



Transforming public transport ticketing with **Thales fare media issuance solutions**



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Thales offers an advanced range of digital and physical fare media issuance solutions for public transport. Working successfully for leading transit agencies and PTOs (Public Transport Operators) around the world, Thales' products and services transform the travelling experience for end users, while reducing operating costs and system complexity.

The Thales fare media issuance portfolio draws on our in-depth experience and expertise across banking, secure payments and digitisation:

- D1 (Digital First):** A dedicated SaaS (Software as a Service) platform for rationalising open and closed loop systems within an integrated ABT (Account Based Ticketing) service
- TSH (Trusted Service Hub) for Transport:** Designed to enhance legacy fare collection systems through the frictionless digitisation of physical transit and travel cards in smartphones and mobile wallets
- Contactless cards and wearables:** a comprehensive line-up of proven, innovative and sustainable product designs, all backed by Thales' global network of secure local personalisation services

Together, these solutions offer transit agencies and PTOs the ability to take full advantage of the disruptive technologies that are redefining public transport. Most notably, these trends include dramatic growth in the deployment of mobile, open loop and ABT systems.

What's driving the growth of mobile, open loop and ABT?

In a relentlessly mobile-centric world, an ever-increasing number of travellers expect to buy and store transit cards on their smartphones. Queuing at a ticket vending machine becomes a thing of the past; catching a ride involves nothing more than a tap of a mobile on a gate or validator.

Mobile ticketing: public transport without the queues



Transit agencies are migrating rapidly to mobile ticketing solutions that give travellers the freedom to generate their transit and travel cards anytime and anywhere. Many such systems also enable existing physical cards to be digitised directly to

a mobile, and linked to an OEM Pay wallet such as Apple, Google or Samsung.

Open loop systems: public transport without the tickets

Open loop systems are another defining trend. Transit agencies including Transport for London (TfL) are demonstrating the compelling benefits of allowing standard EMV payment cards to be used for direct access to public transport. Alongside open loop technology, the rapid adoption of ABT is ensuring that millions of people can move seamlessly from one mode of transport to another. Fares are deducted automatically and directly from a single account.

Why are physical tickets and closed loop systems still important?



The powerful uptick in mobile, open loop and ABT systems is transforming the traveller experience. However, physical ticketing and closed loop systems, where travel cards are issued and branded by or on behalf of the transit agency, remain an important part of the mix. Not everyone has access to a smartphone or bank card, and some travellers simply prefer not to use them to pay for their journey. To ensure that public transport remains accessible to all, legacy fare offers typically run alongside the new generation of open loop and ABT systems.

What are the opportunities and challenges for transit agencies and PTOs?

For transit agencies and PTOs, fare media issuance represents a dynamic and complex landscape. Innovative technologies offer exciting opportunities to improve customer convenience, attract new travellers and welcome back people who stopped using public transport during the pandemic. At the same time, the costs associated with conventional fare media issuance can be slashed.

However, the sheer diversity of the ticketing ecosystem also poses challenges in terms of system complexity, and the need to support different fare collection processes and infrastructure.

That's precisely where Thales can help.

In focus: the four key trends in fare issuance

1. Open loop



Worldwide, dozens of transit agencies and PTOs now offer travellers the freedom to pay for their ride by using a regular EMV bank or credit card at a validator or gate. The cost of the journey is debited directly from the holder's account.

Established players and new entrants offer a choice of operating models

The technical and economic models behind these systems have been defined by major international payment schemes such as Mastercard and Visa, as well as domestic schemes including Cartes Bancaires (CB). Established players such as Mastercard MPGS and Worldline offer payment portals adapted specifically to ticketing, as do a new breed of specialist that includes Littlepay and Switchio. In some cases, these new entrants replace the traditional ticketing players entirely, and are wholly responsible for calculating travel costs.

London highlights the benefits of open loop

TfL has played a leading role in demonstrating the positive impact of open loop solutions. Since London's transit agency adopted this approach, the costs of fare media issuance have continued to fall. They now stand at just half their original level.

The benefits do not stop there. Open loop has attracted new types of traveller and boosted ridership. What's more, customer surveys consistently demonstrate high levels of satisfaction. The wide range of nationalities now paying for their journey with a regular EMV bank card also proves just how intuitive a well-designed open loop system can be.



