

VISA

OVpay

National Tap to Ride
in the Netherlands

A Case Study



Contactless Payments for Urban Mobility made easy all over the Netherlands

OVpay, the new Open Payment national Ticketing System for public transport



In June 2023 the Netherlands introduced OVpay as a check-in and check-out ticketing solution in urban mobility. It is one of the first transit open-loop ticketing solutions in the world operating at a national level. All consumers need is their plastic or virtual bank card on their smartphone or smartwatch.

Public transport in the Netherlands



Approximately

4 Mio

passengers per day



Network:

3,223

route km



60,000

validators

What is needed for OVpay?



A contactless payment device¹

(digital or plastic card, phone, smartwatch, ...)



Together with the public transport companies, Translink wants to make paying for public transport ever smarter, ever easier.

[Statement by Translink](#)



At a glance

The transit landscape in the Netherlands is highly developed and efficient, with a wide range of public transportation options, including buses, trams, metros, and trains. With its well-connected cities, comprehensive public transport network, and commitment to cycling infrastructure, the Netherlands is a model for urban mobility worldwide. Translink has been the issuer and processor of the nation-wide used OV-chipkaart. This closed-loop single purpose card for Public Transport has helped to standardize the ticketing system for years. At the end of 2022, however, this system has started to be gradually replaced by OVpay, an EMV-based ticketing system that leverages the existing bank cards of the public, ensuring convenience and accessibility in the years to come.

How does OVpay work?

Passengers tap with their contactless bank card, smartphone, or smartwatch on the validators to start and finish their trip anywhere in the country. A centralized back office collects the rides and calculates the final fare price which will be charged to the passenger's bank- or credit card account. A ride overview can be requested on their website or the OVpay website or in the OVpay app.



Benefits

Better user experience

- Fewer cards in the wallet
- No need to top up prepaid cards
- No waiting in queues to buy tickets
- Easier solution for occasional travellers and tourists

Superior performance

- Cost-effective and low-maintenance validators instead of expensive ticketing machines
- No tickets need to be produced or printed
- New proposition possibilities like best price calculation and fare capping



OVpay is good for passengers, operators, and authorities

The OV-chipkaart has been a reliable ticketing system for many years, and it continues to receive a high rating of 8.4 from travelers. However, over time, it has encountered challenges due to the underlying technology which will be out of support and excessive hardware infrastructure, leading to significant costs. To address these issues, OVpay, a new ticketing solution based on EMV technology has been introduced. This innovative solution not only preserves all the advantages of the existing system but also allows for the use of open-loop physical and digital cards. This improvement greatly enhances the user experience, promotes financial and digital inclusion, and contributes to revenue growth. Furthermore, by primarily relying on existing open-loop payments cards, the system streamlines processes for Public Transport Operators (PTOs) and public administrations, making them more efficient and easier to manage.

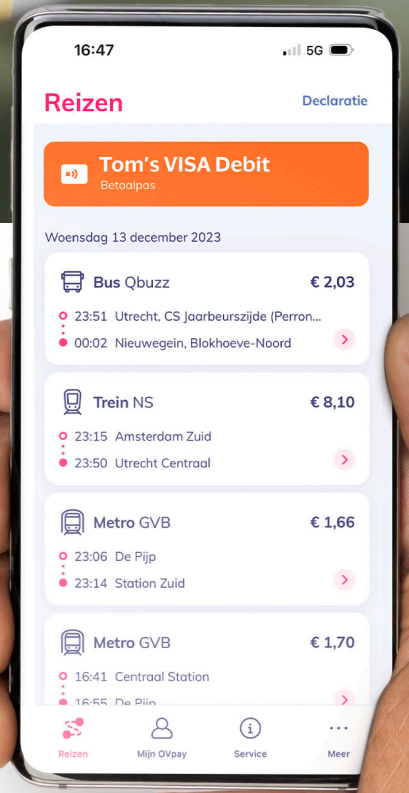
For passengers, OVpay simplifies access to use transportation networks by allowing them to use their preferred contactless payment method, eliminating the need to obtain and

recharge transit cards. This streamlined process reduces queues and waiting time to purchase tickets. The backend system automatically charges the card the best price for the journey, removing the complexities of downloading apps or choosing between ticket options. OVpay promotes financial inclusion by offering options like private issued cards with closed-loop functionality, enabling unbanked individuals to access public transport systems. OVpay caters not only to spontaneous travellers but also to commuters, concession holders, and those who prefer alternatives to bank or credit cards.

