

# NFC Based SMS Ticketing for Non-NFC Devices

Miss. Jahanvi Gupta, Mr. Monal Shinde, Prof. Sushopti Gawade

**Abstract:** NFC (Near Field Communication) Technology has various applications such as Ticketing, Cashless payment, Identification, Time and attendance, Physical access etc. The most important and widely used application of NFC is ticketing. To use NFC applications it requires an inbuilt NFC in your smartphone. Till Today only high-end phones are NFC Enabled. This paper presents a Prototype for Local Train Ticketing using NFC for non-NFC Phones to increase the ubiquity. The system integrates NFC with SMS to produce the ticket. Passengers can get the desired Ticket on their Phone by just showing the phone in front of the Reader at the station. Thus the created application can provide more ubiquity as passengers with low-End phones can also use NFC for ticketing.

**Keywords:** Near Field Communication, NFC, SMS, RFID, J2ME

## I. INTRODUCTION

Near Field Communication is an upcoming radio technology that has wide range of applications in ubiquitous computing environment. It enables the bi-directional data transfer between two NFC enabled devices. It is based up on the existing Radio Frequency Identification (RFID) technology. NFC allows the data transfer at maximum data rate of 424kbps and distance up to 10cm [7].

NFC is widely used in ticketing system of various fields such as movie tickets, public transport system such as bus, railways etc. The public transport ticketing system in India(local trains) has some issues such as paper based tickets and long queues. The solution for these issues lies in using NFC technology for ticketing. Using NFC a paperless ticket can be generated by the users within no time. This can be done by just showing mobile phone in front of readers at the stations.

**Manuscript received January 16, 2014.**

**Miss. Jahanvi Gupta**, Pillai's Institute of Information Technology University of Mumbai, India (e-mail: janvi.r.gupta@gmail.com)

**Mr. Monal Shinde**, Pillai's Institute of Information Technology University of Mumbai, India (e-mail: monal.pradip.shinde@gmail.com)

**Prof. Sushopti Gawade**, Asst. Prof, Pillai's Institute of Information Technology, University of Mumbai, India (e-mail: sushopti@gmail.com)

## II. RELATED WORK

The use of NFC in ticketing has already been analyzed in a few prior trials and research projects. Some of the projects based on NFC that are already implemented are:

*O'BB* (Austrian Federal Railways):ÖBB offers the service named as Handy Tickets based on NFC. In this system Ticket can be obtained on NFC Enabled mobile phone via SMS. The customer has to be register first and then he can buy the tickets by sending an SMS. Customer receives an special code. Before starting the journey customer needs to verify this code at terminal via NFC[1][4]

*Touch and Travel*:This is the NFC trial by German National Railway Company in 2008. For this trial Check-in /Check-out principle is used. The customer has to touch their NFC enabled mobile phones at a special touch points before entering and after leaving a vehicle.

The system automatically calculates the price for the route and the bill is generated at the end of the month. [1][6]

These NFC based systems are successfully established, but are not suitable for Indian economy as these systems work only with NFC enabled devices. These devices are generally high-end devices with high cost. This restricts the ubiquity of the system. Very few users are able to use these systems as the only requirement for using it is high end, NFC enabled devices.

Some of the countries had also Implemented Ticketing Systems based on SMS. In these systems customers have to send SMS containing the information such as source, destination etc. to railway server and the server sends back the ticket via SMS. But customer has to be first registered to the server. The drawback of such kind of system is that user can enter any source or destination, so there are chances of fraud.

To overcome the drawbacks of all these systems we have proposed a system that enables NFC ticketing on NON-NFC devices. The system combines NFC technology with SMS to generate the ticket. The detailed design of the system is given in the following section.

