Secure Over-The-Air Services in NFC Ecosystems

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Contents of the presentation

1. Building up NFC ecosystem
2. Trusted third party and value proposition
3. Venyon Secure Chip Management (SCM)
4. Venyon Top-up-Service (TuS)
1. Building up NFC Ecosystem
Exciting opportunities for stakeholders and great value to consumers

**MOBILE OPERATORS**
- New channel to existing operator services
- Increased data traffic, new users for data services
- New business opportunities
- New customers
- Create stickiness with added value

**BANKS**
- More card transactions
- New customers
- New services
- Create stickiness with added value

**TRANSPORT OPERATORS**
- Fast transactions
- Cost savings in ticket issuance
- More customers
- New and better services
- Less cash handling
- Leverage the infrastructure investment

**CONSUMERS with NFC phone**
- Always with you
- Online connected
- Proximity interactions
- Customized UIs
- “Active smart card”

**MERCHANTS**
- Fast transactions
- Less cash handling
- More customers
- Well targeted loyalty and CRM programs
- Leverage the infrastructure investment
Considerations on the NFC ecosystem

- NFC will be an ecosystem – new services, new business opportunities, intersection of multiple industries
- NFC ecosystem creation will be service driven, not a technology push
- Payment and ticketing are the first applications, other will follow thereafter
- Rollout will start in locations with existing contactless smart card infrastructure
  - NFC is compatible with the infrastructure and thus can leverage the investment made for contactless card acceptance
- These locations will provide the natural starting point for infrastructure creation for NFC based service initiation from Smart Poster embedded with NFC tag
- Payment and ticketing applications need to be provisioned over-the-air after the consumer has purchased the NFC phone
  - There is a need for new line of OTA services for the management of applications to be stored in the Secure Element of the NFC phone
- Establishment of the NFC ecosystem calls for cooperation between the stakeholders, such as mobile operators, banks and transport companies
Over-The-Air services to the NFC ecosystem

VENYON OTA SERVICES
- Application download
- Application management
- Ticket, value top-up

SECURE ELEMENT:
- multi-application smart card chip
- hosts the card applications issued by application issuers

EXISTING LOCAL INFRASTRUCTURE

PERSONAL ASSETS IN SECURE ELEMENT

APPLICATION ISSUERS
- TRANSPORT APPLICATION
- PAYMENT APPLICATION
- LOYALTY APPLICATION
- EVENT TICKETS
- GOVERNMENTAL APPLICATIONS

(Mobile Operators)
NFC OTA services needed for different industry verticals

**APPLICATION ISSUERS**
- Transport companies
  - Transport services
  - Existing services
- Stadiums, venues
  - Entertainment, events
  - Existing services
- Banks
  - Payment services
  - Existing services
- Retailers
  - Loyalty programs
  - Existing services

**OTA SERVICES**
- OTA applic. download
- OTA ticket top-up
- OTA applic. download
- OTA ticket top-up
- OTA applic. download
- OTA applic. download
- OTA coupons, loyalty

**SECURE ELEMENT ISSUERS**
(Mobile Operators)
- Paper tickets
  - Travel cards
  - NFC PHONES
- Paper tickets
  - Access cards
  - NFC PHONES
- Payment cards
  - NFC PHONES
- Paper coupons
  - Loyalty cards
  - NFC PHONES
Silos and fragmentation can hinder market takeoff

- HOW TO ENSURE CONSISTENT CONSUMER EXPERIENCE?
- HOW TO PREVENT FRAGMENTATION OF OTA SERVICES?
- HOW TO REDUCE COMPLEXITY AND BE EFFICIENT
- HOW TO ENSURE INTEROPERABILITY?
NFC ecosystem needs neutral trusted OTA service providers

- Any Secure Element Issuer
- Any Application Issuer
- Any NFC device vendor
- Any SE vendor
2. Value Proposition of Trusted Third Party
TTP based OTA Secure Element management concept

Certified high-security premises

Trusted Third Party as OTA Service Provider
- Data preparation, key mgmt
- E2E secured download
- Transaction log, reporting
- Life-cycle mgmt services
- etc.

