



Smart Posters

How to use NFC tags and readers to create interactive experiences that benefit both consumers and businesses

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Contents

Executive Summary	4
1. Definition of an NFC Smart Poster.....	5
2. The Business Cases for NFC Smart Posters	6
3. Consumer Motivations for Using NFC Smart Posters	7
3.1. Precision	7
3.2. Ease of Use.....	7
3.3. Environmental Benefit.....	7
3.4. Convenience	7
3.5. It's Fun	7
4. Creating an NFC Smart Poster	8
4.1. Ingredients of an NFC Smart Poster	8
4.2. Designing an NFC Smart Poster.....	11
4.3. NFC Smart Poster Content Management	11
4.4. Manufacturing an NFC Smart Poster	12
5. Use Cases for NFC Smart Posters	13
5.1. NFC Smart Posters at Work Around the World	13
5.2. NFC Smart Posters Made by Consumers.....	19
5.3. NFC Smart Digital Signage	20
6. Appendices	21
6.1. Glossary.....	21
6.2. Frequently Asked Questions about NFC Smart Posters.....	22
6.3. Where to Go for More Information	24

Executive Summary

NFC Smart Posters, defined as objects in or on which readable NFC tags have been placed, are an easy way for both service providers and consumers to access the benefits of NFC. The NFC Forum recognizes that there are many business models for the technology, and the use cases are plentiful. This white paper aims to give creators an easy guide to understanding what an NFC Smart Poster is, what is required in developing NFC Smart Posters, and how to avoid common obstacles when creating them. The goal of this white paper is to empower and encourage participants in the NFC ecosystem to embrace and implement NFC Smart Posters.

Written by NFC Forum members from all parts of the NFC ecosystem, this paper also demonstrates what is being done with NFC Smart Posters. It highlights some of the ways in which NFC is already in use around the world, benefiting industry and consumers alike.

1. Definition of an NFC Smart Poster

NFC Smart Posters are objects in or on which readable NFC tags have been placed. An NFC Smart Poster can come in many forms – it can be a poster, billboard, magazine page, even a three-dimensional object. The common factor is an NFC tag that has an NDEF message stored in it and is attached or embedded in the desired medium. This small tag with information is read when an NFC device is held close to it. Examples include a poster with a web address for buying sports tickets, a timetable displayed at a bus stop, and coupons inserted in a magazine advertisement. A Smart Poster could even be a statue of a movie wizard character with an NFC tag embedded into the end of its wand.

The other important part of an NFC Smart Poster is the “touchpoint” that indicates where users should hold their devices to read the tag. The NFC Forum is promoting its “N-Mark” as the global symbol to indicate where NFC functionality is available.



Smart Posters are attractive to retailers, transport agencies, health care providers, and any entity that has information to share. They can be created by advertising agencies or in-house departments that develop communications materials. See [Section 5](#) for real-world examples of Smart Posters.

2. The Business Cases for NFC Smart Posters

There are a number of business benefits delivered by using NFC Smart Posters, such as cost advantages over alternative means of communication, relative ease of implementation, usage feedback, and the provision of an automated interactive communications mechanism to target audiences. The opt-in nature of the concept allows end-users to determine what's of interest, creating a richer and more relevant experience.

NFC Smart Posters can provide a channel to market for services, a channel for the user to provide feedback when Smart Posters are used for surveys, and a distribution channel for coupons and information. They provide an immediately useful call to action on an advertisement. There is a maxim in advertising that states "Half my advertising is working, but I don't know which half" -- the use of NFC Smart Posters allows the implementer to find out.

Specifically, NFC Smart Posters enable the service provider or content deliverer to:

- Interact with end-users to provide up-to-date information, sell them services (e.g., concert tickets or ringtone downloads), or provide them with the means to make contact at their own convenience (e.g., "Touch here to download the phone number for our service agent")
- Dynamically select or update the content accessed via the Smart Poster. This can occur in response to an application stored with personalized information on the user's NFC device (as in the Smart Digital Signage described in [Section 5.3](#)); or, information such as fresh produce prices can be updated in a back-end system (such as a website) and accessed by a static URL stored in the NFC tag
- Establish which information is actually meeting its objectives (for example, is the advertising reaching the correct demographic/number of people?)
- Create instantly achievable calls to action (e.g., downloading music via an advertising NFC Smart Poster)

In addition, NFC Smart Posters are:

- Low in cost compared with other forms of dynamic display (such as LCD displays)
- Easy to implement in large volumes
- Readily updateable – either via changes to the back-end system or by rewriting the tag, unless it was write-protected when the tag's content was fixed (see [Section 4.1.2](#) for more information about creating and protecting tag content)
- Flexible in size and usage

3. Consumer Motivations for Using NFC Smart Posters

NFC Smart Posters can be located in city theaters, bus or train stops, restaurants – almost anywhere. With NFC Smart Posters, users are called to action to engage in the services offered in an active way. Consumers are attracted to using NFC Smart Posters due to factors such as these:

3.1. Precision

An NFC Smart Poster can provide location-based information browsing. By touching an NFC Smart Poster, the user can get information specific to the situation at hand. For example, a customer who touches a tag about a clothing item wants information on that particular item, such as sizes available, how long it will be on sale, and perhaps to order an out-of-stock size for home delivery. The consumer is not seeking general information on the store and its other products.

3.2. Ease of Use

Many digital services can be cumbersome or difficult to use. Using NFC simplifies the user experience. For example, to access the website for a retail outlet, a person could touch the NFC Smart Poster and be automatically directed to the website, instead of having to manually type in a web address. The proper use of touchpoints can also simplify complex instructions – rather than trying to explain where to obtain some information, the tag behind the touchpoint can actually connect a user to it.

