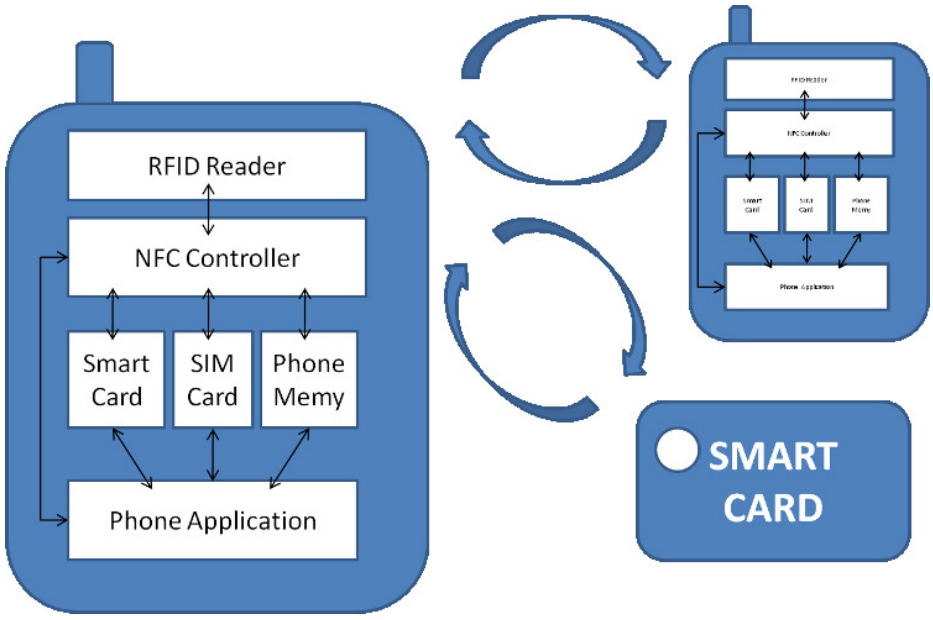
NFC – What's It All About?

Near Field Communication : Technology & Applications

The Near Field Communication standard was developed primarily as a tool to extend the capability of mobile phones by enabling them to interact with contact smartcards and with one another over a simple two way communication protocol. From its origins in 2003, it is now a mature set of standards with a growing range of technology available for applications. It is supported by over 14 mobile telecoms network operators, together responsible for over 40% of the global network connections.



RFID + Device / Device Communication

The NFC standard focuses on three activities. Firstly it allows a reader device to interact with a passive radio frequency device, typically a contactless smart card. Secondly the reader device incorporates its own contactless smart card which it can use as part of the transaction. Thirdly it allows two reading devices to exchange data.

Examples of NFC style applications could include loading the phone with a store of travel tickets (held in the NFC device's "smart card" store) which could then be used by touching the mobile phone to NFC reader points on buses or trains. If permitted by the application travellers could pass on tickets to others by transferring value from one phone to another. Ticket values on the phones could be recharged by touching the phone against NFC "top-up" points.

The first aspect of NFC is indistinguishable from existing RFID solutions and, in fact the NFC standard uses standards commonly found in RFID applications. The rules governing the interaction of the reader and the passive device being interrogated are defined by ISO1443, a commonly used high-frequency RFID standard. The smart card aspects of the interaction are handled by standards familiar to RFID users such as Mifare.

The second aspect can be thought of as a single device combining a reader and its own "smart card". Typically this will be a mobile phone. NFC compatible mobile phones are available from Nokia, Samsung, Motorola, and others. Integrators are also planning NFC plug ins for I-Phones and other suppliers have announced NFC compatible devices for that can be plugged into PC's, via a USB port, for example.

The third capability is that of simple data exchange between two intelligent NFC devices. In this respect NFC can be compared to Bluetooth. NFC however, is based on a simple "touch" to establish an exchange between devices (rather than the complex pairing arrangement needed by Bluetooth). NFC is also only a two device point to point network, compared with the more complex Bluetooth multi-device network.

Benefits of NFC

The NFC standards make new applications possible:

- Widespread consumer access to NFC devices in mobile phones
- Simple "touch-in" connection and data transfer makes it easy to use
- Wide ranging acceptance for standards makes devices from different suppliers interoperable
- Supported by the mobile device and RFID technology communities andf by major financial services providers

NFC standards are already providing consumer based services and the standards take advantage of existing technologies such as MIFARE, HF-RFID and so on.

Technology Aspects

NFC is defined as operating in the high-frequency RFID spectrum at 13.56MHz. As such it supports reading of tags over distances of typically only a few centimetres. NFC tags should be readable by any ISO1443 compatible reader but an NFC application also needs to implement the standards defined by the NFC Forum. These standards cover such areas as Data Exchange Format, Tag Types, Record Type Definitions, and Protocols. NFC supports devices operating in three modes: reader/writer mode (similar to the ISO 14443 standard); per to peer mode allowing two NFC devices to exchange data (covered by the ISO 18092 standard) and card emulation mode (where the device appears as a conventional smart card to an external reader). The NFC Forum provides its standards definitions and many other information resources as freely downloadable documents to both members and non-members. Because interoperability is an important goal for NFC, the NFC Forum is implementing a testing and certification programme that will allow manufacturers to demonstrate that their products conform to the NFC standards. The NFC Forum also has the aim to promote the use of the technology and has recently launched a logo to be used at reader points and on tags that implement NFC standards. More information on the NFC Forum can be found at www.nfc-forum.org.

The NFC Forum logo for reader points & tags

Application Areas

Most applications for NFC to date have been in the consumer arena with projects involving Manchester United Football Club, Barclays (all its debit cards will feature contactless NFC chips by the end of 2011) and Transport for London which is using NFC as an extension to its current Mifare based Oyster Card ticket system. More business oriented applications are also starting to appear. SmartPlan, one of CoreRFID's partners, has provided a version of its care monitoring system that uses NFC devices to allow care workers to check in with their clients. Other application areas identified by the NFC Forum include information kiosks, vending machines and retail applications and applications such as using NFC devices to identify museum exhibits as guides for visitors have also been trialled.

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