Open-loop EMV systems offer advantages to PTOs by reducing ticketing costs, minimizing vehicle dwell time, and enhancing overall efficiency. By enhancing the customer experience and subsequently increasing the usage of public transport, this initiative contributes to higher usage of public transport systems. By transitioning from paper-based tickets to card-based tickets and now to an account-based solution, municipalities have been gradually improving the payment security, while the digitalization offers better access to data-driven insights and value-added services. This, in turn, leads to

enhanced fiscal transparency and increased economic output as digital payment systems substantially decrease ticket management expenses. Moreover, the need for developing and issuing individualized smart cards or mobile applications for each city is eliminated, saving valuable time, effort, and costs associated with maintaining customized systems. An enhanced user experience is expected to drive higher utilization of public transport. This, in turn, will naturally lead to a decrease in car travel, lower carbon emissions, and contribute to the development of sustainable urban areas.

In summary, OVpay offers numerous advantages to passengers, including an improved user experience and time savings. Municipalities benefit from simplified systems and reduced carbon emissions, while PTOs enjoy increased efficiency, cost savings, and valuable data-driven insights. By reducing reliance on physical cards and paper tickets as well as increasing the usage of public transport mode, open-loop EMV systems provide a more sustainable and streamlined solution for transportation networks.



Dutch public transit in context

The public transportation system in the Netherlands is one of the most efficient and well-connected systems in Europe, with millions of passengers traveling across the country every day. The country's railway system has a density of 73.61m railroad per km², which is far higher than the European average of 42.85m railroad per km², providing seamless connectivity between all regions. The total route network covers 3,223 kilometres².

Public transport emerges as a popular mode of transportation, accounting for 8% of the total kilometres travelled in 2021 which is on average 806 kilometres travelled per person³. According to an interview with Translink in May 2023, the company that provides the national ticketing systems, 60% of the revenue is generated from rail, while the remaining 40% comes from buses, metros, and trams⁴. This can be attributed to the higher ticket prices for trains

compared to the lower prices for metro, bus, and tram rides. The public transport system witnessed completion of 12.6 billion kilometres in 2021 and is expected to double by 2026³. This measure plays a vital role in transportation planning, as it represents the volume and distance travelled across trains, busses, trams, and subways. On a daily average, four million passengers are using public transport in the Netherlands, bringing in four billion Euros in yearly revenues⁵.

Amsterdam Central Station, Rotterdam Central Station, and Utrecht Central Station are the top three railway stations in the Netherlands, showcasing their significance as major transit hubs³.



Ticketing lifecycle in three eras: paper-based, card-based, account-based

The ticketing in the first era was no different than the one introduced in the 20th century in any other country based on paper tickets. Known as the “Strippenkaart,” this ticket took the form of a stamp card. Passengers had to get their tickets stamped each time they used public transport, and they could stamp it for an entire day, using multiple stamping spots on the paper card.

The beginning of the second era was marked by a major shift in the Netherlands’ ticketing system as the closed-loop card-based OV-chipkaart took over as the preferred ticketing system against paper tickets. It started in 2005 when the system was introduced in Rotterdam and reached full implementation by July 2014. This implementation was a result of collaboration among the country’s public transport operators, working through Translink.

Compared with paper tickets, using the OV-chipkaart is a breeze. Passengers simply tap the card at designated readers when they hop on and off the transport vehicle. The card serves as a stored-value or travel product card, capable of storing different types of tickets as well as offering an automatic reload option. When checking in, a deposit is deducted from the card, and upon check-out, the remaining balance (excluding the fare) is refunded. The initial implementation utilized advanced MIFARE technology.

The OV-chipkaart’s usage skyrocketed, making it the go-to ticketing solution in recent years, with 14.6 million active OV-chipkaarts in circulation. In 2022 alone, the system’s back office operated by Translink processed 2.14 billion transactions, cementing its position as the preferred payment method for seamless public transportation experiences⁵.