3.3. Environmental Benefit

Accessing information digitally is environmentally friendly. It allows the consumer to access coupons, special offers, or company information without having to carry pamphlets or flyers. Further information can also be obtained easily on-screen instead of requiring additional printing.

3.4. Convenience

NFC devices can store a range of different information in an easily accessible way. Most modern phones have access to several gigabytes of memory, which enables the consumer to carry an almost infinite number of point cards, loyalty cards, and coupons in a device that fits in the hand.

3.5. It's Fun

Simply put, using NFC Smart Posters is fun. It is intuitive and easy to understand. There are no menus to deal with to create connections; it is as simple as picking up an object to look at it.

4. Creating an NFC Smart Poster

In preparing an NFC Smart Poster, there are numerous options in design and manufacturing. For example, the tags can be embedded into the object or they can be attached post-printing. Each technique has its own benefits and drawbacks. Because there are so many variables, it's not practical to try to offer step-by-step instructions for all the possible ways of creating NFC Smart Posters. However, this section aims to provide guidelines and suggestions for some of the most common situations encountered. Additional information is contained in the paper's FAQ section.

4.1. Ingredients of an NFC Smart Poster

An NFC Smart Poster is relatively easy to manufacture, and its ingredients are already commercially available. To produce a Smart Poster, you will need:

- An object (e.g., a plain poster, statue, etc.)
- An NFC tag encoded in the NDEF format
- A touchpoint indicator (ideally the NFC Forum N-mark) that indicates where to touch an NFC device to the NFC Smart Poster to get the best user experience
- An NFC Reader/Writer, capable of writing NDEF formatted tags, to program the content
- A content provider

Note that where security or scale of the NFC Smart Poster roll-out is a major concern, a service provider is an additional essential ingredient.

4.1.1 More about Materials

When you select the object or material for your Smart Poster, make sure that it is suitable for the application or insertion of NFC tags. Because NFC tags are sensitive, it is a good idea to test that the tag can be read once it is in place, using an NFC Forum certified device within a recommended read range. Different materials may affect the performance of the tag (as discussed in [Section 4.4](#)).

It is also important to make sure that the material used is of adequate strength. If your poster paper is very thin, for example, the tag may show through or even rip the paper under severe conditions. Use rugged materials if the tags may be exposed to excessive moisture or extreme environmental conditions (such as strong direct sunlight, continual handling, etc.). Your tag supplier can be helpful in making decisions about the object or material you use.

When it comes to affixing the NFC tags, there are several different ways to attach a tag to a poster; for example, via adhesive, embedded in the material, attached in front or behind, on a casing outside the object, or sewn onto the object, etc. Each method has different benefits and drawbacks. As with the choice of material (see also [Section 4.4](#)), the method of adhesion may affect NFC functionality, so it is a good idea to test a sample of the finished version before rolling out your NFC Smart Poster. Even adhesives may contain substances that interfere with the RF capability of an NFC tag.

4.1.2 More about NFC Tags

Like printed material, the digital content in an NFC Smart Poster needs to be appropriate for the storage space of the NFC tag, just as the content on a standard poster is scaled to the size of the paper, or vice versa. Tags come in different sizes -- make sure that your tags will hold all the content your Smart Poster needs. If users directly touch NFC tags, they can become physically worn or damaged after repeated use – make sure the tags you select will stand up to such use. Because it is impossible to anticipate all variations of tags and readers, we recommend asking your tag supplier for guidance about optimal tag size and form factor.

Each tag should be written and test-read at least once prior to its addition to an NFC Smart Poster.

Keep in mind that tags deployed in public spaces are vulnerable to security attacks. Tags can be overwritten or even replaced by other tags. Consider write-protecting your tags if your application doesn't need them to be re-written, and use the NDEF Signature Record Type Definition (RTD) to verify the integrity and authenticity of the content.

Write-protection means that the tag is locked – that its content cannot be changed or overwritten. If the tags are being mass-produced, write-protecting can often be done when the data is loaded onto them. Write-protecting individual tags may mean that when the tag is written (and after checking the content), a special message must be sent to the tag to set a flag to lock the tag. Though most tags can be write-protected, each one will do this differently, making it essential to refer to the individual tag manual or to confer with the tag manufacturer.

The primary benefit of locking tags is that they become more secure – they can't be changed to direct users to other content. The drawback of locking them is that once the tags are locked, if mistakes are made or the content needs to be changed, then the whole tag needs to be replaced. If the tag is embedded, then the whole NFC Smart Poster may need to be recreated to change tag content.

4.1.3 More about Reader/Writers

Reader/Writers are devices that can read from and write to NFC tags. NFC devices with Reader/Writer mode (as described in [Section 4.1.5](#)) can also be used as Reader/Writers. In developing NFC Smart Posters, the Reader/Writer is used first to encode the information onto the NFC tag.

