The Future of Mobility – Driven by NFC

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NFC FORUM

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Introduction

The world is becoming increasingly urbanized. According to the United Nations, 55% of the global population were city-dwellers in 2018; that number is expected to grow to 68% within 30 years.[1] By 2030, the world is projected to have 43 megacities, each with 10+ million inhabitants.

This increasingly dense concentration of populations poses challenges for urban mobility. Among these issues are: overcrowding and affordable housing shortages; environmental and climate issues; maxed-out public transport systems and longer commutes; longer queues for services; and stress, inconvenience, and wasted time. The COVID-19 pandemic has only exacerbated the situation as commuters seek safer ways to travel, whether in private cars or via public transport modes that support contactless ticketing.

However, urbanization also offers new opportunities for mobile operators and their partners. More populous cities mean large and accessible audiences for mobility services. They can better support upgrades and improvements that allow existing infrastructure and systems to offer greater value and convenience to consumers. The increasing convergence of transport and payment systems (moving from closed-loop to open-loop models) opens additional opportunities for existing infrastructure. And improved mobility services can support contactless solutions that, because they require no surfaces to be touched, better support public health and satisfy consumer demand for safer transactions in the post-pandemic world.

In this increasingly urbanized world, NFC technology can help cities overcome the challenges and take advantage of the opportunities. This white paper takes a closer look at how NFC can empower mobility, supporting a broader range of services in a heavily-populated urban ecosystem.

The growing needs of an urbanized world

As the world's population becomes more concentrated in urban areas, solutions are needed to make megacities more livable for everyone. Let's examine some of the major mobility-related needs:

Easier transport access

Many cities are experiencing ridership declines due a lack of flexibility within the transport system to accommodate modern riders' needs and preferences. As ridership declines, use of ride-sharing services grows, only increasing urban congestion. By making it easier to pay for and access both public and private transport, cities can help increase ridership and reduce congestion.
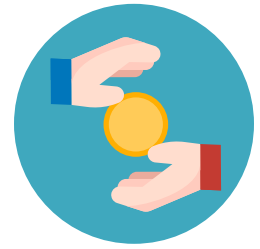
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1   https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html

More affordable, efficient public transport operation

Many public transport organizations have high costs due to staffing needs, pension costs, insecure fare media, fare evasion, and other operational expenses. Interoperability between services and devices is key to ensure high adoption rate and a seamless user experience.
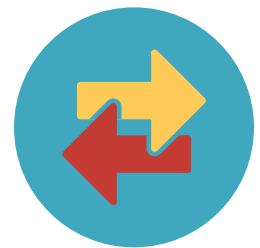
With the fiscal and operational challenges of closed, non-interoperable, proprietary systems, transport organizations need solutions that are more adaptable to change, reduce expenses, increase security, and reduce staffing needs – thereby making operations more efficient and the cost of transport more affordable.

These solutions also need to be flexible enough to support different demographic groups and form factors, such as mobile phones, in multiple regions so that riders of all kinds – daily commuters, business travelers, and tourists alike – have the same easy access.

Broader transport interoperability

As commuters travel longer distances to and from work, they may require the use of multiple modes of public and private transport – such as buses, subways, and trains – in a single day. That means these busy riders may have to juggle multiple cards, accounts, and payment methods on a daily basis. Transport interoperability – whereby payment and access methods can be shared across different modes and operators – can increase ease and convenience for riders while reducing expenses for transport providers.

Better, more up-to-the-minute commuter information

In a heavily congested urban environment, it's essential for public transport operators to have self-adjusting systems that automatically reroute riders when travel on the system is affected by service issues, accidents, power outages, and other interruptions.

Ideally, operators would have the means to keep riders promptly informed about these issues and delays, as well as changing departure and arrival times, and to guide them – on an individual basis – to the best available alternatives to improve their experience.

Better support for visitors and tourists

Tourism and business travel are major sources of income for many cities. How major? Each of the 10 best-performing tourism cities in the world brings in more than $19 billion per year, with Beijing topping the list at $32.5 billion[2]. With so much at stake to their economies, cities need to attract more visitors by making their travel experiences more enjoyable and stress-free.

