



# NFC Market Update and Technology Overview

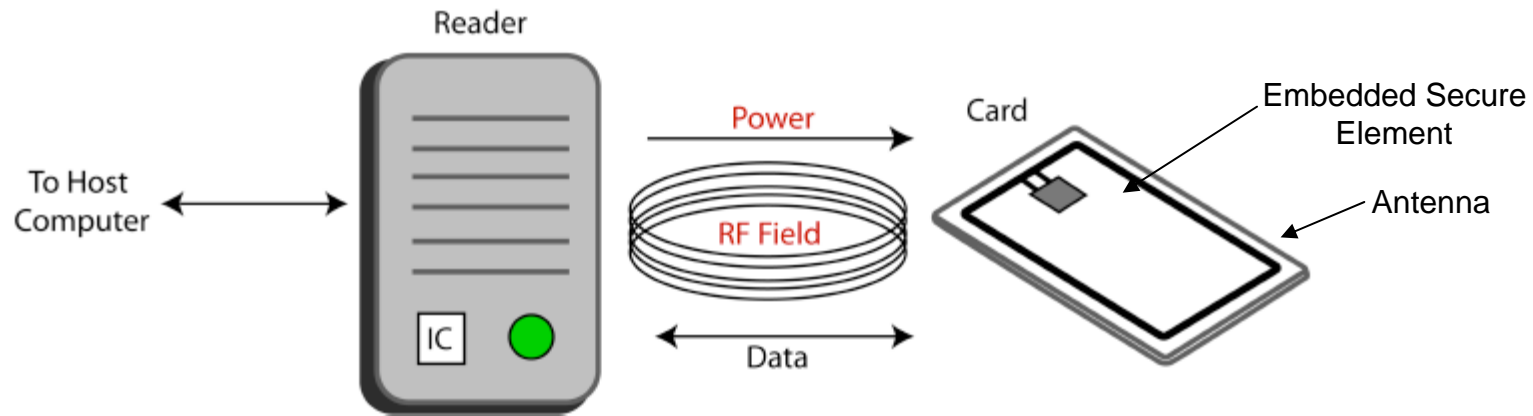
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# Agenda

- ▶ Contactless and Smartcards influence on NFC
- ▶ NFC Market Today
- ▶ Implementation Approaches to NFC
- ▶ Commercial and Trials Snapshot

