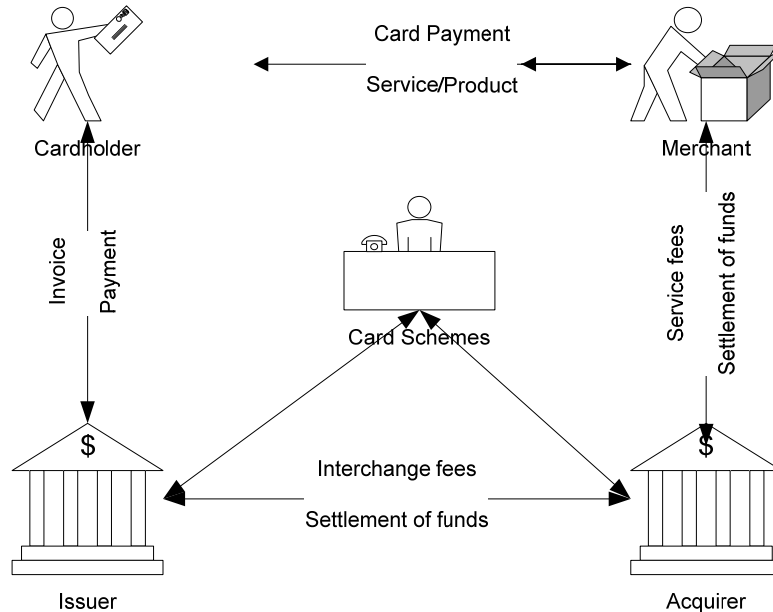
There are two types of Scheme that facilitate the processing of card transactions. These are:

1. Open Loop – Where the card is not limited for use at one merchant or one particular group of stores. Usually, these cards carry the logo of American Express, Discover, MasterCard, or Visa.
2. Closed Loop – These types of cards are only valid at one particular merchant or group of stores and are often prepaid or gift cards associated with the particular merchant.

3. Transaction flow

3.1. Flow diagram

The diagram below shows the flow between the various parties in a card transaction.



3.2. Authorisation

When a cardholder makes a purchase using a payment card, the merchant must obtain authorisation for the purchase from the bank that issued the card – the issuing bank. In the case of a credit card, the Authorisation allows the cardholder to initiate a loan from the issuing bank that will ultimately need to be repaid. For a debit card, the authorisation allows the cardholder to draw down on funds available from the account the card is linked to.

The authorisation is an electronic message that is instigated from the merchant's POS terminal. The cardholder either keys in a personal Identification Number (PIN) or the card details are captured using the magnetic stripe on the back of the card with the cardholder signing of the purchase. The authorisation message is then sent through the network, ultimately waiting for a response from the issuing bank.

3.3. Clearing

For authorisations that were successfully approved, the next step is the clearing phase. During this step, the acquiring bank collates all the authorisations that were successfully processed that day and batches them up into a file. The file is then sent to the issuing banks, via the Card Scheme in the case of an open loop system. The issuing banks then use the clearing information to deduct the monies from the cardholder's account and to add line entries to their statement.

3.4. Settlement

So far all that has happened is electronic messages have been passed about authorising purchases and debiting cardholder's accounts. The settlement step is where actual funds are transferred between the parties to balance the message flow. The acquiring bank

credits the merchant's account. The issuing bank debits the cardholder's account and sends payment to the acquiring bank to credit it for the funds it has just transferred to the merchant. In the case of a credit card the cardholder settles his/her account when the statement is received. In the case of a debit card the cardholder's account is automatically debited. Finally, interchange fees & service fees are deducted from the various payments to compensate the various participating parties in facilitating the transaction flow.

4. Frurion™ Product Overview

Proteros Data Systems Ltd. (Proteros) has designed and developed the next generation of financial transaction testing tools to aid the testing of mission-critical financial payment systems. Proteros's Frurion™ product suite brings to market a set of innovative tools for simulating financial transactions, that create a repeatable testing process, that improve application quality, that reduce time to market and minimise costs of developing and testing financial systems and sustain a competitive advantage for our clients.

Frurion™ comes equipped with a number of utilities that assist the test analyst to define, build and then execute tests for card-payment systems.

Frurion™ has been designed to be dynamically adaptable to changes in processing environments which do not require the underlying software to be changed. Instead parameters can be altered which in turn alter the way the system works. These changes can be applied using a set of tools known as the Editors.

4.1. Test Data Preparation

4.1.1. Message Definition

Two Editors are supplied that control how messages are defined and interpreted by the system. The Data Element Editor allows the dynamic definition of individual fields and their attributes. The system comes supplied with a set of predefined fields for both APACS and ISO8583 definitions.

