



Any service on any device in  
one day, AppXplorer.

 NXP Semiconductors



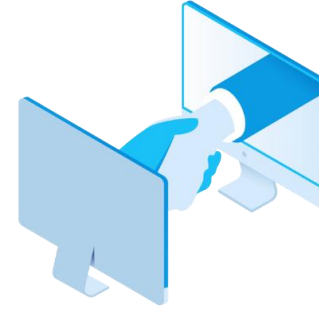
# Cloud vertialization of city services



Fast onboarding via web & Global reach



Partner selection & virtual handshake



One-step activation of new service



Announce/promote



Fast mobile offering



AppXplorer

Multi-form factor support

# Main components in AppXplorer & features

MIFARE DESFire EV2 post-issuance platform



NFC enabled Smart Device

**MIFARE DESFire EV2 smart device in the hands of the end-user in different form factors e.g. smart card, wearable, smartphone**

**Key features:**

- Best in class performance and security
- Delegated Application Management
- File-sharing
- Transaction MAC
- Rolling-keys
- Improved operating range



Cloud marketplace

**Intuitive self on-boarding portal for Smart Device Issuers and Service Providers with communication hub for setting-up Smart City schemes**

**Key features:**

- Multiple HSM infrastructure & KMS
- Card layout and security set-up
- Application data-structure hosting
- Create application on smart card with/o data structure
- Push mobile notifications of new service



Personalization channel

**NFC contactless personalization terminals (smartphones, kiosks, TVM, ATM) for installing and removing content on end-user device**

**Key features:**

- Update existing applications
- Install and remove new applications
- API for Over-The-Air personalization of data structure
- Report Lost/Stolen card
- SDK for mobile applications & self-service kiosks

