

Ghana Electronic Transport System (GETS)

A Unified Digital Fare Payment Framework for Public Transportation in Ghana

ONE TAP TRAVEL EASILY

AUTHOR	Francis Blay Andoh
ATTRIBUTION	Founder, Ghana Electronic Transport System (GETS)
OFFICIAL SLOGAN	One Tap Travel Easily

Abstract

Public transportation remains an essential component of mobility and economic activity in Ghana. However, fare collection across buses, trotros and other forms of public transportation remains largely dependent on cash transactions. This creates challenges including the need for passengers to carry physical cash, difficulties in providing exact change, limited transaction records, revenue-management challenges for transport operators, and limited availability of structured transport data for planning and policy development.

This article introduces the Ghana Electronic Transport System (GETS), a proposed unified digital transport-payment ecosystem designed by Francis Blay Andoh, Founder of GETS, to modernise fare collection and passenger mobility within Ghana's public transportation sector. GETS proposes the use of a reusable contactless transport card supported by a digital platform through which passengers can pay for journeys by tapping the card on compatible fare-validation devices. The proposed system is designed with Ghana's technological and socioeconomic environment in mind, including intermittent internet connectivity, widespread mobile-money usage and the importance of informal and semi-formal transport operators.

The proposed architecture incorporates offline-capable fare validation, electronic balance management, USSD and mobile-money integration, authorised top-up agents, transaction synchronisation and a pathway towards account-based ticketing and additional digital payment methods. Beyond payment convenience, GETS has the potential to generate structured transport data that could support route planning, demand analysis, revenue accountability and evidence-based transportation policy. The article presents the motivation, conceptual architecture, operational model, implementation strategy, potential benefits, challenges and future development pathway of GETS as a locally oriented approach to public-transport digitalisation in Ghana.

Keywords: *Ghana Electronic Transport System, GETS, smart transportation, public transport, contactless payment, smart card, mobile money, digital fare collection, transport technology, Ghana*

1. Introduction

Public transportation plays a critical role in Ghana's social and economic development. Every day, millions of journeys are undertaken for employment, education, healthcare, commerce and other activities. Buses, minibuses commonly known as trotros, taxis and other transport services form an important part of this mobility ecosystem.

Despite increasing digitalisation within Ghana's financial sector, payment for many public-transport journeys continues to depend heavily on cash. Passengers frequently pay drivers or conductors directly, while operators depend on manual processes to collect and reconcile revenue.

Cash-based fare collection can create several operational challenges. Passengers may experience difficulties obtaining change, while transport operators may have limited access to comprehensive transaction histories. At a broader level, the absence of integrated digital fare data can make it more difficult to understand passenger demand and travel patterns.

Ghana has simultaneously experienced substantial growth in electronic payments, particularly mobile money. This creates an opportunity to extend digital-payment infrastructure into public transportation.

The Ghana Electronic Transport System (GETS) is proposed as a response to this opportunity.

GETS is a Ghana-focused digital fare-payment and transport-management concept founded by Francis Blay Andoh. Its central vision is to establish a reusable payment mechanism capable of supporting journeys across participating public-transport services.

The philosophy of the project is represented by its slogan:

“One Tap Travel Easily.”

Rather than requiring passengers to manage different payment mechanisms for different operators, GETS envisions an interoperable ecosystem in which a passenger can maintain value within the GETS system and use a contactless card to pay for eligible journeys.

2. The Public-Transport Payment Problem

Ghana's transportation environment contains characteristics that must be considered when designing a digital fare-payment system.

A significant proportion of public transportation operates through decentralised networks of private operators, unions, drivers and vehicle owners. Consequently, implementing digital ticketing cannot simply involve transferring a technological model developed for a completely different transport environment.

Several practical challenges must be considered.

First, cash remains highly important in everyday transport transactions. Any transition towards digital payment must therefore be gradual and accessible.

Second, internet connectivity cannot always be guaranteed throughout a passenger's journey. A transport-payment system that requires uninterrupted internet connectivity could consequently experience operational difficulties.

Third, many passengers already interact extensively with mobile-money services. A new transport-payment ecosystem should therefore complement rather than unnecessarily replace existing digital-payment behaviour.

Fourth, public transportation involves multiple stakeholders, including passengers, drivers, conductors, transport unions, station managers, mobile-money vendors, financial institutions, telecommunications providers and government authorities.

GETS therefore proposes an ecosystem approach rather than simply introducing another payment card.

3. The GETS Concept

GETS is conceived as an integrated electronic fare-payment platform centred initially on a reusable contactless transport card.

The fundamental passenger experience is intentionally straightforward:

Top Up → Board → Tap → Travel

A passenger obtains a GETS card and loads value onto it using an approved funding channel. When travelling on a participating transport service, the passenger presents the card to a compatible validator.

