

FAQ

NFC Voucher Project

- **What is Near Field Communication (NFC)?**

NFC is a short-range wireless connectivity technology standard designed for intuitive, simple, and safe communication between electronic devices. NFC communication is enabled by bringing two NFC-compatible devices within a few centimetres of one another. Applications of NFC technology include contactless transactions such as payment, transport, ticketing, simple and fast data transfers, access to digital content.

Near Field Communication is based on inductive-coupling, where loosely coupled inductive circuits share power and data over a distance of a few centimetres. NFC devices share the basic technology with proximity (13.56MHz) RFID tags and contactless smartcards, but have a number of key new features i.e. they are "active" with their own battery unlike e.g. contactless cards which are "passive" and can only be read by other devices.

- **How can we experience this technology?**

Products with built-in NFC will dramatically simplify the way consumer devices interact with each other, helping people to speed connections, receive and share information and make fast and secure payments. NFC provides intuitive, simple and safe communication between electronic devices just by bringing them close together. The possibilities are endless and NFC is sure to take the complexities out of today's increasingly sophisticated consumer devices and make them simpler to use.

NFC technology can speed up payments and thus reduce lines at shop check-outs or unattended payment machines like parking meters, send pictures from an NFC-enabled digital camera to a TV set, buy bus tickets and receive them on your phone allowing you to pass automatic gates, and there's many more applications. You can pay using a payment card application, vouchers or e-money stored on your NFC device. You can check balances at anytime or update your tickets remotely. Another benefit is that instead of carrying several physical cards in your wallet, you could choose to have some or all of your card applications stored on an NFC-enabled mobile phone. The mobile phone would become the ultimate mobile payment facilitator. Besides paying simply by "waving" NFC enabled devices, we will also be able to connect and interact with information stored in NFC "tags". These tags can be fixed to objects such as posters, bus stop signs, street signs, product labels, and more. By touching these with an NFC device, information can be read.

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NFC technology will help increase the acceptance and usability of contactless services because it is based on an international standard, designed to work for any service, in any place, around the world.

Daily life example: *"Eric just bought his daily newspaper by waving his NFC mobile phone across the kiosk's NFC enable payment terminal. Fast, as he didn't have to search for cash or wait for the exact change so he still has time to take the next bus. At the bus stop, he quickly checks when exactly the bus should arrive by bringing his phone close to the timetable. Whilst waiting, Eric notices the ad in the bus shelter that says: "get your free burger by waving your phone against this smart poster". Probably there's even more in it than a free burger, as he is a regular visitor of this restaurant and has gathered a number of loyalty points in his phone over the past months. When the bus arrives, Eric doesn't have to queue as nobody needs to search for cash or find the bus fare ticket...he waves his phone and hops on."*

- **What is the concept of vouchers and coupons?**

Many companies today are using paper-based vouchers such as meal vouchers and gift vouchers to reward their employees. Often coupons are offered as well. Mostly these have an extra-legal benefit.

With these vouchers employees can pay for their daily meal in restaurants, buy food at grocery stores or use gift vouchers at affiliated convenience shops. Coupons can be used to receive discounts at stores.

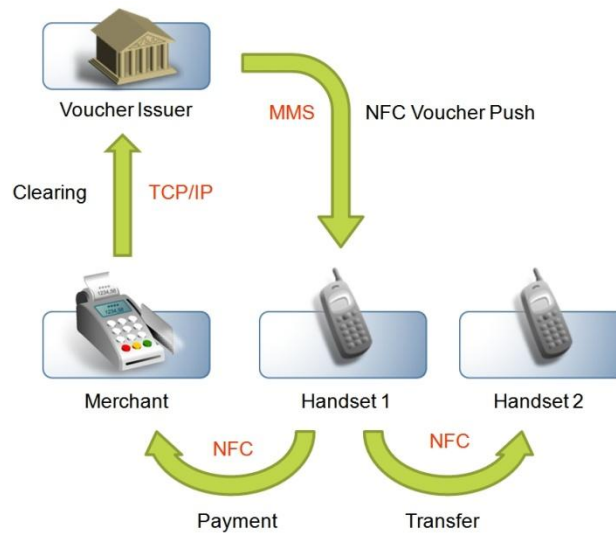
- **What is the concept of NFC Vouchers**

The fact that meal vouchers, gift vouchers or coupons only exist in a paper version entails some disadvantages. Printing and processing (collection, reading, clearing) are time-consuming and thus quite costly. Moreover, there's the obvious ecological impact.

