

The Importance of Card Testing

Testing the future

During recent years, many people have grown accustomed to paying with their credit and debit cards. With a proven reliability, it is an established technology. Still, technologies keep on evolving at a high pace while quality and security remain paramount. Therefore, the need for appropriate test tools and testing services stays as high as ever.

Cards and terminals

Quality assurance is of particular importance in the case of smartcards. Card manufacturers need to issue a product in very large numbers, of high quality and at low cost. Smartcards contain, in addition to a relatively expensive and sensitive microprocessor, software that cannot easily be modified. To avoid replacement costs, it must be assured that smartcards are of high quality before starting distribution and installation.

The terminal manufacturer is confronted with a similar situation. Testing of terminals is of high importance whereby the necessary attention needs to be spent to the transaction flow between terminal and smartcard. For testing mechanical and electrical boundary parameters, standards and tools exist. However next to testing these physical aspects, the software of the smartcard needs also be tested in detail. Smartcard software is written in assembler and can easily cover more 30.000 lines of program code; therefore, testing of such a complex piece of software (mask and personalization) needs careful attention. Furthermore, the integration of the smartcard with the smartcard terminal must be checked in detail, especially all possible error and recovery situations.

Benefits

Testing and identifying faults eliminate costly modifications of infrastructures post launch. Furthermore, errors affecting customers could badly damage the reputation of a supplier or card issuer, whilst knowing that the transition will proceed seamlessly may be considered an asset.

What's more, a significant amount of time can be won when using test scripts which enable a high level of automation. This methodology covers all possible variations, requests and scenarios and makes it possible to perform tests that would take hours to run manually to be completed in a few minutes. System tests can thus run fully unattended and with minimal effort. Furthermore, when outsourcing the testing phase, companies' hands are free to focus on other elements of the migration and on their core business.

Below some statistics illustrating the importance of testing:

- ❑ 50% of all errors are introduced before any code is written at all (in requirement and design phases)
- ❑ Errors discovered before or during unit tests : 1-3
- ❑ Errors discovered during testing : 5-10
- ❑ Errors discovered during production : 10-100

Unmistakably, testing is a key element for overall project quality, cost efficiency and on-time delivery.

The Importance of Card Testing

Components of a test project

When looking at a testing cycle, in general, Testing Companies identifies three major steps: Test Analysis, Test Preparation and Test Execution.

□ Test Analysis Phase

In this phase, testing companies starts to analyze the requirement specifications of the product (functional specifications, interface specifications, manuals, etc...). Based on these specifications, the company derives a test plan. This plan defines the overall scope and the list of descriptive test cases, each detailing its purpose, the procedure and pass criteria.

The Test Plan is discussed in great detail and amended together with the customer to ensure that it meets the required quality levels. This is important as there is a direct relationship between the number of test cases and the cost of implementing and executing them. Especially if the tests cannot be fully automated and manual intervention is needed (e.g. payment terminal or GSM handset testing). We pragmatically find the optimal balance between cost and quality.

□ Test Preparation Phase

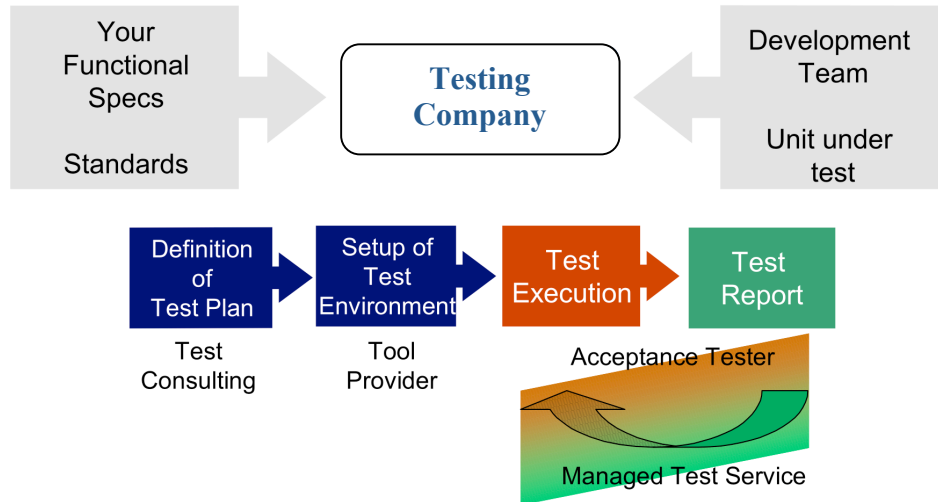
Once the Test Plan is approved, the dedicated test environment is built. This task typically encompasses the development of the necessary simulators and the programming of the executable test scripts. This Test Preparation phase starts after sign off of the Test Plan and runs in parallel with the development of the project, which shortens the overall project time.