When selecting a Reader/Writer, it is important to ensure that:

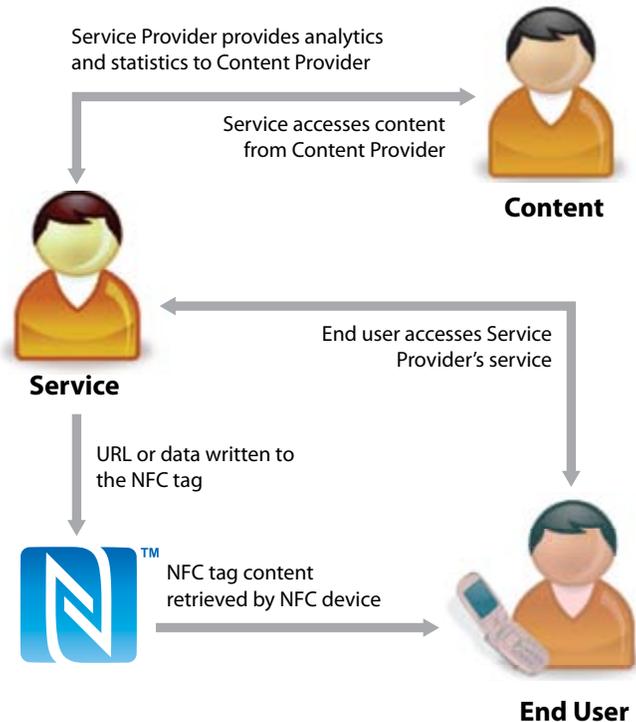
- The Reader/Writer is convenient to use with the quantity of tags to be written to. For example, if 10,000 tags need to be written to, then more than one reader may be required
- The response time of the reader and its associated software enables efficient tag reading/writing capabilities
- The Reader/Writer can read the specific tag that is used in the NFC Smart Poster
- The form factor of the Reader/Writer is suitable for the use case. For example, a PC-connected device will not be very convenient if you need to read tags in the field

To enable the Reader/Writer to successfully communicate with the NFC tag, a compatible application that works with the Reader/Writer and the tag is required. Reader/Writer suppliers should be able to direct you to recommended applications for their products. If you are purchasing an “off the shelf” application, its installation manual may list compatible Reader/Writers and tags.

4.1.4 More about Service and Content Providers

A service provider, such as an advertising agency, provides a communications, storage, or processing service, or any combination of the three, in a platform as an enabler to a content provider, such as a retailer that wants to promote its products to consumers.

In practice, an advertising agency that offers an NFC Smart Poster platform would be engaged by a retail chain to process, store, and communicate its messages to its target customers. In this case, consumers would access the content of the retail chain, but it would be provided via the agency's presentation platform.



A model of how the Content Provider and Service Provider could work together

4.1.5 NFC Technology in Smart Posters

NFC technology enables three modes:

- **Reader/Writer mode** – where an NFC device reads an NFC tag or device acting in card emulation mode
- **Peer-to-Peer mode** – where two NFC devices create a connection to share information
- **Card Emulation mode** – where an NFC device acts as an NFC tag

For passive NFC tags, the information can only be accessed from an NFC device using Reader/Writer mode. The NFC device will read the information stored on the tag and can display the information through an appropriate application, such as a web browser or email client.

Digital signage (see [Section 5.3](#)) that is NFC-enabled may have an active NFC device combined with the sign, which can use Card Emulation mode to act as a standard tag, so that NFC devices can access the information stored. This information can be dynamically updated by the device host. Alternatively, an NFC Smart Digital

Sign could use peer-to-peer mode to share information and get information back from the user. For example, if a user has movie preferences set up in an NFC device, the NFC Smart Digital Sign could access this information and then display a list of movie times highlighting movies that match the user's preferences.

4.2. Designing an NFC Smart Poster

Just as a standard poster must be flat and clean in order to be read, or the bumps on a Braille poster must be prominent so that they can be felt, for an NFC Smart Poster it is necessary that the touchpoint be clearly indicated, and that there is an adequate description of what users will receive when they interact with the poster.

Thus, on or near the Smart Poster, be sure to place a short and easy-to-understand explanation of the particular digital services that will be accessed when touched with an NFC device. Initially it may be necessary to explain that users should touch the touchpoint with their NFC devices to initiate the desired interaction.

There can be more than one touchpoint per object, providing access to different digital services and enhancing the functionality of the NFC Smart Poster. It's important that the instructions make it clear which touchpoint engages which service.

4.2.1 More about Touchpoints and Design

The NFC Forum's lively N-Mark graphic is expected to be the globally recognized touchpoint indicator. It should be printed over each touchpoint to indicate the site of the optimal user experience (the place to touch with the reader device).

The N-Mark is available to anyone by download, free of charge, from the NFC Forum website (www.nfc-forum.org/N-Mark) through a simple click-through license. NFC Forum N-Mark Usage Guidelines are provided with the N-Mark (specifications, colors and format, spacing, use of copyright, and so on), and users are encouraged to follow the guidelines for implementation in order to ensure global consistency. More information about N-Mark usage appears in the FAQs.

If the poster uses more than one NFC tag, make sure that the tags are sufficiently spaced so that only the desired tag responds to the user's action.

4.3. NFC Smart Poster Content Management

Programming and content management for your NFC Smart Poster can be as simple or as complex as your business requires. The content accessed via touchpoint on an NFC Smart Poster can be minimal and static, such as a website address or a phone number for later use. Or, the content can be dynamic, so that the end-user interacts with the content provider, once a connection is made. In this case, additional content beyond what is on the NFC tag is provided over the air to the end-user's NFC device, such as an NFC mobile handset. The user can then buy a ticket or subscribe to a service, etc.

Content can be provided dynamically through two approaches. In one, the NFC device and a preloaded application drive the selection of content, through stored information or preferences. When the connection is made, the information stored on the NFC device results in the delivery of data tailored to the user. For example, a clothing shop's application would call for information on male clothing for male users, or multi-lingual messages could be provided according to the preferences set up on the NFC device.

