



How NFC Tag technology in contactless payment cards is delivering value-added benefits for consumers, retailers and issuers

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Abstract

The majority of payment cards are now contactless thanks to NFC ⁽¹⁾ technology. Those cards or devices ⁽²⁾ also hold the opportunity to provide the owner with value-add services and features that can be easily enabled by the issuer or their service provider. Here, we discuss how these features could be used, explain how they bring benefits and show how accessible they are.

(Note 1) Although NFC (Near Field Communication) has become synonymous with short distance contactless transactions (such as payment and transit systems), the underlying technology is ISO/IEC 14443. In this document, we will use ISO/IEC 14443 and NFC interchangeably.

(Note 2) Payment-enabled devices such as event wristbands, key-fobs, pre-paid refill cups, etc. are growing in popularity and are essentially payment cards without a contact interface or magnetic stripe. All the use-cases mentioned in this document apply to cards and devices alike and we will use the term “Device” to generically describe a payment card or a payment-enabled device.

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Part 1: The NFC revolution

Contactless payment is quietly revolutionizing commerce; a shift that is closely associated with the online generation. More people are now using their mobile phones while inside retail outlets, in order to price-compare, reserve products for immediate pick-up, or even pay for goods at checkout. And with more phones now supporting peer-to-peer payment, they have effectively become personal point-of-sale devices.

The technology behind this is similar to the technology that enables contactless payment cards: Near-Field Communication, or NFC. This describes the wireless technology designed to operate securely over very short distances to enable a wide range of applications. The specifications created by NFC Forum¹ allow its devices to use different communication protocols. As a result, NFC Forum Devices are able to communicate with various Readers, cards and other Devices, as shown in Figure 1.

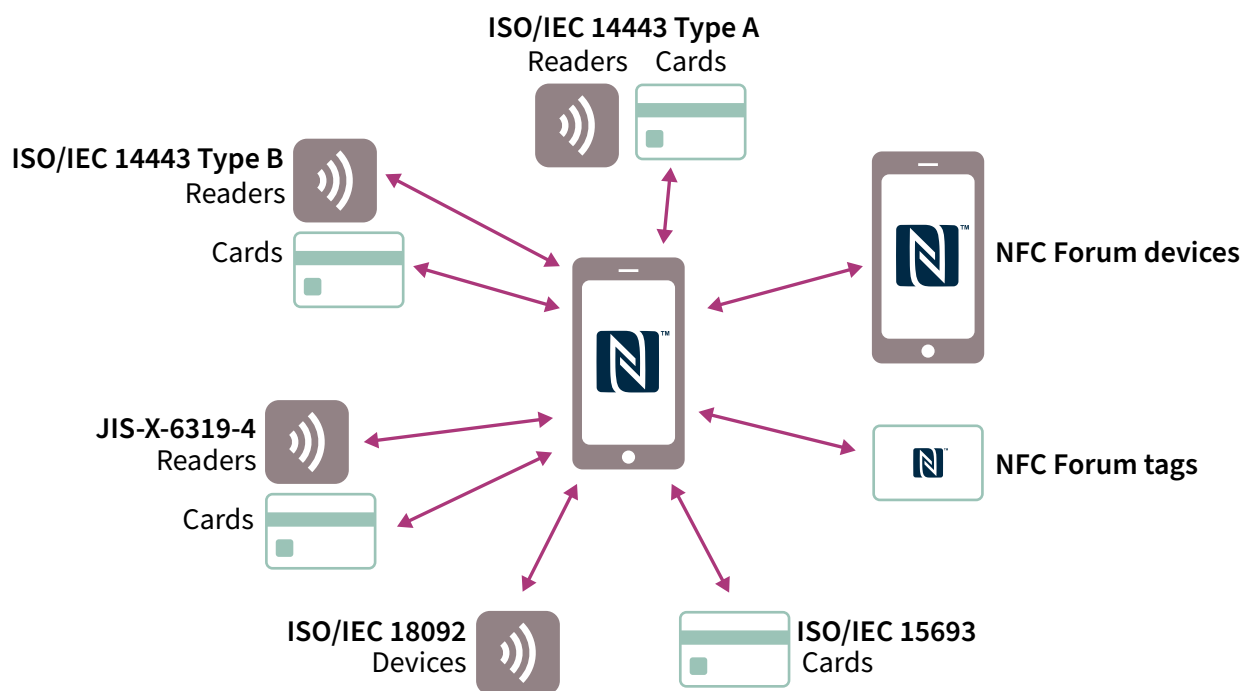


Figure 1: The NFC infrastructure

As NFC Type 4 Tags and Contactless Payment leverage the same underlying communication protocols found in ISO/IEC 14443, it presents considerable opportunity for card issuers to exploit the trends emerging in online retail, commerce and transit, and the important role that technology now plays in consumer habits.

