



NFC Enabling Technology

Enhancing Your Business Opportunities

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ABSTRACT

This White Paper presents a brief overview of NFC (Near Field Communication) enabling technology and how it can be used to enhance commercial devices. NFC enabled devices can do much more than make contactless secure payments for goods and services. With low cost read / write NFC tags, non e-commerce use cases expand the potential for easy exchange of point-to-point data at close range, e-coupon acquisition, device configuration, and specifically targeted information exchange of multimedia content. It further presents current market data and projections for NFC enabled devices. Finally, the need for ensuring interoperability and test across the value chain is discussed.

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Introduction

NFC (Near Field Communication) is a low power, short-range (around 4 – 10 cm) wireless communication technology initially targeted for mobile phones and handheld devices. NFC not only functions as a passive tag containing stored information (like early RFID or contactless cards), but also provides a fast (up to 424 kbps), bi-directional, secure way to exchange data that is easy to integrate into small devices. When two such NFC enabled devices are brought into close range of each other (or touched together), magnetic field induction initiates the information exchange.

NFC-like technology is not new; in fact, it is all around you. Early RFID tags simplified inventory control systems, streamlined identification with ID badges, and, when widely deployed for payment in public transport systems, increased efficiency and significantly reduced operating expenses.

Credit card companies (such as MasterCard®, PayPass™ and ExxonMobil Speedpass™) have embedded RFID solutions into their cards for years, and merchants are adopting point of sale (POS) readers at an extraordinary rate, which speeds transactions and opens the door to collecting targeted consumer data.

NFC is compatible with almost all existing RFID solutions, increasing its potential use with already installed commercial deployments; it is considered an open technology; and it is recognized by ISO/IEC, ETSI, and ECMA.

As the size and cost of NFC technology continue to decrease, more interesting applications become feasible, especially when used in combination with a mobile phone or connected device (See Figure 1.)

Device Solutions Inc. is not only experienced with developing embedded devices, but it also maintains close relationships with cellular operators and offers testing and certification as well as interoperability testing services — all of which make DSI an attractive partner to enhance your NFC propositions.



Figure 1 -NFC Benefits to Mobile Phone Users

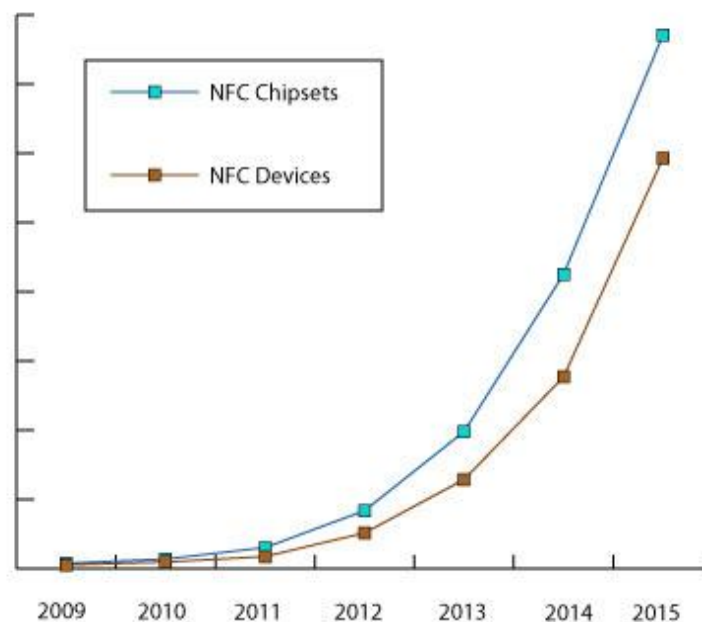
Near Field Communication: A Technology Enabler

As the wireless ecosystem continues to expand and more devices become connected to the web, access to information invariably needs to be quicker, more secure, cheaper, and easier to access.

Ericsson President and CEO Hans Vestberg reaffirmed predecessor Carl-Henric Svanberg’s declaration that by 2020, there will be 50 billion devices connected to the web (compared to 5 billion today¹); this number includes additional consumer devices such as PCs, USB dongles, TVs, cameras, gaming units, and household appliances. NFC can be viewed as an important complimentary technology for such connected devices, and delays in the availability of NFC enabled handsets have given rise to NFC bridge technologies such as NFC enabled microSD cards (following stickers).

ABI Research estimates that “NFC ICs will approach 300 million shipments in 2015. Mobile handsets remain the key market for NFC but increasingly the potential of the technology is driving NFC into other devices and form factors.”² (See Figure 2.)

**Total NFC-Enabled Device and Chipset Shipments
World Market, Forecast: 2009 - 2015**



Source: ABI Research

Figure 2 - NFC Enabled World Market

¹ <http://www.ericsson.com/news/1403231>

² [http://www.abiresearch.com/research/1003525-Near+Field+Communications+\(NFC\)](http://www.abiresearch.com/research/1003525-Near+Field+Communications+(NFC))

While NFC has attracted much attention as the preferred integrated secure payment solution for mobile phones (and rightfully so), NFC also enables a variety of non e-commerce use cases use cases that greatly enhance a device's capabilities (details below). Web browsing, Bluetooth pairing, and Wi-Fi configuration can be greatly simplified, for example, by merely touching the device to a movie poster with an NFC embedded tag. NFC tags are small, cheap [site source], and easily programmed and re-programmed, so the potential for information exchange is almost limitless.

