nfc everywhere

NFC use cases and NXP solutions

Public

BU Security and Connectivity

June 2016

Contents

A DIFFERENT KIND OF WIRELESS

What is NFC?

Near Field Communication is a short-range wireless connectivity technology ***standard***, designed for ***intuitive*** and ***simple*** communication between ***two*** electronic devices.

Initiate interactions with a simple touch

NFC at a glance:

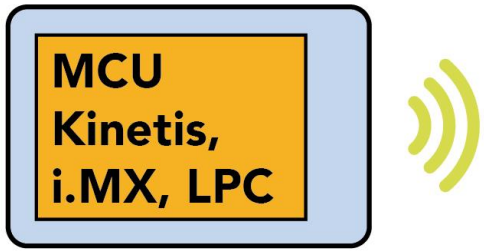
- Contactless proximity technology
- Standardized under ISO/IEC 18092 and ISO/IEC 21481
- Operating frequency: 13.56 MHz
- Operating range: 10 cm (4 in)
- Max. speed: 424 Kbps
- Co-developed by NXP and Sony
- Origins in payment and access control
- Works with existing contactless infrastructure

More than **90 %** of all NFC-equipped smartphone models use NXP technology

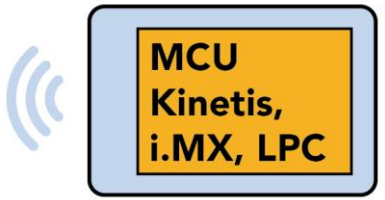
With NFC, you can interface any device to…

Any Device

- Powered by battery or mains
- Can initiate NFC connection
- Reads data in from device or writes data out
- Small: typically ~25 mm^2 IC, 40x30mm antenna
- Many form factors



Another Device



- Even battery-less devices

An NFC-enabled phone

- >1 billion NFC phones in the market (end of 2015)

