Chapter 2
NFC Payment Architecture

ABSTRACT
A main challenge in NFC payment is to make it possible for different actors to interact and coordinate with one another for proper functioning. This requires meeting the standards given by standard organizations which includes infrastructure for networks, different hardware’s, software’s, communication protocols. Challenges include trust, security, commitment and interoperability. This chapter gives the insight about the working and functioning among different actors making it convenient to understand the entire concept. From the users point of view mobile devices play the role of credit card. Mobile device manufacturers include only NFC chip and the antenna to their mobile device. SE is stored to SIM or UICC. MIDlet on customer’s mobile device simulates contactless smart card mode so that POS terminal manufacturers need not to make new terminals equipped with NFC chip reader. Bank authorities need to have added responsibilities of authenticating. Since the architecture has MNO’s and bank as important players both get multi-application NFC SE stored in SIM or UICC.

INTRODUCTION
In case of NFC mobile payment service if an end user wants to make payment with the help of handset he connects to his bank requesting activation of mobile payment service. In order to allow payment service, bank needs to check user’s mobile phone and Secure Element which can be retrieved from end users MNO. On one side bank asks the details of IMEI and SE
from the MNO and on the other side bank replies to the user’s bank request sending IMEI and SE identifiers. When received, these identifiers need to be forwarded to device manufacturer and SE manufacturer respectively. Based on SE identifier, SE manufacturer sends data regarding technical capabilities of SE to the bank. Using the same logic device manufacturer sends data about technical capabilities of mobile device. If user’s SE and mobile device meet the requirements for activating NFC payment service bank refers to MNO again asking for download of payment application to users SE. MNO takes application code using its OTA infrastructure, downloads application code of OTA to the secure element in users mobile phone. At the last stop MNO notifies all actors about successful operation on SE. There are different actors in the NFC payment architecture, where these actors’ acts as an enabler in a business to business relationship with banks and other service providers, in terms of creation of different applications with security features on the SIM Card. There is another actor that has a dominant role. That is the payment card scheme owners, namely VISA and MasterCard. They have launched pilots all over the world and have started transactions with their contactless payment card, PayWave, PayPass.

**NFC PAYMENT ARCHITECTURE**

Since contactless payment cards and NFC payments, through EMV, can work in a similar way these network owners are very dominant in the NFC payment ecosystem. Further, they are interacting with the payment industry and are engaging in collaborations with handset manufacturers. For example VISA have engaged in collaboration with Nokia and together executed trials on M-payments through NFC. Different actors involved in payment architecture are discussed in Simalliance (2013) are as follows.

**Secure Element**

The secure element (SE) is a secure microprocessor (a smart card chip) that includes a cryptographic processor to facilitate transaction authentication and security. It also provides secure memory for storing payment applications (e.g., American Express, Discover, MasterCard, Visa and other payment applications). SEs can also support other types of secure transactions, such as transit payment and ticketing, building access, or secure identification. A
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