NFC: Facts at a Glance

1. What is NFC?

NFC technology is a standards-based wireless communication technology that allows data to be exchanged between devices that are a few centimeters apart.

NFC operates at 13.56 MHz and transfers data at up to 424 Kbits/second. NFC is distinguished by its intuitive interface and its ability to enable largely proprietary wireless networking platforms to interoperate in a seamless manner.

2. What are the primary uses of NFC?

The primary uses of NFC are to:

- Connect electronic devices, such as wireless components in a home office system or a headset with a mobile phone
- Access digital content, using a wireless device such as a mobile phone to read a "smart" poster embedded with an RF tag
- Make contactless transactions, including those for payment, access and ticketing

3. What are applications that use NFC?

NFC can be used for a wide variety of mobile applications, including:

- Making payments with a wave or a touch anywhere contactless card point-of-sale (POS) readers have been deployed
- Reading information and "picking up" special offers, coupons and discounts from smart posters or smart billboards
- Storing tickets for transportation, parking access or events
- Storing personal information that will allow secure building access

4. What are the benefits of NFC?

The NFC Forum provides the following comprehensive list of benefits of NFC on its website:

- Intuitive: NFC interactions require no more than a simple touch.
- Versatile: NFC is ideally suited to the broadest range of industries, environments, and uses.
- Open and standards-based: The underlying layers of NFC technology follow universally implemented ISO, ECMA, and ETSI standards.
- Technology-enabling: NFC facilitates fast and simple setup of wireless technologies, such as Bluetooth, Wi-Fi.
- Inherently secure: NFC transmissions are short range (from a touch to a few centimeters).
- Interoperable: NFC works with existing contactless card technologies.
- Security-ready: NFC has built-in capabilities to support secure applications.

5. How does NFC technology work for mobile contactless payments?

An NFC-enabled phone is provisioned with a payment application and payment account information (i.e., credit or debit card) issued by the consumer's financial institution. The application and payment account information are stored in a secure area in the phone. The phone uses NFC technology to communicate with the merchant's contactless payment-capable POS system, similar to the contactless payment cards and devices in use today. The payment and settlement processes are the same processes used when the consumer pays with a traditional contactless or magnetic stripe credit or debit payment card.

NFC mobile contactless payments can be made at both attended POS locations (such as stores) and unattended locations (such as vending machines) that use the existing merchant payments infrastructure. To pay, the consumer simply brings the phone to within a few inches of a contactless payment-capable POS system and the transaction occurs. The process is the same as that used by the contactless credit and debit cards currently being deployed globally.

6. Are NFC applications secure?

Each NFC-enabled application has its own requirements for security. For example, payment account information and payment transactions must be highly secure, while retail offers may require little to no security.

NFC-enabled credit and debit payment applications are secure. Personal information, including financial information such as an account number and expiration date, is stored in a secured area in the NFC phone, commonly called the "secure element."

7. What is the secure element?

While not all NFC applications require security, those that involve financial transactions, certain mobile marketing applications (e.g., coupons and loyalty) or other applications that must protect a user credential require a "secure element" within the phone to securely store applications and/or credentials (e.g., financial account numbers) and provide for secure execution of applications.

The secure element (secure memory and execution environment) is a dynamic environment in which application code and application data can be securely stored and administered and in which secure execution of applications occur. The element resides in highly secure crypto chips (usually a smart card chip). The element provides delimited memory for each application and other functions that can encrypt, decrypt, and sign the data packet.

The secure element could be implemented either by a separate secure smart card chip (referred to as an embedded secure element), in the SIM/UICC (which is used by GSM mobile phone operators to authenticate subscribers on their networks and maintain personalized subscriber information and applications), or in an SD card that can be inserted in the mobile phone. The secure element implementation approach will be selected by the mobile operator and/or by the service provider (for SD card implementations).

8. How is NFC different from or related to radio frequency identification (RFID)?

NFC and RFID are both wireless technologies, but NFC is used at a shorter range and is used for secure applications, including payment, access and ticketing. RFID, on the other hand, has a longer range, supports minimal security, and is used for very simple applications, such as tracking pallets or animals.

9. How does NFC relate to EMV payment technology?

Contactless payment transactions between an NFC-enabled mobile phone and a POS terminal use the standard ISO/IEC 14443 communication protocol currently used by EMV contactless credit and debit cards. This means that consumers can use their NFC-enabled mobile phones for payment at the existing installed base of contactless credit and debit terminals that are based on this standard. Additional information can be found in the Smart Card Alliance white paper, EMV and NFC: Complementary Technologies Enabling Secure Contactless Payments.

10. What phones will have NFC?

Near Field Communications World maintains a list of mobile phones with NFC, as well as what is expected to come soon. It can be found at: http://www.nearfieldcommunicationsworld.com/nfc-phones-list/.

11. What NFC services are available?

NFC has been implemented in numerous projects globally, with new NFC-enabled services being announced regularly.

Near Field Communications World maintains a database of NFC projects worldwide at http://www.nearfieldcommunicationsworld.com/list-of-nfc-trials-pilots-tests-and-commercial-services-around-the-world/

12. Where can I learn more about NFC?

To learn more about NFC, the NFC Forum, the industry association that develops specifications and does educational outreach about NFC technology, and the Smart Card Alliance provide many resources.

In addition, the following organizations are involved in establishing standards/specifications or in defining business processes and practices for mobile technology and mobile payments.

- 3GPP
- 3GPP2
- CDMA Development Group
- ETSI
- Global System for Mobile Communications Association (GSMA)
- GlobalPlatform
- Mobey Forum
- NFC Forum
- Open Mobile Alliance (OMA)

About the Smart Card Alliance

The Smart Card Alliance is a not-for-profit, multi-industry association working to stimulate the understanding, adoption, use and widespread application of smart card technology. Through specific projects such as education programs, market research, advocacy, industry relations and open forums, the Alliance keeps its members connected to industry leaders and innovative thought. The Alliance is the single industry voice for smart cards, leading industry discussion on the impact and value of smart cards in the U.S. and Latin America. For more information please visit http://www.smartcardalliance.org.