That means navigating language barriers and currency and cultural differences so that tourists and business visitors can get around and enjoy a foreign city as easily as they can at home. To better support out-of-town visitors, cities must also be able to guide travelers through transit changes and provide cost transparency.

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2   https://www.farandwide.com/s/best-tourism-cities-492a16e96eda4df3

More frictionless commerce

There's a reason airports and train stations contain shops and restaurants; Commuters and travelers are also consumers, purchasing goods, food and refreshments, and other services as they travel through the city. For travelers' convenience and to minimize crowding, it is in the best interest of cities to offer solutions that make these purchases as fast and frictionless as possible.

NFC-enabled Mobility-as-a-Service (MaaS) fulfills these needs

The answer to all of these needs is NFC-enabled Mobility-as-a-Service (MaaS) – a more comprehensive, consumer-centric, and seamless approach to mobility that spans all modes of travel and a broad range of related commercial offerings, such as shops, restaurants, hotels, and concierge services. MaaS also allows for the integration of new, innovative services that enable service providers to attract new user groups. Finally, MaaS includes support for multiple form factors, so that riders can choose their preferred medium for their tickets and have their rights available to them on multiple devices of their own choosing.

How the NFC Forum is shaping the market and enabling MaaS

MaaS is an achievable vision of what the future of mobility could – and should – be. To make that vision real, several milestones must first be achieved. Paramount among them are:

- **Broader standardization.** While some components of mobility technology are standardized, the need still remains for standardization of, or guidance on, additional and higher-level system components, such as terminals and front-end and back-end systems. Standardization across transport and financial services is also necessary to avoid "card clash" – forcing riders to choose the right token among transport, EMV, and possibly other tokens at any given time.

- **Greater cooperation and collaboration among transport alliances and regulatory bodies.**

- **A sustainable and flexible base layer of technology** that allows jurisdictions the full flexibility to grow a transport ecosystem beyond pure transport and beyond a card-only experience.

As an independent, broad-based consortium that has played a leadership role in advancing the cause of public transport interoperability and contactless mobile commerce for more than 15 years, the NFC Forum is uniquely positioned to drive standardization and foster the necessary collaboration, both across the NFC Forum membership and with open standards organizations.

Near Field Communication (NFC) offers transport-related capabilities that no other technology can match:

- **NFC supports mobile ticketing**. This makes it easy to purchase, view, and top-up fares.
- **NFC supports easy access**. NFC's tap-and-go operation speeds access and keeps lines short.
- **NFC supports other payments**. NFC can operate in card emulation mode for quick and easy purchases at shops, restaurants, and hotels.
- **NFC supports global open standards for interoperability**. These include ISO/IEC 14443 Type A and B, ISO/IEC 15693, ISO/IEC 18092, and JIS-X 6319-4.
- **NFC supports multiple modes of transport**. NFC works as easily for buses and air travel as it does for subways and trains. NFC is even being used for bike and scooter rentals.
- **NFC enables more efficient operations**. NFC is a more secure solution for transport access and improves fare collection, reducing operating overhead costs and staffing needs. Because riders can tap smart posters when they need information, information-sharing is better and more efficient. And by supporting MaaS, NFC makes the entire transport ecosystem more productive.
- **NFC is more secure than other solutions**. QR codes can be easily duplicated and shared, thereby allowing counterfeiting. NFC cannot be easily duplicated
- **NFC is updatable**. As travel plans change, NFC is flexible enough to accommodate updated information on the rider's mobile device.
- **NFC leverages the rider's mobile device interface**. Unlike QR codes or contactless cards, the mobile device interface enables riders to view their tickets or tokens at any time for greater confidence.
- **NFC supports travelers' preferred languages**. The use of NFC on a mobile phone can overcome the language barrier and offer information and ticket options to users in their own languages.

Over the years, the NFC Forum has devoted considerable time and effort to building bridges and collaborating with other like-minded transport- and payment-related organizations to further global interoperability. These organizations include EMVCo, GSMA, APTA, CEN, IOS, ITSO, STA, and JR East.

The benefits of NFC Forum certification to MaaS

The NFC Forum Certification Program paves the way for MaaS because it confirms that devices, tags, and public transport readers are compliant with NFC Forum specifications. Conformance to the specifications provides consistency of behavior across NFC implementations and sets the foundation for interoperability. Discover more about the NFC Forum Certification Program here.