NFC card or tag

- More than 2 billion pieces produced per year

NFC EVERYWHERE

NFC-enabled devices

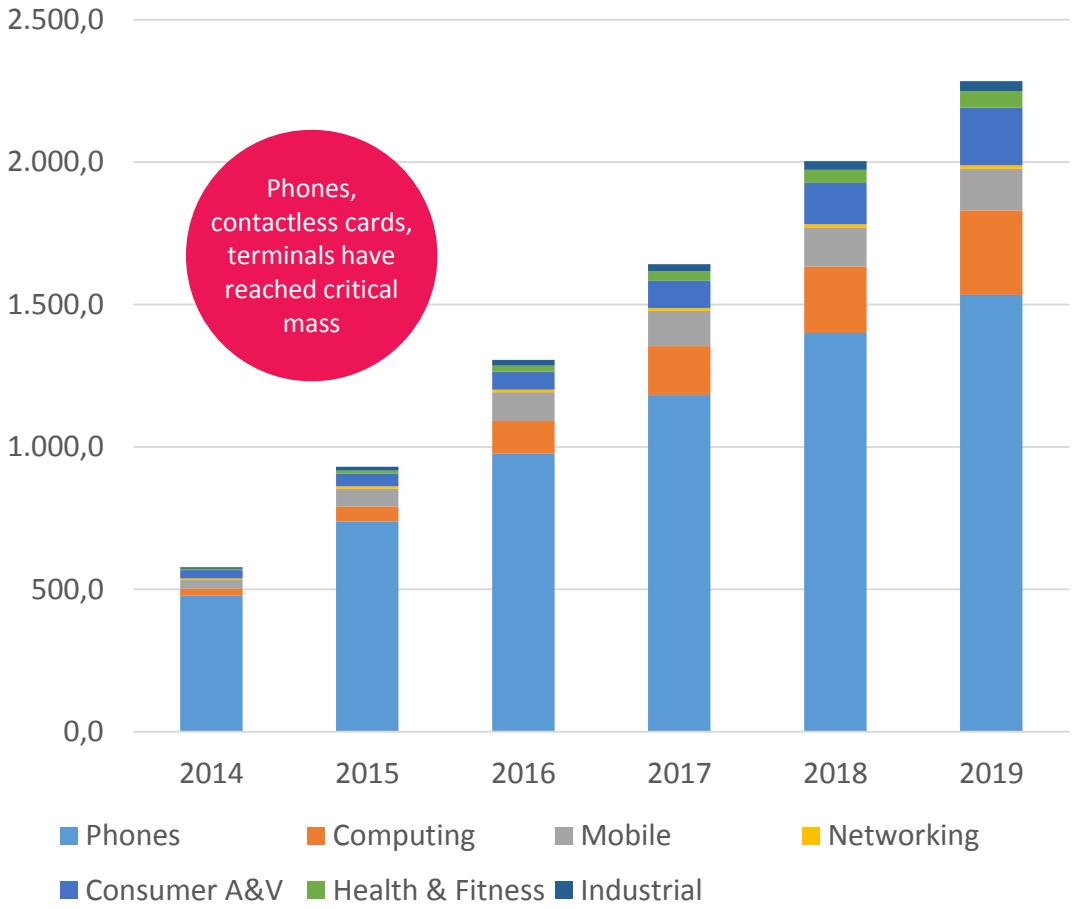
Market update - some key figures

- **>1 billion NFC phones installed base (end of 2015)**
- **Smartphone share** expected to continue growing: **3 in 4 mobile phones** to come **with NFC by 2018**
- **> 5 billion NFC handsets** will ship before **2019**
- **>2 billion NFC cards and tags** per year

Source: NXP, ABI Research

NFC Market outlook

(MPc, ABI Research 2015)



** Updated list of NFC phones and tablets available in the market:*
http://www.nfcworld.com/nfc-phones-list/

Typical NFC use cases and segments covered

		Access	Industrial & Appliances	Medical	Consumer & IoT	Payments
Conditional access		●	●	●		
Commissioning and pairing			●		●	
Authentication			●	●	●	
Zero-power configuration			●		●	
Device-to-device communication			●	●	●	
Payment						●

NXP NFC readers product portfolio

nfc everywhere
CONNECTED TAG SOLUTIONS

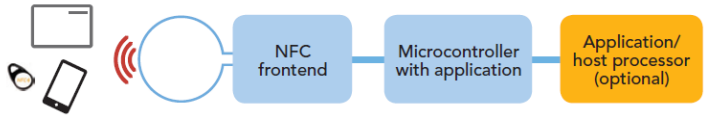
A comprehensive portfolio of NFC Forum type 2 tags covering a broad range of use cases.

Products: **NTAG21x(F)**, **NTAG I²C *plus***

nfc everywhere
FRONTEND SOLUTIONS

The lowest-cost and most flexible way to add NFC to a system.

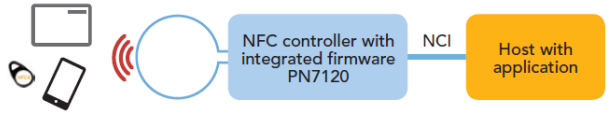
Products: **PN512**, **CLRC663**, **PN5180**



nfc everywhere
CONTROLLER SOLUTIONS

Combination of NFC frontend with an advanced 32-bit microcontroller with integrated firmware.

Products: **PN7120/PN7150**



Optional microcontroller with customizable firmware.

Products: **PN7462**

A DAY IN YOUR LIFE WITH NFC

A DAY IN YOUR LIFE WITH NFC

City

Morning home
Morning travel
@work
Lunch break
Afternoon activity
Home, sweet home

