

WHITE PAPER

# Smart ticketing technology demands new service models

The radical changes needed for business as usual in a smart world

## New technologies for ticketing have changed the game

Transport in the UK is facing a radical shift in the provision of ticketing for the 21<sup>st</sup> century. The introduction of smart technology has shifted the ground from standalone equipment from a limited number of suppliers to a community of multiple and interdependent vendors. Many scheme and transport operators have commenced smart ticketing schemes without thinking through the service implications of this change and how business as usual will be maintained. New models for ongoing service are required for smart ticketing and this whitepaper explores these in the context of an emerging new service model – Service Integration and Management (SIAM)

## The last few years have seen an explosion in smart ticketing adoption

With the advent of DfT targets for the adoption of smart ticketing (primarily surrounding the uptake of the ITSO standard within the UK) within new rail franchises, transport operators have additional obligations to use smart ticketing. Independently the smart phone revolution amongst consumers and off station sales has fuelled mobile and print@home ticketing in addition to the use of smartcards which ITSO implies. In the bus world, the major Passenger Transport Executives (PTEs) in the UK are driving smart ticketing schemes through the use of ITSO cards for concessionary fares and are looking to convert the investments made in this area into commercial ticketing.

When ticketing was largely based on paper ticket issue (with simple magnetic strip based codes for some modes of public transport), the only issue was to ensure that details were printed properly on the right stock and that any magnetic encoding of the journey was correct. The only “electronic interaction” between equipment was therefore a reading of the magnetic stripe of a ticket (if it existed) by a different device – usually a barrier, for example a gateline at a rail station, a turnstile for a ferry or a gate at an airport. For this level of very loose integration, each piece of equipment can be seen to act in an almost purely standalone manner. If problems occur (which do occasionally happen) then manual “work arounds” are easy to apply. Anybody who has ever travelled to Luton airport on a standard paper ticket will experience this where the gatelines at Luton Airport Parkway (the interchange station for the airport shuttle service) do not work with tickets valid for “the airport”. Manual checking of tickets is applied at the gates and people act as the fall back for this systems problem.

This has led to all operators adopting case by case service contracts with each equipment vendor selected (the Ticket Issuing Systems (TIS), Ticket Vending Machines (TVMs), Electronic Ticket Machines (ETMs) and gatelines). For each of these types of equipment existing contracts have clear service level agreements *appropriate to paper based ticketing*. However smart ticketing changes things:

- There may be no printed details of a customer journey visible in any format which can be read by staff. This places reliance on new staff devices to de-code and validate smart products if any form of human “work around” is needed
- Bar coding technology requires equipment to contain optical reader capability which complicates existing asset and software upgrades which need to cope with new ticketing media
- The use of smartcard technology brings new vendor services, most of which are supplied by multiple vendors within the industry:
  - card production and issue services
  - an ITSO HOPS for ITSO compliant ticketing (or security management and transaction collection for EMV and proprietary schemes such as Oyster)
  - smartcard validators
  - handheld staff devices
  - smartcard interaction device upgrades to existing equipment
  - remote fulfillment services for products bought on the web or mobile devices
  - security services for assets and equipment within a smart ticketing scheme as a whole
  - back office services for the new smart ticketing models

Given this number of new types of device, the services required to sustain business as usual for the average operator are becoming increasingly complex and fragmented. This would be bad enough if it was merely a matter of new equipment assets to manage, but smart ticketing requires a significant level of **software interaction** across this range of devices.

### About this document

SIAM is a new service approach to complex multi-vendor software services. This whitepaper discussed the use of SIAM to underpin smart ticketing in the UK transport industry.

## What is going wrong for service in smart schemes?

CGI has delivered some of the largest and oldest ITSO compliant smart ticketing schemes in Britain today as both a Systems Integrator and as a vendor of back office and other services. From over 20 years of actively working to implement smartcard, mobile and EMV based ticketing schemes in the UK and around the globe CGI has experienced some interesting changes to the interdependencies which this technology imposes on the operator. Here are some real life (anonymised) examples of how interaction problems can lead to a breakdown in service for both the customers and the organisation:

- One scheme has issued cards with the date of creation written in place of the cardholder's birthdate. Whilst it was amusing that one of CGI's smart ticketing senior solution architects was given this card, *he couldn't actually buy any products* as the selling systems interpreted (rightly from their perspective) that as a one year old he would not need a product for travel
- Another scheme had problems sending ITSO messages back to the HOPS due to the systems components attempts to *use a communications port which was locked down* due to the operators security policy
- Fares and key *updates can be highly problematic*, especially when a scheme encompasses thousands of devices in the field. It is interesting to note that the only major issue with Oyster in recent history was associated with updates across the estate
- One operator has *no current formal SLAs for smart services* despite offering ITSO based tickets to its customers for some years. It has experienced service outages of an average of 10 days and significant ad hoc fix costs. This has been OK in pilot and for limited products but is not adequate for full running to the targets required by the franchise
- Current service desk functions and *triage are centered around paper ticketing and electromechanical faults* – software interaction issues are not even perceived and so aren't included in triage, leading to delays
- Devices *don't all have the same levels of software/firmware* leading to issues between devices – this has particularly affected the ITSO world where upgrades of components to the latest level of the standard have had unpredictable results
- In one ITSO scheme CGI has been called upon to arbitrate between an ETM and HOPS supplier over the interaction between ISAMs and the equipment when changes were required which stopped communications of the ticket machines back to base. Service issues continued for weeks, until the software issue was finally resolved
- Changing ISAMs between equipment and equipment swap outs where failures occurred have caused issues in ITSO schemes due to the *infrastructure interpreting ISAM details as belonging to an asset which is no longer in service or which is attached to a different ISAM*
- One scheme had a season ticket holder who was allowed through a barrier with his smartcard only to be challenged on train because the Train Manager's handheld device read the card and *reported that the ticket was expired*. Subsequently the passenger negotiated the barrier at the destination successfully
- An operator has *no link to the business vision* for new products and services to the technologies which must deliver these in the future.

These issues are not exhaustive, but they all show the increased software interaction between different equipment and vendors and in service issues which this has caused, which has been a result of smart ticketing.

The service problems which can occur are no longer inconvenient (with paper tickets the operator staff can override the systems and at least work around issues) but can have significant service and financial issues. Although not publically quantified as yet, several commercial e-purse bus schemes have experienced failure on launch. Card interpretation issues have caused, service problems with the e-purse cards issued to the public (expiry dates on the brand new cards issued have caused spurious ETM rejections). This has in turn mandated driver acceptance of all “expired” cards (despite failure on the bus) and an associated free journey has been allowed to cardholders. This obviously had a revenue impact as all the card users were travelling for free (the e-purse was not being debited) whilst the issue was resolved. Worse still is the experience of the Myki card in Melbourne Australia where service issues and a lack of staff visibility of the contents of the smartcard issued for use on the tram network led to an estimated **40% increase in fare evasion**.

Ensuring service, particularly where a “Pay as You Go” (PAYG) offering is being made to customers is vital for the public perception (trust is everything for the passenger to use it) and patronage, staff confidence and revenue collection.

## SIAM – What is it?

Many organisations are moving away from monolithic software solutions from a single vendor or the use of Systems Integrators to produce a turnkey system in favour of new models. Increasingly, small vendors with boutique applications are being used to craft highly specific end to end solutions delivered by a community of suppliers, each contributing components which are best of breed. Allied to this technology evolution within transport has been a move away from proprietary products towards the open source software agenda driven by central government to lower the total cost of ownership of solutions.

These factors have driven organisations (including the systems integrators) towards the use of the term software ecosystem to describe the complex interactions between software components and the vendors producing these. To manage an ecosystem, particularly post implementation where inevitably changes to each component are required and have impacts on other pieces of the software “jigsaw”, new ways of working are evolving. The latest model is named Service Integration and Management or SIAM and seeks to co-ordinate the efforts of a vendor community rather than adopt a series of standalone component “silos”. This model is based on a few key principles:

- **The concept of service towers** plays an important role in defining groups of components and their vendors who have significant interactions. To the cynic a service tower is a fatter silo of the past, but designed correctly these towers can offer levels of service across multi-functional areas
- **The use of multi-vendor resolver groups.** To support each service tower, a significant change is required in establishing multi-vendor groups to quickly resolve issues rather than spending valuable time in establishing who is to blame. A key change is required in the setting of service contracts to ensure that vendors involved are targeted at working together rather than finding out who is paying service credits for failures
- **Vendors need to change their behaviours.** SIAM best practice principles insist that titles and organisation badges are “left at the door” to avoid vested interests. In order to facilitate this behavioural change, service choices (and contracts) need to recognise issues which have traditionally caused vendors to adopt a protectionist view
- **Knowledge transfer** needs to occur around the community to ensure that the customer organisation doesn’t “lose touch” with the services supplied and that each participating vendor appreciates the issues and design of other components which affect its products and services

- **One size doesn't fit all.** Business varies across the day. Service levels traditionally do not as it is easier for both the supplier and customer to measure against a single "steady state" and have service credits assigned. The problem is however that this is mandating the highest common denominator across a working day and increases costs (as vendors must field higher levels of redundancy to accommodate the highest level of service and provision for similarly high levels of potential service failure). Against this backdrop many vendors are now looking at service risk management in new ways, delivering higher levels of service assurance (and backing this financially)
- **Helpdesk integration** which contains knowledge so that effective triage is quickly and efficiently delivered and that the information needed for multiple vendors to participate in resolving issues is passed to the right community for resolution
- **New forms of governance** are required and importantly it is important for the customer organisation to recognise:
  - The level of skill inside the organisation and whether SIAM should be run internally, externally or mixed across these
  - What responsibilities can and cannot be assigned to the vendor community
  - Whether a SIAM partner is required to take responsibility for some or all of the service towers
  - What levels of contracting are required and how these build to support the desired end to end service (Are prime contracts required, are managing agent agreements needed, do current contracts need to be novated and if so how?)
  - How will performance be measured and what will form the basis of reward/penalty?