Arriving soon: hundreds more open loop deployments

Not surprisingly, hundreds of open loop systems are currently under development by transit agencies and PTOs. Indeed, a number of national governments have now mandated its use on public transport.

2. ABT

The growth of ABT is going hand-in-hand with deployment of open loop systems. With ABT, fares are deducted directly and automatically from the traveller's nominated account, which might be tied to either a regular EMV bank card, or a closed loop card issued by or on behalf of the transit agency. For travellers, that removes the stress and complication of identifying and selecting the correct fare product. For transit agencies and PTOs, the costs associated with issuing those fare products are reduced, or eliminated completely.

3. Closed loop EMV

The public transport market is also shifting in favour of using EMV to support closed loop transit and travel cards (sometimes referred to as private cards). Ultimately, the aim here is to eliminate the use of legacy ticketing standards such as Calypso and MIFARE. This enables transit agencies to rationalise their fare media acceptance infrastructures around EMV.

The new wave of closed loop EMV cards comprises two different approaches:

A financial institution issues the cards. These cards include the logo of both the transit agency and the international payment scheme providing the EMV technology (e.g. Mastercard). In some cases, the financial institution's logo is also carried on the card. This approach was adopted when closed loop EMV systems were first introduced, but has since been joined by a second option:

The ticketing operator issues the cards. This approach is seen as addressing some of the shortcomings of partnering with a financial institution. Transit agencies benefit from greater control, fewer stakeholders, and a direct relationship with their customers.

Thales' Gemalto D1 platform a mobile and physical issuance system that enables transit agencies to realise the full benefits of using EMV. With D1, EMV can underpin both their open loop and closed loop systems, within a unified ABT service that manages all types of fare media. A single back office-ticketing infrastructure can be utilised, streamlining operating costs and complexity. Furthermore, front-end equipment supports a single protocol and is similarly simplified and standardised.



4. Mobile ticketing

Digitisation is disrupting virtually every aspect of daily life. Ticketing is no exception. In the public transport domain, numerous mobile ticketing systems have emerged to enable users to generate and store digital transit and travel cards on their smartphones. These include card scanning solutions such as Thales' **TSH for Transport** and independent ticketing systems that are deployed in parallel with existing fare products.



Own brand or OEM?

In terms of the mobile interface, transit agencies and PTOs can choose between implementing it within their own app and wallet, or digitising transit and travel cards within OEM Pay wallets. **TSH for Transport and D1** support both these approaches.

Fare media issuance as a service from Thales

D1

Thales' D1 platform is a SaaS-based offer designed around the demands of ABT. By leveraging the power of trusted EMV technology, D1 enables open loop and closed loop white label systems to be managed via a single, unified ticketing infrastructure. Benefits include:

