Near Field Communication

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TECHNOLOGY

The Near Field Technology (NFC) works with the use of a magnetic induction field. It operates at a radio field range of 13.56 MHz. NFC communicates using Radio Frequency Identification tags, which are tiny chips with built-in radios. Communication is made possible using wireless readers that pick up signals from the radios.[i] NFC also uses wireless readers to pick up signals from other radios.[ii] Philips has developed a NFC application called the PN511 transmission.[iii] This transmission module utilizes a modulation and demodulation similar to that of a personal computer's modem. It also operates at a range of 13.56 MHz. NFC has a maximum working distance of 20 centimeters. It's speed ranges from 106 kbit/s, 212 kbit/s or 424 kbit/s.

There are currently two modes of NFC, Passive and Active. The first mode is Passive Communication Mode. This occurs when the initiator device provides a carrier field and the target device answers by modulating on the existing field. In this mode, the Target device may draw its operating power from the Initiator-provided electromagnetic field. The second mode is the Active Communication Mode. This is when both Initiator and Target device communicate by generating their own field. In this mode, both devices typically need to have their own power supply.[iv]

NFC devices are unique in that they can change their mode of operation to be in reader/writer mode, peer-to-peer mode, or card emulation mode.[v] In reader/writer mode, the NFC device is capable of reading NFC Forum mandated tag types. An example of

this is an NFC Smart poster tag. The reader/writer mode is on the RF interface compliant to the ISO 14443 and FeliCa schemes. In Peer-to-Peer mode, two NFC devices can exchange data. For example, you can share Bluetooth or WiFi link set up parameters, and exchange data such as virtual business cards or digital photos. Peer-to-Peer mode is standardized on the ISO/IEC 18092. In Card Emulation mode, the NFC device itself acts as an NFC tag, appearing to an external reader much the same as a traditional contactless smart card. This enables contactless payments and e-ticketing, for example.[vi] The same procedure can be used to establish a wireless (Bluetooth, WiFi, etc.) link between two pieces of computer or consumer electronics equipment like TVs, laptop computers, PDAs, mobile phones and so on.[vii]

CURRENT APPLICATIONS

Near Field Communications current applications include the use of wireless data transfer such as wireless keys, electronic money, electronic tickets, data documents, and mobile commerce.[viii] On top of the current applications, it also applies to the use of touching to confirm and act upon the user's request such as touch-and-go, touch-and-confirm, touch-and-connect, and touch-and-explore. NFC is fully compatible with both NXP's MIFARE and Sony's FeliCa contactless smart card platforms. These proven systems provide a solid foundation for the introduction of NFC-enabled devices. This enables NFC devices, like your mobile phone or PDA, to act as an electronic key to access your home, office, or car. NFC devices can also pay for, or act as, your transport ticket.[ix]

HOW IT AFFECTS CONSUMERS

NFC provides secure storage for your confidential personal data. Examples of these are credit card numbers, coupons, membership data, or digital rights. This is accomplished by providing a fast and easy connection between PC and mobile phone, or TV and PDA. NFC allows you to easily update and align your appointments or any other data. NFC also provides access to information anywhere and at any time. For example, a consumer can upload the departure times of a bus into a mobile device by simply holding it close to the NFC-enabled timetable/. It can also access the latest film news and reviews at the cinema by holding it up to an NFC-enabled poster. This is more than just a wireless connection; it's a basic tool that allows for intuitive interaction with the [digital] environment.[x]

ADVANTAGES OF NEAR FIELD COMMUNICATION

Acting as a secure gateway to the connected world, tomorrow's NFC-enabled mobile devices will allow consumers to store and access all kinds of personal data. This can be done at home or on the move. By bringing two NFC-enabled devices close together, an automatic network communication will happen. This will not require the user to configure the setup. NFC-enhanced consumer devices can easily exchange and store personal data such as messages, pictures, and MP3 files. NFC enabled products delivering ease of use, instant intuitive connectivity, zero configuration, and smart key

access. NFC meets all consumer needs today and creates opportunities for mobile services.[xi]

