Smart Cards in Mobile Payment/NFC

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Agenda

- Mobile Commerce
- Mobile Banking
- NFC 101 – Technology & Use Cases
- Contactless Payment
- Secure NFC Architecture Options
- Latest NFC Commercial & Trial Activities
“There are only three forgotten things consumers will return home for: a cellphone, a wallet or purse and keys”

*Len Lauer, COO of Sprint Nextel Corp., WSJ, April 17, 2006*
Wireless Device an Increasingly Rich Platform
NFC Mobile to Become a Payment and Interactive Marketing Platform

From Back Pocket to Front Pocket

From Paper to Virtual Coupons

From Paper to Virtual Tickets

From Mass to Personalized

From Pre Sale to in Store Experience
Mobile Commerce

- Mobile Commerce (M-Commerce, mCommerce) has many definitions
  - The ability to conduct commerce, using a mobile device (e.g. a mobile phone) while on the move
  - Could include: Mobile Payment, Mobile Banking, Mobile ticketing, remote payment, p2p transactions, coupons, loyalty, etc.

- Deployment gated by several factors including
  - Device provisioning, how to get the technology or application onto the mobile device
  - Security requirement and inter-related commercial agreements prior to deploying
Mobile Banking

- TowerGroup projects that mobile banking will exceed 40 million users by 2012\(^1\)
- Consumers want it
  - 40% of US adults would access or manage bank accounts from their mobile phone\(^2\)
  - Over 50% of calls to the call center or VRU (voice response unit) are balance or transaction inquiries\(^3\)
  - 75% of online bankers would likely adopt the solution\(^4\)
  - 86% would check credit card and account balances a median of four times per month\(^4\)
  - Mobile banking was second only to online banking as most popular channel\(^3\)
  - 87% of the respondents preferred their bank’s online website for enrollment\(^3\)
- Who is using it today?
  - Higher income (> $150K) & younger consumers (18-34) are the first adopters and most active users of mobile banking\(^5\)
- Drivers for adoption
  - Bank needs to reduce costs, increase access, opportunity for un-banked or under-banked
## 3 Mobile Banking Modes

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<th>Solution</th>
<th>Strengths</th>
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| Messaging (SMS/Text)| • Already exists on most phones  
                      • Best-suited for two-way alerts  
                      • Rapid, dynamic, real-time exchanges for instant information  
                      • Consumers used to using, paying for SMS |
| Mobile Web          | • No need for consumers to download anything  
                      • Mobile network improvements lead to better browser  
                      • Automatic updates  
                      • Familiar experience (similar to online banking) |
| Client Applications | • Customization, high level of branding  
                      • Speed and direct access to accounts  
                      • Lesser charges for data plan access (no need to browse)  
                      • User experience perceived to be most secure |

Source: Javelin Strategy & Research, 2007
The NFC Evolution

- 2002: NXP and Sony jointly invent NFC
- 2004: NFC Forum established by NXP, Sony and Nokia
- 2005: First commercial phone available
- 2005: Field trials become prominent
- 2006: First commercial roll-outs in Europe
- 2007: NFC Forum includes 150+ organizations
- 2008: Small commercial launches, ecosystem continues to build
- 2009: NFC commercial phones begin to ramp in all regions
NFC Key Points

- Close proximity wireless technology
- Based on RF technology at 13.56 MHz
- Operating distance of typically 4 cm
- Compatible with field proven contactless infrastructure
- Data exchange rate up to ~848 kbit/sec
- Able to do Active or Passive communication
Main NFC Application Categories

Card Emulation Mode
Transactions:
- Mobile payment, Ticketing, Access control, Transit, Top-ups, Toll-Gate

Peer-to-Peer Communication
Connectivity:
- Data transfer: Fast, easy & convenient device association, setup & configuration

Reader Mode
Service Discovery:
- Content distribution, Information access, Smart advertising
NFC Applications in Mobile Phones

Transactions
Payment everywhere:
Mobile phone = POS

Transactions
Access to public transport:
Mobile phone = transport card

Transactions
Access Control:
Mobile phone = key

Transactions
Mobile phone = credit/debit card

Service Discovery
Take info from poster:
Mobile phone = ticket counter

Connectivity
Exchange information:
Mobile phone = electronic business card

Transactions
Exchange information:
Mobile phone = electronic business card
Contactless Market Is Happening

80 million cards issued – and growing

Over 150,000 merchants enabled

“The adoption rate is the fastest we’ve seen for any new technology. I do expect we will continue to see significant growth; whether it’s double or triple we’ll have to wait and see.”

Brian Triplett, Senior Vice President for Emerging Product Development – Visa USA
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
Typical NFC SE Architectures in Mobile Phones

- Secure element embedded in the phone
- SIM/UICC centric solution, pay by mobile

- NFC-WI link between NFC and eSE
- SWP link between NFC and UICC

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 micro SD card hosting the application
- SD or micro SD card hosting NFC and SE
- No NFC controller SD or micro SD card hosting application. Antenna in phone
- Phone agnostic solution, micro SD hosting application

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

Questions?
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Sources

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2. eMarketer 2006
3. BancorpSouth mobile banking trial 2007
4. MQA Research, Mobile Finance Survey, 1023 respondents, March 2006