The message editor provides the means to define the structure of any message by simply allocating with fields make up a particular message. Using these tools the system can be changed dynamically to be capable of being updated with changes to existing message structures or having new structures defined.

The system is also capable of storing and using a number of definitions of messages and fields. This means that an infinite number of systems can be defined and used thus not confining the system to just those definitions for Visa, Mastercard or American express but can be extended to handle any card-payment system, most notably internet payment gateways.

4.1.2. Data Definition

The Data Editor provides a mechanism for low-level data entry. This facilitates testers being able to key-in data according to the message definitions. Furthermore the Data Editor validates the data as it is keyed-in to ensure it conforms to the message and field definitions. This ensures that data quality issues are eliminated and time is not wasted chasing down possible system faults as a result of poor data quality.

4.1.3. Excel Interface

The Data Editor provides a mechanism to create test data using an intelligent tool within the Frurion™ application. However, it is recognised that a lot of testers like using Excel to store their test data. For this reason Frurion™ comes equipped with an Excel interface which can read in data from Excel and auto populate any defined message structure.

This tool has the ability to be run via a User Interface or can be scheduled to run overnight in batch mode. This allows the tester to spend his time preparing his test data and results and then scheduling an overnight run of the utility, to produce results for the next working day.

4.2. Test Execution

Once the field, message and data have been defined and created it is possible to use them to execute test cases. There are a number of tools that come with the base product to facilitate testing card-payment systems.

The system comes equipped with three real-time authorisation simulators that can be used to simulate any point in the card transaction network.

4.2.1. ISO8583 for Scheme testing

The Scheme test simulators provide the functionality required to load test data, which has been created during the data preparation process described above, and to then send requests to and receive responses from the host system under test when the ISO8583 protocol is being used. This set of simulators can be used to simulate either an acquirer or an issuer host system.

4.2.2. APACS PoS testing

The APACS simulators provide the functionality to simulate either the Point of Sale terminal and card or the acquirer system when the APACS standard message protocol is used. Test data created as part of the data preparation process described above can be loaded into the simulator and then used to simulate certain test conditions. The APACS standard for PoS terminal communications is predominately a UK only standard.

4.2.3. ISO8583 PoS testing

For terminals used outside of the UK, the ISO8583 standard is most often used. The ISO8583 PoS simulators have been designed to simulate either the Point of sale terminal or the acquirer.

4.2.4. Data File Generator

When testing card-payment systems, the Data File Generator can be used to produce settlement files for the corresponding real-time authorisation messages generated by the simulators as described above.

This tool can be further extended to generate any flat-file by using the field and message editors to define the structure of the file.

This tool has the ability to be run via a User Interface or can be scheduled to run overnight in batch mode. This allows the tester to spend his time preparing his test data and results and then scheduling an overnight run of the utility, to produce results for the next working day.

4.3. Utilities

Fruirion™ comes equipped with a number of utilities to aid the tester during the test function. These include:

- Expected Results creator – Once test data has been defined it is possible to create expected results to be used to compare against actual results and hence test the accuracy of the host system under test.
- Comparison Report – this utility produces an HTML report of the differences between expected and actual results and can be attached to an associated defect when an issue is being investigated.
- Hex Dump – some of the transaction messages carry binary data that cannot be read using conventional tools. The Hex Dump utility allows the tester to investigate a problem by being able to look at any given message or file in its binary format.
- Reference data – Each field can have a set of values assigned to it to limit the values that can be keyed-in during data entry. Reference data can be loaded from external sources or defined within Fruirion™.

4.4. Summary

Fruirion™ comes equipped with all the tools and utilities required to prepare and test any card-payment host system.

Its ability to change to circumstances dynamically means that less time is spent on waiting for the tools to be changed to new circumstances, allowing valuable testing time to be spent on testing.

What differentiates Proteros from its competitors is that the tools have been designed so they can be adapted to changes very quickly and easily. When the team worked for First

Data International (FDI) they were responsible for defining and implementing changes to FDI's mainframe system. This was a manually intensive task that consumed resources and budgets. The resultant products are ones that are extremely efficient and very cost effective and have been developed from the team's own experiences in this area.

Other tools in the market contain legacy designs that are not as easily adaptable. The competitors have to continue to support these systems while Proteros does not have any commercial pressure. Furthermore the design has laid the foundations for new products to be built to cater for other payment systems, without too much effort. When these are analysed against competitor products we find that either the competitor has a product designed exclusively for the card-payment market or has a legacy tool that may support other payment systems but comes at a cost.

End of Document