The second way to provide and manage dynamic content is by using a backend system, which can be very convenient in practice. For a simple case, when a backend system is used for resolving a final web address, the address need not be changed in the NFC tag, but only in the backend system. At a higher level of complexity,

the content sent to a user can be changed in a backend system as needed (new items on sale by a retailer every week, for example), again without having to rewrite the NFC tags.

Using a backend management system with an NFC Smart Poster can increase the amount of available content far beyond the capacity of a single tag, such as by including pictures and movies, or adding levels of interactivity.

Taking the dynamic content concept even farther, NFC Smart Digital Signage (see [Section 5.3](#)) provides users with rich, highly personalized content and customized interactive experiences.

4.4. Manufacturing an NFC Smart Poster

Be aware that many materials can interfere with the performance of NFC tags, including but not limited to metals, ferrites, carbon and carbon composite materials, and different types of paints and inks. These materials could be included in the tag, tag package, the form factor of the poster, and even any adhesives that are used. This is important because interference can degrade tag-to-reader communication, which may diminish the user experience or prevent access to content altogether, turning your Smart Poster into a “stupid” poster and likely causing annoyance to consumers.

Therefore, you should be alert to interference issues when embedding, printing, or attaching an NFC tag, or when dealing with the finished poster. Watch out for metal-based frames and wired glass that may surround an NFC Smart Poster when it has been placed in service. When mounting a poster, be sure to avoid placing it over a metal backing.

When embedding tags in either a poster or an adhesive sticker, take care that the printing process does not damage or kill the tag. Pressure or misalignment of the printing press can damage the tags or the antennas.

5. Use Cases for NFC Smart Posters

5.1. NFC Smart Posters at Work Around the World

NFC Smart Posters have been created and used for many purposes, in many countries. We have collected some representative examples meant to show the versatile benefits of smart posters. Note that while all of the examples show NFC Smart Poster use cases, the devices and tags may not fulfill all of the requirements established for “NFC Device” or “NFC Tag” as defined in the Glossary. The selected use cases are described below, starting with the simplest applications and ending with the most complex.

5.1.1 Tourist Information, NFC Parcours Princesse Grace – Monaco

An experimental project using NFC Smart Posters has been in use along the *Parcours Princesse Grace* in the Principality of Monaco since April 2008.

The project, named “NFC Parcours Princesse Grace Monaco,” enables NFC device users to touch NFC Smart Posters at the memorial sites on each stage of the itinerary at the Parcours in Monaco, to receive information and directions, creating a complete new experience. This project demonstrates how NFC technology can reduce the number of printed brochures used in the tourist industry, while providing users with interactive and real-time information through the simplicity of touch.

Contributors: WIMA, Nokia, NXP Semiconductors, Monaco Government Tourist & Convention Authority



5.1.2 NFC Smart Posters in the Nouveau Musée National de Monaco – Monaco

To enrich the visitor’s experience at the Monaco Museum, NFC tags were placed near selected exhibits in December 2008. By touching the touchpoint (proprietary touchpoint as shown in the image here), the user could access more detailed information, including further text about the exhibit, photos, audio commentary, and video content. An NFC Smart Poster displaying where all the NFC-enhanced exhibitions were located in the museum directed visitors to enhance their experience.

Contributors: WIMA, Nokia, NXP Semiconductors, Monaco Government Tourist & Convention Authority, Nouveau Musée National de Monaco



5.1.3 “Amazing NFC” – Oulu, Finland

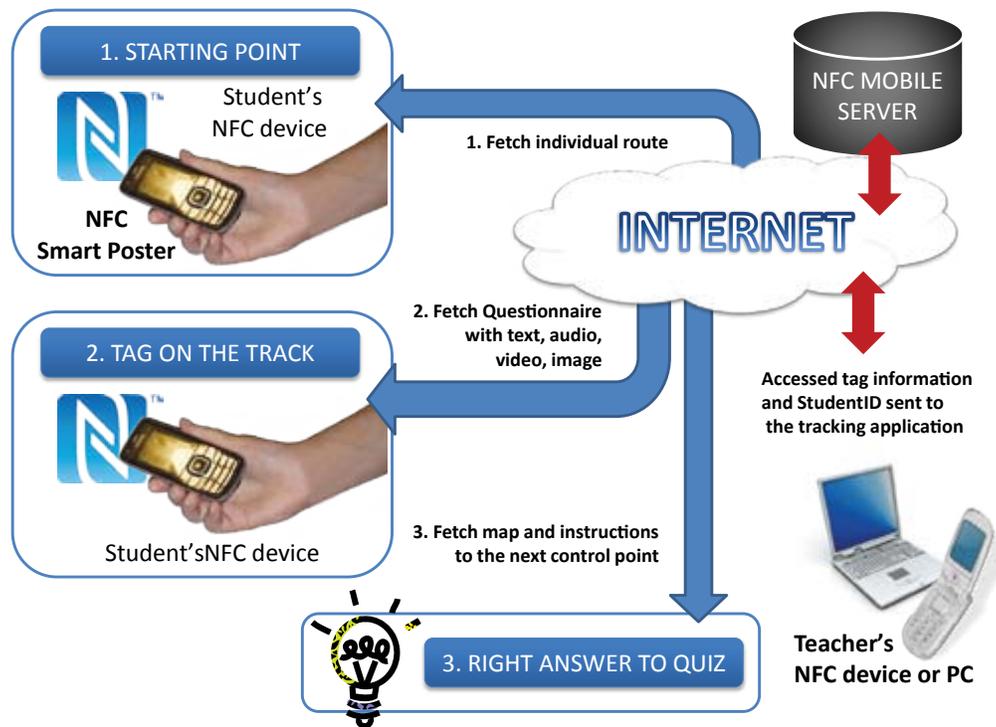
The Oulu Region is in northwest Finland and has over 200,000 inhabitants. It is the fastest-growing region in Finland, and it boasts world-class standards in information technology networks and services. Its high-tech industries are famous for their high growth.

