CREDIT TRANSFER IN MOBILE COMMUNICATION USING NFC

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ABSTRACT

Near field communication is one of the secure methods and plays an important role in many issues. In upcoming years the NFC technology can offer an important contribution in various fields, particularly payments and money transactions. In this paper focused on NFC technology based on peer-to-peer mode operations using credit transfer among mobile phones. It demonstrates the NFC availability for secure and easy communication as well as authentication in mobile applications. In this paper based on various technologies such as NFC is related to android mobile phones and Bluetooth technologies because to improve the secure communications among mobile devices.

Keywords: NFC, Android, Mobile computing, Bluetooth

Introduction:

NFC is an acronym for Near Field Communication, which is close-range contactless communication between devices that can be used for payment, tickets, secure entry, keys, etc. NFC is similar to Bluetooth technology by allowing two devices to interact with each other. But NFC works only in very close proximity, up to 20cm (7.87 inches) in theory, although its actual optimal operating distance is somewhere around 4cm (1.57 inches) or less. On the other hand, Bluetooth can pair devices up to 50 meters apart. There are three modes of operation used in this NFC technology. The phone is used as a reader to read RFID tags and contact less smart cards, for example information on a poster. The phone works in the same way as a contact less smart card and is used for payment, ticketing or access control. The phone can exchange data with other phones or devices, for example a business card can be exchanged between two professionals. NFC technology used in various fields such that touch and go, touch and confirm and touch and connect. The history of NFC is listed below. In 1983 the first patent to be associated with the abbreviation RFID was granted to Charles Walton in 1983. Sony and Philips agreed on establishing a new technology specification and created a technical outline on March 25, 2002. Nokia, Philips and Sony established the Near Field Communication (NFC) Forum in 2004. 2006 Initial specifications for NFC Tags and Nokia were introduced first NFC phones. The first android phone was introduced by 2010 Samsung Nexus S. at 2011 Google introduces how to use NFC in various applications. Research in Motion is the first company for its devices to be certified by MasterCard Worldwide, the functionality at 2011. in 2012 Sony introduces the "Smart Tags", which use NFC technology to change modes and profiles on a Sony smart phone at close range, included in the package of (and "perfectly paired" with) the Sony Xperia P Smart phone released the same year. 2013 IBM Scientists from Zurich, in an effort to curb fraud and security breaches have come up with a new mobile authentication security technology based on Near-Field Communication (NFC).IBM’s new technology works on similar principles to that of a dual-factor authentication security measure. This paper discusses the most relevant issues of NFC technology and proposes, demonstrates, and evaluates an application that allows secure money transfer between mobile devices using NFC on android and Bluetooth technologies. It is demonstrated the usage of both technologies at the same time. In the
section I what is NFC. In section II credit transfer application. In section III what is android. In section IV how the android is related to NFC technology.

I NFC:

Near field communication (NFC) [1] is a latest wireless communications tools with protection support. It emerged from the grouping of contact less recognition (Radio Frequency Identification - RFID) and cell phone devices. It is launch in 2004 by Philips, Sony, along with Nokia, but only a moment ago is being further popular. When it appeared there were not many devices supporting it, so NFC was under the bed until now. NFC can be used with a large diversity of devices like mobile phones, notebooks, desktops, locks, printers, TVs, and consumer electronics. NFC offers users much kind of services like payment, loyalty, transport, travel, culture, and infotainment. Nowadays, NFC makes a boom in world devices, because many projects have born with this technology. Around the world many companies are researching on NFC technology and are creating lots of projects focusing on it. There are many ongoing projects using this technology. A common ticket or a coupon are issues of past. Mobile phones can be used as virtual vouchers, transport tickets, or even supermarket loyalty cards. NFC technology allows three modes of operations: read/write mode, peer-to-peer mode, and card emulation mode. Then, a NFC device can act as a NFC tag emulator or a tag reader [2]. Operating at 13.56 MHz and transferring data at up to 424 Kbits/second, NFC provides intuitive, simple, and safe communication between electronic devices. NFC is, at the same time, a “read” and “write” technology. The communication among the devices occurs when they touch. The maximum distance allowed for NFC well work is ten centimeters [3]. NFC creators advise the usage of a secure element [4] to turn payment and ticketing applications more secure. A secure element is used to store confidential and sensitive information like a credit card pin. At this moment, there are only three places that can be used as secure element: the subscriber identity module (SIM) card, the external memory card, or a phone’s embedded NFC chip. NFC peer-to-peer mode (ISO 18092) allows two NFC enabled devices to exchange data among them, as illustrated in Figure 1.

![Figure 1. Peer-to-peer operation with NFC.](image)

Contact information or the Bluetooth pairing data (this is used by the application presented in this paper) are examples of data types that can be exchanged using NFC. Till now, Bluetooth based applications are complicated to use since they presuppose that users previously are paired their phones. With NFC it is possible to skip this step because peer-to-peer mode allows exchanging the pairing data. NFC technology is versatile and can be used in any industry. Business can operate and respond in real time due to the speed of the technology. Users do not need to be technically minded as the technology is automatic and connections do not need to be set up. The technology supports secure applications. There is no need to manufacture physical tickets therefore saving money. The technology is interoperable globally, particularly useful when used for payment in various countries. When used in a ticket or payment mode the user has the ability to view and load value using their smart phone. NFC over Bluetooth they are both short-range communication techniques integrated into mobile phones, however NFC uses far less power than Bluetooth and can be used when the phone is switched off (handy if the users mobile phone battery dies). There is a lower risk of unwanted interception due to the shorter distance between the communicating devices.
NFC is compatible with existing RFID infrastructures. The user can connect quicker with NFC than Bluetooth technology because NFC connection is established automatically, whereas with Bluetooth users have to initialise the connection themselves.

