CLOUD SYSTEM FOR ELECTRONIC RECEIPT MANAGEMENT

Ⓟ TECNOLOGÍA PATENTADA

Ⓛ LICENCIADA EN EXCLUSIVA

DATOS DE CONTACTO:

Research Results Transfer Office-OTRI
University of Alicante
Tel.: +34 96 590 99 59
Email: areaempresas@ua.es
http://innoua.ua.es

RESUMEN

The industrial computer network research group (I2RC) from the University of Alicante has developed a Cloud system for automatic generation and management of receipts. The system can easily be integrated into the points of sale of the company and allows scanning, storing and transmitting receipts between devices and the cloud according to the safety standards of digital signature and payment. With this technology, it is not necessary print receipts. The management of the receipts from sales may be made ubiquitously over the Internet, both by customers and by the firms. In addition, the system allows the implementation of applications and analysis tools that improve competitiveness and create opportunities for exploitation and commercial development.

Companies interested in commercial exploiting of this technology and in developing business projects based on the know-how of the research group are sought.

INTRODUCCIÓN

After a sale has been made, most of the companies offer to the customer a paper receipt. This receipt is a proof of the purchase made and certifies certain customer's rights (warranty, repayment periods, etc.). However, this process does not link the sales data and customer and does not allow to the company designing custom commercial strategies that can improve customer satisfaction and therefore their benefits.

Moreover, the printed receipts management by customers is a tedious task: the receipts can be lost or damaged along time (eg receipts from thermal printing systems). This is a problem for the customer when trying to enforce their rights.

To mitigate this situation, firms generally use loyalty programs where the customer is identified in the sale process and in exchange they get certain commercial advantages (discounts, etc.). However, the adoption of these programs by firms and consumers remains low.

There are other efficient electronic receipt systems, but they are focused on specific aspects of the commercial transaction process. These solutions are incomplete because do not take into account all the complexity of integration with local sales systems, security in shipping, storing information and ubiquitous access to digital receipts by users.

Therefore, it is necessary to have an electronic management system of receipts that includes not only aspects of generation, maintenance and shipping, but also solutions for integration with firms' sales systems and ubiquitous access through the cloud.

The proposed electronic management method avoids printing paper receipts and all its disadvantages for both the company and the customer. In addition, it facilitates linking the sales with customers.

The proposed system is based on Cloud technologies such as Infrastructure as a Service (IaaS) and Software as a Service (SaaS).

The system allows ubiquitous access by firms and users to the repository of receipts stored in the cloud using web interfaces. In addition, the system facilitates the installation of tools and analysis applications on information stored from receipts.

The overall scheme of the proposed system is depicted in the Figure 1.

Figure 1. Overall scheme of the system

- **Receipt Generator Subsystem**: Subsystem located on each sales point of the firms. It is composed of:

    - Receipt generator device (POS) of the firm.

    - A digitizer module that performs the generation of the receipt, the conversion of them to digital format (jpeg, png tif, pdf, postscript, etc.) and their delivery to the Cloud repository.

    - Printer device to print the receipt (if necessary).

- **Cloud Management Module**: Central module located in the systems of the cloud service provider. This module performs the acquisition of information from the generator subsystem, the management and information analysis, and the presentation of information to consumers and firms.

- **Information Query Subsystem**. Subsystem composed of:

    - - A user device with a web interface for access to the receipts and to the related applications.

    - A terminal of the firm can access to the receipts repository and analysis information from them.

The digitizer module is deployed in the firms licensed by the system together with the receipt printer devices. The main innovation of this module is that it is implemented as a printer driver application to facilitate the integration with current systems sales of the company. The main objective of this module is the acquisition of the ticket generated by the POS in which it is installed and send it safely to the cloud management module. If necessary, the receipt may also be obtained in paper using the printing device.

The **cloud management module** is responsible for receiving digitized receipts from all deployed digitizers modules and it is responsible for executing the following processes:

    - Structured storage of the receipts.

    - Receipt analysis and information inference.

    - Receipt access for customers and firms.

In addition, this module is responsible for providing the necessary interoperability services with the aim to establish an open architecture for expansion through third-party solutions.

This receipt management method defines an architecture formed by a middleware as a key element to ensure the access to information and the maintenance of the security. All operations of maintenance, query and analysis are done through the

functionality offered by the middleware, which defines a uniform method of management for all of them.

The communication operations with users and firm and with other corporative processes are made in accordance with the principles of the paradigm of Service-Oriented Architecture (SOA). These operations have been designed by means web services based on SOAP ("Simple Object Access Protocol") and REST ("Representational State Transfer") protocols.

Through this system the users can access through Internet and at any time to the receipts generated in all point of sales of licensed firms. The queries can be made through web interfaces accessible by any Internet-connected device, including mobile or portable devices. The selected receipts can be downloaded and printed at any time, so that, the user will no longer store them in paper avoiding the risk of damage or loss them. In addition, the system supports analytical tools on the receipts of each user to provide quality information and other services from the aggregated data.

The licensed firms will have the receipt set of their customers. From this information can be made analysis of sales and design commercial strategies.

VENTAJAS Y ASPECTOS INNOVADORES

The proposed system has the following innovative features:

• The system allows storage, maintenance and electronic availability receipts in the cloud for each user and firm, enabling ubiquitous access from any Internet-connected device.

• The system improves the current management receipt systems due to its easy integration into the point of sale without interfering with normal operation. The system is installed complementary to those already present in the company.

• The storing and managing processes of receipts are moved to the cloud allowing access through web applications and other Internet services. The system is based on an open architecture which allows expansion through third-party solutions.

• The system allows users access value-added applications such as accounting tools, personal finance, warranty management, etc.

• The system allows commercial firms have structured sales data on which applied information analysis or big-data techniques for design marketing strategies.

• The system ensures confidentiality and reliability of receipt information using high-level security such as electronic signatures and PCI protocols.

ESTADO ACTUAL

The Research Group has developed a functional prototype of the system implemented with all modules showed in Figure 1. The system can be tested and simulated. Also there is a detailed documentation of the specification.

The system can be deployed into the cloud and implemented via software for each business sector.

Specific customer's requirements could be considered to determine the best way of implementing the system.

APLICACIONES DE LA OFERTA

Preferably the system can work in the following industry sectors without prejudice to its extension to other fields of application:

- Information technology providers.
- Internet service providers.
- Cloud computing Infrastructure and service providers.
- Commercial sector industry.
- Marketing and market analysis.

COLABORACIÓN BUSCADA

Companies interested in acquiring this technology for use, adaptation or commercial exploitation are sought. Possible technology transfer agreements are:

- License agreements in order to use, manufacture or marketing the technology.
- Research and Development (R&D) project for technical cooperation in order to adapt and implement the technology to company applications.
- Subcontracting project for technical assistance and training in order to adapt or deploy the technology into the company customer environments.

DERECHOS DE PROPIEDAD INTELECTUAL

This technology is protected by granted patent.

- Application Number: P201531549
- Application Date: 29/10/2015

SECTORES DE APLICACIÓN (6)

Footwear and Textile
Computer Science, Language and Communication
Engineering, Robotics and Automation
Toys
Wood and Furniture
Stone and Marble