Segments

consumer and IoT

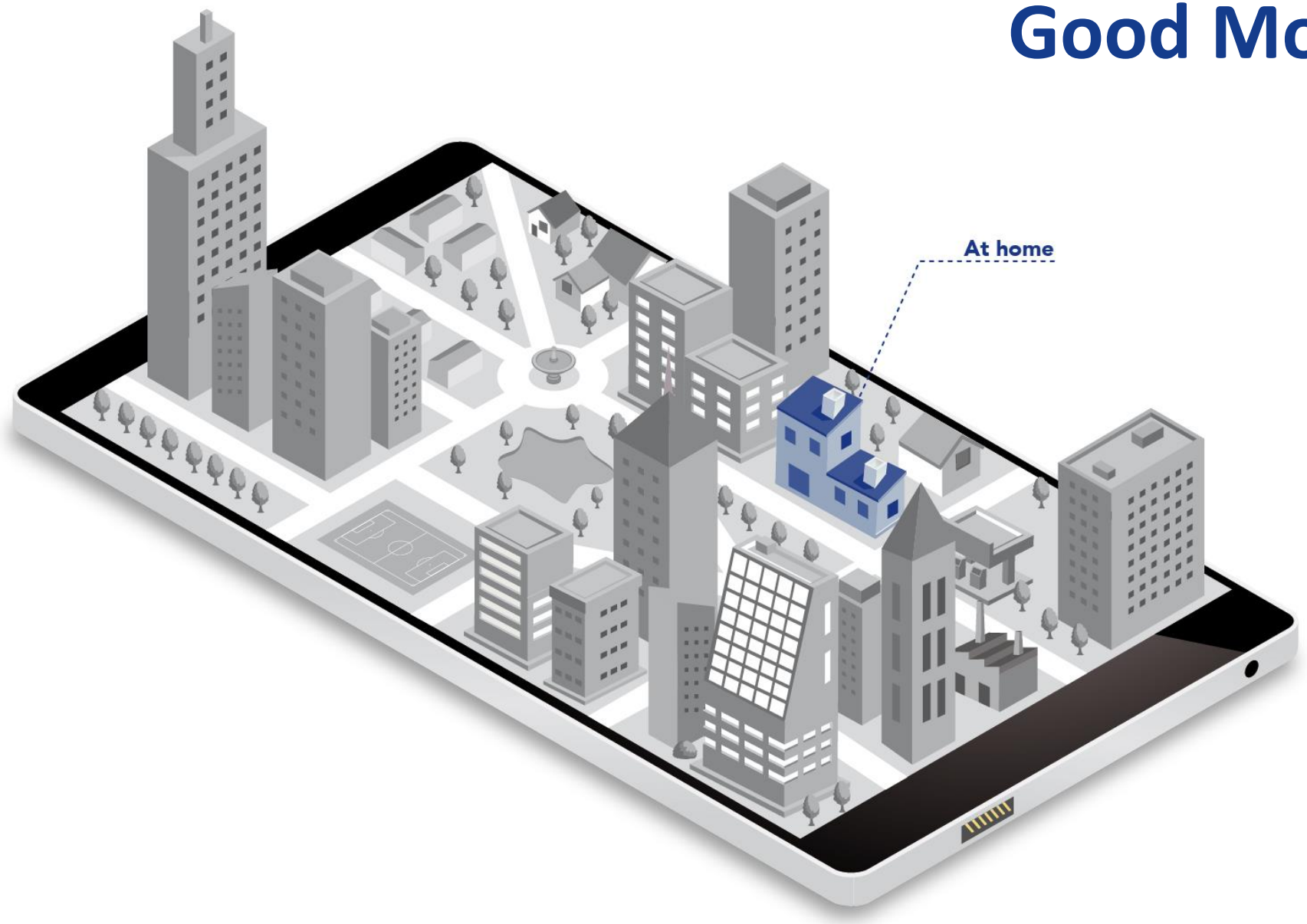
industrial and appliances

access

payments

medical

Good Morning



Product authentication

Conveniently protected through NFC

Drinking a delicious, hot coffee

Brushing your teeth before leaving for work

Ensure that only original parts are used in a device

Benefits

- Revenue & quality protection
- Instant matching of settings
- Facilitate purchasing decision

NXP NFC solutions

- NFC frontends: **MFRC630**
- NFC controllers: **PN7120/PN7150**

Zero-power-configuration

Simplified access through NFC

Personalize the thermostat according to the weather forecast for the day

Configure the alarm before leaving home

Use a phone as external user interface and configure the device in unpowered state

