fime

It's **ABT time**

Meeting customer expectations with account-based ticketing.

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> If transport agencies, like public transport operators and public transport authorities, are to meet changing consumer expectations for seamless travel they need to change the game. Account-based ticketing systems enable them to grasp this opportunity and, at the same time, realize significant operational savings.

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1. Introduction.

In the last 20 years, automated fare collection (AFC) systems have revolutionized the transport ticketing industry globally. From the first national deployments in the late 1990's[1] AFC systems have made the business of managing tickets and fares faster, cheaper, simpler and more resistant to fraud, both for the customers using the services and the transit agencies delivering them. The broad appeal of AFC systems has led to high penetration around the world and a global market valued at US$4.7bn.[2]

1   South Korea's Tmoney and Hong Kong's Octopus are the first recorded deployments AFC systems deployed, in 1996 and 1997 respectively.

2   Persistence Market Research report 'Automated Fare Collection Systems Market: Global Industry Analysis and Forecast, 2016–2024'

Today, the market is moving again. The last decade has seen the emergence of a new set of enabling technologies which promise to transform the industry once more.

The shift of data and applications into the cloud and the widespread adoption of mobile apps and contactless payments have introduced new levels of convenience and flexibility to a wide range of consumer services such as banking, retail and leisure, altering popular service expectations forever.

These expectations now challenge the transport ticketing industry to follow suit.

Increasingly, consumers are demanding choice and flexibility over how they interact with – and pay for – the services they use. In the transport ticketing world, this means growing demand for faster, more efficient, seamless and interoperable services.

These include a growing range of new payment form factors that stretch far beyond dedicated AFC travel cards to encompass contactless bank cards, mobile contactless devices, in-app payments and wearables.

If the transport agencies, including public transport operators (PTOs) and public transport authorities (PTAs) are to meet these new expectations they need to change the game.

Account-based-ticketing (ABT) systems, whether these integrate EMV® acceptance or not, enable them to grasp this opportunity and, at the same time, realize significant operational savings.

Transitioning from transit ticketing to the new age of transport payments, however, means navigating new integration complexities, understanding emerging payment technologies, and ensuring compliance to new standards that will enable the global interoperability demanded by today's digitized travelers.

2. What is account-based ticketing?

As a concept, ABT is nothing new. As far back as 2011, the Smart Card Alliance, a U.S. industry body, defined ABT as **"the transit fare collection system architecture that uses the back-office system to apply relevant business rules, determine the fare, and settle the transaction."**

Back-office is the operative term here.
In conventional AFC systems the traveler's
ticketing information and its value are held
on a paper ticket, a stored value card or a
virtual smartcard hosted on a smartphone.
In ABT, however, the traveler has a remotely-
held account in which their data and value
is stored and from which they pay for their
travel in-transit or after the journey has been

completed. This cloud-based model means
the traveler only ever carries an 'identifier'
locally; an authenticator present on whichever
media they use (smartcard, smartphone
or wearable) that enables the ABT system
to confirm their identity as the account
holder, capture their transit activities and
respond according to the business rules that
parameterize the system.

By performing the ticket and fare management processes in a back-office system, ABT allows transport agencies to centralize their operations, realize a wide range of benefits, and deliver the 'all new' user experience that today's digitized customers expect.

As industry leading standards body, OSPT Alliance confirms: **"ABT could offer a way to super-charge ticketing solutions and promote a better traveling experience. It is an enabler of mobile and contactless device usage that consumers are increasingly adopting in other verticals."** [3]

3. It's all ABT the benefits.

1. Unified infrastructure.

By centralizing all ticketing operations, transport agencies can realize never-before-seen levels of operational agility. System and service updates can be implemented instantly and across multiple channels, without the need to reissue cards and tickets and minimizing the manual updates needed at local kiosks and ticketing vending machines (TVMs).

Processing costs are also reduced since authorization to travel is no longer contingent on the transaction.

In short, connection to the back-end system and payment can now be processed after the journey has been completed, enabling operators to process payments in batches.

2. New revenues and support for innovation.

The flexibility of ABT is not limited to the customer. Transport agencies can take advantage of the system's power to innovate by rolling out new services that can enable them to both generate new revenues and deliver added value to the customer.

Examples here include:

- The enrolment of multiple devices and IDs to a single account, enabling choice for the individual or support for multi-user family accounts.