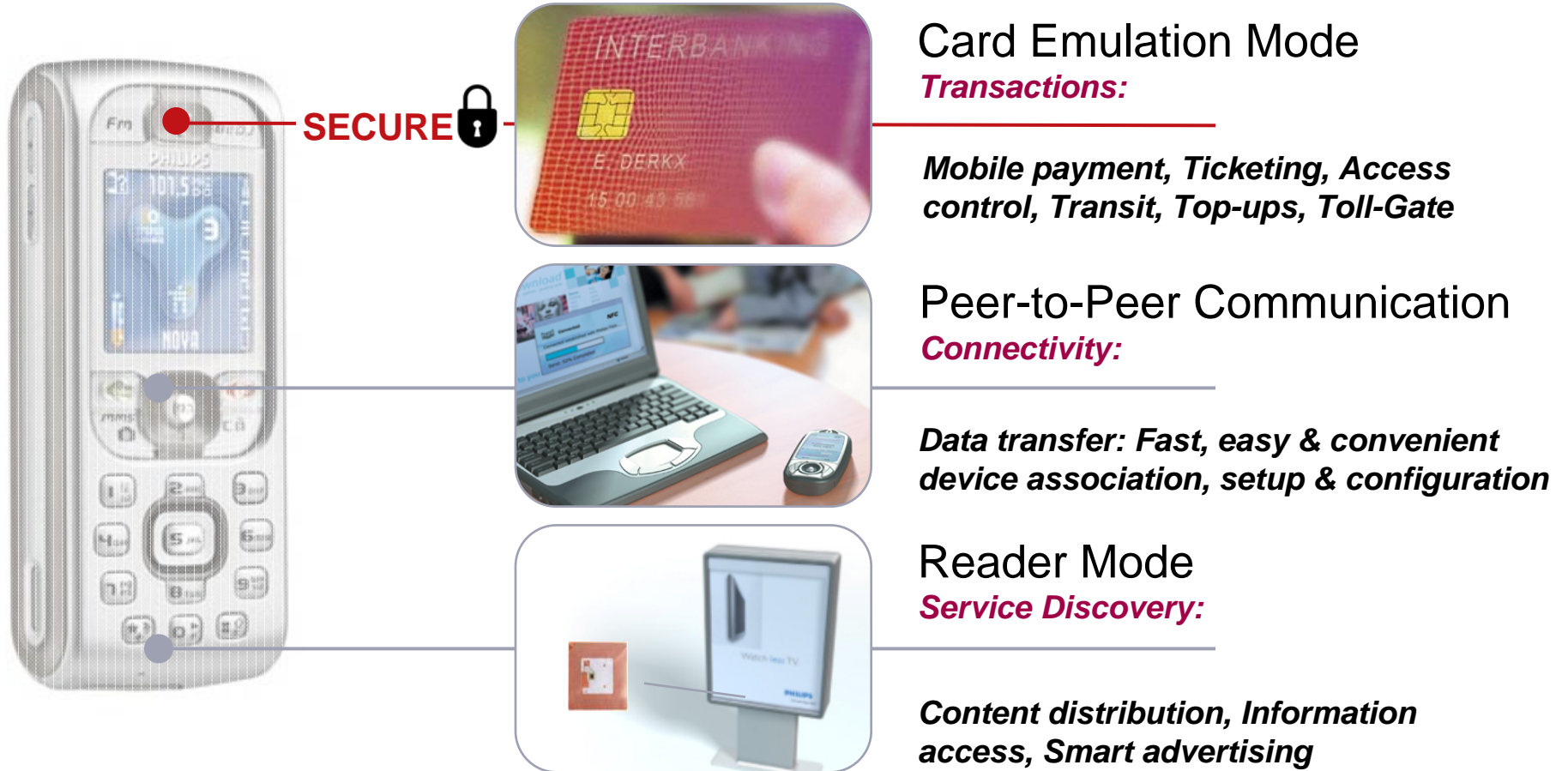
# Smartcard contactless reference



Source: Smart Card Alliance Smart\_Card\_Security\_WP\_20081013.pdf

- The contactless smartcard is the driving element for embedded smartcard solutions
- The existence of multi-application contactless smartcard is a precursor to multiple smartcard resident in a mobile device on a single secure element
- Infrastructure on the reader side, as well as the bridge to OTA manage a smartcard in a mobile will drive the use cases accordingly

