Agenda

► Overview of MIFARE SDK related technologies
  ▪ NFC Technology (Read/Write mode)
  ▪ MIFARE, NTAG and ICODE products
► NFC in Android
► MIFARE SDK
  ▪ Introduction to the MIFARE SDK library
  ▪ How to start using the library
  ▪ MIFARE SDK Lite Edition vs Advanced Edition
► MIFARE SDK code examples
► Use Cases
NFC Technology
Read/Write mode

Card Emulation

Peer to Peer

Read/Write
Reads / Writes data from any tag or contactless card

MIFARE SDK
Broadest product portfolio tailored to more than 40 different applications

Broadest product portfolio tailored to the automatic fare collection market

Leading product families are MIFARE Classic, MIFARE Ultralight, MIFARE Plus, MIFARE DESFire and SmartMX

Ideal choice for mass market deployment of NFC proximity marketing and electronics pairing applications

Combines ease of integration, high RF sensitivity and anti-cloning features

NTAG I2C connected tag integrates a I2C contact interface in addition to the passive NFC Forum compliant interface

Industry standard for high-frequency (HF) smart label solutions. Broadest product portfolio tailored to the automatic fare collection market

Billions of ICs in the field and thousands of successful installations
NFC in Android
Android NFC Market Update

- Global Smartphone sales exceeded 1.2 Billion units in 2014. 20% year-on-year increase registered.
- Smartphones share expected to continue growing from 67% in 2014 to > 80% or even higher in the coming years
- 3 in 4 mobile phones to come with NFC by 2018

- All major OEMs supporting Android integrate NFC technology
- Android accounts for more than 75% of Mobile OS market share
  - +1.5M apps on the Play Store
  - +450K Publishers
  - +1.5B downloads from the Play Store every month
  - +1M devices activated worldwide everyday
NFC in Android

► Read/Write mode supported
  ▪ Passive NFC Forum Tags
    ❖ Tag Type 1: Topaz
    ❖ Tag Type 2: MIFARE Ultralight & NTAG (simple dedicated API)
    ❖ Tag Type 3: FeliCa
    ❖ Tag Type 4: MIFARE DESFire
  ▪ Proprietary NXP NFC Tags
    ❖ MIFARE Classic (simple dedicated API)
    ❖ICODE

► Peer to Peer mode supported

► Card Emulation mode “supported”
  ▪ HCE supported since Android KitKat

► Android NFC developer's guide
NFC in Android
My first MIFARE DESFire-based application

► Connect to the card and exchange data
  ▪ Class to use: android.nfc.tech.IsoDep class ??
  ▪ Commands to be exchanged in hexadecimal !!

► Advanced technical knowledge needed
  ▪ MIFARE DESFire EV1 datasheet …
  ▪ ISO 7816-4 specification …
  ▪ ISO/IEC 14443 standard …

► Manage the MIFARE DESFire AES-based cryptography
  ▪ CMAC calculator
  ▪ CRC32 calculator
  ▪ Initialization Vector management

► Users care about the User Interface and application interaction
  ▪ The time you invest managing the contactless communication, the time you do not invest developing your cool app
MIFARE SDK
MIFARE SDK

Introduction

► Extensive software development tool that lets developers create contactless applications for the complete portfolio of MIFARE, NTAG and ICODE products on any NFC-enabled devices.
► Software and Hardware KeyStore supporting NXP’s SAM AV2 module for the development of secure apps.
► Complete product support package: user manual, documentation, examples, …

http://www.mifare.net/en/home/
http://www.mifare.net/en/products/mifare-sdk/
MIFARE SDK
Why should I use it?

► MIFARE SDK is ideal for building reliable, interoperable and scalable applications for smartphones
► Developers are able to benefit from an enormous reduction in development time.
  ▪ Developers focus on designing creative apps and the best GUI for their brands.
  ▪ Short time from idea to market
► Get rid of “complicated” datasheets and application notes
  ▪ Full command set support on Java level
► Leverage the worldwide success of NXP’s product installations.
► Comprehensive documentation with User Manual and Javadoc documentation
► Source code examples to get familiar with the technology as fast as possible
► Talk to our experts on the MIFARE SDK Forum
The MIFARE SDK package contains:

- Java library file (to import in your programming IDE)
- Complete Javadoc documentation with the API description
- User Manual describing how to start and use the SDK
- Sample reference applications
- Release note

Requirements:

- **Software**
  - Android Development Tool environment from Google
  - [HIC Omnikey Driver for Android]

- **Hardware**
  - Android NFC device with Android 4.x (ICS) and above
  - [HID SAM reader]
MIFARE SDK Documentation
User Manual and Javadoc documentation

MIFARE SDK User Manual
Introduction to the MIFARE SDK and explanation on how to integrate the MIFARE SDK in your project and start developing

Javadoc documentation
Complete API description ideal for programmers
Javadoc documentation can be consulted as an interactive website and integrated into the development IDE for further consulting during coding phase
MIFARE SDK Sample App

- Sample App downloadable from the Play Store
- Application that detects any card and demonstrates read/write of data onto the card
  - It supports MIFARE, NTAG and ICODE products
- Hardware KeyStore is demonstrated using HID OMNIKEY readers with NXP’s SAM inserted into it
- Source code available in the MIFARE SDK package
MIFARE SDK
Lite vs Advanced version

LITE version offers a reduced API for simple use cases such as read/write operations and single NDEF operations.