“Amazing NFC” is a city orienteering course for educational purposes, which has two routes: a civic track and a cultural/historical track. On the civic, or “survival,” track, pupils get to know Oulu’s offices and institutions. On the cultural/historical track, students become familiar with Oulu’s culture and history.

The pedagogical goals of the NFC-based Urban Orienteering project were to teach secondary school students skills and knowledge for coping with everyday life, and to familiarize students with the culture and history of their own city. By transferring the educational setting from the classroom to the actual contextual environment, the project aimed to influence the students’ motivation to learn and build life-management skills, with the idea that school is part of the surrounding society and we learn from life in general.

By touching the NFC Smart Posters, the students would receive text, video, or audio tracks relating to each checkpoint. They would also receive a map to the next checkpoint. The teachers could also monitor the student’s progress, as the checkpoint information was sent back to a central system that the teacher could access via computer.

Contributors: City of Oulu, VTT Technical Research Centre of Finland, University of Oulu, MSG Software, TeliaSonera



“Amazing NFC” Urban Orienteering

5.1.4 NFC Smart Posters for Event Management – Monaco

Since 2008, the international NFC-focused conference WIMA has used a number of NFC Smart Posters to display information at the event, including the conference program and the exhibitor listing. Attendees are invited to discover further details by touching the tags on the NFC Smart Posters with their NFC mobile devices. A web page opens on the screen of the device, displaying information on the speaker, company, or exhibitor.

NFC is also used for accessing attendee badge information for access control and business card exchange.

At WIMA 2010, exhibitors were invited to be part of the “WIMA NFC Experience” and write their own applications for tags, which were placed on an NFC Smart Poster for attendees to discover and use around the event.

Contributors: WIMA, ITN International, Innovision R&T, NEXPERTS, Monaco Telecom



5.1.5 NFC Future Shop Project – Oulu, Finland

In April 2008, this project enabled participants to make food purchases at home by touching NFC Smart Poster shopping lists with NFC devices. The shopping lists were compiled according to the wishes of each participant, and they included NFC Smart Poster cards for approximately 200 frequently purchased products. Selections were made either at the local store using a bar code reader, or at home using the NFC Smart Poster product list.

Each food item was displayed on a card, with its name, details, and a picture of the product. The card was also an NFC Smart Poster with a touchpoint. Purchases could be made on two days a week, when orders were sent through the NFC handset to a backend system. The shopping order was then delivered the same day.

All participants received written information about the functions of their NFC mobile phones and their shopping application, and about other project-related topics. In addition, an informational seminar and orientation meeting were held for the users on the opening day of the pilot program. After the first week, the users met to exchange experiences. All the elderly participants receiving these services were provided with personal instruction at home on how to use the functions of both the NFC handset and the shopping application. Employees' working hours were monitored through an NFC-based reporting system when they collected and delivered the shopping.

Contributors: City of Oulu, Oulu Innovation, VTT Technical Research Centre of Finland, TeliaSonera, Tradeka



5.1.6 Restaurant Pannu FastTrack Ordering – Oulu, Finland

Restaurant Pannu offers meal ordering via NFC device, which includes “fast-track ordering” during the busy lunch hours. Users can download a Restaurant Pannu application to their NFC devices. By touching an NFC tag on the restaurant table and then the menu item desired, an order is sent to TeliaSonera’s backend system, which delivers the order to the restaurant’s payment system and kitchen. Electronic lunch coupons can also be redeemed via the NFC ordering system. Users can access additional information from NFC Smart Posters placed on the restaurant tables.



Contributors: Restaurant Pannu, TeliaSonera, City of Oulu

5.1.7 Shopping Assistant – Slovenia

In 2008, to improve its customers’ shopping experience, a Slovenian supermarket created a Shopping Assistant web-based application. To improve return on investment of the NFC trial, several NFC use cases were enabled with one application.

Shoppers were able to list what products they were looking for when shopping and link their loyalty cards to the application as well.

NFC Smart Posters were placed around the store advertising products. To encourage using these NFC Smart Posters and purchasing the products, touching an NFC Smart Poster would give users information on the particular product and would also reward them with additional points on their loyalty cards.

To decrease the time customers would spend shopping, NFC Smart Posters were displayed on both sides of the entrances to each aisle. When NFC devices were waved in front of a touchpoint, the Shopping Assistant application would compare the items on the shelf to those the customers were searching for and inform them if the products were on the aisle, eliminating unnecessary item hunting.

The Shopping Assistant application could also display prices in the shoppers’ local currency, and it allowed loyalty card holders to see the actual costs of products with member discounts applied, and how many loyalty points they would receive per product.

All these functions were enabled with the one application and NFC.

Contributors: Adamsoft

5.1.8 Service Discovery, Find Locations, and/or Get Updates – Multiple Cities, USA

NFC Smart Posters have long been a staple feature adding value and functionality for participants in NFC mobile payment trials. In 2005, the “Fly By” NFC mobile payment pilot project involving Atlanta Spirit, Chase, Cingular (AT&T), Visa, Nokia, Philips (NXP) and ViVOtech was the first large-scale NFC mobile payment pilot project anywhere in the world. This project enabled participants to pay at merchants within Atlanta’s Philips Arena using their Nokia NFC mobile phones provisioned with Chase cards. Additionally, participants could receive real-time information about their hockey or basketball teams, as well as download team-related images and ringtones by tapping Smart Posters deployed throughout the Arena.

