

Mobile Printing using near Field Communication

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Abstract

In Over the last year there have been countless developments related to new mobile phones, tablets, and apps for personal and business use alike. While the majority of these developments have nothing to do with printing, there have still been a fair number of developments in the mobile printing realm (mobile printing is defined as sending or initiating a print job using a mobile device, such as a smartphone or tablet). We have noticed that new features have been added to mobile printing apps, including support for more printer models, file types, and print settings, and that more mobile operating systems are now compatible with these apps. These are certainly positive developments in terms of making mobile printing accessible to more users, as well as more practical. In this paper we will focus on developments in mobile printing using Near Field Communication Technology.

Keywords: Near Field Communication, Mobile printing

Introduction

The Near Field Communication (NFC) is a set of standards for mobile devices designed to establish radio communication with each other by being touched together or brought within a short distance. The NFC standard regulates a radio technology that allows two devices to communicate when they are in close proximity, usually no more than a few centimeters, allowing the secure exchange of information. NFC standards are based on different communications protocols and data exchange formats, and include also existing radio-frequency identification (RFID) standards such as the ISO/IEC 14443 specific for identification cards, proximity cards and contactless integrated circuit cards. The coverage of various ISO standards ensures for NFC technology the global interoperability that makes the technology usable in different areas.

From a technological perspective, NFC is also an extension also of the ECMA and ETSI standards, which describe the integration of a smart card with a terminal device. NFC devices allow writing and reading of information at a high speed (424Kbis / s) when they are placed in close proximity, creating a wireless connection, which is also compatible with widely used technologies such as Wi-Fi and Bluetooth. The NFC technology could be very effective in various areas. The main applications that can benefit from its introduction are:-

- Payment via mobile devices such as smartphone and tablets.
- Electronic identity.
- Electronic ticketing for transportation.
- Integration of credit cards in mobile devices.
- Data transfer between any types of devices such as digital cameras, mobile phones, media players.
- Monitoring.
- Gaming.
- Loyalty and couponing/targeted marketing/location-based services.
- Health care

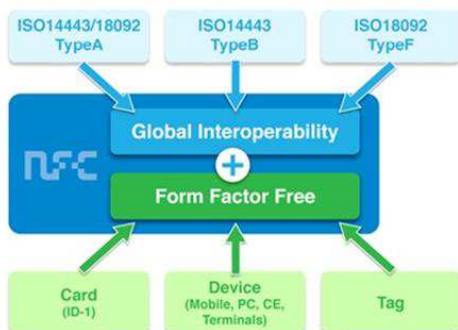


Figure 1 : NFC standards



Figure 2 – NFC Application Fields

NFC Technology Working

The antennas of the Emitter and Tag are coupled via an Electromagnetic Field and this system can best be viewed as an Air-Core Transformer. An alternating current passes through the primary coil (Emitter) and this current induces a field thru the air, inducing current in the secondary coil (Tag). The Tag may use the current from the field to power itself. The design, configuration, and tuning of both antennas determines the coupling efficiency from one device to the other. In general, inductive coupling thru air is very inefficient, and therefore, the read/write range is quite limited. Usually, the tag is a device containing an antenna, typically called an Inlay, as well as a small amount of memory. A tag is a passive device, and the power the device needs to operate comes from the electromagnetic field, generated by the emitter. Between the two NFC devices, an electromagnetic field is generated where the data can be exchanged in one, or both directions, depending on the type of devices used. NFC works using magnetic induction (Air-core transformer): a reader emits a small electric current, which creates a magnetic field that, in turn bridges the physical space between the devices. That field is received by a similar coil in the client device, where it is turned back into electrical impulses to communicate data such as identification number, status information, or any other information. So-called 'passive' NFC tags use the energy from the reader to encode their response, while 'active' or 'peer-to-peer' tags have their own power source and respond to the reader using their own electromagnetic fields.