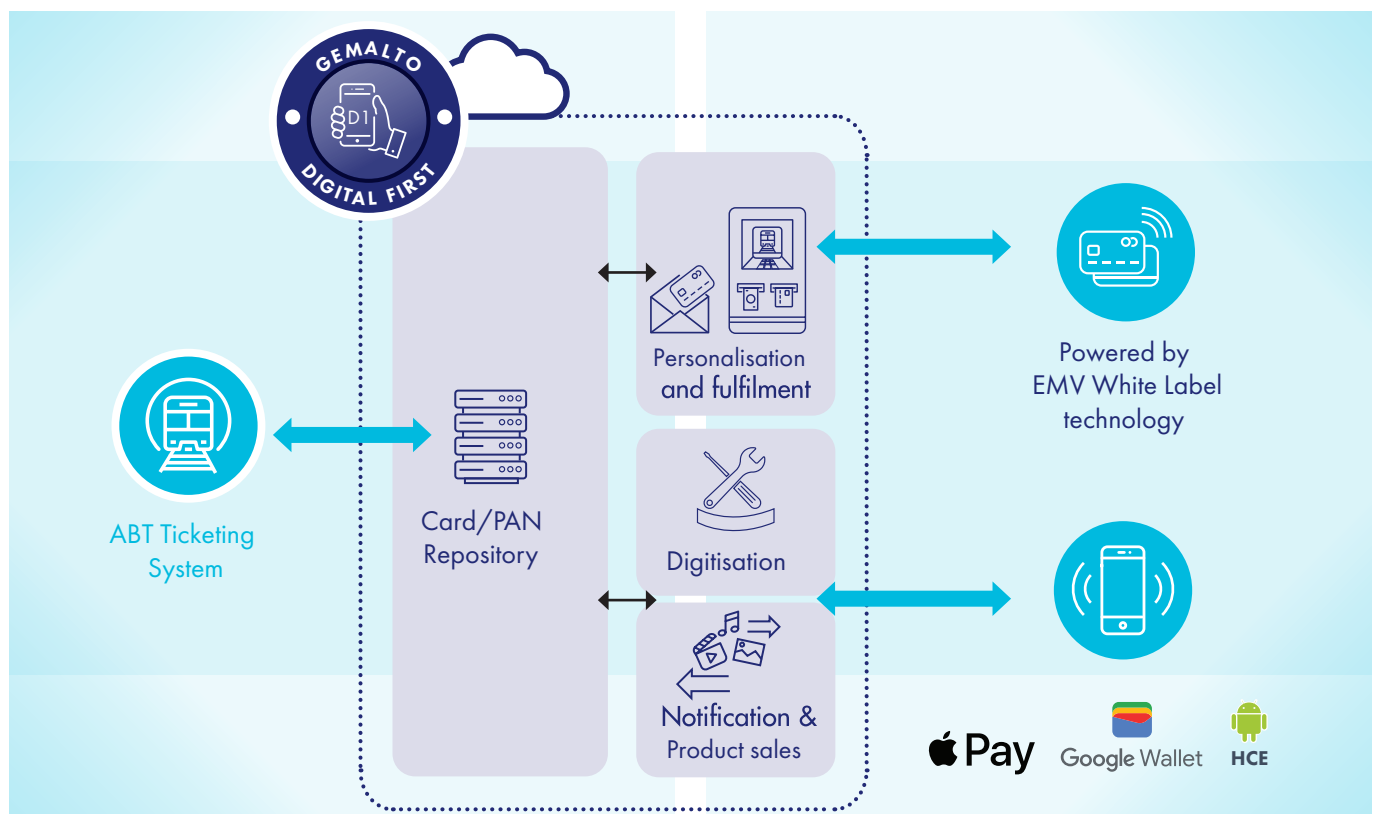
- ▮ Effortless payment and management of fares
- ▮ Significant reductions in operating costs and complexity
- ▮ Direct real-time communication with travellers

D1 provides a single point of contact between the operator's back office and physical and digital ticket issuance. Our solution connects central ticketing systems, the transit agency's mobile app, and OEM and OTT Pay wallets.

D1 is the only commercially available platform that complies with the demands of major OEM Pay wallets for transit use cases. For travellers, that means the highest standards of flexibility and convenience. Digital cards can be created effortlessly in wallets or apps, and linked to their chosen payment card.

D1 delivers a complete EMV white label solution. Ticketing schemes can be rolled out easily under the transit agency or PTO's own brand. Thales has established relationships with all the key players and stakeholders in the payment ecosystem. As a result, D1 removes the need for transit agencies and PTOs to form their own partnerships, or take responsibility for complying with PCI standards.

With the technological landscape evolving at speed, D1's SaaS mode does more than minimise upfront investment. It also ensures that transit agencies and PTOs keep pace with the latest improvements and innovations.



TSH for Transport

TSH for Transport by Thales is a cloud-based solution that enables transit agencies and PTOs to bring their legacy fare media issuance offers into the mobile age. Supporting established ticketing standards such as Calypso, FeliCa and MIFARE, TSH for Transport is proven in the most demanding environments. In both Hong Kong and Paris, our solution is ensuring an easier ride for millions of travellers on public transport.