The system authenticates the card, determines the applicable fare according to the configured fare model and records the transaction.

Where appropriate, the corresponding amount is deducted from the passenger's available transport balance.

This approach is intended to reduce the number of steps required to pay for transportation while creating an electronic transaction record.

4. Proposed System Architecture

The GETS ecosystem can be conceptualised through several interconnected components.

4.1 GETS Contactless Card

The physical GETS card serves as the primary passenger payment instrument during the initial implementation phase.

Each card would contain a unique identifier recognised by the GETS platform. The card would be designed for repeated use rather than being restricted to a single journey.

The proposed model does not require the standard card to display extensive personal information. This simplifies initial distribution while reducing unnecessary collection of passenger information.

4.2 Fare Validator

Participating vehicles or stations would use compatible validation devices.

When the passenger taps a GETS card, the validator would perform the required fare-processing operations and provide immediate confirmation that the transaction has succeeded or failed.

4.3 GETS Backend Platform

A central backend would provide the core management infrastructure for the ecosystem.

Potential functions include:

- card and device management;
- transaction processing and synchronisation;
- balance management;
- operator settlement;
- fare configuration;
- security monitoring;
- transaction auditing;
- reporting and analytics.

The backend would therefore function as the central technological infrastructure connecting passengers, transport operators and authorised service providers.

4.4 Offline-Capable Operation

One of the important design considerations for GETS is the ability to continue essential fare operations during temporary connectivity interruptions.

Validators could securely maintain required transaction information locally and synchronise eligible records with the central platform when connectivity becomes available.

An offline-first or offline-capable architecture is particularly important when developing transportation technology for environments where uninterrupted mobile connectivity cannot always be assumed.

5. Mobile Money and USSD Integration

GETS is intended to integrate with Ghana's existing digital-payment ecosystem.

Rather than requiring passengers to depend exclusively on banking applications or smartphones, the platform proposes multiple methods of loading transport value.

Potential channels include:

- mobile money;
- USSD;
- authorised GETS vendors;
- participating mobile-money agents;
- transport-station service points;
- future mobile and web applications.

USSD integration is particularly important because it can provide access to essential GETS services without requiring a smartphone application.

A passenger could potentially enter a GETS card number, specify an amount and authorise payment through a supported mobile-money service.

This creates a connection between Ghana's established mobile-payment infrastructure and public transportation.

6. GETS Passenger Application

Although the contactless card forms the foundation of the proposed initial system, GETS can eventually be complemented by a passenger application.

The application could provide functions such as balance checking, transaction history, top-ups, card management, journey information and customer support.

Future development could also introduce digital wallets, QR-based payments and other payment mechanisms.

The physical card nevertheless remains important because GETS is intended to accommodate passengers with different levels of access to smartphones and mobile data.

The objective is therefore not to make smartphone ownership a requirement for accessing digital public-transport payments.

7. Fare Models

The GETS architecture can support different fare models depending on the requirements of participating transport services.

For fixed-fare services, a passenger could tap once and have a predetermined amount deducted.

More sophisticated networks could implement tap-in and tap-out functionality.

Under this approach, the passenger taps when entering the transport network and taps again when completing the journey. The platform then calculates the applicable fare according to configured rules such as distance or fare zones.

This flexibility could allow GETS to operate across different categories of transportation without requiring every participating operator to adopt an identical fare structure.

8. Potential Benefits

GETS could provide benefits to multiple stakeholders within Ghana's transportation ecosystem.

For passengers, the system could reduce dependence on cash and difficulties associated with finding exact change. A reusable card could also create a more consistent payment experience across participating transport services.

Transport operators could benefit from electronic transaction records, improved fare accountability and access to operational information.

For government agencies and transport planners, appropriately governed and aggregated data could provide insight into travel demand, passenger volumes and route utilisation.

Such information could support evidence-based decisions regarding transportation infrastructure and service planning.

The system could also contribute to Ghana's broader digital-transformation agenda by connecting transportation with the country's growing electronic-payment ecosystem.

9. Data and Transport Planning

The significance of GETS extends beyond fare collection.

A digital fare platform can generate structured operational information that is difficult to obtain consistently from cash-only transportation.

For example, aggregated and appropriately protected data could potentially help identify:

- heavily utilised routes;
- passenger-demand periods;
- transfer patterns;

- transport capacity requirements;
- revenue trends;
- areas experiencing transportation pressure.

However, transport data should be collected and processed according to appropriate privacy, cybersecurity and data-governance principles.

GETS should therefore incorporate data protection into its technical architecture rather than treating privacy as an afterthought.

10. Security Considerations

Security is critical for any system responsible for processing monetary value.