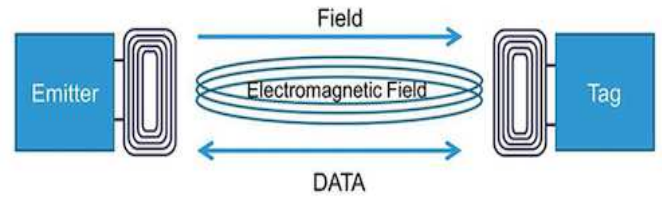


Figure 3 : Working Principle of NFC

It can be used to induce electric currents within passive components as well as just send data. This means that passive devices don't require their own power supply, and can instead be powered by the electromagnetic field produced by an active NFC component when it comes into range. Unfortunately, NFC technology does not command enough inductance to be used to charge our smartphones, but Qi charging is based on the same principle.

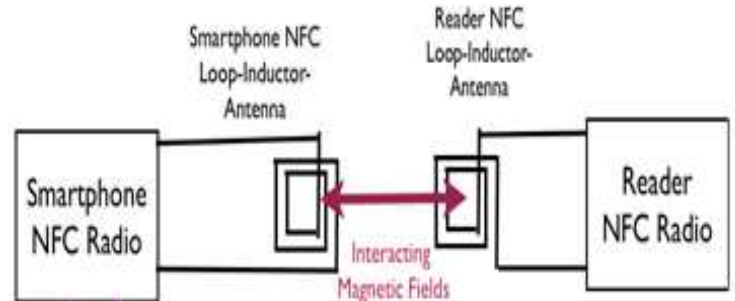


Figure 4. Circuit diagram for NFC Loop Antennas Interacting Between Receiver and Smartphone.

In Figure 4 the NFC reader excites current at 13.56 MHz through the reader NFC antenna (which is really an inductor). This induces a magnetic field, which further (via mutual coupling) induces an electric current in the smartphone's NFC antenna when they are closely placed. This induced electric current can be read, and we have communication. This is exactly what is happening when it comes to NFC communication in practice, with the focus on the antennas.

NFC Based Mobile Printing

Every day, a few thousand people look at something on their mobile device that they need to print out. The problem is that it is not so easy to do using devices in which the whole idea of printing something was either overlooked or outright frowned upon. Looking to remedy that oversight, HP this week unveiled its HP 1200w Mobile Print Accessory, a device that when attached to an HP printer, allows users to send print jobs via a near-field communications (NFC) link.

The HP 1200w Mobile Print Accessory plugs into a USB port on supported HP devices, enabling both wireless direct printing and touch-to-print.

- Make wireless printing easy for everyone in the office. With wireless direct printing, simply connect your mobile device to a printer or MFP in the same way you would discover and connect to a public wireless network.
- Walk up and print from your NFC-enabled smartphone or tablet with just a touch. NFC, or near field communication, automatically discovers the printer for you, eliminating the guesswork and creating a one-to-one connection using wireless technology.

- Get up and running fast with easy USB installation.

Safeguard your business information. Print files are sent using 128-bit encryption.

- Stay in control. When you enable a pass phrase through the HP Embedded Web Server, you're in charge of who can use your printer. HP has been working closely with leading manufacturers of mobile devices to integrate printing into popular operating systems. In fact, HP is the only print vendor developing embedded print functionality for Apple iOS, Samsung Android, and Windows 8, which means in most cases, you won't have to download an app. For mobile devices without built-in print support, printing is just as simple, but users will first need to download the HP ePrint app⁴ or HP ePrint software.⁵

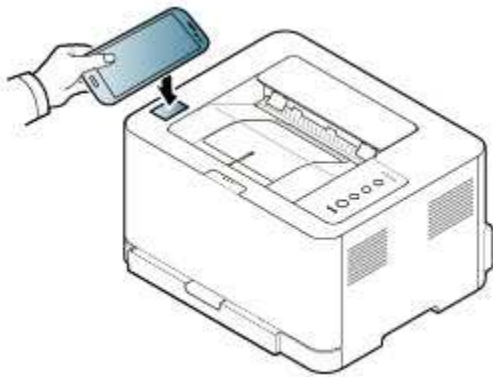


Figure 5 : Mobile printer

HP wasn't the first to embrace near-field communications (NFC) as a way for printers to keep up with the mobile world—Brother gets that prize—but it's catching up fast. On Tuesday, the company announced the 1200w Mobile Printing Accessory, a little box that attaches to a printer's USB port to bring NFC capability. The 1200w works with 2008-era and later LaserJet and Officejet printers (and it assumes that the rear USB port is free, because most business printers use ethernet or another connection). The idea is that you just plug in the device and print. The reality may take a little more doing.