With NFC uniquely positioned as a key enabling technology to make the MaaS vision a reality, it's helpful to explore the subject through the eyes of a traveler.

If you want to get from point A to point B, finding travel options is easy. There are many Journey Planners linked to search engines and maps that will, if you click the right options, find the right journey for you. You can even choose the quickest, the cheapest, or the greenest.

The difficult part is what to do next and how to navigate the experience in real time. MaaS is a concept that has been developed to answer that conundrum.

Under MaaS, new companies – or forward-thinking industry stalwarts – will arise to offer the customer the opportunity to take their preferred journey by aggregating all the elements into a single transaction: buying the necessary tickets on their behalf, pre-arranging the car or bicycle hire, and loading them to their preferred device.

The difficult part is enabling the traveler to undertake the journey seamlessly and contactlessly – without issues. These issues may include: not knowing which card or token to use for a particular transport mode, dealing with transport system delays, rerouting, overcrowding conditions, and other vagaries of the heavily-populated urban environment.

This is why the NFC Forum's role is so vital. NFC devices are specifically designed to work quickly and seamlessly at every stop along the way – at the car hire desk, the airline check-in, the bicycle docking station, or when you're using the metro, boarding a bus, or catching a long-distance train.

But if you have spent a hundred dollars or more on a wallet full of tickets, permits, and vouchers, can you feel comfortable about undertaking the journey? Can you expect and trust that every element will work when and where you need it?

Yes, your mobile phone can check real-time departure times, bus stands or rail track numbers. It can help you find your way down streets and around airports or rail stations. But you need to be sure that it will also open the metro gate or unlock the bike rack.

At the coffee shop, if the contactless payment doesn't go through, you can always switch to another card or offer cash. But not on public transport. In a big-city transport system, things need to happen very fast – in less than half a second. And they need to happen correctly every time – even when your phone has gone dead or you are right in the middle of a critical move on a gaming app.

With many dollars at stake, you must have complete faith in the NFC device that you just waved at the ticket machine or transit gate. You, the traveler, don't ever want to worry, or even think about it. To achieve that level of trust and consistent performance, it's essential that the NFC Forum tests and certifies that every device performs exactly as it says in the specification.

To put it simply, the customer's trust comes through the NFC Certification program.

And to make sure the other side of the contactless interface (the transit gate, the bus ticket machine or the validator) will recognize your NFC phone or wearable, those public transport devices must also be certified to a compatible level.

That's why the NFC Forum has formed liaison partnerships with other complementary certification schemes, such as those run by the GSMA on behalf of the mobile phone Industry, with EMVCo on behalf of the payments industry and with the Smart Ticketing Alliance (STA) on behalf of the public transport industry.

As an independent, global, broad-based consortium committed to open standards, the NFC Forum is well positioned to forge consensus across these groups.

With back-to-back, proven, complementary certification schemes for that contactless interface, all customers and travelers can set out on their journeys with the confidence that all elements of the journey can be made contactlessly and securely – 100% of the time.

How do MaaS stakeholders benefit from certification?

While MaaS encompasses many more data exchanges than those between mobile devices and readers, NFC Forum certification offers benefits that help ensure seamless travel experiences for both service providers and users.

MaaS service provider benefits

As a MaaS service provider, certification means:

- **Assured performance for your users**. That means greater customer satisfaction and increased loyalty irrespective of device type.

- **Reduced customer support costs**. When things work seamlessly and securely, you have fewer issues to address and require fewer customer support resources.

- **Increased ability to offer new, value-added services**. When you have a virtually bulletproof solution, you can devote more effort and resources to innovation.

Traveler benefits

For travelers enjoying MaaS, NFC certification ensures benefits that make travel and commuting more enjoyable:

- **Greater flexibility and freedom of choice**. You are no longer limited in your travel choices and can revise your plans at will without hassle.

- **Greater customization**. You are free to design and follow your own unique itinerary without inconvenience.

- **Greater personalization**. You can tailor your travel experience to your individual needs and preferences – ideal for travelers with special needs.

- **Greater assurance**. Travel is less stressful and anxiety-provoking.