# Customer main market streams & potential for growth

AppXplorer & MIFARE DESFire EV2



Natural development & growth

**Grow and adapt your own scheme**  
**Migrating to new concept e.g. ABT**  
**Improve security on the go**



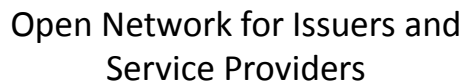
Aggregate City services & offerings

**Control your own scheme**  
**Extend offered content, partners**  
**Daily companion**



EMV enablement & acceptance

**Your DESFire scheme on EMV card**  
**No change to infrastructure**  
**New services: auto top-up via bank acc.**



Market place to facilitate collaboration



Personalization agent  
& channel



## Marketing platform for Issuers and Service Providers



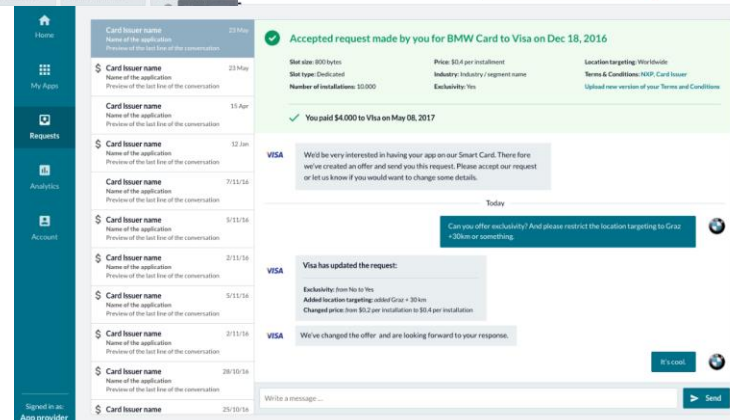
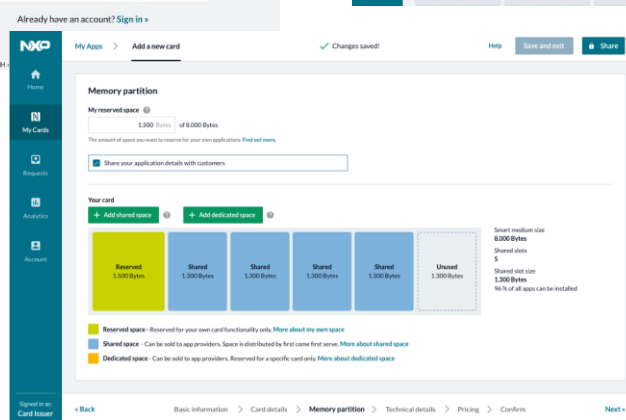
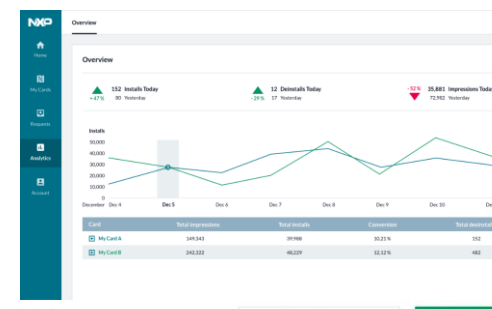
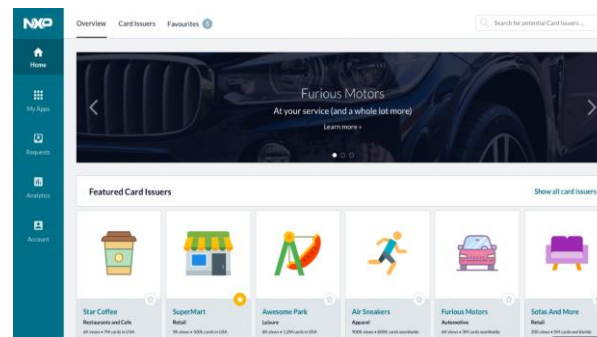
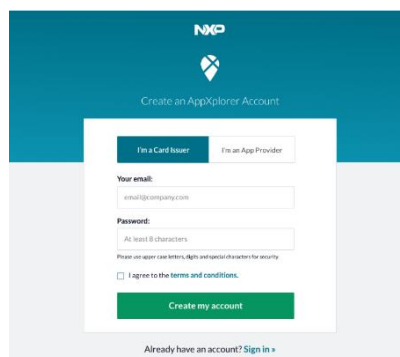
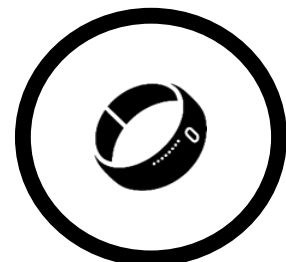
## Channelize end-customer reach