In 2006, the “Tap & Go” NFC mobile payment pilot project in New York City, launched by Citigroup, MasterCard, Nokia, ViVOtech and Cingular (AT&T), showcased Smart Posters that allowed pilot participants to tap their phones to get information on locations where their MasterCard PayPass-enabled NFC phones were accepted. This project was followed in 2007 with another NFC mobile payment pilot project involving HSBC and MasterCard, which delivered the first solution that allowed customers to download both credit and debit cards over the air to their NFC mobile phones. Smart Posters were used to help participants find the locations where payments with their NFC mobile phones would be accepted. By tapping a Smart Poster, participants could download a location to their NFC phones, along with directions to merchants nearby enabled with contactless payment readers.

Contributors: ViVOtech, HSBC, MasterCard, Visa, Citigroup, Chase, Cingular (AT&T), Nokia, Philips (NXP) and Atlanta Spirit

5.1.9 NFC Posters Used to Drive Traffic to Merchants – San Francisco, USA

In the landmark 2008 Bay Area Rapid Transit (BART) NFC mobile payment and transportation pilot project in San Francisco, NFC Smart Posters were successfully deployed to help drive traffic to merchant locations. In multiple BART train stations across the San Francisco Bay area, posters for Jack in the Box were deployed, allowing participants to tap their phones to get directions to the nearest Jack in the Box location and receive updates about any special promotions going on. Participants could use their phones to ride BART to the nearest location, and they could just tap their phones at contactless payment readers in Jack in the Box locations to pay for their meals.

Contributors: ViVOtech, BART, Sprint, First Data, Jack in the Box, Cubic



5.1.10 First Use of Mobile Coupons, Promotions, and Payment Together – Taiwan

The 2007 Taipei Fubon Bank and Taiwan Mobile NFC mobile payment pilot project marked the first deployment of an integrated NFC payment and promotion solution. For the first time, participants could download not only credit and debit cards over the air, but could also tap NFC Smart Posters located throughout the region and at retailers' storefronts to download coupons and promotions directly to their wallets. Coupons were stored securely in the mobile wallet software application on their NFC mobile phones, along with credit and debit cards. To redeem them, participants just selected the desired coupons and tapped their phones at hundreds of contactless-enabled merchants.

Contributors: ViVOtech, Taipei Fubon Bank, Taiwan Mobile, MasterCard



5.1.11 Location-Based Personalized Coupons and Promotions – Bangalore, India

In the largest NFC mobile phone payment pilot in the world to date, the Citi "Tap and Pay" pilot project in India, NFC Smart Posters were used to deliver coupons and promotions to participants targeted to their locations and personal profiles. The 3,000 participants only needed to tap their NFC phones at NFC posters located in high-traffic areas to download coupons and discounts relevant to each person's location and personal profile, which were stored in the mobile wallet and redeemed by waving the phone on contactless readers at the point of sale. Promotions were available for a wide range of shopping categories, which included department stores, food courts at shopping malls, restaurants, bookstores, and theater multiplexes. These targeted promotions generated a much higher usage and redemption rate than normal promotions and added value to the entire mobile payment experience.

Contributors: ViVOtech, Citibank, Vodafone, MasterCard, Nokia



5.1.12 Prepaid Card Sign-up – Kuwait

A leading bank in the Gulf Region started an NFC Smart Poster trial in February 2010, which enabled NFC device holders to sign up for a prepaid card application by waving a phone in front of the touchpoint. The phone then communicated with the server over the air and downloaded a personalized VISA Prepaid Card. This innovative application has increased the cardholder base.

Contributors: ViVOtech, National Bank of Kuwait, Zain, Visa



5.1.13 Opt-in for Timely Couponing – Kuwait

In Kuwait, a shopping mall adds value for its retailers by using NFC Smart Posters placed in the entrances of the mall. Users touch their NFC-enabled handsets to NFC Smart Posters to opt in and receive the day's special offers. The relevant special offers are matched to the user's profile so that each shopper receives pertinent and attractive offers. This is particularly beneficial to the businesses advertised, as it drives pre-qualified (more motivated) customers to their establishments. Not only the retailer but also the payment processor benefits, as these incentives are also tied to a specific mode of payment used in this case.



Contributors: ViVOtech, National Bank of Kuwait, Zain, Visa, The Avenues

5.1.14 Additional Use Cases for NFC Smart Posters

- Parking – Information services and contact information are accessed through NFC Smart Posters
- Education – Text, photos, videos, class scheduling, and enhanced learning environments are stored in NFC Smart Posters or linked via a URL
- Elderly service meal orders – Customers order their meals by touching NFC Smart Posters to choose dishes and then sending the requests via the NFC device
- Remote worker reporting – Remote workers confirm locations visited and tasks completed, and download updated information
- Weather – NFC Smart Posters provide users quick access to weather forecasts
- Maps – An interactive NFC Smart Poster map allows the user to download the map, get additional information on relevant services, and access coupons, etc.
- Events calendar – Users can download tickets or coupons or be linked to event websites
- Taxi ordering – An NFC Smart Poster automates the process of ordering a taxi by sending the NFC Smart Poster's location with the user's details in a text message to the taxi dispatch

5.2. NFC Smart Posters Made by Consumers

NFC Smart Posters are not exclusively the preserve of commercial organizations. Part of the appeal of the technology is that consumers can create their own NFC Smart Posters linking to their favorite websites, storing texts and useful phone numbers, and so on. For example, a typical consumer-generated NFC Smart Poster for household use might contain half a dozen tags with the following functionality:

- A link to a site offering local weather news
- A link to access online stock updates
- The phone number of an emergency plumber
- The phone number of the children's school
- A regularly used text like "I've walked the dog" or "Please buy milk on the way home," or "Hi, Honey, I'm home"

These are custom tags programmed by users to meet their own needs, then affixed to perhaps a daily planner, a bulletin board, or other locations around the home.