However, to address potential risks from the outmoded MIFARE technology, to reduce the costs associated with card issuance and the maintenance of Ticketing Vending Machines maintenance, and consistently enhance the customer experience, the evolution of ticketing systems in the Netherlands entered its third era with the introduction of OVpay. OVpay is the brand under which all future ticketing offerings are launched. Its main component is an account-based ticketing (ABT) system that uses open-loop EMV credentials as account identifier and payment method simultaneously. This is what allows passengers to use their own bank or credit card to tap in and tap out. In addition, the ABT also supports e-tickets (QR codes) and the OV-pas. To support inclusivity and serve customers who will not or cannot use open-loop cards, closed-loop EMV cards that are only accepted for public transport close the gap and are branded under the name OV-pas.

OVpay achieved nationwide implementation as an open-loop solution by June 6,

2023⁵. The inception and development of OVpay can be traced back to 2014 when collaborative discussions took place among government entities, transport operators, issuing and acquiring banks, card schemes, and Translink. Building upon the expertise gained from OV-chipkaart’s 16-year journey and drawing lessons from open-payment systems in other countries, OVpay’s foundation is solid. A significant milestone was reached in 2019 when the National Railways NS spearheaded a successful pilot project between The Hague and Leiden. The positive outcomes and feedback paved the way for OVpay’s nationwide deployment. In 2021, Lelystad became the first city to embrace the new open-loop system. Presently, OVpay has been widely adopted across every Dutch city & town, with an extensive network of 60,000 terminals equipped to accept EMV cards and credentials⁵.

What is OVpay exactly, how does it work and how is it implemented? The next section will answer these questions in detail!



What is OVpay exactly?

People want freedom on how to travel and how to pay, be it through public transportation or any other mobility solution. We believe that access, payment and usage of these services should be intuitive and easily accessible. We are committed to this goal every day, both now and in the future.

Peter van Dijk, CEO of Translink



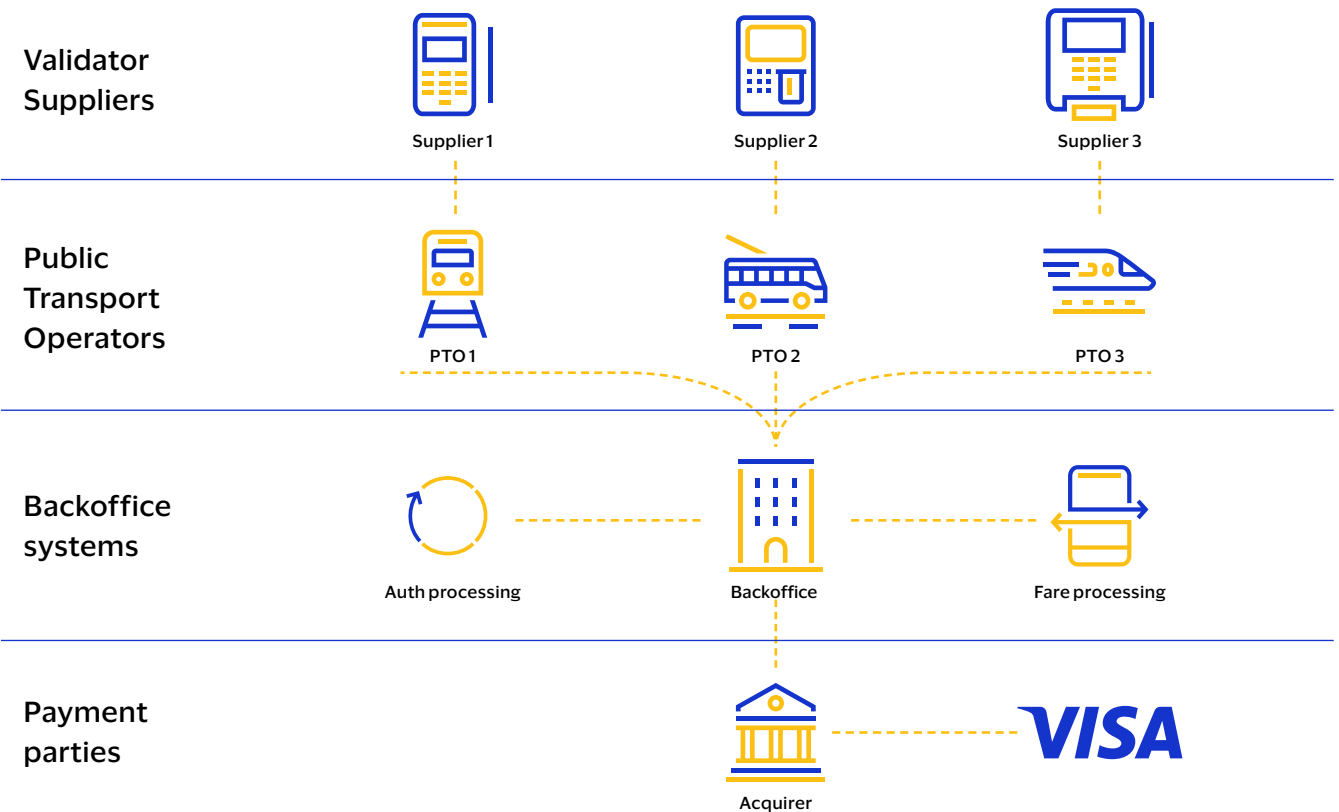
OVpay, the latest open-loop payment solution for public transport in the Netherlands, revolutionizes the way passengers pay for their journeys. With OVpay, passengers have the freedom to use their preferred payment method, whether it is a contactless debit or credit card, smartphone, or smartwatch. In the initial phase, the default fare is a second-class ticket based on the distance travelled, without any discounts or subscriptions. However, phase 2 will introduce exciting new features such as discounts as well as subscription options.

