Assignment 1

NFC Protocol

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Definition

- Near Field Communication (NFC):- It is a wireless communication protocol that operates over short ranges, typically within a few centimeters, and has a maximum range of approximately 10 cm. It allows two devices to communicate with each other by establishing a wireless connection.

NFC Architecture:

- NFC architecture comprises two main components:
  NFC controller and an NFC tag. The NFC controller manages the wireless communication, and the NFC tag is responsible for storing data. The NFC controller has an antenna that generates a magnetic field, which is used to communicate with the NFC tag. The tag, which is often embedded in a smart card or sticker, has an antenna that receives the magnetic field is uses to power the tag's circuits. The tag which then sends data back to the controller by modulating the magnetic field it receives. The controller processes the data and sends it to the appropriate application.

Communication Protocol:

- The communication protocol used in NFC is based on the ISO/IEC 14443 and ISO/IEC 18092 standards. There are two modes of operation : active mode and the passive mode. In active mode, both the NFC controller and the NFC tag generate magnetic fields to communicate with each other. It is typically used for peer-to-peer communication, such as file transfer or device pairing. In passive mode, the NFC controller generates the magnetic field, and the NFC tag modulates the field to send data. This mode is used for reading data from NFC tags, such as in contactless payments or ticketing.

Use Cases of NFC:

- It has a wide range of applications which are including contactless payments, transportation ticketing, access control, data transfer, and authentication. The following are some of the most common use cases for NFC:

1. Contactless payments: NFC is widely used for contactless payments, allowing customers to pay for goods and services by simply tapping their smartphone or smart card on a payment terminal.
2. Transportation ticketing: NFC is also used for transportation ticketing, allowing passengers to simply tap their smart card on a reader to pay for a ride.
3. Access control: NFC is used for access control in various applications, such as buildings, parking lots, and events. NFC tags can be embedded in ID cards, wristbands, or other devices, allowing users to gain access to restricted areas.
4. Data transfer: NFC is used for data transfer between devices, such as transferring files, contacts, and other information between smartphones.
5. Authentication: NFC is used for authentication in various applications, such as online banking and access to secure facilities. NFC can be used to authenticate users, providing an additional layer of security.