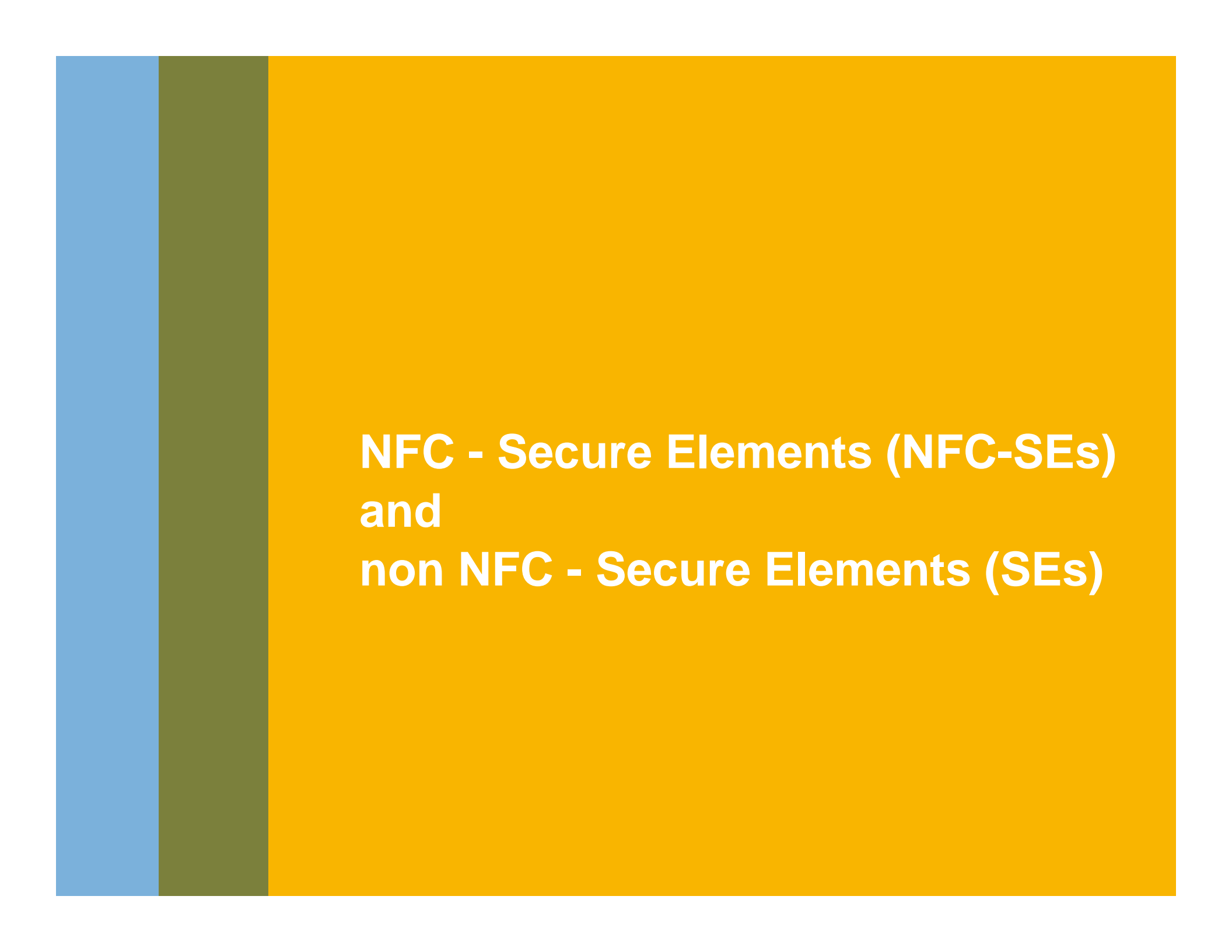
# Main NFC Application Categories



# NFC market today

- ▶ Over 150 trials in the past 3 years and first commercial roll-outs all reporting very positive user experience
- ▶ Main standards in place (ETSI, NFC Forum, WiFi alliance, BT SIG, GP...)
- ▶ Industry players in the value chain investing in NFC
- ▶ NFC design-ins underway for mobile handsets to be ready in volumes by late 2009.
- ▶ Involvement of GSM Association in NFC roll-out and active endorsement to have NFC technology in "*mainstream mobile phones by mid-2009 by using the standardized single wire protocol (SWP) interface.*"
- ▶ Non-mobile market – PC, infrastructure, medical, gaming, automotive - represents market growth in the short term while the mobile market is maturing

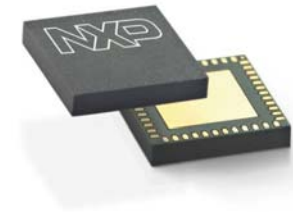




**NFC - Secure Elements (NFC-SEs)  
and  
non NFC - Secure Elements (SEs)**

# What is NFC-SE (secure element)?

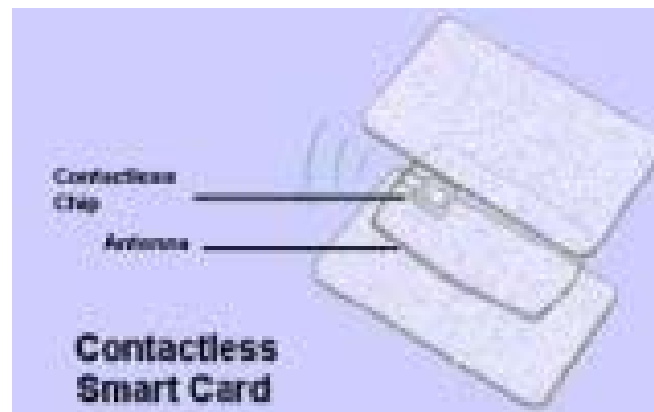
- ▶ NFC-SEs
  - Represents the combination of NFC with Smart Card technology for secure and trusted transactions
- ▶ NFC provides the RF front end for connectivity
- ▶ Smart Card provides security/crypto engine
  - Many configuration possibilities



# What is (non-NFC) secure element?

## ▶ Secure Elements

- Represents the Smart Card technology for secure and trusted transactions applied to mobile devices
- Elements have the ability to drive their own RFID interface, no NFC transceiver or controller needed





# Stickers – example First Data Go-Tag™

- ▶ Bridge product which allows contactless deployment in form factor compatible with mobile device, while compatible with existing contactless card specifications