- The possibility for transport agencies to establish commercial partnerships with third party organizations like popular local attractions, for example, and consolidate the customer's travel and entry ticketing in a single mobile-app or dual-interface card.

- The aggregation of usage data, and its subsequent analysis, is greatly simplified, making it easy to identify new data-led revenue opportunities and create insight-driven efficiencies based on information such as traffic throughput and peak time flows.

- A digital customer's account opens a new channel for customer interaction, such as real-time travel information feeds, or customer service messaging, further enhancing their traveling experience.

3. Open-loop EMV® payments.

The decision over whether to support open-loop EMV payments in an ABT implementation is a tough call for transport agencies. Following the success of Transport for London's (TfL) implementation and the increasing penetration of EMV globally, it isn't hard to see why many aspire to upgrade their systems to offer open-loop EMV.

However, with greater costs and complexities in implementation and the need to partner with a supporting payment scheme, **agencies need to carefully balance whether this system is best suited to their market and, if so, when it would be best to implement.**

That said, accommodating <mark>EMV payments offers</mark> travelers greater flexibility, convenience and, as with all contactless-centric implementations, reduced queues and quicker throughput.

From an operator perspective, this also translates into a reduced need for transit-specific travel cards, cutting manufacturing costs and the need for on-the-ground resource to support issuance.

These benefits also readily serve tourist markets, enabling visitors to easily board the local transport network with a fare-media that's already in their pocket.

4. Greater risk and fraud management.

With an account-based model, a customer's payment limits can be set remotely and adjusted automatically according to pre-determined criteria, helping transport agencies manage the risk associated with the instant-authorization, deferred-payment model.

Unlike stored value cards used in AFC systems, lost or stolen ABT cards can be cancelled and the customer's preloaded card balance protected, helping to further reduce instances of fraud.

Both features promote efficiency and reduce frustration for transit agencies and end-users alike.

5. Reduced on-the-ground costs.

Put simply, the more that happens in a centralized, cloud-based environment, the less needs to happen on the ground.

For transport agencies, this means there is less cash to process, reduced support needed at entry gates, and fewer ticket vending machines to maintain as the customer manages the loading of their account remotely.

6. A fast, simple and flexible user experience.

Travelers no longer need to concern themselves with 'topping up' their cards, or having sufficient funds preloaded onto their card to complete their journey. Instead, their ABT account can be linked to their bank account and either set up an **automated deposit**, triggered when their balance has diminished, or **load funds manually via a digital transfer** from their mobile or online banking facilities.

Additionally, users can utilize their **preferred authenticating media as** they wish with account-based systems – whether that's a smartcard, mobile device or a wearable.

7. Reduced complexity in smartcard profiles.

From a technical point of view, transport agencies also benefit from issuing less complicated smartcard profiles.

Given that all processing is performed in the back-office environment, fareboxes, validators, ticketing gates and fare media no longer need to embody the same level of intelligence, resulting in substantial savings in cost and greater operational efficiency.

Stepping through an ABT transaction.

The traveling customer loads value (currency) into their ABT account at a kiosk, via a TVM, or through their mobile app.

At this time, the customer's **on-card status** register is updated with a **value event** that confirms a **load** has been performed on their chosen ticketing media (smartcard, wearable or smartphone).

Note – this does not indicate account value, just a positive 'status update'.

The value event is then shared with connected readers or validators during the next system broadcast. This means that when the customer touches their device or card to the gate's reader, the on-card status register confirms their validity to travel, and opens.

This on-card status register is crucial to enable the throughput speeds expected today as, provided a status is positive (i.e. recent 'value event' has been registered), travelers can be granted access to the transport network even if the reader cannot connect to the back-office at that time or if network connectivity is slow.

The on-card status register on their card or mobile device is updated again when the reader is next live and, when combined with a repeat of this activity when the customer 'touches out', the back-office system to identify the journey and charge the account with the appropriate fare.

To reduce risk further and to enable throughput even in absence of network connectivity at the reader, the register is updated securely with transaction status only - no actual funds are stored on the card, wearable or smartphone.