A simple photograph can also be transformed into an NFC Smart Poster. For example, an elderly relative may have trouble remembering names or numbers, but still have a good memory for faces. An NFC tag programmed with a person's phone number can be stuck on the back of a photograph of the person, so that by touching an NFC phone to the NFC tag on the photograph, the elderly user can automatically call a friend in a simple and intuitive way.

5.2.1 Obtaining Ingredients for Consumer Smart Posters

For consumers to create NFC Smart Posters, they will require NFC tags and NFC Reader/Writers to program them, in addition to their NFC phones or similar devices. NFC tags from leading tag manufacturers can be found on their websites, and they can also be obtained in NFC tag "kits" from online retailers, which generally include everything needed to create NFC Smart Posters.

NFC Reader/Writers can also be found in most major consumer electronics chains or on major retail websites; however, they may be called "contactless smartcard readers." Consumers should confirm that these readers have software capable of writing NDEF messages to the NFC tags.

5.3. NFC Smart Digital Signage

An interesting extension of the NFC Smart Poster concept adds a contactless reader and backend system to a display screen. This enables an interactive and highly customized experience for the user.

Here is how it works. Preferences are set in consumers' mobile phones with simple software upgrades. These could include language preferences, home currency, favorite sports team or player, etc. A Smart Digital Sign includes an LCD display connected to a contactless reader and a backend program, which can be either an Internet connection or an onsite computer, depending on the locale and application. When a user approaches the reader and screen, the phone triggers the display to change and show the user information according to his or her preferences. For example, a U.S. traveler in Beijing who sees a fast food menu in Chinese can tap the reader to change the display to English and U.S. dollars. A hockey fan visiting an arena could tap the home team display and get the latest statistics on his favorite player. This application can also be effective at corporate events and trade shows to personalize a welcome screen as attendees arrive.

5.3.1 Taxi Digital Signage – Tokyo, Japan

In 2010, 4,000 taxis in Tokyo had NFC-enabled monitors installed in them. Passengers are able to view streamed content such as advertisements and programs that are broadcast directly to the taxi monitors. Dynamic NFC content that is matched to the broadcast program can be accessed via the embedded NFC Reader/Writer by the user's NFC device.

When consumers touch their NFC devices to the NFC Smart Digital Sign, they will receive customized coupons and services, real-time news and weather, and general information. Depending on the credentials set up in the system, personalized information such as the passenger's horoscope, etc., can be provided.

The system can also be easily scaled to include micropayments and other NFC services. This opens the way for a single terminal being used for couponing, information, and payments within the taxicab.

Contributors: Toppan Forms Co., Ltd.; Nippon Taxi Ad K.K.; Softbank Mobile Corp.; TV Tokyo Corporation; Telecom Services Co., Ltd.

6. Appendices

6.1. Glossary

Content Provider – An entity that is the source of the content accessed via touchpoint on an NFC Smart Poster, such as a retailer that wants to sell its products illustrated on the poster, or a concert promoter that seeks to sell tickets to an event a poster advertises

Digital Signage – Signage that uses digital media to display the information for the user. Most commonly these are LCD/Plasma screens (such as arrivals boards at airports), and they may have either NFC tags or card emulation devices providing NFC Smart Poster functionality

ISO/IEC – Two organizations that provide internationally accepted standards across most fields

NDEF – The NFC Forum's NDEF (NFC Data Exchange Format) specification ensures a uniform format for data exchange in any NFC application

NFC Device – A device capable of operating in either read/write mode or peer-to-peer mode using ISO/IEC 18092 communication protocols

NFC Forum Certified Device – A device that implements at least the mandatory parts of the NFC Forum Protocol Stack and the mandatory NFC Forum Operating Modes and has received NFC Forum certification. For more information, refer to the High Level Conformance Requirement document (HLCR)

NFC Smart Poster – A poster or other item that has an NFC tag attached to it

NFC Tag – A contactless tag that can store NDEF information on it and can be accessed by an NFC device

RF – An abbreviation for Radio Frequency

RTD – An NFC Forum RTD (Record Type Definition) defines NDEF payload data formats and their associated type names

Service Provider – An entity such as an advertising agency that provides a communications, storage, or processing service, or any combination of the three, in a platform as an enabler to a content provider

Signature RTD – A specification defining the record that contains a digital signature related to one or more records within an NDEF message. The signature can be used to verify the integrity and authenticity of the content

Touchpoint – The place on an NFC Smart Poster that an NFC device should touch, in order to obtain digital services, usually indicated by the N-Mark

6.2. Frequently Asked Questions about NFC Smart Posters

6.2.1 What is the N-Mark?

The NFC Forum has developed the N-Mark trademark (shown below) so that consumers can easily identify where to use their NFC-enabled devices. A stylized “N,” it indicates the spot where an NFC-enabled device can read an NFC tag to establish a connection; for example, on a Smart Poster.