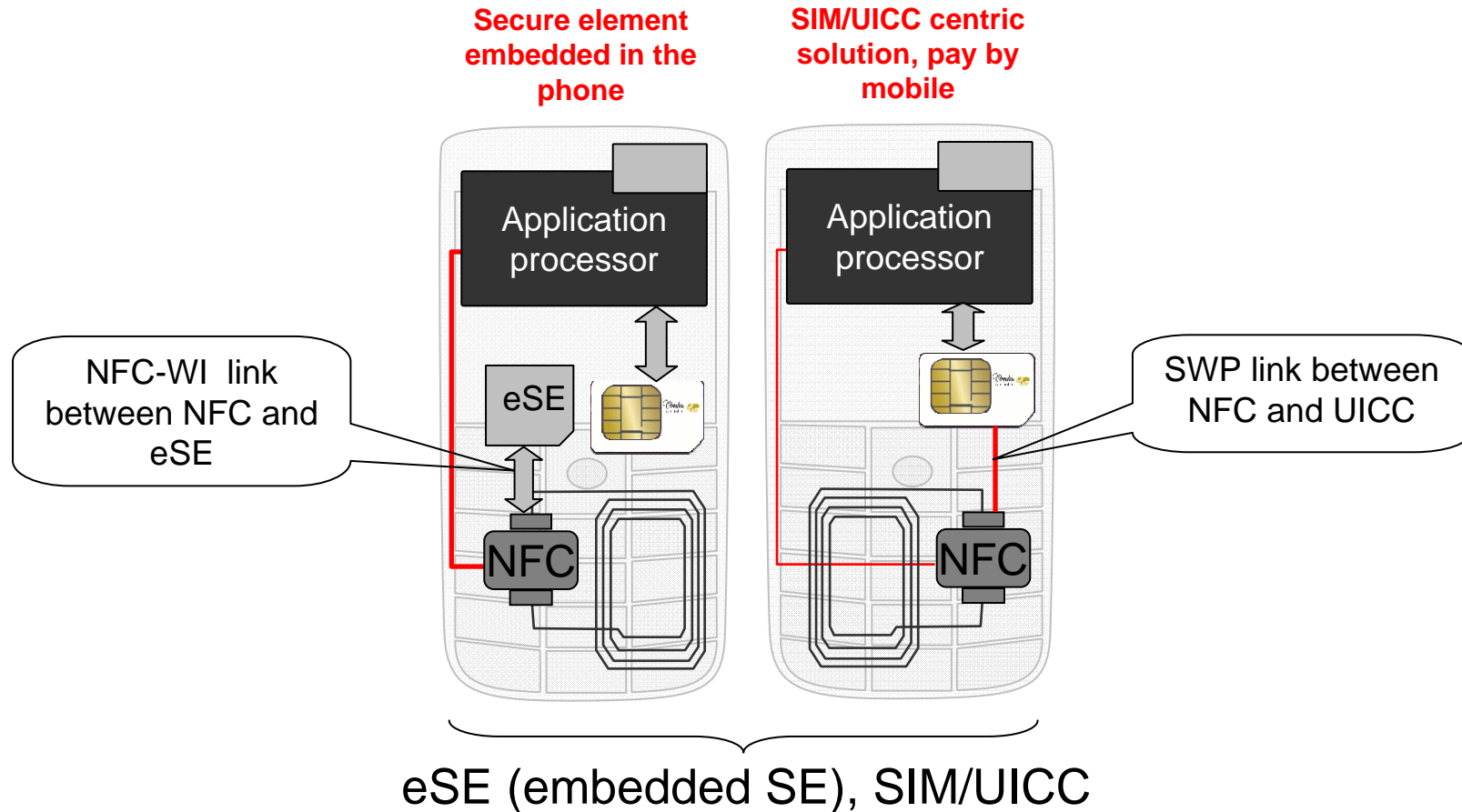
- ▶ **Provides a new, convenient way for customers to pay**
  - Preferred form factors include stickers to support migration to mobility
- ▶ **Enables placement of a payment type on any personal item**
  - Mobile handset, mp3 player, employee badge or other
- ▶ **Different form factors can be used for customized branding**



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# Typical NFC SE Architectures in Mobile Phones



▶ Alternative Architectures based on different combinations and connections of eSE, SD, NFC and SIM/UICC are also possible