The GETS architecture would therefore require safeguards covering the card, validator, communications infrastructure and central platform.

Potential measures include cryptographic authentication, secure communications, controlled device registration, transaction integrity verification, fraud monitoring and secure administrative access.

Offline functionality would also require carefully designed controls to prevent duplicated transactions, balance manipulation and other forms of abuse.

Cybersecurity should consequently form a core workstream throughout the development and deployment lifecycle.

11. Proposed Implementation Strategy

A nationwide transportation-payment infrastructure should not be deployed as a single untested implementation.

GETS would be better introduced incrementally.

An initial prototype could demonstrate the fundamental technological concept: card issuance, balance loading, card validation, fare deduction, transaction recording and backend synchronisation.

Following successful technical testing, a controlled pilot could be implemented on selected routes or with selected transport operators.

The pilot could evaluate transaction speed, passenger acceptance, device reliability, connectivity behaviour, security, operator experience and financial reconciliation.

Results from the pilot would then inform subsequent expansion.

This phased approach would allow technical and operational problems to be identified before larger-scale implementation.

12. Future Development

The long-term GETS architecture can extend beyond a physical prepaid card.

Potential future developments include:

- **Account-Based Ticketing (ABT):** Passenger value and travel rights could increasingly be maintained securely within backend accounts rather than depending entirely on information stored on a physical card.
- **Bank-Card Payments:** Compatible validators could eventually accept supported contactless debit and credit cards.
- **Mobile Wallets:** Passengers could potentially use compatible smartphones and digital wallets.
- **QR Payments:** QR technology could provide another payment mechanism for passengers and transport services.
- **Advanced Transport Analytics:** Aggregated transaction information could contribute to predictive demand modelling and transport planning.
- **Integration with Additional Transport Modes:** The platform could potentially expand to other participating public-transport services as Ghana's transportation infrastructure develops.

GETS should therefore be viewed as a developing transport-payment ecosystem, rather than solely as a physical card.

13. Challenges and Considerations

The implementation of GETS would require solutions to several technical, economic and institutional challenges.

These include the initial cost of validation hardware, integration with existing operators, cybersecurity, telecommunications availability, passenger education, revenue settlement, regulatory compliance and stakeholder coordination.

Adoption among informal and semi-formal transport operators may represent one of the most important implementation considerations.

Successful deployment would consequently require collaboration between technology developers, transport operators, unions, telecommunications companies, financial institutions, regulators and relevant government agencies.

GETS must also demonstrate that digital payment creates practical value for drivers and operators rather than simply transferring additional complexity to them.

14. Discussion

The technological transformation of transportation systems should reflect local conditions.

Systems used successfully in highly centralised transportation networks cannot necessarily be transferred directly into Ghana's decentralised public-transport environment without adaptation.

The proposed GETS model therefore emphasises interoperability, mobile-money integration, offline-capable transactions, accessible top-up mechanisms and phased implementation.

These characteristics reflect an important principle in technology development: successful innovation does not necessarily require replicating another country's system. It requires identifying proven technological concepts and adapting them appropriately to local social, economic and infrastructural realities.

GETS represents an attempt to apply this principle to Ghanaian public transportation.

15. Conclusion

The Ghana Electronic Transport System (GETS) proposes a unified digital ecosystem for modernising fare payment within Ghana's public-transport sector.

Founded by Francis Blay Andoh, the project proposes combining reusable contactless transport cards, digital fare validation, mobile-money and USSD integration, offline-capable transactions, authorised top-up channels and centralised transaction management.

The proposed platform could reduce dependence on cash while improving passenger convenience, operator accountability and the availability of transportation data.

Nevertheless, successful implementation will depend on more than technology. It will require effective partnerships, regulatory compliance, strong cybersecurity, sustainable financial arrangements and acceptance among passengers and transport operators.

A phased implementation beginning with prototype development and controlled pilot deployment provides a practical pathway for evaluating these requirements.

Ultimately, GETS presents a vision in which a passenger can move across participating transport services through a simple interaction:

One Tap Travel Easily.

Author and Project Attribution

Francis Blay Andoh is the Founder of the Ghana Electronic Transport System (GETS) and originator of the GETS project described in this article.

- Project: Ghana Electronic Transport System (GETS)
- Founder: Francis Blay Andoh
- Slogan: One Tap Travel Easily
- Focus: Digital Fare Collection | Smart Mobility | Contactless Transport Payments | Ghana Public Transportation

Declaration

This article presents the conceptual framework and proposed architecture of the Ghana Electronic Transport System (GETS). Features described as proposed, potential or future capabilities should not be interpreted as currently deployed nationwide infrastructure. Further technical development, stakeholder consultation, regulatory assessment, field testing and pilot implementation are required before large-scale deployment.