Mobile phone application enhancements are also possible that would permit users to interact with an NFC transaction such as confirming a data sharing session or allowing the device to access the cellular network to seek more information than an NFC tag provides. This type of point-to-point sharing (such as transferring photos) may also provide a way to offload network data traffic in loaded systems.

"Connected" Information in a "Non-connected" Device

NFC enabled devices can retrieve information from NFC tags with no need to access a cellular network; similarly, data can be exchanged point-to-point between two devices quickly, securely, and without cumbersome set-up by simply touching the devices together. This feature can greatly enhance user experiences in emerging markets where mobile phone users may not have access to a data plan but could still use NFC to access e-coupons and information and make secure payments for ticketing, transportation, etc.

Standardization and Certification

Since the NFC standard is an extension of existing ISO/IEC and JIS standards, NFC enabled devices can communicate with existing contactless cards and readers. NFC standards are maintained by the NFC Forum, an organization

...formed to advance the use of Near Field Communication technology by developing specifications, ensuring interoperability among devices and services, and educating the market about NFC technology. Formed in 2004, the Forum now has 140 members. Manufacturers, applications developers, financial services institutions, and more all work together to promote the use of NFC technology in consumer electronics, mobile devices, and PCs. ³

...The NFC Forum Certification Program will... provide device manufacturers with a means of establishing their products' compliance with the NFC Forum's published open standards. ⁴

For more information on the NFC Forum, visit <http://www.nfc-forum.org>.

³ <http://www.nfc-forum.org/aboutus/>

⁴ <http://www.nfc-forum.org/certification/>

Through roundtable discussions, the NFC Forum has also encouraged and supported the development of open source APIs for NFC enabled Android devices. For more information, see <http://www.nfc-forum.org/home/>.

Market Interest

Due to the rapidly evolving RFID and NFC eco-systems, increased popularity of RFID enabled devices, and the proliferation of point of sale readers, almost every wireless analyst is constantly revising his or her forecast to include more categories of devices and adjustments to volume estimates for mass market availability.

Market Estimates Vary

Estimates of NFC market potential for handsets and chips differ widely among industry analysts: while ABI Research projects that the number of NFC enabled handsets will near 300 million by 2015 ⁵, IMS Research forecasts up to 785 million NFC chips to ship in the same time frame ⁶.

Almost all sources agree that launching NFC enabled smart phones is the key to boosting market development in the coming years.

Contactless Point of Sale (POS) Devices Rapidly Deployed

Over ½ million (est.) point of sale devices continue to be installed in anticipation of RFID contactless credit cards / smartphone implementations, and global transportation systems continue to rapidly convert to contactless / NFC enabled device support.

As POS devices are installed, the uptake of tags will be integrated with the user experience to extend NFC to include sharing and information exchange use cases.

Operator Trials / Mobile Phone Integration

As NFC functionality converges onto the mobile phone and as cellular operators search for new value added services to increase ARPU, operators view NFC as a driver for consumer loyalty (lower churn) and see the increased value in the mobile phone becoming an e-wallet. New SIM cards (UICC) contain secure elements to guarantee NFC transactions. While there is an increased cost to add NFC capability to every phone, the sooner it is added to all phone segments, the sooner economies of scale can be realized and new business partnerships and opportunities can cover the incremental cost.

AT&T, Verizon, and T-Mobile US have announced a trial of a contactless payment system in cooperation with Discover Financial Services' payment network and UK's Barclays Bank.

⁵ ABI Research, <http://www.nearfieldcommunicationsworld.com/2010/06/02/33799/300-million-nfc-chips-to-ship-in-2015-says-abi/>

⁶ IMS Research, <http://www.nearfieldcommunicationsworld.com/2010/06/02/33802/ims-forecasts-785-million-nfc-chips-to-ship-in-2015/>

Operators want to ensure an NFC revenue stream as well, and this early partnership creates direct competition against Visa and MasterCard for the next generation eWallet.

Visa and Bank of America Corp. have been running various trials for mobile-based NFC purchasing based on an NFC enabled microSD card (developed by DeviceFidelity), which is inserted into the phone's memory card slot. This solution is similar to contactless credit card technology rather than being integrated with the cellular operator ecosystem via NFC technology within the phone itself.

Considered a "bridge technology," contactless stickers and microSD cards provide mobile phones with NFC capability without having to wait for integration.