4. ABT implementation considerations.

Implementing an ABT system presents transport agencies with a variety of new challenges, from technical integration complexity, to support for emerging payment technologies, together with compliance and certification requirements with interoperability standards for mobile and contactless payments.
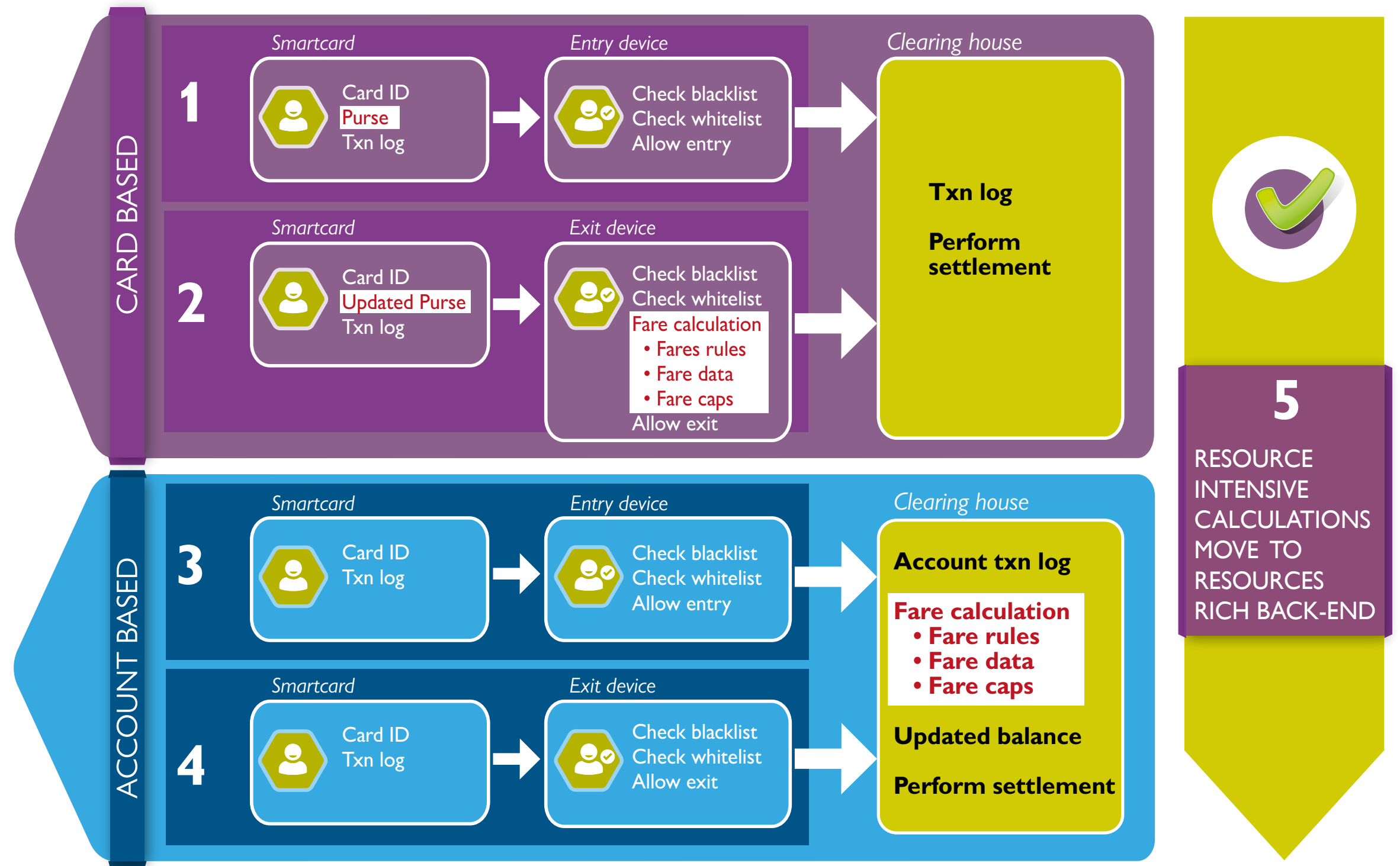
To overcome these and ensure the implementation is effective, secure and reliable, specialist knowledge and training is a must.

This journey must begin with a sound understanding of the ABT technical infrastructure.