Business agreement

Application Issuer

Secure Element Issuer

Service agreement
- Service requests
- Reporting etc.

Service agreement
- SE key management
- Reporting etc.

Request for application download

Any NFC Device

- Any 3rd party application

Java/GP based SE, such as Java (U)SIM
NFC providers great value to consumers

- Fast and convenient payments
  - No cash, fast check-out
- Fast and convenient ticketing
  - Purchase tickets with mobile, anywhere anytime
- Enhanced loyalty schemes
  - Coupons and vouchers always with you in your mobile
- Browse the card applications and content locally on the phone
- Manage your applications over-the-air
- Easy access to services in your surroundings, with a simple touch of a phone

CONSUMERS with NFC phone

- Always with you
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Venyon – a neutral service enabler for NFC ecosystem

- Venyon has been established and incorporated in December 2006 by Nokia and Giesecke & Devrient for the purpose of creating a neutral NFC ecosystem service provider.
- Venyon implements and operates a secure and versatile service platform to be used for the over-the-air provisioning of the consumer applications, such as credit cards and transport tickets, to consumers’ NFC enabled devices.
- Venyon is a truly open and independent service company offering its services to all stakeholders in the NFC ecosystem, including all mobile handset and smart card vendors – there is no exclusivity in the relationship with Venyon shareholders.
- Venyon operates a white-label business model for hosted OTA services.
  - Mobile operators, banks, transport companies and other service providers can utilize the Venyon services for downloading and managing their applications in the consumers’ NFC phones while the branding and consumer facing activities remain with these service providers.
Venyon is already in full operational mode

- Venyon continues the NFC ecosystem OTA service activities started by G&D and Nokia
- OTA service platforms for NFC devices developed by G&D and Nokia and transferred to Venyon, and Venyon continues with the further development of these OTA platforms
- Venyon’s core competences in security, smart card, NFC, mobile and server technologies are essential for the development and operation of a reliable and secure service platform
- Venyon has established offices in
  - Europe (Helsinki, Finland and Munich, Germany)
  - US (Dallas, Texas)
  - and will open an office shortly in APAC
- Venyon’s first data center is based in Munich, and additional data centers are planned to be established according to the market requirements
- Venyon is engaged in NFC activities in North America, Europe and APAC
3. Venyon Secure Chip Management
Venyon offers SE application management as a hosted white-label service

- Venyon implements and operates a versatile and secure OTA platform to manage Secure Element applications in NFC enabled devices
- Venyon Secure Element application management is offered as a hosted service
  - White-label business model
- Secure Element Issuer remains as the legal owner of the SE and related keys, while Venyon provides trusted processing services for the Secure Element keys and applications
- Open to all
  - Mobile operators (SE issuers)
  - Service provides issuing SE applications
  - NFC enabled handsets, from all vendors
  - Secure Elements, from all vendors
Venyon Secure Chip Management (SCM) Platform

- Venyon Secure Chip Management platform has been implemented for secure and flexible management of all kinds of SE application.
- Venyon SCM design enables:
  - High security
  - High availability
  - Scalability
- SCM design is modular, which enables smooth integration with external systems & services of:
  - Application service providers
  - Mobile operators
Implementing NFC in a mobile device

Secure Element applications, such as credit cards and transport tickets used over ISO 14443 contactless interface

CONTACTLESS TERMINALS AND NFC TAGS

OVER-THE-AIR MANAGEMENT OF SECURE ELEMENT APPLICATIONS

APPLICATION ISSUER
(E.g. Bank)

SECURE ELEMENT ISSUER
(Mobile Operators)

UI Applications
- Browse contents of Secure Element applications
- Provide the interface for management of Secure Element applications over the air
- Manage the use of Secure Element applications with contactless terminals
- Read external NFC tags to initiate services

UI Applications on Mobile Platform

Secure Element (e.g. SIM)

NFC Chip

Antenna

ISO 14443

APPLICATION ISSUER

Applications, such as credit cards and transport tickets used over ISO 14443 contactless interface.