By exploiting the features inside contactless payment cards, issuers can create a new experience for card users, one that is already helping to combat the growing decline in brand loyalty and store footfall. It can also strengthen the relationship between retailers and card issuers. In addition, as NFC read-capability is now available in many smart phones, NFC Tags can be read from and even written to by the card owner, which presents an entirely new paradigm for the way we interact with our financial products. Here, we present a number of scenarios that illustrate this.

Part 2: Use-Case Scenarios

2.1 Easier, faster, more secure card activation - going mobile

The number of contactless payment card issuers is increasing daily. It is no longer just the remit of large financial organizations. The use of pre-paid cards or devices backed by leading Payment Networks is creating new market opportunities for enterprising companies looking to offer a new kind of financial service.

At the same time, more and more issuing institutions offer mobile applications to do such things as checking their balance, getting transaction alerts, holding or blocking the card in case of loss or theft, etc. Consumers appreciate the convenience of immediate information and action without the hassle of calling a customer service number.

Surprisingly, card activation still requires the consumer to either go to an ATM or call a 1-800 number, enter the 16 digits card number and provide some form of authentication or identification (such as a PIN or the last 4 digits of a Social Security number).

Modern contactless cards can support immediate activation of the card in a seamless and more secure manner, using virtually any NFC-enabled mobile phone (Figure 2).

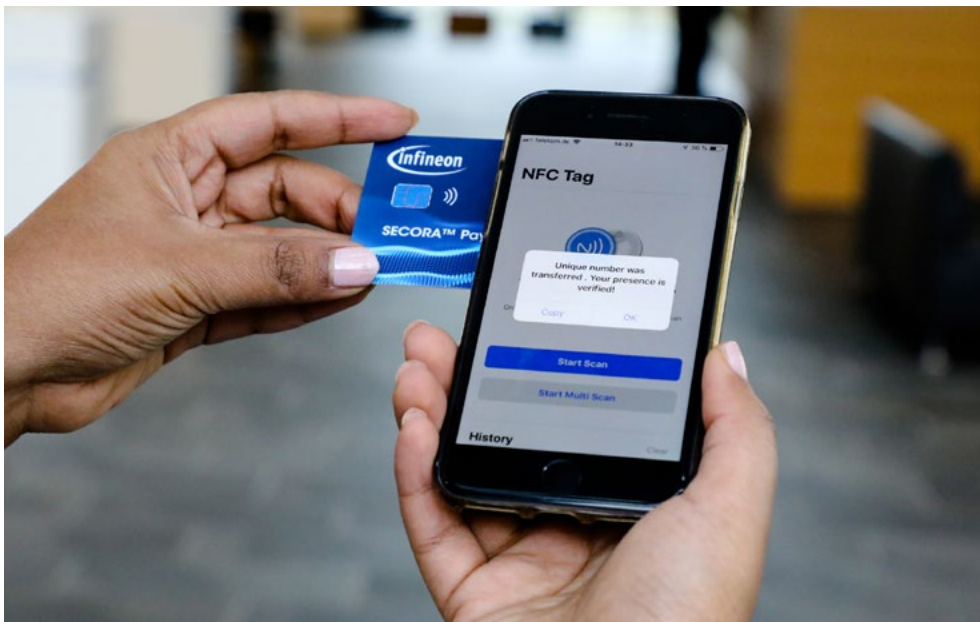


Figure 2: NFC Forum Tag technology can be used to streamline user verification

By adding an activation number to the Tag, owners can simply install and open the provider's application and tap the unregistered card to their phone. Using the activation number on the Tag, authentication can be applied inside the app, allowing the user to activate their new card. Opening the app will also bring up all of the recent (or even historical) activity. This means that long after the card is put into use, users will continue to use the 'tap to open' feature to monitor their spending habits with their mobile phone.

A "light" version consists of an NFC Tag that contains the hyperlink to the issuer's activation site, removing the need to install an app on the phone.

If we consider form factors other than a card, such as wearables, this NFC-based activation process greatly reduces the complexity. As there is no visible PAN (Primary Account Number), the Device's unique identifier needed for activation would need to be printed (plain text or QR code) together with the activation instructions. With NFC, by simply tapping the Device onto the phone, the consumer is offered a very simple activation process.

As outlined earlier, more consumers now use their phones during the shopping process, which could now include checking that they have the funds necessary to make that impulse purchase (Figure 3).