From a passenger's perspective, the OVpay system operates similarly to the existing OV-chipkaart but with notable enhancements in terms of convenience, security, and simplicity. To start a journey and check-in, passengers only need to tap their preferred payment device (contactless card, smartphone, wearable, etc.) against a card reader or gate when entering the station or vehicle. To check the validity of the card, an Account Verification Request is executed in the background. When the passenger arrives at his destination, the same action is repeated to check out. These taps are processed swiftly, with an offline data authentication taking less than 500 milliseconds⁵. At the end of the day, the payment is automatically processed. The total cost of trips made during the day is calculated, and the corresponding amount is charged the next day using the chosen payment method. By the end of 2023, some PTOs started to introduce discount

products when using the bank card. Soon, PTOs can introduce also fare capping to ensure passengers always get the best price for instance within the city boundaries. Detailed ride summaries can be easily accessed through the OVpay website or mobile application. To view these records, passengers will have the option to register for the OVpay app. Alternatively, passengers can access these records anonymously by referring to a service code provided in their bank statements and entering it on a dedicated website. It is crucial for passengers to ensure that their card has sufficient balance to cover all their daily journeys. Failure to ensure sufficient balance on the card will result in the card being blocked for future check-ins on public transport. However, the blocked cards will be automatically removed from the deny list as soon as the transaction authorizing the debt is approved in accordance with Visa's MTT regulations. Regarding inspections, passengers simply need to present their used payment device to the inspector's device, confirming their valid check-in.



Urban Mobility system architecture





What happens when you tap with a Visa card?



In the traditional Tap to Ride setup, each region, operator, or means of transport has its own ticketing infrastructure. These systems handle tariffs, fare calculations, and revenue collection independently. To do that, their architecture consists of various components including front-end validators, a transit back office, a payment service provider, and an acquirer. This works fine unless multiple systems are operating in the same area which can lead to interoperability issues and a fragmented user experience. Passengers must deal with multiple vendors and miss out on the benefits of a unified fare structure. To overcome these challenges, an integration layer can be introduced to consolidate tariffs, calculate fares, and reconcile fare collection across operators. The integration layer itself does not act as a merchant; instead, each operator acts as one and therefore must employ their own acquirer.