These inconveniences can be tackled using an NFC-enabled mobile phone as storage medium and payment facilitator for electronic vouchers.

The solution is developed by Clear2Pay/Integri, Keyware and Accor, in close collaboration with Belgian universities. A two-year research project investigated all aspects of replacing paper vouchers with an NFC Voucher residing on the handset.

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The Voucher Issuer pushes the NFC Vouchers by MMS to the user's NFC handset. Users can now make payments by waving their mobile phone over an NFC enabled payment terminal, electronic cash register or another NFC handset. A user can also transfer his or her NFC Vouchers to another person's handset.

- **What are the benefits of NFC Vouchers?**

- For issuers
 - Significant cost savings: printing, sending by mail, collecting, reading and clearing of paper-based Vouchers are time-consuming and costly operations. Replacing Vouchers by an NFC-based alternative would tackle these difficulties.
 - Ecological: eliminates usage of paper
- For merchants
 - Fast payments reduce queues at the counter
 - No need to collect paper-based Vouchers and send them to the issuer. Clearing and Settlement is done in a completely automated way i.e. the merchant initiates an online request to the issuer to clear the Vouchers he has collected
- For consumers
 - Simplified voucher payments with a richer experience
 - User-friendly and convenient mobile payments: "tap-and-go"
 - Portable and convenient: handsets are often at hand
 - Speed: contactless payments are fast, there's no need to search for paper vouchers
 - Flexible: usable wherever NFC accepting payment devices are available

- Voucher balance is consultable anytime on the mobile phone
- Vouchers are transferable from one user to another
- NFC Vouchers residing on the handset are protected via a PIN code. Hence, when a phone is stolen or lost the NFC Vouchers cannot be used without knowing the code

- **Why is the banking world not involved in the project?**

The NFC Voucher project is a “closed-loop” system, similar to today’s meal voucher model where the only actors involved are the voucher issuer, the employer and employee. Moreover, to issue and process NFC Vouchers, no bank licence is needed (which was investigated by the research project).

- **Why is there no mobile operator involved in the project?**

There are no mobile operators involved because in this project the NFC Vouchers are stored on the phone, in the Secure Element. International negotiations are ongoing to move the Secure Element from the phone to the SIM card which would involve mobile operators.

- **Why aren’t familiar technologies such as smart cards used?**

Smart cards are a valid alternative for paper-based vouchers or gift coupons, however, NFC technology is more “intelligent” and proves to have a number of added benefits such as a display to check balance, the availability of additional contactless applications and the possibility to transfer vouchers to another mobile phone without additional costs.

- **How secure is paying with NFC Vouchers?**

In the NFC-Voucher project, the choice was made to design a system based on offline stored value: the NFC Vouchers are stored on the mobile phone. This approach is very similar to the existing meal voucher model.

The security of the NFC Voucher system primarily relies on the Secure Element (SE) found in the NFC phone. This SE is a piece of hardware that is secured to perform cryptographic operations and store the NFC Vouchers. As all transactions are performed offline, without interaction from the host, end-to-end security must be set up between SEs. The Vouchers themselves are cryptographically protected with a cryptographic signature, similar to the ones generated by the current Belgian eID card.

- **How fast is a typical NFC Voucher payment transaction?**

Today an NFC Voucher payment transaction takes about 5 to 7 seconds. The relative modest transactions speed results, from a commercial point of view, are

caused by the limits of the computing power of the mobile phone's SE, and the way in which the SE is integrated into the NFC phone.

The Secure Element, taking care of the cryptography, has been pushed to its absolute limits to ensure end-to-end security and Voucher protection using RSA cryptographic algorithms. More recent cryptographic algorithms (ECC) are already implemented in the SE, but not exposed yet by the SE's operating system. The combination of exposing this functionality, and a more optimal integration of the SE in the NFC phone (possibly in the SIM card), will drastically improve transaction speed, making NFC Vouchers ready for commercial use.