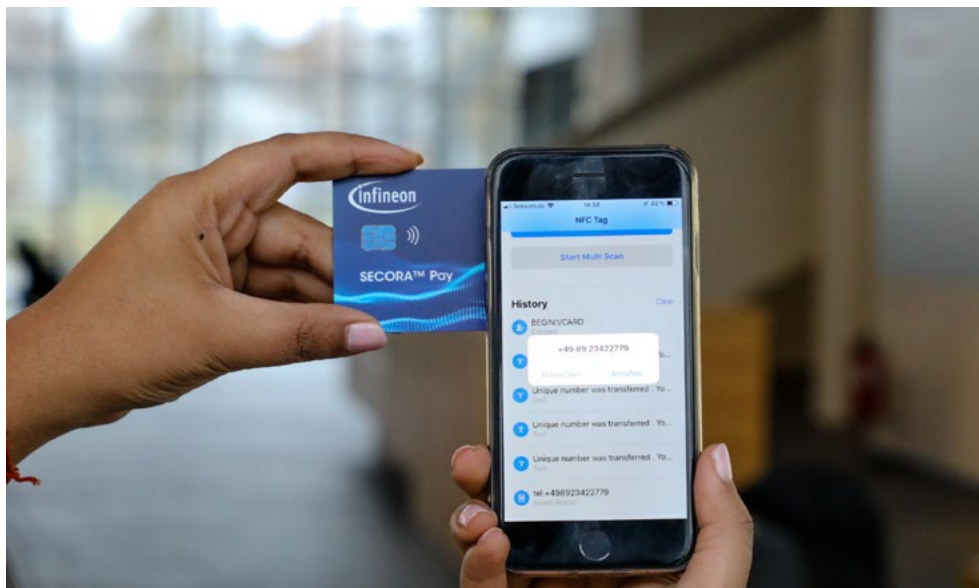


Figure 3: Users could use their phones to quickly check their purchasing history

2.2: The electronic business card

The world still relies heavily on contact information and while much of that is now managed through email and other online tools, there is still a huge reliance on the conventional paper-based business card. This is not surprising, given the unique convenience it offers; a small card that fits easily into a pocket and can be exchanged quickly, yet provides a permanent record of meeting someone.

Now, that same convenience can be provided by a contactless payment card. This may raise some questions, such as how does the user put their contact details onto an NFC Tag? The answer lies in the technology. Access to the data stored in NFC Type 4 Tags can be set by the card issuer; if the issuer makes this access open it can be easily updated by the card owner using an app on a smart phone (Figure 4). A side benefit for the issuer is that the business user is showing the brand every time he/she exchanges his/her “business card”.

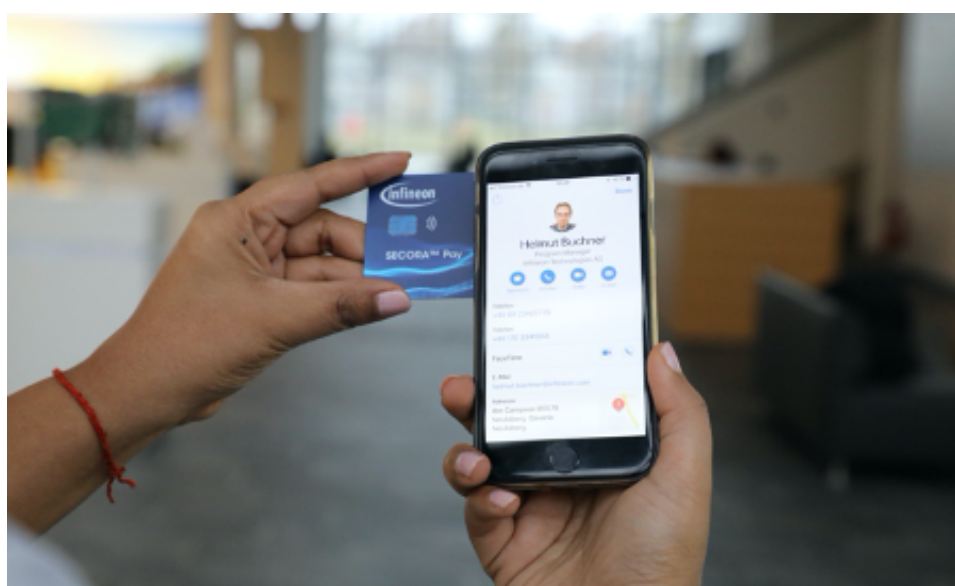


Figure 4: NFC Tags could replace the traditional Business Card

2.3: The “In Case of Emergency” experience

ICE, which stands for In Case of Emergency, is an initiative that many smart phones now support. Essentially, it allows someone to access the emergency contact of a person even if their phone is locked. This kind of rapid response can be essential in an emergency, as the ICE information stored on the phone may include vital medical details, such as a pre-existing condition or medicines used.