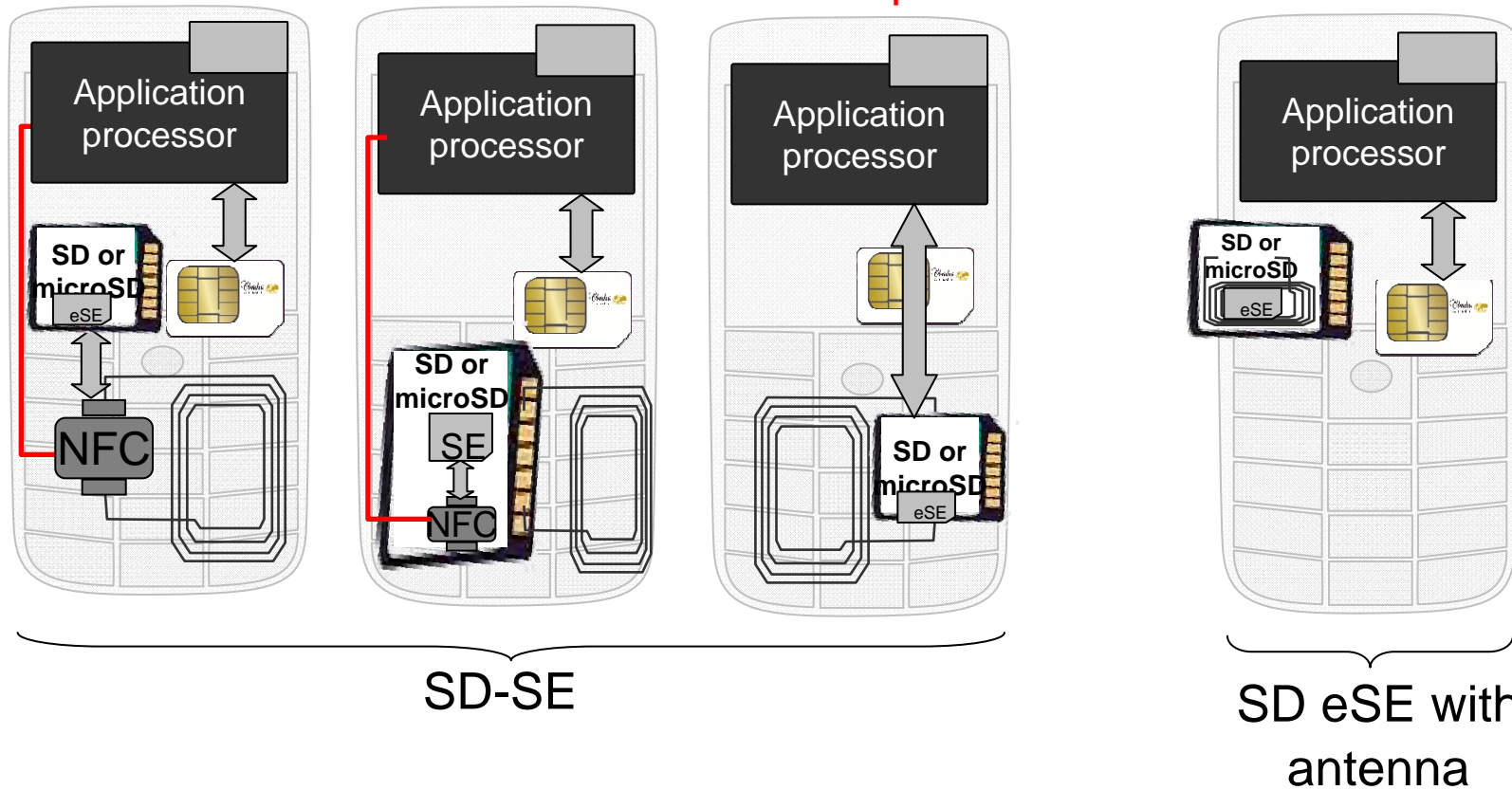
# Other SE Architectures in Mobile Phones

SD or microSD card hosting the application

SD or microSD card hosting NFC and SE

No NFC controller SD or microSD card hosting application. Antenna in phone

Phone agnostic solution, micro SD hosting application

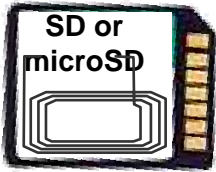


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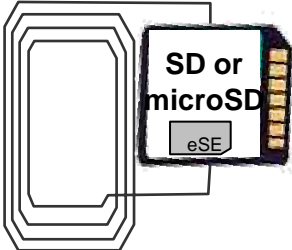