Another approach to achieving ticketing interoperability is through a centralized fare collection entity, like Translink for OVpay. This entity takes on the responsibility of consolidating tariffs, calculating fares, collecting revenue on behalf of the operators, and distributing the revenue accordingly. Operating as a “merchant of record,” the fare collection entity streamlines processes in a central back office and works with an acquirer (EMS for OVpay) for payment processing. By assuming the role of the ticket seller, the entity offers passengers a seamless ticketing experience, eliminating the need to engage with multiple vendors. The revenue collected is then distributed among the operators based on predefined rules. Each public transport operator acquires licensed front-end validators that connect to the centralized ticketing back office. The selection of validators may vary across operators, allowing for customization to meet their specific requirements. For example, a metro operator may require validators that activate gates, while a bus operator may opt for smaller onboard validators.



How does this apply in the Netherlands?

The Dutch transit landscape has a unique and centralized ticketing system that sets it apart from other countries. This system involves various entities working together to ensure efficient and convenient transportation services for the public.

One pivotal player in this setup is the “Nationaal Openbaar Vervoer Beraad” (NOVB) that serves as the National Public Transport Council in the Netherlands. It acts as a connector between transit parties and the decentralized regional governments, playing a crucial role in shaping and coordinating public transport policies. In collaboration with decentralized governments and the Cooperative, the NOVB initiated to develop OVpay as the successor to the existing OV-chipkaart payment system.

On the other hand, all PTOs in the Netherlands collaborate beneath the banner of “Coöperatie Openbaar Vervoerbedrijven” (Public Transport Companies Cooperative). Established on January 1st, 2016, this cooperation aims to provide improved and cost-effective solutions for public

transport payments whereas all PTOs are the shareholders. To facilitate nationwide fare collection, the cooperation founded Translink, the payments heart of the Dutch public transport system. Translink plays a pivotal role in enhancing the payment experience for passengers, ensuring a seamless process.

Translink enacts the role of “merchant of record” explained above and operates the centralized ABT system, managing the behind-the-scenes processes. While Translink oversees the fare collection system, it is worth noting that some Dutch operators, particularly the larger ones, maintain their own back office operations to safeguard and supervise Translink’s system. While Translink uses only one main backend system, there is an open-market model for hardware tools which allows PTOs to select from a variety of validator suppliers already certified by Translink to interface with its backend system. This freedom of choice plays a key aspect in the success of OVpay.

With over 2.7 billion public transport transactions annually, Translink generates

a wealth of travel and transaction insights⁶. These valuable data points serve as essential resources for policymakers, enabling evidence-based decision-making and policy development. Additionally, Translink at this moment relies on only one acquirer (EMS) for efficient payment transaction processing.



OVpay has a customer centric approach. Technology is adapted to meet customer demands; our objective is a customer satisfaction of 9+ out of 10. Only this way EMV technology will meet its promise.

[Bas van Weele, Program Director of OVpay](#)



Promising results so far

OVpay shows a progressively growing number of usages. This indicates a trend for the near future, where OVpay is projected to become the primary ticketing method in Dutch public transport.

One of the PTO's stated that they recorded 70,000 trips⁷ paid with OVpay already in the first week after launching the open-loop service. The monthly cumulative taps in the Netherlands have increased significantly from 7.3 million in April 2023 to 22 million in December 2023⁹. Despite the remarkable growth, the Dutch open-loop EMVco system is currently only utilized for single, full-fare rides, which account for approximately 6% of total trips⁵. However, in terms of full fare taps, EMV taps have already secured a 30% market share⁵ as of at the end of December 2023. **Translink expects a potential of 50% to 60% of full fare tickets⁵ tapped with EMV**, as kids, elderly, and anonymous passengers would regularly use EMV-based ticketing. Customer satisfaction with OVpay has already achieved a score of 7.8 out of 10 in April 2023⁵ although Translink aims to improve this score significantly as more validators are deployed OVpay boosts efficiency and saves costs by reducing the need for staff to sell tickets, like drivers or physical POS stations. It also decreases the dependency on ticket vending machines, leading to a reduction in total cost of ownership (TCO). **Translink's overarching goal and expectation is to decrease the TCO from 14% to below 10%⁵.**

In the short period since the nationwide introduction of the OVpay system in June 2023, significant levels of adoption have been observed. While long-term results are not yet available, the substantial increase in taps on OVpay has led to expectations of rapid development, with the potential of becoming the primary mode of public transport ticketing.