- **How fast is the transfer of Vouchers to another phone?**
Transferring NFC Vouchers from one phone to another takes about 7 seconds.
- **What do I need to make payments with my NFC Vouchers?**
To pay with NFC Vouchers you need an NFC enabled mobile phone. The merchant needs to be equipped with an NFC Voucher accepting device.
- **Is an NFC enabled phone more expensive than an average phone?**
Prices of NFC phones vary per manufacturers. On average, NFC phones tend to be slightly more expensive nowadays. It is expected that with the widespread adoption (estimated from 2011 onwards) of the technology, NFC phone prices will drop.
- **Do I need to enter a PIN code when paying with my NFC Vouchers?**
Yes. Consumers need to enter a PIN Code when NFC Vouchers are presented for payment.
- **What if I loose my mobile phone containing Vouchers?**
When your NFC phone containing NFC Vouchers is lost or stolen, you loose your NFC Vouchers. However, finders or thieves cannot use your NFC Vouchers as they are protected by a PIN Code.

In the current system, it is not possible to block NFC Vouchers and apply for new ones as this could open the door for fraud: one could apply for new NFC Vouchers without having lost the concerned vouchers. Implementing a recovery scheme for lost or stolen Vouchers is possible from a theoretical point of view, but would imply a disproportionate technological burden on the system.

- **Do I take my NFC Vouchers with me when moving my SIM to another NFC phone?**

No. NFC Vouchers are stored in the mobile phone, more particular in the Secure Element. However, international negotiations are ongoing to move the Secure Element from the phone to the SIM card which will enable to move NFC Vouchers by moving SIMs.

- **Will I need to pay for using NFC Vouchers?**

There are no additional charges involved as transfers between mobile phones are done offline.

- **Where are my NFC Vouchers stored?**

NFC Vouchers are pushed by MMS by the issuer and stored inside the end-user's mobile phone

- **When will we experience mass deployment of NFC and more particular, NFC Vouchers?**

NFC technology has a huge commercial potential and analysts have provided various market projections. Jupiter Research has projected that up to 700 million NFC-enabled mobile phones will be sold by 2013, representing up to 25 percent of the market at that time (November 2008). Jupiter Research has also projected that NFC Mobile Payments will exceed \$30bn by 2012 (September 2009). Frost & Sullivan predicts that NFC phones will come on stream in 2010 and commercial deployments in 2011/2012 (December 2009).

One of the key benefits of NFC is its simplicity – bringing two objects together is easy - hence it has a very good chance to be valued and used for many years to come.

- **Can NFC leverage on the existing payment infrastructures?**

NFC is based on pre-existing contactless payment and ticketing standards that are used on a daily basis by already millions of people using their contactless cards worldwide. These standards determine not only the "contactless" operating environment, such as the physical requirements of the antennas, but also the format of the data to be transferred and the data rates for that transfer. Payment terminals equipped to accept contactless payment terminals can easily be extended for NFC. Electronic Cash Registers can easily be connected with an NFC reader.

In the context of the NFC Voucher project, even another NFC enabled phone can accept payments with Vouchers.

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- **What is the difference between other wireless technologies such as e.g. Bluetooth?**

Near Field Communication is a short-range (a few centimeters) wireless connectivity technology. Bluetooth wireless technology was designed to replace cables between cell phones, laptops, and other computing and communication devices within a 10-meter range. Hence, Bluetooth could incur issues like for example unintentional payments. Bluetooth technology enables more data transfer debits but requires more power from the mobile phone as well.

- **What are the results of the research project?**

Details are described in the document "Findings of the NFC Voucher Project".

- **What were the tasks of each project partner?**

This is a high level overview. Details are described in the document "Overview of the project partners".

- Industry partners

Clear2Pay/Integri: Definition of the NFC Voucher specifications, project leader.

Keyware: Development of the NFC terminal

Accor Services: Know-how of the paper meal voucher model, advisor and validator of the NFC Voucher concept

- University Groups

ICRI: Legal aspects

CUO: Usability

COSIC: Security, development of the NFC application on the SE

WICA: Development of the NFC application on the NFC phone

SMIT: Business model