**SD-SE vs UICC/SIM, eSE**

# What is SD-SE ?

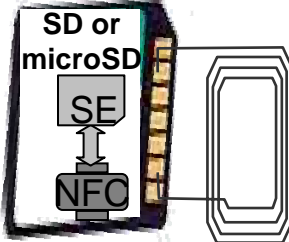


Embedded secure element direct connect to antenna also embedded on card

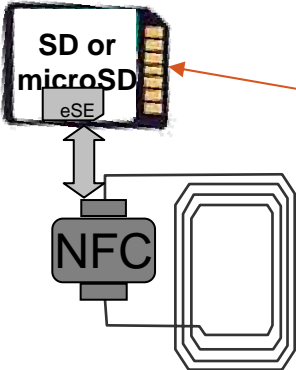


Embedded secure element direct connect to antenna in phone or dongle/token

This approach is similar to existing contactless credit card, but adding support for multi-app deployment



Embedded secure element and NFC with direct connect to antenna in phone or dongle/token



Embedded secure element with NFC-WI connect to NFC embedded in phone or dongle/token



# Latest NFC Projects – adding to the 150 +

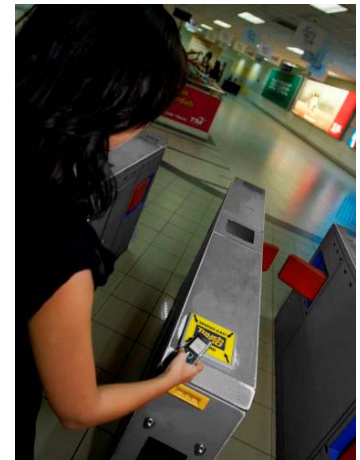
## Malaysia

- ▶ Apr 2009 – Mobile payment and transport ticketing
- ▶ Visa, Maybank, Maxis, Nokia, Touch 'n Go



## Austria

- ▶ January 2009: Transport ticketing - field testing an NFC system based on Germany's VDV contactless ticketing standard.
- ▶ ÖBB – Austrian federal railways group, Mobilkom Austria, Nokia, NXP