"Mobile handsets remain the key market for NFC but increasingly the potential of the technology is driving NFC into other devices and form factors," says ABI's Jonathan Collins, author of Near field communications: Embedded and aftermarket contactless applications for mobile devices and other consumer products. "The potential to offer NFC to handsets with microSD slots is helping to change the mobile handset landscape for many NFC vendors and supporters," he added.⁷

A key point here is that consumers are becoming increasingly comfortable with the use of the mobile device as a secure payment tool.

In preparation for NFC enabled Android mobile phones, companies have also been developing an open source NFC Android™ API.

McDonalds has started to expand the potential of NFC beyond that of payment by conducting trials that combine mobile-based coupon distribution with payments and also collect user data for marketing purposes.

This surge of activity clearly indicates market opportunities in all areas of the NFC ecosystem.

With decades of experience in both the consumer and M2M wireless industries, and dozens of successful product implementations in a wide range of vertical applications, Device Solutions is well positioned to enable your NFC strategy.

Scope and Use Cases

An NFC enabled phone has potential for great user convenience. A connected device can also use back-end network services to enhance the overall experience.

⁷ NFC World. <http://www.nearfieldcommunicationsworld.com/2010/06/02/33799/300-million-nfc-chips-to-ship-in-2015-says-abi/>

Since NFC enables fast, secure, bi-directional data sharing, it creates unlimited potential for use cases (See Figure 3 – NFC Forum Use Cases).



Figure 3 - NFC Forum Use Cases

Connect(ed) Devices

- Touch two devices together to quickly configure data bearer (automatic Bluetooth pairing, IR, Wi-Fi, etc.) with no need for user interaction
- Share mobile phone content (photos, music, phonebooks, business cards, web sites, social networks, etc.) with other consumer electronics (TVs, cameras, PCs, other phones, Netbooks, PDAs, etc) quickly and easily

Read / Write Tags

- Put phone in specific profile by touching tag on meeting room, desk, car, home
- Get public transport schedules, traffic info., from bus or subway station
- Get movie info., show times, soundtracks, music, trailers directly from movie posters
- Get recipes related to favorite foods while in the grocery store aisle by touching a tag associated with a particular item; also receive related coupons, shopping list recommendations, wine selections, etc.
- Retailers can easily re-program or throw away old tags when dated
- Use as key to unlock cars, doors, or to take the place of office badges

Ecommerce

- Make retail payments at point of sale, utilize eWallet
- Pay for public transport, buy event tickets

Enhancing / Creating New Value Chains

In order for an NFC enabled device to be a viable component in the value chain, the ecosystem must be sufficiently available to create economies of scale. RFID niche devices, while still moneymaking ventures, risk becoming obsolete without increased consolidation. Due to the commercial uptake of RFID tags, ecommerce, Smartphone penetration, contactless public transport, retail payments, mobile banking, etc., the backwardly compatible, secure, open, NFC integrated solution is well positioned to be successful.

The value chain must capitalize on convenience, speed / ease of use, and security.

The NFC Ecosystem

The NFC Forum identifies 11 key sectors that envelop the NFC ecosystem (see Figure 4) with over 140 members representing each of the key areas.

With experience in virtually every area of the NFC ecosystem, Device Solutions and its partners are well positioned to provide engineering consulting expertise; supply product solutions, integration, and creation; create and execute test plans; and help secure customer acceptance and industry certification.

Let Device Solutions help you navigate the NFC waters and bring your NFC business opportunity to life.



Figure 4

NFC Forum Ecosystem Stakeholders

References / Links / Acronyms

API	application programming interface
ARPU	average revenue per user
DSI	Device Solutions Inc.
ECMA	European Computer Manufacturers Association
Ecommerce	electronic commerce
ETSI	European Telecommunications Standards Institute
eWallet	electronic wallet
IEC	International Electro-technical Commission
IR	infrared
ISO	International Organization for Standardization
JIS	Japanese Standards Association
microSD	micro secure digital
NFC	near field communication
PDA	personal digital assistant
POS	point of sale
RFID	radio-frequency identification
SIM	subscriber identity module
UICC	universal integrated circuit card

Resources:

http://www.nfc-forum.org/resources/presentations/contactless_2010.pdf
[http://www.nfc-forum.org/events/oulu_spotlight/Forum and Use Cases.pdf](http://www.nfc-forum.org/events/oulu_spotlight/Forum_and_Use_Cases.pdf)
<http://www.smartcardalliance.org/pages/smart-cards-applications-nfc>
<http://www.nearfieldcommunicationsworld.com/>
<http://www.mobilecommercedaily.com/>
<http://www.nfcnews.com>
http://www.nxp.com/news/content/file_1700.html

Figures

Figure 1 <http://symbian-lifelog.com/2008/11/nfc-near-field-communication.html>
Figure 2 <http://data.abiresearch.com/Image/RR-NFC-10%20chart.jpg>
Figure 3 [http://www.nfc-forum.org/events/oulu_spotlight/Forum and Use Cases.pdf](http://www.nfc-forum.org/events/oulu_spotlight/Forum_and_Use_Cases.pdf)
Figure 4 http://www.nfc-forum.org/resources/presentations/contactless_2010.pdf

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