Which role does Visa play?

Visa's mission is to uplift everyone by becoming the best payment solution worldwide. We recognized the need for a flexible global standard, enabling passengers to easily tap and ride, while also creating a framework to meet industry standards for passenger throughput and tariff calculations based on their profiles and all their trips during the travel period. The framework would

also contain clear rules regarding debt recovery that gain consensus among all banks.

Visa has introduced the Mobility and Transport Transaction Framework (MTT) to establish guidelines and best practices for enabling the acceptance of "open-loop" payment cards using contactless EMV technology. This initiative aims to facilitate

fast, convenient, and secure automatic fare collection within the Urban Mobility environment. OVPay serves as a prime example of how the MTT framework can be successfully implemented at a national level, demonstrating its practical application and effectiveness in enabling seamless payment solutions for transit systems.



However, MTT is just the beginning.

Delivery Lifecycle



Discovery



Vision



Initial Design



Procure/
Develop



Testing



Pre-launch



Launch



Post-launch

Implementing a national transit project like OVPay involves multiple public and private enterprises, including PTOs, Tech Partners, system integrators, governmental authorities, and financial services organizations from various locations worldwide. With its vast experience in over 750+ projects and an extensive network, Visa plays a pivotal role in facilitating and guiding these projects throughout the entire Delivery Lifecycle. In the case of OVPay, Visa was instrumental in the Discovery phase, exploring and showcasing the possibility of integrating bank cards as an alternative to tickets to benefit all stakeholders. Drawing on their expertise from previous projects, Visa assisted Translink in creating a Vision that aligned the project's purpose with

long-term strategic objectives. During the Initial Design stage, Visa ensured adherence to the MTT framework's best practices and guidelines. To guarantee successful Procure and Development, Visa provided Translink with the resources of the Visa Ready for Transit Program, which includes a list of certified Tech Partners. Before launching any Tap to Ride system to the public, Visa implemented a thorough certification and Testing process which was executed in full for OVPay. Once the technical system was ready, Visa supported the execution of the Pre-launch engagement plan that included the preparation and activation of Communications, PR, Marketing, and Customer Services leading to the system's successful Launch. Visa maintains regular

Post-Launch advice with Translink and all Tech Partners, monitoring system adoption, addressing real-world issues, and collaborating on further optimizations and improvements.



Your take away

In conclusion, the Dutch public transport ticketing system has evolved through three distinct cycles, each addressing challenges and enhancing the user experience. The latest introduction of OVpay represents a cutting-edge solution that is expected to experience rapid adoption. OVpay offers significant cost savings for public transport operators and government administrations while providing passengers with an effortless and user-friendly experience.

By eliminating the need for buying tickets, OVpay streamlines the payment process and provides passengers with detailed ride summaries. According to Translink, the success and advantages of OVpay are a result of strong collaboration between all participating parties. Strategic decisions made by NOVB, Translink, and public transport operators enabled swift and efficient implementation, with customized solutions for any challenges encountered.

Key factors for the successful implementation of these ticketing systems include robust collaboration among all parties involved. Building upon the expertise gained from previous systems like the OV-chipkaart, close cooperation,

and effective communication played a vital role in shaping OVpay. Collaborative discussions, pilot projects, and stakeholder feedback contributed to the development of an innovative and user-friendly ticketing solution.

Throughout the implementation of OVpay, Translink identified several valuable lessons that should be considered as recommendations. The issue of card clashes arose as passengers were accustomed to tapping their entire wallet with the unique OV-chipkaart system. With the acceptance of any contactless bank card as a valid payment method, confusion can occur, leading to missed check-outs. Mitigating this issue requires effective communication and well-established service processes. Overall, Translink emphasized the importance of effective communication and collaboration between all stakeholders involved in implementing a transit ticketing system. By leveraging the expertise and input of various parties and maintaining open lines of communication, it is possible to overcome challenges, improve user experiences, and achieve successful outcomes in public transportation ticketing systems.

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