



Shifting the Ticketing Paradigm

CIPURSE™ Brings Mobility and Security to Transit
Ticketing Systems



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1 Introduction

Transit operators today are beset by a wide range of competing pressures. Costs are rising, passenger numbers are growing and assumptions around desired levels of service and customer convenience and mobility are changing too. At the same time, they must operate in an increasingly technology savvy world, where expectations about digital convergence are meeting rises in fraud and crime, both online and in the physical world, and norms around the way public services are funded are evolving too.

Because of this, many operators are rethinking their strategies and business models, and as a result their technology requirements.

The Open Standard for Public Transport (OSPT™) Alliance exists to develop and promote the next generation of secure, cost-effective, and flexible fare collection solutions through a global, multi-provider community. The OSPT Alliance has developed the CIPURSE™ open security standard—an advanced foundation for card and mobile for developing highly secure, interoperable, and flexible transit fare collection solutions and beyond. Interest in this innovative open standard has driven rapid and continuing growth in OSPT Alliance membership and in the number of CIPURSE Certified products available to the market. CIPURSE is widely recognized among transit operators and authorities as the open standard to choose for future-proofing AFC implementations and applications in other neighboring ecosystems.

OSPT Alliance members include the most prominent players in the smart ticketing market. Anyone in the transit ecosystem can join the OSPT Alliance and their contributions are valued. The synthesis of new ideas and viewpoints is creating dynamic discussion and momentum

This paper will examine how open standards can meet the needs of the AFC market today from two perspectives – business and technical. It is based on the understanding that as public entities that must serve and retain customers, transit operators need to future proof their operations, both strategically and technically, all the while retaining the ability to maximise

future opportunities as they arise. The following sections show that with open standards, it is possible to achieve this while protecting existing technology investments and keeping pace with security needs.



2 AFC System Implementation Today

There is a strong and continuing global trend towards deploying automated fare collection systems as operators realise the benefits of smart technology in reducing risk and revenue loss, better managing staffing levels and improving the customer experience. Operator interest lies in not just card based ticketing but mobile ticketing and especially in systems implementing Host Card Emulation (HCE).

Today, however, the degree of automation deployed varies greatly. In general, implementations fall into a number of categories.

2.1 Mandated Specification Implementations

In some countries, transport operators are either obliged or encouraged to deploy national or regional schemes, based on formally agreed specifications. Any decision about evolving these systems will require a decision at national level. In one sense that makes evolution easier, but in another more difficult. Interoperability challenges will be reduced because they have been addressed previously but the sheer economic cost of migrating a national solution can be a strong deterrent to change. In these cases, an approach which allows for evolution rather than full replacement is likely to be attractive. Systems in this category include those of the UK, Germany, the Netherlands, Hong Kong, Singapore and soon India.

2.2 Good-enough Proprietary Implementations

Some transit authorities have implemented AFC solutions based on a proprietary solution. These systems are fast, secure, reliable, and convenient enough to maintain the current total cost of ownership for the next three to five years. These systems also provide enough protection for potential new private or public investments that are planned to connect public transport services with relevant emerging digital services. Japan and South Korea's systems fall into this category.

2.3 Proprietary Implementations Needing Evolution

Some proprietary transit ticketing solutions require significant evolution due to the maturity of the implementations and their functional or security limitations. For example, reasons include the need to advance security to align with today's standards, an unsustainable cost of ownership and restrictions created by vendor lock-in. Not only will these limitations constrain the future development of proper public transport policy, but they also deter investment into new approaches such as HCE which will offer ultimate user convenience and demonstrate the value of transport as the most proven 'top-of-the-wallet' application.

2.4 Manual Systems

These systems lack an automated fare collection system. Based on our current research, 95% of cities today are still using proprietary or manual implementations. This white paper will address the benefits of evolving existing systems or integrating complementary and new technologies

to migrate away from proprietary solutions to an open standards ecosystem. In particular, the paper will highlight that AFC systems should be viewed as an 'asset' that can attract private / public investments, rather than a procurement cost.

3 Evolving your AFC System: the Options

Public transport operators and authorities have several options when considering fare collection systems evolution. These options range from developing their own solutions to complete system migration. We offer the following perspectives to provide guidance.

3.1 Innovation at the Point of Contact

Contactless secure communication, AFC, and purse-based micropayment technologies are not really new. They have evolved slowly over several decades and are in their current state because there were no open standards until recently. The growing pervasiveness of digital services, such as mobile wallets, information, communications, and rights to travel, are driving the emergence of new business models. Whether delivered over the Internet, mobile networks, or between individual devices, these services are interoperable. And as a result, they can reach everyone, including people with no banking relationship.

Today, AFC systems have the potential to become the contactless and mobile killer application, enabling new business models. HCE is creating especial interest. However, just as mobile operators take losses on short calls for the opportunity to generate revenue from other value-added mobile services, transit investors must be prepared to invest in services and infrastructure that allow interoperability while encouraging consumer loyalty. Automated fare collection, based on the CIPURSE open standard, promises precisely that. Transit operators and authorities can protect their existing infrastructure investments while evolving to interconnect

digital consumer channels. This opportunity promises to achieve what was started over 30 years ago with purse-based attempts to replace cash.

3.2 Innovation Led by Public-Private Partnerships

Automated Fare Collection innovation may also be made a condition for successful Public-Private Partnerships (PPPs). Successful transport PPP projects have multiplied in the past few years. As a consequence, participants are applying procurement best practices such as return on investment (ROI) requirements, total cost of ownership optimization, multi-sourcing, and independence from a single supplier. These practices are rapidly becoming the norm.