## Singapore

- ▶ Mar 2009 - Mobile payment trial
- ▶ Visa, Citibank, Nokia, MobileOne

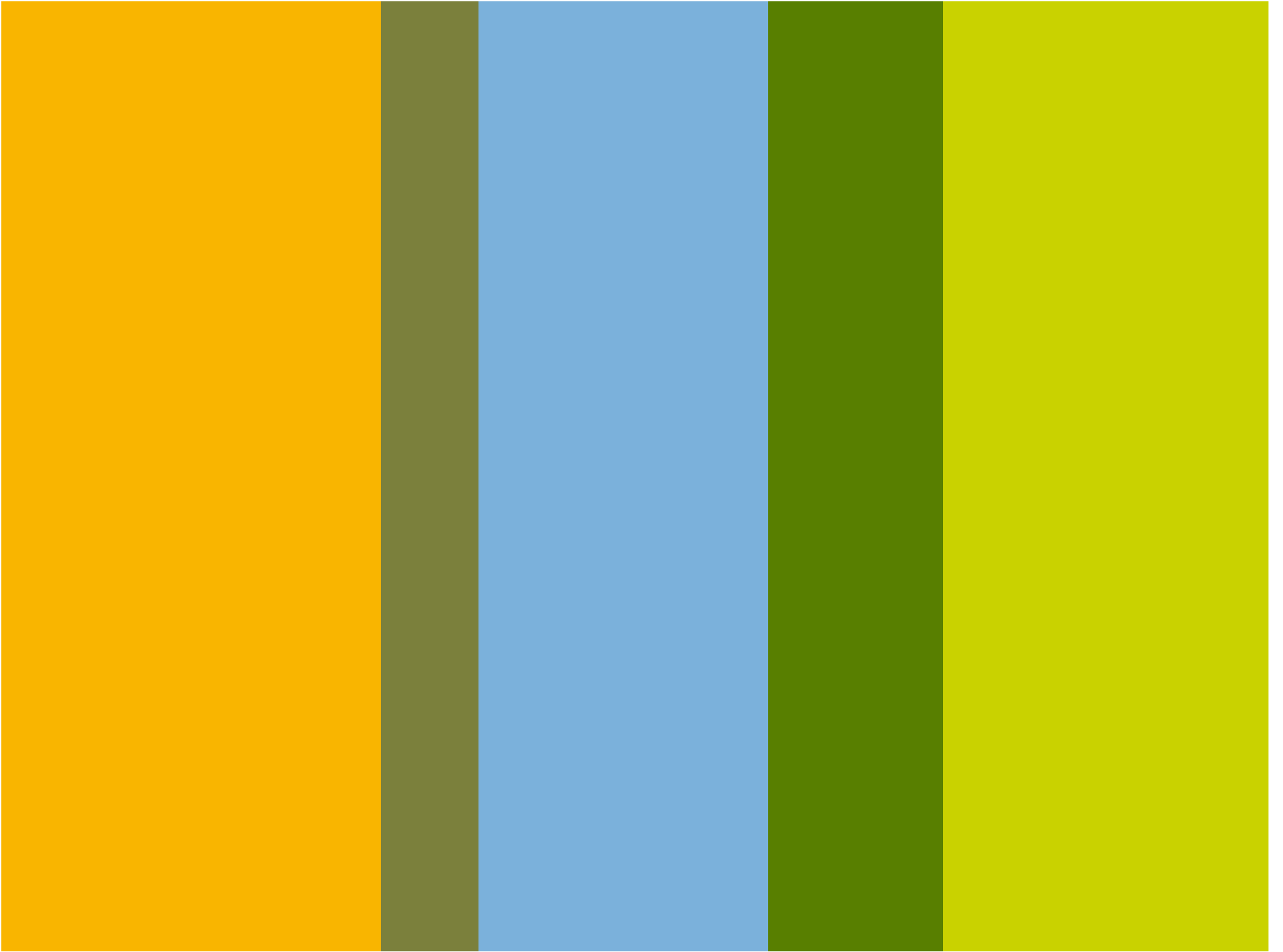
## Boston, US

- ▶ November 2008: “Touch 'N Go Event Solutions”
- ▶ Greenbuild event using 500 NFC enabled Nokia 6212 phones to wirelessly scan visitors' NXP chip-equipped badges, collect contact information and qualified inquiries and to conduct surveys
- ▶ ITN International, NXP, Nokia



# Summary

- ▶ **Mobile “swiss army” device a natural fit for NFC integration**
- ▶ **Smart card technology will be the enabler of value added NFC applications**
- ▶ **Secure Element NFC and Secure Element non-NFC the current architectures being assorted**
- ▶ **Commercial uptake happening in tightly controlled geo’s and regions, setting the stage for larger deployments**





# Terminology

- ▶ **eSE (embedded Secure Element)**
  - The secure element is soldered on the PCB of the phone and can not be removed without special equipment
- ▶ **Plug-In**
  - The secure element can be removed by the user without special equipment. Form factor can be SIM, SD, micro SD,...
- ▶ **UICC (Universal Integrated Circuit Card)**
  - Name for the SE used in mobile terminals in GSM and UMTS networks. In a GSM network, the UICC contains the SIM applications, in UMTS networks the USIM applications
- ▶ **R-UIM (Removable User Identity Module)**
  - is a card developed for CDMA handsets that extends the SIM card to CDMA phones and networks. The card also contains SIM (GSM) application, so it can work on both networks
- ▶ **Contactless frontend**
  - NFC-IC providing card emulation and reader functionality
- ▶ **Contactless frontend interface**
  - Interface between contactless frontend (NFC-IC) and secure element
- ▶ **SWP (Single Wire Protocol)**
  - Contactless Frontend Interface standardized by ETSI to connect a UICC to a contactless frontend
- ▶ **Direct Antenna**
  - Proprietary solution to provide NFC-like contactless card emulation, does not require a contactless frontend. The antenna is directly connected to the secure element (a dual interface smartcard).
- ▶ **OTA (Over the Air)**
  - Mechanism to provision, personalize and manage SE via global platform compliant commands over the air
- ▶ **OTI (Over the Internet)**
  - Mechanism to provision, personalize and manage SE via global platform compliant commands over the internet
- ▶ **GP (Global Platform)**
  - Organization defining infrastructure and management of smart cards across various industries