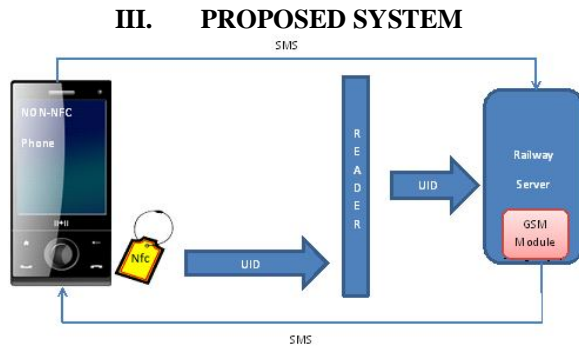


Fig.1.Proposed System

Figure 1 shows the architecture of the proposed system. The system contains following components:

1. NON-NFC phone
2. NFC Tag
3. NFC reader
4. Server

NON-NFC phone is a mobile device that will contain ticketing application developed in J2ME. User has to enter details about ticket using this application.

NFC Tag is a small chip that is attached to NON-NFC mobile. This tag contains information about the user.

NFC reader is a device that has to be implanted at different stations so that users can generate their ticket by showing their mobile phones in front of the reader. This reader is a kind of RFID reader that is already in use by some systems.

Server is the component that controls all the working of the system. Server will contain the database of all the registered users. Server will generate e-ticket after authenticating the user.

**Working:**

First user has to register to the system to be able to use it. After registration user is allocated with NFC tag that is to be attached to mobile phone. This tag contains a unique identification of the registered user. Server maintains the database of the users with their unique identification. After registration user have to download and install an application on his mobile phone. When user wishes to buy a ticket, user have to enter the details such as destination, class, etc. for the ticket. As the user submits the details, the application will send these details via SMS to the server. User will have to show the mobile phone in front of the reader at station. The reader will read the

information(UID) from the tag and will trigger the server. As soon as the server gets the UID, it will read the SMS from the registered number with that UID and generate the source station automatically based on the reader information. Once the server has authenticated the user via reader it will generate the requested e-ticket and send it to the user via SMS. In this system NFC plays a very important role for authenticating the user to reduce frauds.

## IV. CONCLUSION

The Proposed system can overcome the biggest drawback of the existing NFC Ticketing systems. This system allows the customer to use NFC Ticketing even they don't have high-end mobile phones. Thus the system is suitable for Indian economic environment and can be easily implemented with the existing ticketing systems. The system can work with most of the mobile phones that are used today thus increasing the usability of the system.

## REFERENCES

- [1] Rainer Widmann, Stefan Grunberger, Burkhard Stadlmann, Josef Langer University of Applied Sciences Upper Austria "System Integration of NFC Ticketing into an Existing Public Transport Infrastructure" in International Workshop with Focus on Near Field Communication 2012
- [2] A. Juntunen, S. Luukkainen, and V. K. Tuunainen, "Deploying NFC Technology for Mobile Ticketing Services - Identification of Critical Business Model Issues," in Proc. of the 9th International Conference on Mobile Business (ICMB'10), Athens, Greece, Jun. 2010, pp. 82–90.
- [3] K. Finkenzerler, RFID Handbook: Fundamentals and Applications in Contactless Smart Cards, Radio Frequency Identification and Near-Field Communication, 3rd ed. Chichester, UK: John Wiley & Sons, 2010.
- [4] "Handy-Ticket," OBB, retrieved on Sep. 20th, 2013. [Online]. Available: <http://www.oebb.at/en/Tickets/Handy-Ticket/index.jsp>
- [5] J. Langer and M. Roland, Anwendungen und Technik von Near Field Communication (NFC), 1st ed. Springer, 2010.
- [6] "Touch & Travel," Deutsche Bahn, retrieved on Oct. 20th, 2011.

[Online].Available:<http://www.touchandtravel.de/site/touchandtravel/de/dieidee/funktionsweise/funktionsweise.html>

- [7] “About NFC,” NFC Forum, retrieved on Aug. 18th, 2013. [Online].Available: <http://www.nfc-forum.org/aboutus/>