II USING NFC IN CREDIT TRANSFER APPLICATION

Credit Transfer is a peer-to-peer (P2P) NFC based application [11]. The main goal of this application is to transfer money between two mobile phone sim cards. This application will allow mobile operators to change the usual call center calls or auto attendant to a nice look mobile application. The service already exists in most of the network operators over the world but this is a way to beautify and simplify the credit change service. The solution was applied to this type of service but it is possible to apply it to others. The system architecture of the proposed Credit Transfer application is presented in Figure 5. In this figure, it is shown two devices with a NFC chip and a Bluetooth adapter. Both transmit a message between devices, but each message has a specific function. First message (NFC chipset) is used to notify the receiver device to turn on the Bluetooth (BT) adapter and the second message (Bluetooth adapter) is used to send all the other information of the credit transfer. This application is based on a client-client system because it is not necessary to have a server side. The money sender communicates to his network operator the value that he/she wants to send and, after, receives a positive answer that it will notify the receiver. The Credit Transfer operation is illustrated in Figure 6.

As above mentioned, Credit Transfer is possible because Google offers a peer-to-peer NFC application programming interface (API). This API supports data exchange between two enabled NFC devices. NDEF message is needed to allow the communication between devices. A NDEF message [12] was created with a generic control RTD and it allows the application identification in each device. Particularly, in Android code it is needed to use two important methods, the enableForefrontNDEFPush and the disableForefrontNdefPush (as shown in Figure 7). These methods enable and disable the NFC adapter. The adapter needs to be disabled for the message dropping since, on NFC communications, only a message and corresponding communication is possible once. The used method for pairing performing among devices is available at Figure 8.
III NFC IS RELATED TO ANDROID

NFC technology use in the mobile industry is also fast growing. All major manufactures of android smart phones and tablets have at least one NFC-bearing product. Most recent high-end releases from mobile device makers usually include NFC functionality. NFC technology has become a buzzword in the android phone and tablet industries lately. Most recent phones and tablet releases include NFC chips. There are currently about a hundred android devices that support NFC. NFC is being marketed as a file-sharing or data-sharing tool. This specific use came to the fore when Google released Android 4.0 Ice Cream Sandwich, which also debuted the Android beam functionality. Though NFC and Android beam, devices can swap files very quickly to each other. More than that the presence of NFC on an Android device also allows the same device to read and/or write to programmable NFC tags. Not all phones and tablets have NFC. how to check for its presence? One way is to check underneath the back plate and check for small print or other clues. On certain Samsung phones such as the Galaxy S3, for instance, to see “Near Field Communication” printed on the battery pack. On some other models such as the Galaxy Note 2, no such print, but an NFC antenna embedded on the back plate itself. On some devices especially Sony Xperia handsets. – The N-Mark – the official symbol indicating that the devices is NFC – enabled. With the growth of interactive advertising, contactless payment systems, and the introduction of services like Google Wallet in the US, NFC is the wireless standard best poised to make our smart phones a viable alternative to credit and transport cards. There are already over 300,000 MasterCard Pay Pass merchant locations in the US, but there’s still a way to go before NFC adoption rates are high enough for these technologies to become viable on a mass scale. But if a few more budget and midrange smart phones start shipping with NFC, this could be the way that a lot of us pay for our goods in the future.

Figure 5. credit transfer among paring devices

Figure 6. showing for successful credit transfer among paring device

If your device has NFC, the chip and Android Beam need to be activated so that you can use NFC. Tap on the NFC switch to activate it. The Android Beam function will also automatically turn on. If Android Beam does not automatically turn on, just tap it and select yes to turn it on. Smart phones’ NFC capabilities operate in tandem with Android Beam. If Android Beam is disabled, it may limit NFC’s sharing capacity. With NFC activated, you already use it for beaming data. For successful data sharing, take note of the following. Both sending and receiving devices must have NFC and Android Beam activated. Neither of the devices should be asleep or locked. You’ll get both audio and haptic feedback when the two devices detect each other. Do not separate your devices until the beaming has started. You’ll hear audio feedback when the file or content has been successfully beamed. At this time, the ability to share content is limited to small files.
Regardless, you can still send content or file types such as web pages, map locations, and contacts with no trouble.

IV CONCLUSION

The design and deployment of NFC technology offers new conveniences and benefits to users, and represents several advances in security and privacy over traditional architectures. Ensuring that security and effective user privacy defaults and controls are built into NFC applications is critical to assuring widespread trust, adoption and innovation of this technology. Not all privacy and security concerns may be addressed solely by the NFC technology and standards – the broader NFC ecosystem must be aligned with the security and privacy benefits. This will require co-operation on the part of all NFC ecosystem players, notably application developers. Privacy by Design principles is instrumental in helping to achieve this cooperation and alignment. Nokia is a leading global player in the NFC ecosystem and is working to ensure that Privacy by Design principles are embedded in their products and services, including NFC technologies.

V REFERENCES