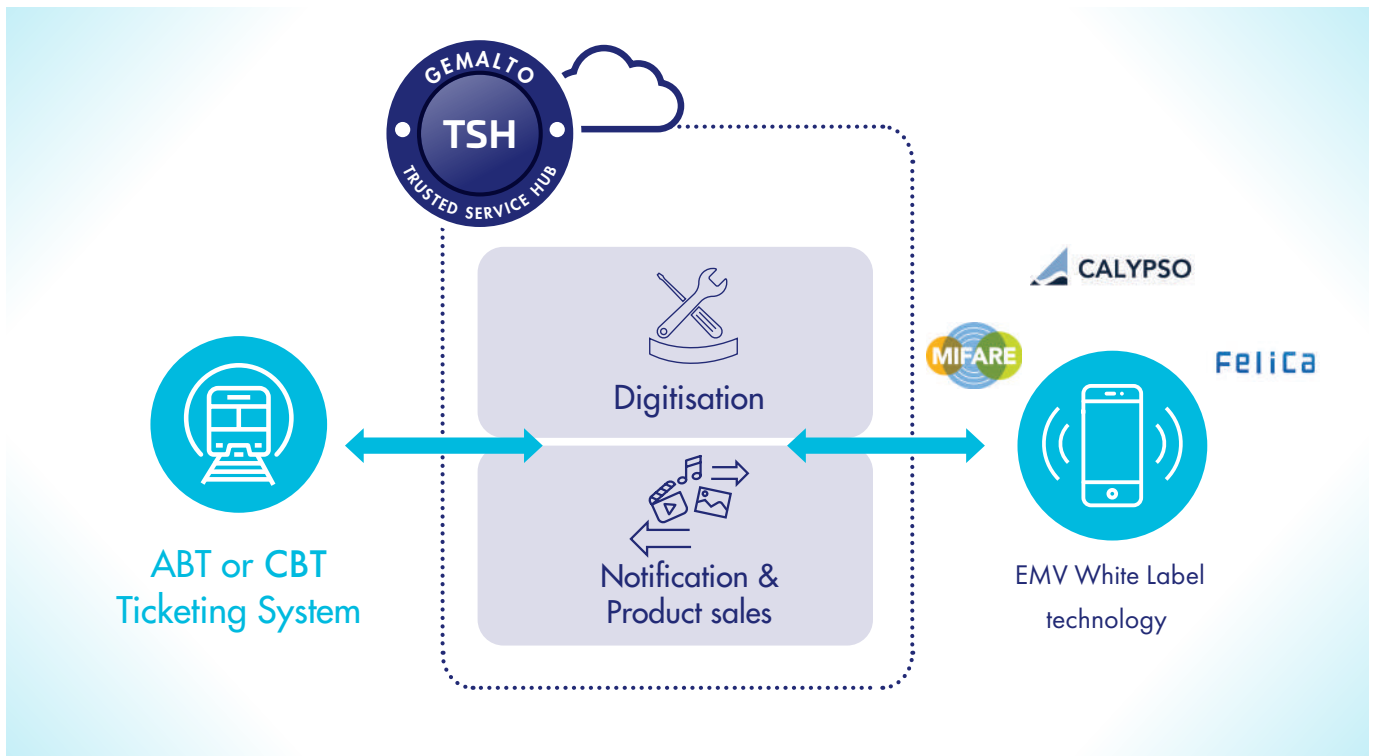
With TSH for Transport, travellers can easily:

- Digitise their physical travel card in a mobile wallet
- Create a new digital card directly on their smartphone
- Link their digitised travel card to an existing payment card in an OEM Pay wallet

- Use their smartphone for swift and secure access to public transport

Options available to transit agencies and PTOs include:

- Launching their own mobile ticket wallet, within their own app
- Digitising their ticket offer in partnership with leading OEM Pay wallets
- Building their white label closed loop offer on trusted EMV payment technology
- Leveraging TSH for Transport's compatibility with global ticketing standards such as Calypso and Felica