6.2.2 How do I get the N-Mark?

The N-Mark is available to anyone by download, free of charge, from the NFC Forum website (www.nfc-forum.org/N-Mark) through a simple click-through license. NFC Forum N-Mark Usage Guidelines are provided with the N-Mark (specifications, colors and format, spacing, use of copyright, and so on), and users are encouraged to follow the guidelines for implementation in order to ensure global consistency.

6.2.3 Does the N-Mark have to be a specific size on the Smart Poster?

The height of the NFC Forum N-Mark should not be less than 3 mm. There is no regulation on the maximum size, provided that the NFC Forum N-Mark is never displayed in a larger size or more prominently than the company's own marks.

You can adapt the size of your N-Mark to the size of your tag, or make it however large you would like it to appear on the Smart Poster, as long as you keep within the specifications.

6.2.4 How many times can I use the N-Mark on a Smart Poster?

The number of N-Marks that appear should correspond to the number of tags used on the Smart Poster.

6.2.5 Where should the N-Mark appear on the Smart Poster?

The NFC Forum N-Mark may only be used to identify the position over the tag where the consumer can align the NFC Forum N-Mark with an NFC-compatible device to enable an NFC interaction, such as reading information or downloading a URL from the Smart Poster. Please check to be sure that your poster material (paper, plastic, etc.) displaying the N-Mark allows this interaction between the tag and the device.

The NFC Forum N-Mark should appear on the front of the Smart Poster and should be placed in an easily accessible area to ensure that consumers' NFC devices can readily interact with it.

Adapt the spacing of each N-Mark on your Smart Poster visual according to the number of tags that will be used and the size of the Smart Poster. Note that it is important to leave enough space between tags in order to avoid conflicts of information stored in tags in close proximity.

6.2.6 What are the benefits of using the N-Mark on a Smart Poster?

The user identifies the N-Mark on a Smart Poster as a touchpoint for information or a service when using an NFC device.

6.2.7 May I use the NFC Forum N-Mark with my own proprietary mark on the Smart Poster?

The NFC Forum N-Mark can also be used in conjunction with proprietary marks on a Smart Poster to let out-of-market consumers know NFC services are available.

The NFC Forum N-Mark cannot be combined with or integrated into any company-specific or proprietary marks.

6.2.8 I have heard of the Smart Poster RTD; what is the difference between Smart Poster RTD and an NFC Smart Poster?

The Smart Poster Record Type Definition (RTD) is an NFC Forum technical specification that describes how to put URLs, text messages, or phone numbers on an NFC Forum Tag and how to transport them between devices. An NFC Smart Poster is an object containing an NFC tag.

The Smart Poster RTD specification refers to the encoding of certain content on a tag, while an NFC Smart Poster refers to any tagged object regardless of what content or service the tag contains.

6.2.9 What materials can interfere with the performance of NFC tags?

Many materials can interfere with the performance of NFC tags, including but not limited to metals, ferrites, carbon and carbon composite materials, and different types of paints and inks. When developing an NFC Smart Poster it is important to take into consideration these materials being included in the tag, tag package, the form factor of the poster, and any adhesives that are used. Please discuss these concerns with the tag supplier and NFC Smart Poster manufacturer when preparing an NFC Smart Poster. The immediate surroundings of the Smart Poster should also be taken into account, such as metal framing or wired glass in close proximity to the poster.

6.2.10 What is the difference between an active and passive tag? Can an NFC tag be either one?

The purpose of an NFC tag is to store information or commands (e.g., go to a specific URL, send a specific short code, etc.) that can be read by an inquiring NFC device, such as a consumer's NFC phone. There are basically two types of tags, passive and active. A passive tag is a stand-alone component. It must be powered by the inquiring NFC device that is operating in Reader/Writer mode, so that the inquiring NFC device can then access the information or instructions contained in the passive tag. An active tag uses card emulation mode to communicate information or instructions to the inquiring NFC device, but to do so the active tag requires power from a source other than the inquiring NFC device.

One advantage of an active tag is that it allows information or instructions stored in the tag to be dynamically changed. Regardless of the type of tag deployed, the user experience and end result should remain the same. Depending on the application requirements, an active tag offers several advantages over a passive tag but generally incurs greater cost and requires a local source of power.

Currently, passive tags may use the N-Mark (please refer to the N-Mark Guidelines for Tags and Media). Active tags that implement all three modes, as defined in [Section 4.1.3](#), and have received NFC Forum Certification may use the N-Mark; active tags that only implement the card emulation mode may not use the N-Mark.

6.3. Where to Go for More Information

N-Mark Guidelines for Tags and Media

http://www.nfc-forum.org/resources/N-Mark/NFC_Forum_N-Mark_Trademark_Usage_Guidelines.pdf

N-Mark Guidelines for Devices

http://www.nfc-forum.org/members/certification_members/marks/N-Mark_Trademark_Usage_Guidelines_for_Devices.pdf

N-Mark License

http://www.nfc-forum.org/resources/N-Mark/nmark_license

All NFC Forum Specifications, including:

- NFC Data Exchange Format (NDEF) Technical Specification
- NFC Smart Poster Record Type Definition (RTD) Technical Specification

<http://www.nfc-forum.org/specs/>

NFC Forum Certification Database

<http://www.nfc-forum.org/certification>

NFC Forum Transport White Paper

http://www.nfc-forum.org/resources/white_papers/

Chip-Enabled Mobile Marketing – Smart Card Alliance

http://www.smartcardalliance.org/resources/pdf/Chip-Enabled_Mobile_Marketing_WP_092710.pdf



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