HP says it's worked closely with Apple, Microsoft, and Samsung to embed a printing app into the companies' mobile operating systems. In the case of Microsoft, the embedded app is for Windows 8, but not Windows Phone. If your mobile device is not one of the anointed, you can still use HP's ePrint mobile app—hardly a shabby fallback, though not quite as gee-whiz easy as touch-and-print.

There has also been a greater focus on Near Field Communication (NFC) printing, which has certain advantages over Wi-Fi printing including no requirement for the user to be on the same Wi-Fi network as the print device.

Fujifilm UK, LG, and Samsung are all experimenting with NFC-enabled printers, and more and more mobile devices provide NFC support (including models from Acer, Asus, BlackBerry, Google, HP, HTC, LG, Lenovo, and Nokia). Both the Xpress C410W and C460FW connect wirelessly with mobile devices via NFC for fast, integrated and convenient printing on-the-go. Users can effortlessly and securely print pictures, documents, e-mails and web content by simply tapping their smartphones on the printer. Users without an NFC-enabled phone can still benefit from mobile printing with the Samsung Mobile Print App. The App enables users to print virtually everything from PDF files to Microsoft Office documents directly from their smartphones.. Users who do not have NFC-enabled smartphones or have not installed the Samsung Mobile Print App to their phones can still benefit from the Xpress C4x0 series through Google Cloud Print support. This solution allows users to print over the web when connected anywhere with any smart device, including tablets, laptops and Chromebooks. Additionally, owners of Samsung's GALAXY smartphones and GALAXY Tab devices have the added benefit of being able to print files directly through integrated mobile print support without needing to download a separate application. Users can simply click "print" from within photos, documents, email and web browser pages to quickly print via WiFi. The new line-up features several additional solutions that save time and money by making it easy to manage print jobs and keep track of printer supplies. With Samsung's "Easy Printer Manager" desktop application, users can monitor printer status, such as error messages, paper jam alerts and lack of paper or toner. This simplifies life for consumers and enables small businesses to better manage their printers

Conclusion

Near-field communication (NFC) the ability to touch two devices together to exchange data is becoming commonplace in mobile devices, and now it's appearing

in one of the most non-mobile technologies out there: a printer. The need for a dedicated print app to print from a mobile device is not ideal. When you are at home or in the office, using your PC, one do not need to open a special piece of printing software to print a file. Instead, just click File → Print or Ctrl + P from whatever program you are in. This is a simple solution that's become second nature to most users. There has been a greater focus on Near Field Communication (NFC) printing, which has certain advantages over Wi-Fi printing including no requirement for the user to be on the same Wi-Fi network as the print device. Using NFC technology, one can print without connecting to the printer physically. It is easy, portable, fast, one do not have to carry the printer device from place to place.

References

- [1] <http://www.nfcworld.com>
- [2] Liladevi B.Rahul RajC.P.,Tolety S., , *A study on smartphone printing approaches*, Information & Communication Technologies (ICT), 2013 IEEE Conference on NFC, 11-12 April 2013,JeJu Island
- [3] <http://www8.hp.com/h20195/v2/GetPDF.aspx%2Fc03918574.pdf>
- [4] www.en.wikipedia.org/wiki/Near_Field_Communication
- [5] <http://www.samsung.com/us/support/howtoguide/N0000189/12097/138758>
- [6] <http://www.myprintresource.com/blog/10977006/mobile-printing-with-native-wi-fi-and-nfc>