## Event Access



Loyalty  
scheme





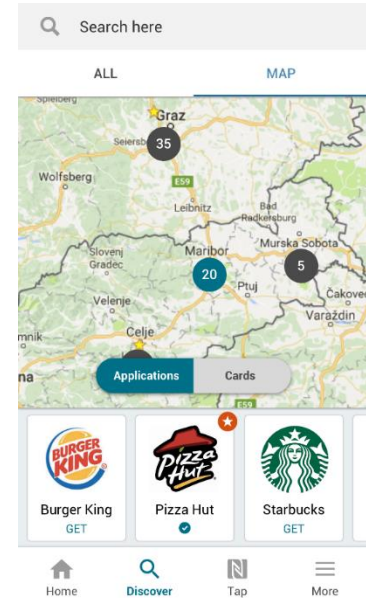
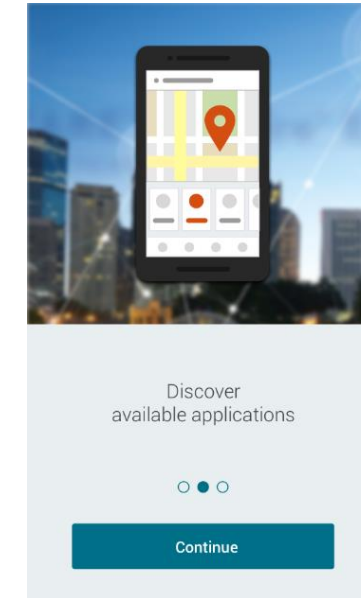
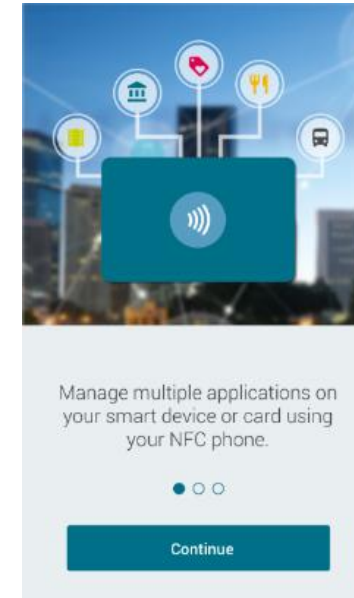
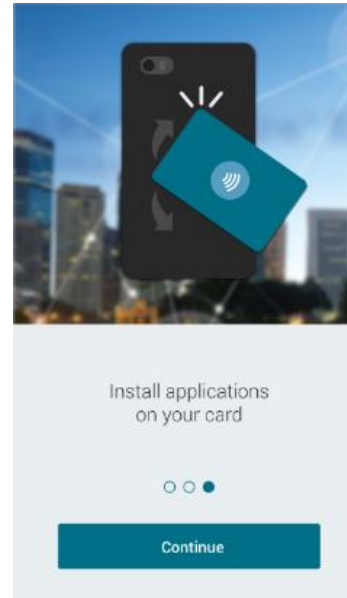
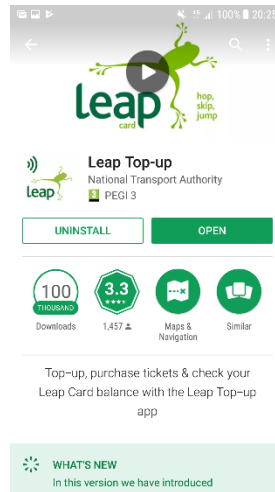
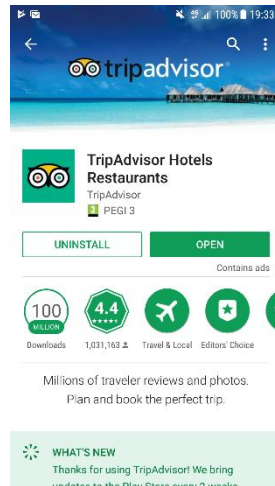
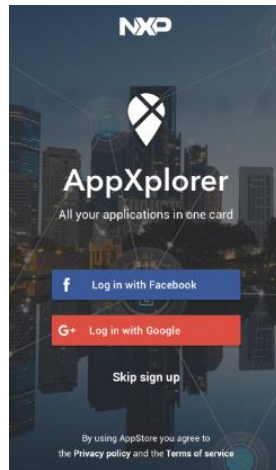
# AppXplorer & DESFire EV2 for great customer experience



# AppXplorer data-flow



# AppXplorer Mobile, smartphone application UI



Global AppXplorer mobile application  
White label AppXplorer mobile application under customer branding  
AppXplorer SDK for all types of self-service terminals and mobile applications



# NTA Case Study, NFC Mobile PoS & MIFARE® DESFire®

The mobile interaction mechanics are well accepted by end-users



- The National Transport Authority (Dublin) introduced mobile reload NFC app for their Leap card
- The app was launched January, 2016
- Over 150,000 app downloads June, 2018
- Over 4.8M+ euro transactions processed per month (November, 2018), growing month over month
- Represents over 20% of all reload transactions
- Still growing month on month