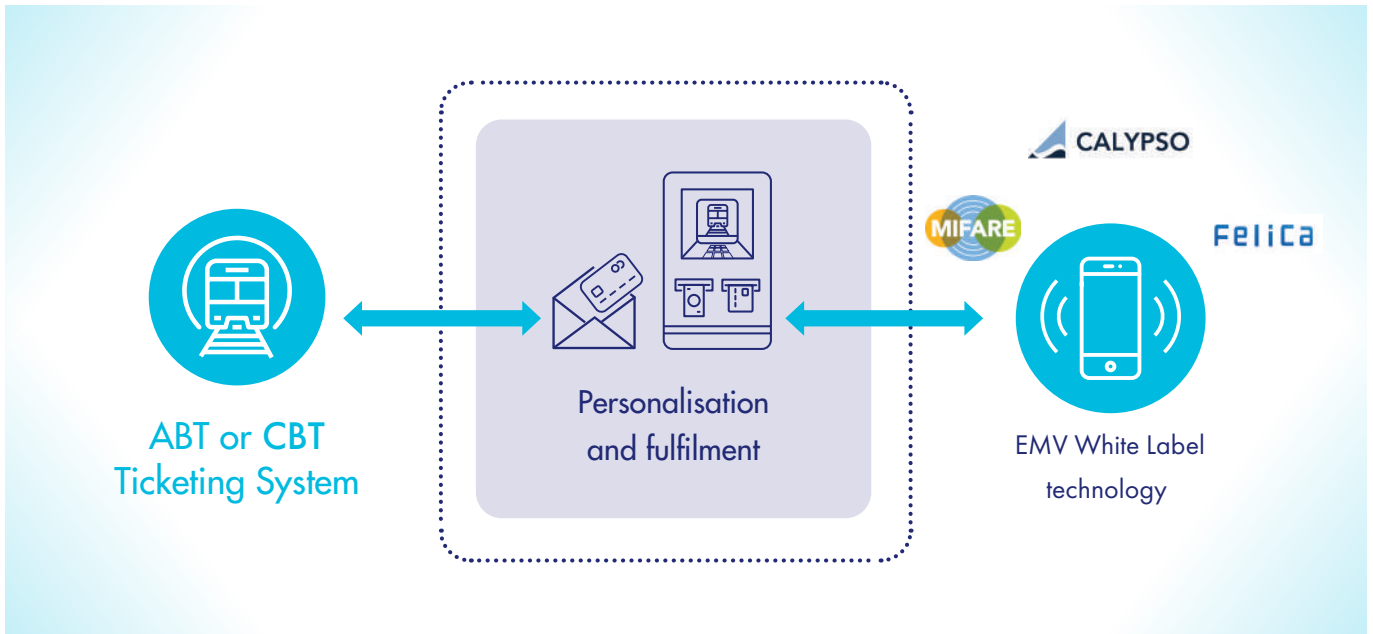
Physical transit cards and personalisation services

Since 2013 Thales has delivered in excess of 300 million contactless transit cards. Our products are used in more than 100 different cities and regions worldwide. The Thales portfolio includes support for:

- | Calypso and Calypso for ABT
- | Closed loop systems
- | White label EMV-based open or closed loop cards issued by transport operators

- | Innovative product designs including contactless wristbands
- | Secure local personalisation services via 32 dedicated centres worldwide

The Thales transit card portfolio builds on our extensive capabilities and experience in the EMV payment card sector. In both markets, we continue to invest in novel designs and technologies that enhance the user experience and support sustainable business strategies.



Thales' innovative solutions include:

- | Contactless wristbands that can support exciting use cases such as issuance in conjunction with mass spectator events including music festivals and major sporting fixtures
- | Cards manufactured from recycled plastics and bio-sourced materials, thereby reducing CO2 emissions and waste



Why **work with Thales?**



- **Experience:** Working for numerous financial institutions worldwide, Thales has developed extensive experience across payments, digitisation and mobile environments. We deliver one billion payment cards every year, and serve one hundred different customers with digital payment and banking platforms. This expertise in the financial domain combines with advanced capabilities in ticketing. Again this is the result of working in close partnership with transit agencies, PTOs and authorities around the world. As a result, we have a detailed and in-depth understanding of the challenges faced by the public transport industry.
- **Technology:** Thales has a range of processes and technologies that ensure continuous upgrade of our cloud platform, fully supported by a dedicated, multi-skilled team.
- **Customer Success Managers (CSM):** Thales has a team of CSM experts committed to helping our customers design their solutions and then deliver them. After roll-out, the CSM

team helps those customers to define the required KPI to measure service performance, and propose plans that will grow adoption and usage.

- **Partnerships:** Thales has established partnerships with numerous companies and organisations in the payment and transport industries. These partnerships enable Thales to combine the expertise and resources needed to develop and implement industry-leading issuance services.
- **Global reach:** Thales' worldwide presence ensures we are an ideal partner for ticketing projects that demand global expertise and reach.
- **Commitment to sustainability:** Thales is committed to sustainability and cutting the carbon footprint of transportation. This aligns us with the goals of transit agencies as they aim to reduce reliance on private cars and promote more sustainable modes of travel.

THALES

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