Advanced version offers a complete API for all MIFARE cards and supports all type of operations. Software and Hardware KeyStore are only supported in this version.
MIFARE SDK Lite version

Getting started

**STEP 1**
Login & Download
Login in the MIFARE SDK website and download MIFARE SDK Lite version for free

**STEP 2**
Install
Follow the MIFARE SDK User Manual in order to integrate the java library in your Android project

**STEP 3**
Code
Start developing cool NFC apps that leverage on MIFARE, NTAG and ICODE infrastructure
MIFARE SDK Advanced version

Licensing and getting started

1. Login
   - Login in the MIFARE SDK website

2. Buy credits
   - Purchase credits:
     - 1000 Credits: 99€
     - 5000 Credits: 399€

3. Download SDK
   - Download the MIFARE SDK Advanced version from the website

4. Register your app
   - Register the app where the MIFARE SDK will be used

5. Start coding
   - Use the obtained key in your app and start coding cool NFC apps
Practical exercise

How to start building your MIFARE SDK apps

https://youtu.be/AsDZT101Zrk
MIFARE SDK
My first MIFARE DESFire-based application

► Dedicated DESFire class available
  ▪ No hexadecimal commands to be sent

► High-level Java API for operating on the card
  ▪ Authenticate
  ▪ Read
  ▪ Write
  ▪ ChangeKey
  ▪ …

► Advanced technical knowledge not needed anymore

► Manage the MIFARE DESFire AES-based cryptography
  ▪ The MIFARE SDK will manage it for you
    ◆ Software and Hardware KeyStore

► Developers invest the majority of their time in the application logic and User Interface

```java
objDESFire.connect();
objDESFire.authenticate(AppId, deskey);
objDESFire.write (data);
```
MIFARE SDK

New features and updates

Latest features in Advanced Version v02.02 and v02.01:
- Root check removed
- ICODE SLIX2 support added
- PlusSL1 class is added for detecting Security Level 1 separately
- GetCardDetails API is made uniform across cards
- Added MakeReadOnly API for MIFARE Ultralight and NTAG
- Fixed Ultralight C CounterIncrement API
- …

New features to come
- Full MIFARE DESFire EV2 command set support
- Other SAM form-factors
- New platforms support
- Utilities, tools, APIs, …
MIFARE SDK Sample code
Practical exercise
MIFARE SDK Sample Code I

https://youtu.be/GAO1KMs646c
Practical exercise
MIFARE SDK Sample Code II

https://youtu.be/EjVdlpg5OG8
Practical exercise
MIFARE SDK Sample Code III

https://youtu.be/HS2P0cix8_Q
Use Cases
MIFARE SDK
Where to use it

► Smartcard-enabled Android applications
► Access management
► Closed-loop micropayment
► Campus and student cards
► Loyalty programs, couponing and gift card applications
► Gaming
► Libraries
► Smart homes
► Consumer interaction
► Smart media
► ...
MIFARE SDK
Loyalty Use case

Idea
My restaurant application with menus, reservations, … in the Play Store.
MIFARE-based Loyalty card service as the way to succeed

Development
Develop application using Android API, MIFARE SDK and cloud services
Application logic: 4 hours
Application GUI: 2 hours
MIFARE logic: 15 minutes

Publish
Publish application in the Play Store and wait for new customers thanks to my brand new MIFARE-based Loyalty program!!!
Conclusion
MIFARE SDK

Wrap up

► Smartphone applications are a great business opportunity
  ▪ Make your application stand out with NFC technology
► Managing contactless communication is not easy using Android API
► MIFARE SDK helps you to develop reliable, interoperable and scalable applications that rely on NXP products
  ▪ High-level Java API for contactless communication
  ▪ Complete and comprehensive documentation
  ▪ Source code examples
  ▪ Support to developers
  ▪ Integration of new products guaranteed
MobileKnowledge
Thank you for your attention

► We are a global competence team of hardware and software technical experts in all areas related to contactless technologies and applications.

► Our services include:
  ▪ Application and system Design Engineering support
  ▪ Project Management
  ▪ Technological Consulting
  ▪ Advanced Technical Training services

► We address all the exploding identification technologies that include NFC, secure micro-controllers for smart cards and mobile applications, reader ICs, smart tags and labels, MIFARE family and authentication devices.

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