

# Near Field Communication (NFC)

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### Technology Overview

Near Field Communication (NFC) is a standards-based, short-range wireless connectivity technology that enables simple and safe two-way interactions between electronic devices. It allows consumers to perform contactless transactions, access digital content, and connect electronic devices with a single touch. NFC devices are naturally interoperable, as they are based on pre-existing contactless payment and ticketing standards used on a daily basis by millions of people and devices worldwide. These standards determine not only the "contactless" operating environment, such as the physical requirements of the antennas, but also the format of the data to be transferred and the data rates for the transfer.

NFC communicates via magnetic field induction, where two loop antennas are located within each other's near field, effectively forming an air-core transformer. Communication between two NFC-compatible devices occurs when they are brought within four centimeters of one another. NFC operates within the globally available and unlicensed radio frequency ISM band of 13.56 MHz. NFC is both a "read" and "write" technology.

The NFC standard supports varying data rates, again to ensure interoperability between pre-existing infrastructures. The current data rates are 106 kbps, 212 kbps, and 424 kbps. NFC devices are unique in that they can change their mode of operation to be in reader/writer, peer-to-peer, or card emulation mode. The different operating modes are based on the ISO/IEC 18092 NFC IP-1 and ISO/IEC 14443 contactless smart card standards.

Because the transmission range is so short, NFC-enabled transactions are inherently secure. Also, close physical proximity of the device and the reader gives the user the reassurance of being in control.

### Typical applications:

Applications of NFC technology include contactless transactions such as payment and transit ticketing and simple and fast data transfers, including calendar synchronization or electronic business cards and access to online digital content.

One example that demonstrates how NFC technology can help someone capture information: People walk past billboards and posters with product advertisements, but how often do they remember to act on their interest? By adding NFC-compatible "tags" to posters and magazine advertisements, people can read the tags with an NFC-enabled phone and act immediately, before they forget.

A wide range of devices and machines are likely to become NFC enabled. Here are some examples:

- Mobile phones
- Vending machines
- Parking meters
- Check-out cash registers or point-of-sale equipment
- Personal computers
- Posters, street signs, bus stops, and local points of interest (with NFC-readable tags only)
- Product packaging, etc.

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#### References:

1. [www.nfc-forum.org](http://www.nfc-forum.org), NFC forum web site.