# AppXplorer business model

## General Access

### Free/Complementary to the IC

- Set-up account on AppXplorer WEB & AppXplorer Identifier
- AppXplorer WEB on-boarding
  - Smart device/card memory partition/lay-out
  - Application data-structure lay-out design
  - Initiation of DAM keys & store in AX HSM (KMS)
- Marketplace access to meet partners & manage customer experience
- Over The Air features for installing and removing service on smart device (post-issuance)
- AppXplorer Global mobile application with partner branding of welcome screen
- Reporting & analytics, with basic SLA as complementary service

## Premium services

### Paid based on customer needs & scale

- Additional SLA packages for wide market-deployment
  - Overall dedicated E2E solution SLA (up-time & conquer sessions)
  - Localization and other related performance features
- AppXplorer Mobile application options
  - White Label, AX in-app logic fully branded under customer image
  - Mobile application SDK, build all AX features & logic into customer mobile application
  - Self-service kiosk SDK, build all AX features & logic into customer end-customer self-service kiosk
- Post-issuance personalization & customer back-end integration
  - Mobile top-up (set-up fee & SLA fee/month)
    - Cloud set-up and if needed payment gateway integration
  - Account Based personalization/top-up
- Card life cycle management
  - Lost/Stolen, device pairing with smartphone
- Mobile notification
  - New service or promotion announcement
  - Lead generation



# MIFARE the perfect partner to build independent “Smart City” scheme



- Over 900 million ICs deployed
- Over 40+ applications



- eTicketing in more than 100 major cities
- 10 regional and countrywide schemes



- Bike-sharing
- 24 countries



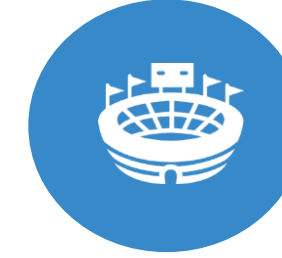
- Hospitality and accommodation around the World, over 5M rooms RFID



- Universities use MIFARE for access, micro-payment and other applications



- Car-sharing and mobility access



- Events, leisure and entertainment, recreation activities

# CES 2017, Las Vegas, Smart city solution in numbers

- **180'000** smart city enabled **badges** issued
- **10'000 rides** based on CES 2017 badge on Las Vegas Monorail
- **>100% increase** on **ticket pre-purchase**
- Overall **25% of in-app purchases** during the event
- **System up times** during the event: **100%**
- **Very good feedback** through **social media**



Commercial deployments:

<https://youtu.be/8LmZKewx5K0>

<https://youtu.be/S4BjL8MTkKQ>

<https://youtu.be/bbjTRX-SMFQ>





SECURE CONNECTIONS  
FOR A SMARTER WORLD



# MIFARE DESFire EV2 multi-application environment



## Secure Multi-Application Architecture

- Each application is a folder similar to Windows root directory folder
- Applications and files are defined during creation
- Each application manages its own content

## Drop-In Replacement

- Backward compatibility
- System integrators enjoy the performance enhancement and smart feature extensions