But how many people actually use the ICE feature on their phone? Wouldn't it be easier and perhaps even more intuitive to include that information on a contactless payment card? NFC Tags require no batteries to operate as they draw all of their operating power from the NFC Device or Reader. This is one of their greatest advantages over other forms of technology, including smart phones.

If someone's ICE information is stored on a mobile phone, emergency services would need to rely on that phone being powered up – or in the case of an accident, not broken or lost – in order to access the ICE data. If that same data is stored on a contactless payment card, accessing it becomes much simpler and more reliable.

2.4: Direct messaging to the consumer

NFC Tag technology can, through simply tapping the Payment Card to an NFC-enabled tablet or Smart phone, lead the consumer to valuable information resources. For instance, the Tag could direct the consumer to a video showing the environmental commitment of the card issuer towards using friendly materials in the card, such as natural fibres and recycled plastic. It could also explain the manufacturing processes used and how they are working towards reducing the impact of this.

The Tag could also be set to direct the consumer towards more direct marketing, by taking them to a landing page on the issuer's website that provides exclusive offers or information about additional financial products and services.



Part 3: NFC Tag key features

The data stored in an NFC Tag is structured. The NFC Forum has spent considerable time and effort – and continues to do so – in order to standardize the way data is presented. This is formalized in the NFC Data Exchange Format (NDEF), which allows a Device to not only understand the information it is receiving but also know exactly what to do with it. Table 1 shows a selection of the most common types of information that can be stored and shared, and what the Device will automatically do with it when it is received.

NFC Forum Tag information	NFC Forum Device action
URL (web link)	Open the web link (for example, website page)
Telephone number	Start a phone call
SMS text	Send the SMS
E-Mail address	Create/send an e-mail
Point of Interest (POI)	Open a mapping application and show the POI
Postal address	Open a mapping and navigation application and plan a route
Contact details	Store the contact details on the Device
Bluetooth ID (of an electronic device)	Pair the Device (or disconnect if already connected)
WiFi password or key	Log the Device into the router

Table 1: Some common NFC Forum Tag NDEF formats and associated Device actions (Source: NFC Forum¹)

Part 4: The NFC Device in your pocket

Contactless payment has been a feature of the smart phone for many years, but more recently the phone manufacturers have also opened up their architecture to developers, allowing them to access the NFC technology.

For example, all iPhones starting with the iPhone 7 have had the ability to read and write to NFC Tags, although complete read and write functionality has only really been supported since iOS 13, highlighting the important relationship between the hardware platform and software infrastructure.

The Android operating system is widely used by most phone manufacturers, including Google, Samsung, Huawei and Sony. Reading and writing to NFC Tags has been supported by the OS since 2012 and today many of the phones offered by the manufacturers mentioned above support Tag read and write (although the consumer would need to check compatibility for each specific model).

This effectively means that a large number of consumers already have an NFC Device in their pocket, able to read and write information to and from an NFC Tag located in a payment card. For card issuers, this represents a significant marketing opportunity, to build customer loyalty, improve user convenience, increase user satisfaction and build stronger relationships with retailers, both online and traditional.



Part 5: Choosing the right technology partner

There are several technologies that can support the use-cases described in Part 2, but they are not all equal. The following checklist may help when choosing the right technology:

- › **Is the technology secure?** Basic tag technologies have been available for a long time, but typically have very low to no levels of security, exposing the overall system to misuse or fraud. A preferable solution would employ modern technologies that are more secure, with support for the use of passwords, encryption and multiple administration levels, for example.
- › **Is the technology an open standard?** An open standard offers the benefits of mass adoption and a vibrant ecosystem. This helps deliver constant innovation in an environment that enables healthy competition.
- › **Is the technology Future-proof?** Can the technology support one or several use-cases? Can applications be added after issuance?
- › **Can the technology support convergence?** There are now multiple electronic payment systems in use, as well as identification applications. Can the technology support these, along with Physical and Logical Access and Authentication?

There is a limited number of technologies and technology partners that can tick all of the above boxes. Beyond the technology itself, the breadth of solutions (Payment, Identification, Wearables) and the commitment to the Market are important to consider.

With over 22 Billion Security ICs shipped during its 25 years of being in the Security Market, and its commitment to open standards and leading position in the Payment and Identification Markets, Infineon Technologies qualifies as a prime technology partner.

Part 6: References:

- 1: NFC Forum: <https://nfc-forum.org/what-is-nfc/about-the-technology/>