- **Greater enjoyment**. When you're not distracted by the mechanics of getting around, you're able to enjoy the travel experience more.

The NFC Forum certification MaaS value proposition

NFC Forum certification offers a powerful value proposition for anyone committed to making MaaS a reality:
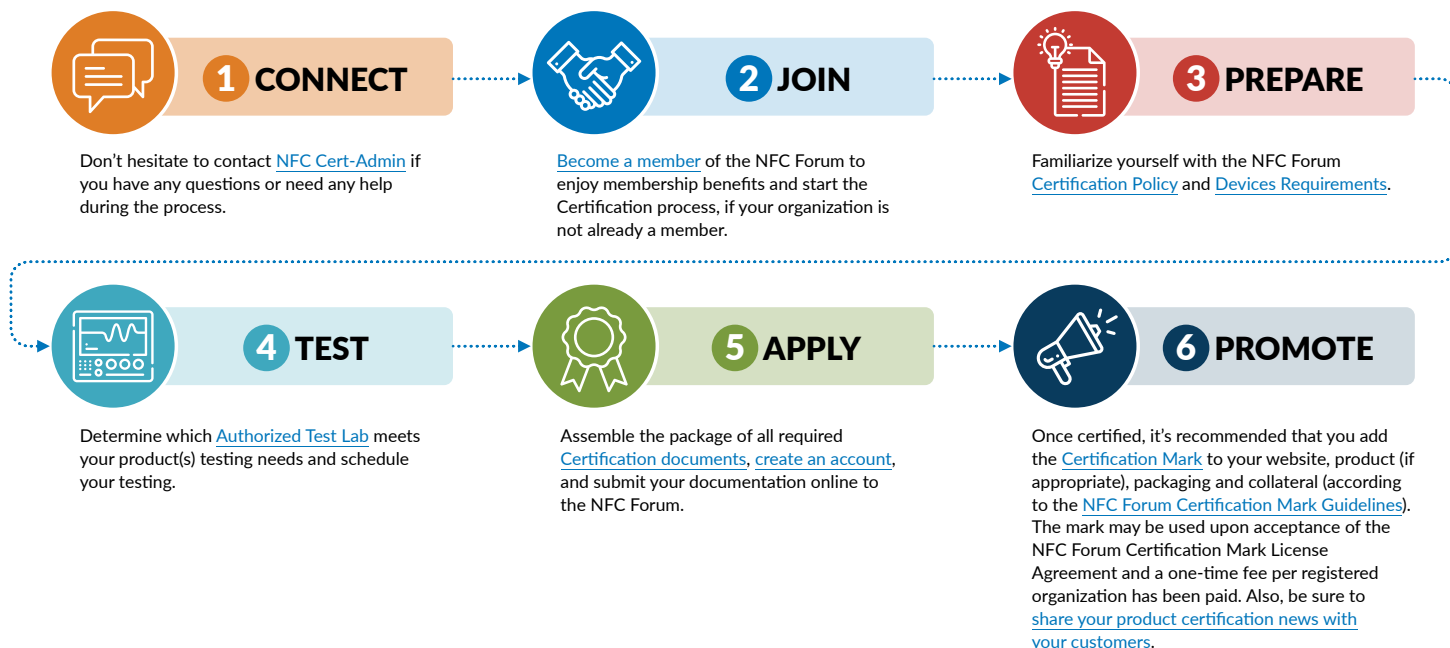
- NFC Forum certification independently and fully addresses the requirements of the MaaS ecosystem player.
- NFC Forum certification provides a neutral, non-proprietary framework – including a compliance test plan executed by third-party laboratories.
- NFC Forum certification delivers the essential boundary conditions for a successful certification that will enable a positive user experience by fulfilling the needs of users.

How service providers can pursue NFC Forum certification

If you're a service provider attracted by the idea of NFC Forum certification, your next step is to know what's involved: how the certification process works and what it requires flow would work for service providers.

STEPS TO CERTIFY

1 CONNECT

Don't hesitate to contact NFC Cert-Admin if you have any questions or need any help during the process.

2 JOIN

Become a member of the NFC Forum to enjoy membership benefits and start the Certification process, if your organization is not already a member.

3 PREPARE

Familiarize yourself with the NFC Forum Certification Policy and Devices Requirements.