NFC technology provides simplicity to end-users. End users, or employees, need only to hold NFC-enabled devices together to access services. They can then interact with content, set up connections, make payments, or act as tickets. Many corporations use contactless ID cards to control access to their facilities and networks. NFC can reduce the cost of card issuance and management. Consumers are able to use their phones to get into their offices. NFC enabled devices can also simplify login to enterprise networks. As NFC technology receives signals from the office, NFC-enabled devices can access wireless settings. This allows users to quickly get to work in any office location.[xii] Other advantages include increase in revenue, reduction of cost of electronics, and consumption of rich media content.[xiii]

PROMOTIONS

Near Field Communication is a technology that is on the verge of a revolution. It changes how people are able to transfer information and make fast and secure payments. Sony and Phillips first developed NFC technology.[xiv] In order to promote their products, they created the NFC Forum in 2004. By 2005, the first NFC enabled phone was introduced. NFC technology is becoming very popular around the world. As technology progresses, major cell phone companies, chip merchants, and credit card are getting involved. In order for this technology to be a success, companies are to working together

to ensure that the product will continue to progress. The major companies that form the NFC Forum are Visa, MasterCard, Intel, Nokia, Samsung, and Microsoft, Cingular Wireless, and many others.

In order to promote the use of near field communications, NFC applications have been tested all over the world. The technology was first used in the World Cup. It has since been used in stadiums in Germany. It started to gain popularity while giving consumers high-tech tickets. To get into the stadium, a consumer must simply wave their NFC enabled device across a NFC scanner.[xv] Once the fans were inside the stadium they were able to wave their device across other scanners inside the stadium to find information about directions to their seats.[xvi] This was the beginning of a revolutionary idea, and a marketing success. Fans came across the world to watch the World Cup. Many early promoters used NFC enabled devised to find their seats. NFC made it more efficient to find a seat at the game.

NFC is also being promoted in many Asian countries. Asians countries are also being able to purchase food, transit tickets, and tickets to events with just a wave of their NFC enabled device.[xvii] NFC is becoming the new trend in many Asian countries. This is because of the hunger they have for innovation in the technological world. The United States is also trying to promote NFC. New York City and San Francisco have been testing the NFC technology at selected transit stations. MasterCard and Nokia have also helped promote NFC by giving 500 consumers NFC enabled phones to use at local convenient stores.

In January HSBC credit card services gave 200 of their employees NFC enabled phones. They were able to use the phones at Starbucks, McDonalds, and local stores that had NFC enabled readers. Gerhard Romen, who is the marketing committee chairman for the NFC Forum said, "NFC in the US is at a turning point". NFC is being promoted throughout the United States. Influential companies are joining the advancing technologies of NFC. They are increasing their efforts to advance the use of Near Field Communications.

ROAD MAP

In order for Near Field Communication technology to succeed Phillips and Sony needed to create a road map that they could work from. They needed to have a vision, mission, and a key understanding of the challenges they may face in the future. Phillips and Sony had a vision for the future where consumers would be able to access information and make payments without the use of hard assets such as cash, or credit cards. They wanted a "World of secure universal commerce and connectivity, in which consumers can access and pay for physical and digital services anywhere, at any time, using any device".[xviii]

Philips and Sony desired a system in which consumers would no longer have to lug around their wallets. Years ago the cell phone replaced the wristwatch; it now is in the process of replacing credit cards. With the help of companies such as Bank of America and Citibank, consumers can use their cell phones as a debit or credit card. Members of

the NFC Forum estimate that by 2008 there will be commercial rollouts in all regions. By 2011 they estimate that over 30 percent of all cell phones will be NFC capable (NFC Forum)

CURRENT CHALLENGES

In order to achieve their vision members of the NFC Forum stated, "The mission of the NFC Forum is to advance the use of Near Field Communication technology by developing specifications ensuring interoperability among devices, services, and educating the market about NFC technology."[xix] To achieve this mission Phillips and Sony have created the NFC Forum to help spread the news about NFC. They have created alliances with many companies noted earlier in our report. These alliances will help ensure that NFC will succeed.