CARD BASED

1
Smartcard
Card ID
Purse
Txn log

Entry device
Check blacklist
Check whitelist
Allow entry

2
Smartcard
Card ID
Updated Purse
Txn log

Exit device
Check blacklist
Check whitelist
Fare calculation
• Fares rules
• Fare data
• Fare caps
Allow exit

Clearing house
Txn log
Perform settlement

ACCOUNT BASED

3
Smartcard
Card ID
Txn log

Entry device
Check blacklist
Check whitelist
Allow entry

4
Smartcard
Card ID
Txn log

Exit device
Check blacklist
Check whitelist
Allow exit

Clearing house
Account txn log
Fare calculation
• **Fare rules**
• **Fare data**
• **Fare caps**
Updated balance
Perform settlement

5
RESOURCE INTENSIVE CALCULATIONS MOVE TO RESOURCES RICH BACK-END

1. ABT security.

ABT mandates the use of secure authentication. This means agencies must develop specialist knowledge of industry standard cryptography to guarantee the security of each implementation.

That said, once deployed, ABT systems heighten security considerably. On this subject, the OSPT Alliance makes the follow observations:

ABT does not require fare value write backs to the fare media, further reducing the chance for a security breech or a transaction **tear event** that may cause card corruption.

Note: A tear event may occur when value is written back to the card, as is required in a stored value transaction. If a transaction tear occurs, data can be lost, and the card can potentially become corrupted, something which may require transit staff involvement to repair. Minimizing write backs to the card improves card to reader performance – something ABT takes full advantage of.' [4]

2. Quality assurance.

As with any significant infrastructure deployment, maintaining quality throughout the project is fundamental to an ABT project's success.

This requires expertise and careful selection from hardware and technology options, through to the system's deployment and final service delivery.

This presents a significant challenge to many transport agencies, who must navigate a number of new technologies and processes to master their selection.

Each implementation raises unique integration and interoperability requirements that must be overcome to ensure resultant ABT systems operate smoothly and effectively.

3. Standards, accreditations and certifications.

Another crucial success factor for transport agencies is to understand both the global and regional security standards that underpin ABT systems.

Transport agencies routinely turn to specialist experts and consultancies that can support full implementations from start to finish, providing the technical guidance and advice needed to ensure a smooth and uninhibited ABT rollout.

Failure to engage comprehensively with programs to manage both quality assurance and standards compliance, together with their accompanying testing and certification procedures, can result in crippling delays and breaks of service further down the line.

Only by having access to the technical knowledge needed to prepare for, and obtain, the accreditations that ensure compliance, can an ABT deployment occur without incident.

4. The right form factors, at the right time.

Transport agencies will need to assess the value of investing in ABT support **for wearables and mobile contactless form factors, as well as smartcards.** The decision will likely be influenced by a variety of factors, such as current mobile contactless uptake among local users, projected adoption of wearables in the future, as well as the cost and complexity of implementation balanced against available budgets.

Similarly, support for multi-application smartcards can create complex integration challenges, particularly when multiple stakeholders for payments and access control, for example, play a part in the card's functionality.

These decisions need not be taken immediately, however, at the point of deployment. With the right architecture and preparation, ABT systems can be upgraded over time to accept new form factors in line with their popular adoption.

5. EMV – is it for me?

Despite being proven, secure and widely adopted across the payments market, the EMV ecosystem is complex for transport agencies to navigate, with multiple players, technologies and guidelines. For agencies seeking to support EMV open-loop in their ABT systems, getting to get to grips with these complexities first is essential. **Again, transport agencies commonly benefit from expert guidance from specialist consultancies to help them through this maze and toward a fully certified EMV-compliant infrastructure.**

5. Choosing a trusted implementation partner.

To truly realize the potential of ABT, the transport agency's ability to navigate open standards, and manage complex integration and interoperability requirements will be crucial. As the technologies, business models and standards continue to evolve, the capacity of an agency to effectively evaluate all the options in line with a sound strategy becomes ever more difficult.

Expert technical consultancy, from an industry proven implementation partner well versed in payments and developing new, innovative solutions across form factors, is essential. Such a partnership ensures the quality of an ABT project from the start, minimizes unnecessary delays and ensures a smooth, cost-effective path to market. A thorough testing and certification plan is also key to guaranteeing secure and interoperable solutions first time. During this implementation process, prioritizing quality assurance (QA) from the get-go will ensure the ABT solution runs smoothly and efficiently, year after year.

6. Conclusion.

With over 20+ years of experience ensuring the efficient and successful implementation of card and mobile transaction service, Fime is well-equipped and experienced in supporting the transport market in delivering the next-generation of transit ticketing solutions.

With unrivalled expertise in EMV and developing mobile payment solutions, Fime can provide end-to-end support for your projects, from technical consultancy and training, through to design support, quality assurance, field testing and certification services.

Visit the Fime website for more information

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Making innovation possible.

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