These key principles drive SIAM and offer a new model for delivering end to end integrated service for any solution.

## SO WHAT MAKES SIAM SO APPROPRIATE AS A FIT FOR OPERATORS ADOPTING SMART TICKETING?

The nature of smart ticketing schemes involve multiple software products which interact to form an end to end whole and many vendors contribute to this experience both for the passenger and staff. Adopting a service tower approach with associated multi-vendor resolver groups makes sense when the software interactions which smart ticketing mandates are considered. Similarly during the average travel day, service takes on a different requirement profile – the high degree of throughput at peak commuting times requires a different level of service to an outage in the middle of the morning. This is especially the case where other equipment is available. Simple examples show this:

- During peak commuting hours, gatelines at city terminal rail stations must be available and cope with high throughput – this is not the case at other times in the day
- A single TVM problem at 11.15am in a bank of six machines on a main station concourse is less problematic than the only one on an unstaffed station at 08.00 am
- An ETM failure on an outward leg of a bus route from its depot is more of an issue than one stop on the inbound service
- A web based TIS being unavailable at 02.15am on a Tuesday morning is less of an issue than the same outage at 10.00pm on Sunday evening (when many commuters renew their travel products for the coming week)

Traditionally service level agreements (SLAs) have stipulated availability and fix regimes which are tuned to peak issues only, and in most cases operators do not have service levels for smart. A SIAM approach tuned to the real needs of the business would lower

*“The CGI back office system has **worked perfectly from the start**. It has enabled us to realise a once-impossible vision of an easy-to-administer, national, concessionary travel scheme which brings enormous benefits to all concerned: the people of Scotland, Transport Scotland, the Scottish Government and all the transport operators involved.”*

**Gordon Hanning, Transport Scotland**

the costs associated with service provision, both for the vendors and the customer scheme operator.

Many operators have an existing governance structure for dealing with ticketing vendors appropriate with the standalone electromechanical issues of equipment but do not have any knowledge transfer on smart ticketing. Gaps usually occur where:

- Implementations are handled by “group level” teams with local operating groups expected to provide ongoing service. This can give rise to problems:
  - Service groups do not have any knowledge transfer and have long learning curves
  - Solutions may not be designed for optimal service (often smart has been imposed by political drivers rather than the operations)
- Post go-live, new products and services are required which need to be managed into business as usual
  - The business aspirations of local operating company commercial groups cannot be understood in terms of how the technology can be used to introduce the required products and offers

These issues point towards the investigation and adoption of a SIAM approach.

## The Challenges for adopting SIAM

If we accept that smart ticketing technology has changed the nature of how service must be provided by an operator then the nature of this change drives a service model requirement which is very well met by the principles of SIAM discussed above. However is it not as simple as just “doing some SIAM” or adopting some new buzzwords.

To deliver smart business as usual ticketing services in the future operators will need to:

- Clearly decide on the governance structures and at what level within the organisation (National multi-modal, National single mode or operating company) they need to apply
- Adopt a long term vision and commitment to providing service for smart technology. Many operators are still in pilot thinking where limited deployment is made on a tactical level. This is not sustainable into the future and a tipping point will occur where service is not optional but core to revenue generation
- Manage the internal culture to foster a collaborative approach internally and change the way in which the organisation interacts with its vendor base
- Understand the concepts behind the service tower approach and apply this to their infrastructure and vendor community
- Change the way vendors are selected and treated in the future (including the way in which contracts are agreed)
- Adapt existing contractual arrangements to the new needs and ensure that:
  - The correct behaviours are measured to deliver to the real business needs and that everybody has an “end to end” service focus
  - Clear governance lines are understood by all
  - Service is invoked efficiently and quickly should issues arise with the best information on what has gone wrong and why through helpdesk provision which has knowledge “built-in”

It is not likely that the average operating group will have the expertise to achieve this change in house which points to having either consultancy or a SIAM partner who can bring the expertise to bear in setting up a SIAM model. This thinking and experience needs to be allied to deep areas of expertise in smart ticketing technology to assist in setting up the service towers and resolution processes. Although it is tempting to think of the ticketing experience alone, the process and management change skills required to assess the current position and adopt a SIAM approach should not be underestimated.

With the right partner, transport operators can migrate into this new service paradigm and gain more from the diverse vendor base required for smart ticketing to deliver continuous high levels of support for the passenger as they buy, pay for and use travel into the future.

If you have seen elements within this paper where your organisation could improve smart ticketing business as usual services and needs to adopt new processes to gain a SIAM approach, please feel free to contact CGI for further discussion.

## Author

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