When Sony and Phillips created their mission, they had a vision to revolutionize contactless technology. The main goal was to make Near Field Communication available in devices across the world. They desire to create a world where cell phones would be used as a Swiss Army Knife. Another goal they are setting is ensuring interoperability between NFC devices. The NFC Forum will continue to spread the word about NFC, and change views on advertising.

FUTURE CHALLENGES

By ensuring interoperability, Sony and Phillips are bridging the gap between software and hardware between different machines. For example, a cell phone that is capable of interacting with computers. Sony and Phillips hope that the NFC Forum will educate enterprises and consumers about the positive aspects of contactless technology. They also estimate that NFC will change the way advertising is being done. Technology today allows consumers to recording their favorite TV shows. Consumers today are skipping right through commercials. Sony and Phillips plan on revolutionizing the way people are marketed to. They are setting the stage for a kind of advertising that has never been done before. They plan on doing this using NFC enabled posters. This change in marketing will allow NFC users to be selective in who they receive ads from.

However, NFC is facing many challenges in right now. Some of the challenges being faced are backward compatibility. This involves ticketing, payments, etc. Phone availability is also a challenge that is being addressed. In order for NFC to be put in all phones, phone manufacturers have to come to a standardized agreement. Most consumers will most likely use their cell phone as their main NFC enabled device. Phillips and Sony need to be able to create alliances with phone manufactures, and service providers. Then NFC enabled phones can be made available to the public. Phillips and Sony must also work with Bluetooth and explore device pairing.

Other challenges that NFC will face in the future are dive-switching, advertiser and agency education on content discovery, and compelling application availability. An example of dive switching is banking soft cards. The makers of NFC must also be able to

have NFC enabled components that can be used and implemented. They need to have transit systems, stores, posters, etc. If products do not go out into the market, consumers won't be able to use NFC. Advertisers also need to be educated in NFC technology. Then they can implement it in their marketing. Posters can be used to give consumers in depths look at movie trailers and ticketing info. Marketers must be able to effectively use NFC products.

Security is another major future concern. Consumers may be scared to use NFC as a payment method because of the security risks involved. Identity fraud is something that is a major problem and this problem may hinder the use of NFC enabled devices. Sony and Phillips have taken some steps to help secure safe and reliable transactions by implementing passwords. If a consumer lost his or her phone and someone tried to use it, the phone would be password protected. In the future, there are several ways NFC can be implemented.

The last future challenge is other competitive technologies that may hinder the expansion of NFC products. Products such as blue tooth, RFID, and infrared technologies can do many of the same things. However, other technologies do not compare to the capabilities that NFC can perform. With respect to Bluetooth, NFC must be able to work together with Bluetooth capabilities so that they can perform together. RFID can be used to track inventory and consumers buying habits. NFC can also be used to do this but NFC is more sophisticated. It isn't just used as a scanner and won't read every tag in range. NFC is used for short-range wireless connectivity. It is able to read tags independently of

each other. Infrared communications works the same way that your television remote does. This can be used for long-range communication but is not as practical as NFC is. It is more susceptible to security issues and cannot be used as an e-commerce device in the manner NFC is used.[xx] Although there are some competitive technologies that are similar to NFC, they do not at this time have the same capabilities.

WHO IS AFFECTED BY NFC TECHNOLOGY?

NFC enabled products effect everyone. The NFC Forum has a socio-economic diagram showing the reaches of this technology. NFC products are designed for consumers and are more likely to connect bank accounts with cell phones. In fact, trials have already been conducted in the United States to receive feedback. The first major trial was held in Atlanta, Georgia, at the Philips Arena in 2005. 150 people participated in the trial. The feedback was incredible and sparked interest elsewhere in the country. The requirements for the participants were that they 1) had a chase issued Visa account, and 2) had a Cingular Wireless account. When the first 150 participants met those requirements they were given NFC enabled Nokia cell phone.