CONTACTLESS TERMINALS AND NFC TAGS

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UI Applications on Mobile Platform

Secure Element (e.g. SIM)

NFC Chip

Antenna

ISO 14443
NFC enabled mobile device – Over-The-Air management

Over-The-Air management of SE and UI Applications is a must
- It is simply impossible to have all potential SE and UI applications pre-loaded
- Security sensitive card holder and application data cannot pre-provisioned

OTA management includes
- SE application download
- SE application personalization
- SE application life-cycle management
- UI application download
- Distribution of new UI application versions
- Additional services, such as "info service", "stop service", "re-issuance service" etc.
4. Venyon Top-up-Service
Venyon Top-up-Service for different applications

- Several applications and use cases require or may require value top-up functionality
  - Public transportation ticketing
  - Stored value applications such as e-purse
  - Gift cards
  - Event ticketing
  - Loyalty
- Venyon Top-up-Service enables to transmit this value to NFC enabled handsets and applications securely over-the-air
- Venyon offers compliance with different handset types including scalability
- Benefits all parties
  - Reduces e.g. cost of ticket issuance
  - Reduces cash handling through online payment
  - Top-up on demand, anytime, anywhere
  - Easy viewing of available tickets/value
Features for Top-Up Service

Value Top-Up
- Secure channel to load tickets
- Stores product & service details
- Maintains transaction integrity
- Scalable & flexible services
- Supports multiple app. issuers
- Supports multiple payment i/f's
- NFC mobile device agnostic

OTA interface
- Ticketing & tariff details
- Send Ticket
- View service reports
- Manage offered services

Payment Service Provider
- Order ticket
- Receive ticket
- Top-Up value

Ticketing Service Provider
- Ticketing & tariff details
- Send Ticket
- View service reports
- Manage offered services

Cellular Network
- OTA interface: over-the-air interface

* Consumer’s single point of contact for all value top-up services
Top-Up service solution with Secure Chip Management

- Initial transport application download to mobile
- Application personalization
- Application update request
- New application version download
- Payment approval request
- Payment approval response
- Transaction reporting
- Service monitoring
- Self care

Venyon Services

SCM Service

Mobile network

Passenger with mobile phone

OTA interface

Ticketing system

Payment system

Get ticket information
Purchase ticket

Receive ticket information/download ticket

Request ticket and tariff information
Ticket download

Payment approval request
Payment approval response

GUI

Vennon

OTA interface

GUI user

Purchase ticket

Get ticket information

Receive ticket information/download ticket

Initial transport application download to mobile

Application personalization

Application update request

New application version download

Payment approval request

Payment approval response

Transaction reporting

Service monitoring

Self care

Secure channel to load tickets throughout process

Ticketing system

Payment system
# Venyon’s value proposition

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Cost efficiency</strong></td>
<td>Mobile operators, banks, transport operators and other stakeholders avoid the upfront investment while still being able to migrate to NFC</td>
</tr>
<tr>
<td><strong>Less fragmentation</strong></td>
<td>A single point of contact between stakeholders prevents fragmentation of OTA solutions and improves efficiency</td>
</tr>
<tr>
<td><strong>Competence &amp; global presence</strong></td>
<td>Proven track record in OTA services and strong expertise in smart card, payment and mobile technologies combined with global reach</td>
</tr>
<tr>
<td><strong>Neutrality &amp; openness</strong></td>
<td>Neutral party with white-label business model; open to all mobile operators, service providers, handset and smart card vendors</td>
</tr>
<tr>
<td><strong>Time to market</strong></td>
<td>Extensive experience on OTA services in NFC and fully operational service platform available now</td>
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THANK YOU!

Happy to answer to any questions:

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