4 TEST

Determine which Authorized Test Lab meets your product(s) testing needs and schedule your testing.

5 APPLY

Assemble the package of all required Certification documents, create an account, and submit your documentation online to the NFC Forum.

6 PROMOTE

Once certified, it's recommended that you add the Certification Mark to your website, product (if appropriate), packaging and collateral (according to the NFC Forum Certification Mark Guidelines). The mark may be used upon acceptance of the NFC Forum Certification Mark License Agreement and a one-time fee per registered organization has been paid. Also, be sure to share your product certification news with your customers.

NFC certification is a six-step process from start to finish. Resources are available at the NFC Forum to help make your certification a seamless, smooth, and swift process.

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NFC mobility use cases

Forward-thinking transport operators are already paving the way for MaaS and enhanced mobility services.

Suica brings MaaS to Tokyo

East Japan Railway Company's (JR East) Suica is a proven example of the power of MaaS. Today, citizens of Tokyo can take a train to work, switch to a bike for the last leg of the commute, buy a soft drink, and securely access the office building – all with their NFC-based Suica mobile wallets.

JR East operates one of the world's most advanced railways carrying 17 million riders a day. Its "Move Up 2027" strategy calls for making cities more comfortable to live and work in. Suica is key to this effort, creating an environment in which people can choose the services they want to use and how they want to use them, spanning transportation, shopping and settlement.

Suica began by supporting rail transportation and shopping and is now expanding its services to include:

- **Promotions** – Users who purchase Coca-Cola from a vending machine can earn and track bonus points to earn free bottles of Coca-Cola.

- **The sharing economy** – Docomo Bike Share, Inc. is offering an innovative bike sharing program using Suica to identify and authenticate users so they can unlock and ride bikes.

- **Hotel and building access** – Suica is used to authenticate users and provide secure access to office buildings.

MaaS eases growing pains in Hauts-de-France region

Home to six million people, the fast-growing Hauts-de-France region of France was experiencing increasing traffic congestion and longer commuting times. With 20 mobility operators across the region, multimodal trips were cumbersome and difficult. The region responded by implementing a MaaS solution enabled by NFC. Today, travelers in Hauts-de-France can take advantage of a "door-to-door" mobility service that integrates the transport offerings of public and private operators, including buses, trains, carpools, and bicycles.

The service is based on Conduent Transportation's Mobility Companion Platform and PassPass app. Users can plan a trip by entering dates, times, locations, and preferred modes of transportation. The service responds with the best routes and additional information, such as carbon footprint, rates, and walking time. Travelers purchase all fares from a single platform, and NFC enables ticketing and access.

RATP supports MaaS throughout greater Paris

An NFC-based MaaS deployment is reaping benefits for riders and operators alike on one of the largest transit networks in the world in greater Paris. Régie Autonome des Transports Parisiens (RATP), the state-owned public transport operator, partnered with Wizway Solutions to make MaaS available on the Paris Métro, Île-de-France tram, and RATP Bus

Network, as well as part of the regional express rail (RER) network. The network supports more than four billion trips annually.

The Wizway solution is based a single API that uses NFC technology and securely emulates transit cards on every type of NFC-enabled smartphone. It's implemented on mobile apps (RATP and Ile de France Mobilité) as well as transit apps for major regional cities (Lille, Strasbourg) and regional trains (SNCF) and is compatible with existing contactless readers based on Calypso, an NFC Forum liaison partner.

In addition to ticketing and access, the solution supports journey preparation, including traffic information, fares, maps, itinerary search, and next arrival times in real time. Since May 2020, Wizway has recorded an impressive +144% growth in the use of NFC for transit in France.

Driving the future of mobility together

The NFC Forum calls upon all stakeholders to join us in working to make MaaS a reality and deliver enhanced mobility services to an increasingly urbanized world.

- **If you're a transport operator**, you can look forward to smoother, more efficient, and more profitable operations.
- **If you're a commuter or traveler**, you will enjoy a better transport experience with less hassle and more value-added offerings to choose from.
- **If you're a supporting business**, you can pursue new, incremental revenue opportunities.
- **If you're an innovative service provider**, you can access a global platform for new business growth.

For more information, please visit the NFC Forum website.