## Improved Operating Range

- Increased operating distance
- Fast and Reliable transactions

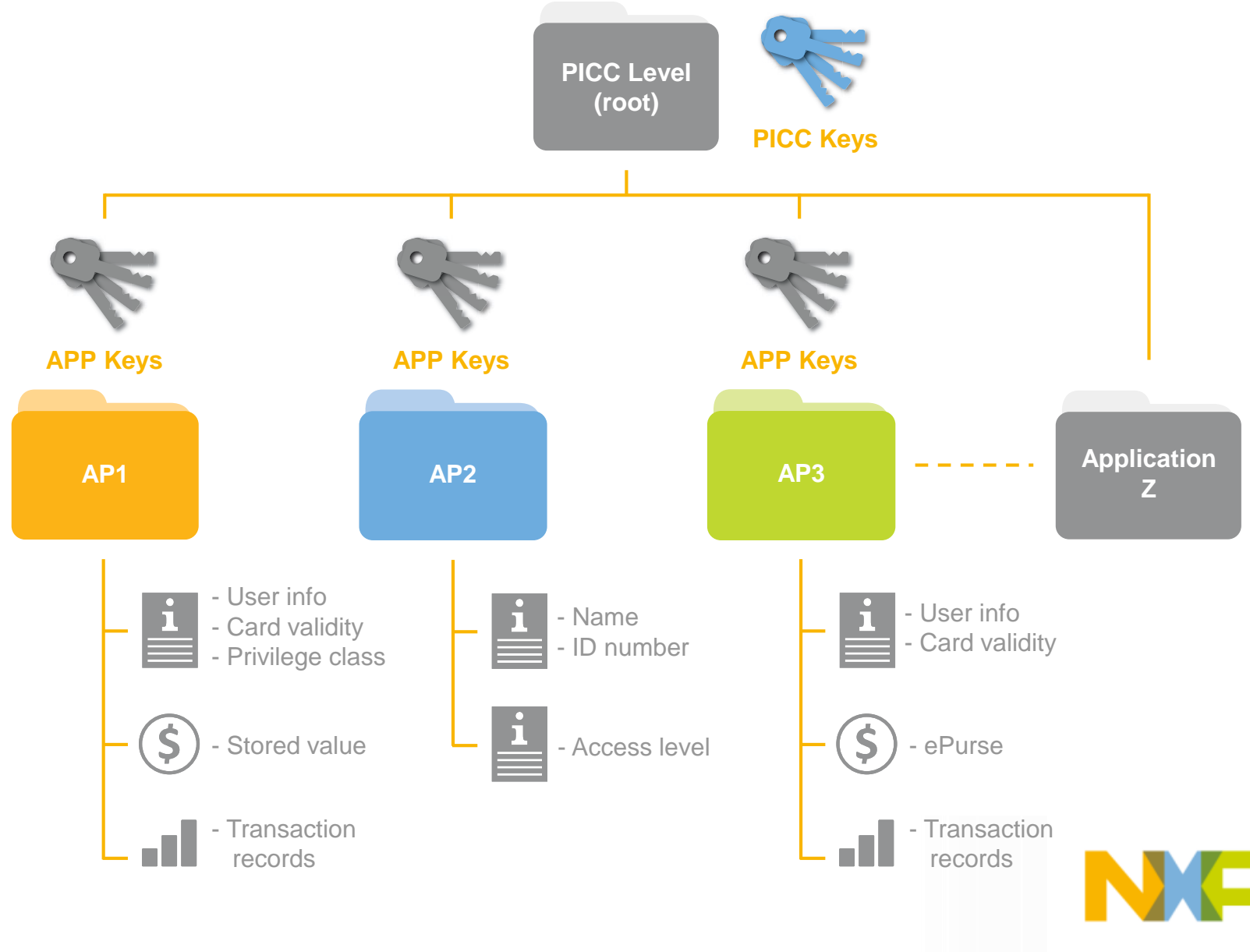
## Common Criteria EAL 5+

- Enhanced security level with Common Criteria EAL5+ certification, same level as products used in Banking and ePassport application

# Secure Multi-Application Architecture



- Flexible application and file system
- Each application is like a folder under a Windows root directory
- Applications and files are defined during its creation
- Each application manages its own keys
- Card owner hold PICC keys for card management



# AppXplorer in brief



## NXP AppXplorer WEB collaboration platform

Common platform for smart device issuers and service providers to offer multi-application environment with single mobile interface for management of end-customer smart device on the go.

## E2E Security

AES 128 encryption & websocket protocol used to secure communication between end-user Android NFC smartphone and AppXplorer WEB/cloud platform using smartphone mobile application as end-user UI.

## Centralized with zero-friction customer experience

Using Android NFC smartphones end-users securely manage on the go (install, update, personalize, remove) applications on their MIFARE DESFire smart device.

# Simple onboarding through MIFARE end to end solution