□ Test Execution Phase

As soon as the units under test are available, testing can begin. Test Execution time is reduced to an absolute minimum as the test environment allows full automation. Each component is submitted to functional unit testing, followed by an integration test phase and in some cases, a stress test phase. Test reports are generated based on the test results, which stipulates a first analysis of any defects that caused the test to fail.

Below a visual presentation of a test cycle.

The Importance of Card Testing



Test tools:

- ❑ **INQ End-to-End Payment Platform**
Dedicated platform to test the different units of a payment system: card, terminal, acquirer, network and issuer.
- ❑ **INQ Level 1 Platform**
Dedicated platform to test the level 1 protocol between smartcards and terminals.
- ❑ **INQ Stress Platform**
Dedicated platform to test issuer and acquirer behavior under stress
- ❑ **INQ SEPA Platform**
Dedicated platform to verify SEPA (Single Euro Payments Area) compliance.
- ❑ **INQ Card Perso Platform**
Dedicated platform to validate the content of a smart card after personalization.
- ❑ **INQ End-to-End Mobile Platform**
Dedicated platform to test handsets, SIM cards and mobile applications.
- ❑ **INQ e-Government Platform**
Dedicated platform to test electronic identity cards and passports

Each platform includes a number of [off-the-shelf-test-suites to test standards](#) such as **EMV, CPA, SEPA, CCD, USAT, qVSDC, NFC, 3G** etc. These test suites are fully prepared solutions that include simulation and test scripts, and are based on international regulations.

Test services

If looking for a proprietary implementation, tailor-made test suites can easily be made to match

The Importance of Card Testing

specific requirements. Also, we have a specialized and experienced team stand-by, offering you the service you need:

- ❑ **Training and consulting**
- ❑ **Tool customization**
- ❑ **Acceptance testing**
- ❑ **Managed test services**

About Clear2Pay

Clear2Pay is an innovative financial technology company focused on delivering globally applicable solutions for secure, timely electronic payments. Headquartered in Brussels, Belgium, the company facilitates banks and financial organisations in their provision of payments services. Clear2Pay's technology helps to reduce transactions processing costs, and to deliver new, compelling payment services in a competitive way. Clear2Pay's payment solutions offer organisations easy, branded ways for their customers to pay online: from complex trade-supporting business-to-business environments, through e-commerce applications, to retail payments and remittance services. Functions embrace payments origination, reporting, linkage with back-office processing systems, clearing, netting and settlement. Clients include global and major regional financial institutions such as ING, SEB Kort, VISA, MasterCard, ABN AMRO, Nordea, Abbey National, Fortis Bank, ANZ and Commonwealth Bank. Clear2Pay operates out of Belgium, France, the Netherlands, Poland, Spain, United Kingdom, United States, Australia, China, Malaysia and Singapore and currently employs over 400 staff. More information is available on www.clear2pay.com.

About Integri a Clear2Pay Company

The company employs 45 staff, has more than 150 customers and sold more than 2000 licenses in 35 countries since its inception in 1992. Integri is located in Belgium, France and the US. Integri's clients are mainly financial institutions, smartcard manufacturers, terminal manufacturers, ticketing operators, mobile operators and system integrators active in e- or m-business.

Integri is an autonomous business unit of Clear2Pay, a financial technology company focused on delivering globally applicable solutions for secure, timely and streamlined payment processing. Headquartered in Brussels, Belgium, employing more than 300 staff, Clear2Pay facilitates banks and financial organizations in their provision of payments services. More information is available on www.integri.com.

Contact: tony.rodriquez@integri.com, 214-296-9276, Dallas, Texas

www.integri.com