Participating non-transport private players understand the value of public transport as a single point of access to captive consumer communities. Regulations—or the lack of them—are creating unique new business opportunities. Transport authorities benefit because they earn a concession, instead of having to pay for system procurement. In a PPP context, private investors are usually not willing to make investments in which returns are dependent on a proprietary solution.

Lessons learned from PPPs can benefit countries with a long history of public-funded fare collection systems—especially as public moneys become harder to access. In emerging markets, rapidly growing populations are forcing regulators to innovate and open-up fare collection card issuance to non-transport applications. The resulting innovation has boosted ROI by incredible amounts. And it has accelerated deployment three to five times faster than previously.

Although PPP may not be the right model for every region, it does deliver an objective reality check. PPP advances can foster publicly funded programs that incorporate innovation made possible by the CIPURSE open standard.

3.3 Integration instead of Migration

The integration of an open platform such as CIPURSE with standard(s) already in place is a safe and future-proof way to enable the benefits of digital innovation such as HCE already described.

Before the CIPURSE open standard was available, multivendor implementations were attempted without much success. With limited, if any interoperability, these solutions required operators to support multiple technological specifications with limited hardware resources. Integration attempts also created unforeseen difficulties with proprietary systems across different transport tiers.

Events that compromised security in proprietary technologies have effectively prevented operators from getting more out of their existing ticketing systems. Although the fraud is not damaging enough to justify a migration to a new standard, it is significant enough to prevent expanding ticketing solutions to non-transport business models.

However, a legacy deployment can easily coexist with a highly secure CIPURSE-certified solution. As a hardware-agnostic open standard, CIPURSE enables such coexistence.

The CIPURSE standard is truly open. It does not discriminate against any system player. As a result, it is easy to support interoperability of a legacy fare collection application with CIPURSE, and to create bespoke business models to be tailored to the local realities of a specific program.

Because CIPURSE is an open standard, no single solution provider will exercise a monopoly on the entire fare collection market in any given region. Indeed regions can now design implementations that best fit their particular market segments. For example, CIPURSE can coexist with U.S. EMV open-loop bank-issued cards. It can work with Asian purse-only closed-loop cobranded cards. It can be integrated into closed European proprietary systems. And its flexibility supports a wide range of variants in Latin American countries where 85% of the population is unbanked.

Compatibility with card readers is also straightforward. The cost of a standards-based, CIPURSE-compliant card platform is not significantly different from the introduction of a single card platform. There is no hardware modification required, as long as the contactless reader is compliant with ISO 14443 A or B.

4 Why Choose CIPURSE?

In every other area of technology, the introduction of open standards and resulting open solutions has spawned innovation and new opportunities. For example, the Internet Protocol (IP) standard replaced multiple other network transport protocols and launched massive growth in networking capabilities. There is growing consensus among program owners that fare collection technology is now mature enough to not have to rely on a single solution provider. An open standard simplifies connections between service providers, because service interoperability is enabled at the application level, not at the platform level.

The OSPT Alliance' s diverse and growing membership is a strong factor in making CIPURSE a viable open standard for secure ticketing and beyond. The transport ticketing industry' s leading technology players are active members, participating in its working groups and driving the CIPURSE standard forward to cover mobile ticketing with the CIPURSE Mobile Guidelines and HCE. Members from around the world and across the transit ecosystem bring diverse perspectives and the strength of real-world experience. As a result, the CIPURSE open standard offers greater robustness and flexibility than any proprietary solution available today.

As a hardware-agnostic solution, CIPURSE opens options for card acceptance. Local markets can drive program evolution depending on the value brought by each proposition. Accepting a multiple options path is also more cost-effective. The ability to use "chip A" based closed-loop CIPURSE; "chip B" based open-loop EMV; "chip C" account-based token; or "chip D" for any combination of the previous, allows program owners to source the right model mix for their local ecosystems. This is far more cost-effective than having to specify and deploy an application across tiers of proprietary technology.

The CIPURSE specification also delivers unprecedented scalability. The limited-use ticket, the mid-range, and the high-end products all use a common command-set and security framework,



which facilitates introduction of new products and avoids costly and complex system modifications. Furthermore, thanks to compatibility between these profiles, operators can introduce complementary services. For example, ticketing could also support access control to a stadium, car park ticketing, bike rental, and other services. All at virtually no extra cost. Mobile can be easily brought into the mix too.

Integrating CIPURSE-based solutions is simple and fast. For example, any ISO 14443-compliant card reader can accommodate a CIPURSE solution by upgrading to ISO 14443-4 and integrating a CIPURSE Secure Access Module (SAM) or CIPURSE functionality into the existing SAM or firmware.

A growing number of operators across the world are choosing CIPURSE and specifying its use in tenders and Requests for Proposals. Its use is extending beyond ticketing into neighbouring ecosystems in mobility services and beyond, expanding the range of value added service collaborations available to operators that were previously inaccessible because of closed proprietary technology.

It's free to download the CIPURSE standard for evaluation purposes and a range of membership types are available to meet all requirements. For further information about OSPT Alliance, CIPURSE, and how to integrate it into existing systems, please visit the [OSPT Alliance website](#) or view OSPT Alliance's white paper on [Integrating CIPURSE V2 into an Existing Automated Fare Collection System](#).

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