Calypso main characteristics

Among the different ticketing systems on the market available at the moment, Calypso ranks as an attractive and innovative solution, made for transport operators and driven by transport operators. Here are a few good reasons why customers choose Calypso technology.

**Fast and Secure**

Calypso uses up-to-date contactless technology to ensure a complete transaction in less than 200 milliseconds.

All ticketing transactions are run through a secure session that guarantees the integrity of the data written onto the card, even if the card is withdrawn too quickly. The Ratification anti-tearing function leaves the card in a safe state if the communication link is broken between the terminal and the card.

To avoid possible fraud or forgery, the secure session ensures that the card, the terminal, and the data are genuine, thanks to mutual authentication. Calypso's high level of security is reached using microprocessor cards, Security Modules on terminals, and proven fast symmetric cryptographic algorithms using hardware accelerators (DESX, TDES, AES). The card, the terminal and all data exchanged between them are authenticated. These operations are carried out with a high-speed algorithm resulting in the shortest possible transaction time.

There are three main secret keys which perform a specific function: personalization, loading and debit. The secret keys inside the cards are uniquely diversified by the card serial number and the corresponding SAM master key: If a card's secret keys are cracked, only the security of the attacked card is jeopardized, and will be invalidated by the system.

Calypso guarantees the uniqueness of the Calypso application serial number, currently for cards as well as for future applets.

**Ready for new trends and open for new services**

Today, transport operators wish to deliver the best services and simplify people’s daily lives. Future tools may help them in reaching that goal: NFC phones will certainly become more widely used and stand out as the inevitable multi applicative media. Meanwhile contactless USB keys may increase home usage services, such as the reloading of transport rights.
Calypso is ready to accept these new challenges: a generic applet is already available, fully compliant with the Global Platform API specifications, and is today widely used by SIM providers and bank card manufacturers. The applet is downloadable onto a Secure Element based on the Java Card environment and implemented in an NFC mobile phone or a contactless USB key. This enables new facilities for customers and retailers.

Rolling out an electronic ticketing project over time requires the ability to integrate new upgrade and technological capabilities on an ongoing basis.

Modern urban living is rapidly changing with new technological innovations, one of which is the possibility to integrate different electronic “on demand” services into one single medium. Therefore different applications can be brought together into one single device for the citizens of tomorrow in Europe or elsewhere: The “Urban Pass”, will have the ability to integrate mobility and banking applications, local authority and public administration service access.

Calypso security technology and memory storage are tailored to meet multi-functional requirements. A transport application and a dedicated city application may, for example, safely reside on the same Secure Element of a portable object; moreover, they may live alongside third party applications, opening the road to the ideal urban pass.

**Facilitating back-office integration**

Calypso implemented in front-end of AFC system, frees the back office from an important number of administrative tasks regarding control and recovery of failed transaction. Thanks to the Calypso secure session, all transactions performed off-line by the terminals are successfully completed and optimized and can be collected by the central system later on.

The high security level and the specified rules greatly simplify the design and development of all back offices and further assure the interoperability between ticketing systems from different suppliers.

**Encouraging competition and fully interoperable**

The Calypso technology enables ticketing schemes to be truly independent from industry suppliers.

License and non-license holder companies (via the purchase of OEM licensed components) can promote the technology through tendering. The conditions are clearly non-discriminatory, allowing fair competition between those who already possess the necessary licenses and those who would have to acquire them if awarded the contract.

The technology is distributed through numerous licenses, offering a wide range of multi-source compliant cards and terminals.
Moreover, because of the huge variety of licensed companies in the market, this allows different parts of the ticketing system to be assigned to different suppliers. This competition leads to a significant drop in investment costs within the tendering procedures and also enables the possibility to tender for only single elements and components of a ticketing system.

If there is an unfortunate case of a licensed component manufacturer not performing efficiently, it is possible to take on a new supplier who will acquire the license and manufacture the component.

Calypso technology is able to satisfy the demands of interoperability while offering each operator freedom and independence. Wide Calypso interoperable networks have now proved this, gathering operators within a city or within regions: Lisbon: 8 operators, Paris: 3 major operators, Grand Montreal 20, French Rhône-Alpes region: 32 operators and authorities, and so on.

Interoperability between suppliers increases the need for security, confidentiality and integrity. The key to an efficient interoperable system is technical compatibility by adhering to international standards and the sharing of data model implementation.

Calypso follows this basic concept and is compliant with many international standards.

**Adaptable, flexible and adapting supply to demand**

Calypso can complement or ease the migration from any existing ticketing systems by using paper tickets, magnetic stripe tickets and allowing for a seamless move from one technology to a fully contactless system on a step by step basis.

There is no requirement to have a central system, a GPS-system or an existing data collection system.

Calypso is a fundamental step towards a Customer Relationship Management application. Transport operators may draw-up and store precise usage statistics on their network by storing "events" from entrance and exit gates. They could then tailor the network activity according to user demand. The statistics will remain strictly anonymous, thus preserving user privacy and adhering to data protection laws.