The feedback received from this trial was that consumers experienced 25% faster purchasing. Visa established a no-signature policy for items less than $25 and this allowed consumers to simply wave their phone in front of the NFC reader and it would deduct their purchases from their bank accounts. NFC phone users were also able to download ring tones and statistics from NFC enabled posters in the stadium. A person

only had to hold their phone in front of a NFC poster and it would transmit a signal allowing them to view the statistics, or hear the ring tones from their favorite players.

NEW YORK CITY TRIAL

Another trial was conducted later that same year (2005) in New York City. The requirements were almost the same for those wishing to participate. Participants had to 1) be a selected MasterCard holder and 2) have a Cingular Wireless account. When the participants met those requirements they were given a NFC enabled Nokia phone. For the results and more information on the New York City Trial see www.nyctrial.com.[xxi] The results were similar to the previous trial in Atlanta, Georgia.

NFC enabled products have endless uses. It is only a matter of time before everyone will be using this technology. The use of this technology is not limited to the cell phone. Philadelphia schools are using this technology to keep track of their students. In a certain district in Philadelphia all high schools implemented this new technology. NFC technology was put onto all student ID cards. Before this system was implemented, teachers had a hard time keeping track of who was in their class. A student was assumed to be present unless teachers were told otherwise. Under the new system students have to wave their ID cards against a NFC reader as they enter class. Administrative staff was given readers to scan student ID cards to make sure students were where they need to be. The NFC enabled student ID cards also contains student's medical information. The ID

cards can also be used during lunchtime to deduct from a students lunch account when ordering food.[xxii]

OTHER NFC NEWS

The popularity of NFC enabled products is continuing to spread throughout the United States. The National Association for Convenience Stores (NACS) predicts that in the next 5 years, convenient stores will start using this technology.[xxiii] In more recent news, a major envelope manufacturer started producing envelopes that will protect NFC cards from being read while being sent in the mail.[xxiv] This developing technology has not only occurred in the United States. Canada recently introduced Visa payWave, which is the same technology that allows users to purchase items using NFC via cell phones.[xxv] This technology is becoming more useful to the everyday consumer and companies are starting to respond.

For example, VeriFone QX100 is a NFC enabled reader that has been approved by both Visa and MasterCard. Convenient storeowners are now able to purchase this unit and allow consumers with NFC enabled cell phones to make purchases in their stores. Again, the NACS predicts that in the next 5 years convenient stores will adapt this technology. However, this technology is not limited to the convenient store industry. Transit systems in major cities, such as New York and San Francisco, are conducting their own trials. Massachusetts Bay is using this technology in their CharlieCard. A user of the Massachusetts transit system is able to use their NFC enabled phone to purchase tickets

and download schedules. These types of uses are revolutionizing the way purchasing and data transfers happen.

CONCLUSION

NFC is a technology that affects everyone. It is definitely targeted at the consumer, but this technology is available for any industry. The example of the Philadelphia High School district was not targeted at consumers. However, the technology allowed staff to keep track of students and better serve them. It also allowed students to use their ID cards to debit their lunch account. In the trials at the Philips Arena and New York City, consumers were allowed 25% faster transactions. They also had access to data they could store on their cell phones. NFC users were also able to use their cell phones to purchase transit tickets and view schedules in certain cities.

NFC is a relatively new technology. I. David Ramirez was at PETCO Park last Friday watching the Padres defeat the Cardinals. While purchasing a hot dog and some fries at a concession stand, I noticed an NFC reader on the counter next to the cash register. I was surprised. I asked the vendor if he had seen anyone use the reader and he replied, “no”. He told me that he hadn’t seen anyone use it, and that he didn’t even know what it was. I think it is only a matter of time before people will catch on. I can’t wait till they do; it’ll be good to have 25% faster transactions at the concession stands.

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