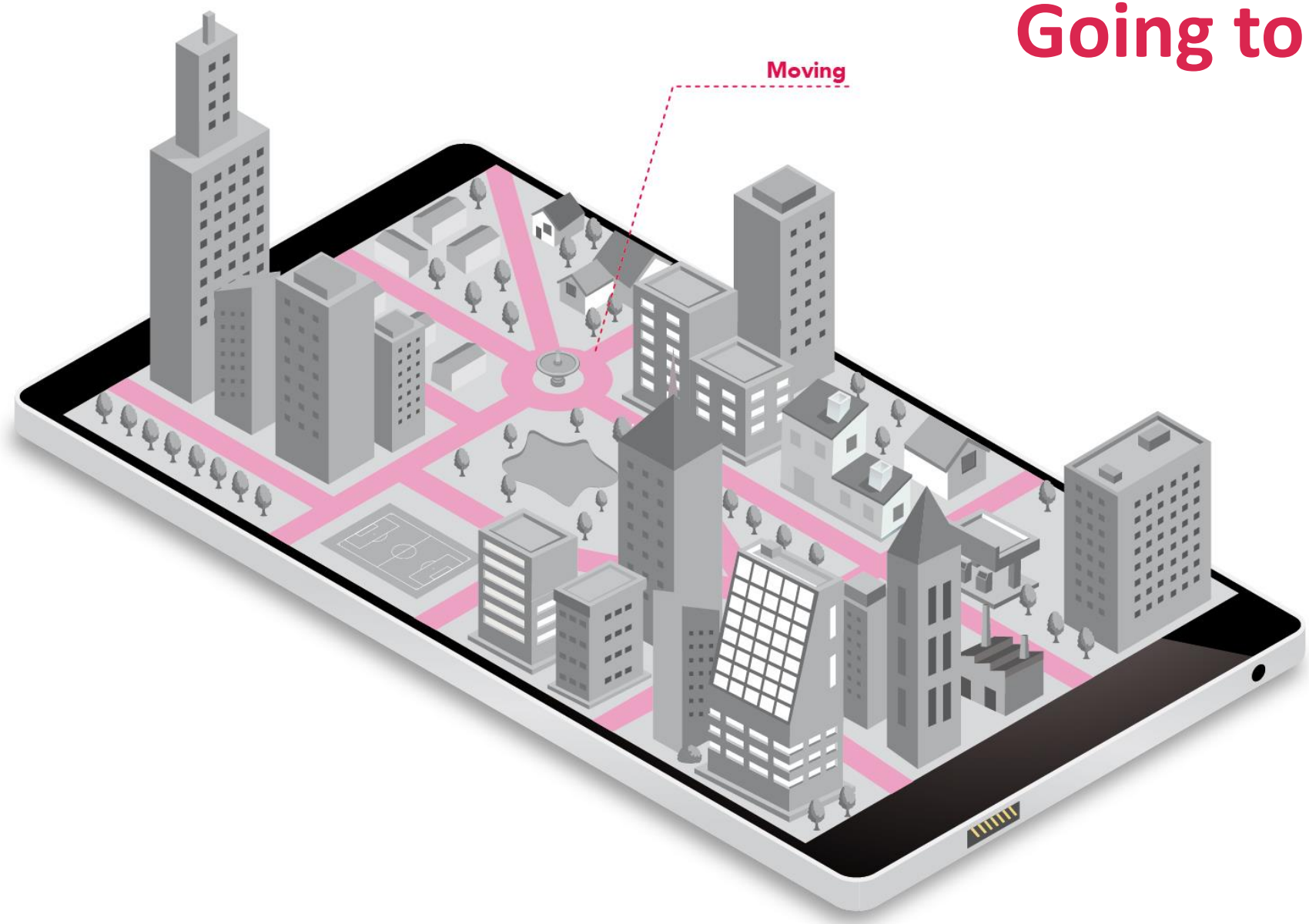
Benefits

- No power required
- Cost reduction
- Simplified human interface (no complex user manuals)

NXP NFC solutions

- NFC connected tag: **NTAG I²C *plus***

Going to work



Conditional access control

Secure and convenient access through NFC

Use a bike rental service to get to work

Tap to access public transport

Give access to an installation or use a bike rental system

Benefits

- Higher security compared with legacy technology
- Easier tracking of user behavior/fraud detection
- Increased user convenience and commercial speed
- Reduced maintenance costs

NXP NFC solutions

- NFC frontends: **PN5180, CLRC663**
- NFC controller: **PN7462**

Pairing

Easy pairing to Bluetooth through NFC

Walking to school while listening to your favorite band

Tap your headset against your friend's headset, silent disco

Tap to trigger pairing with Bluetooth or other RF technologies

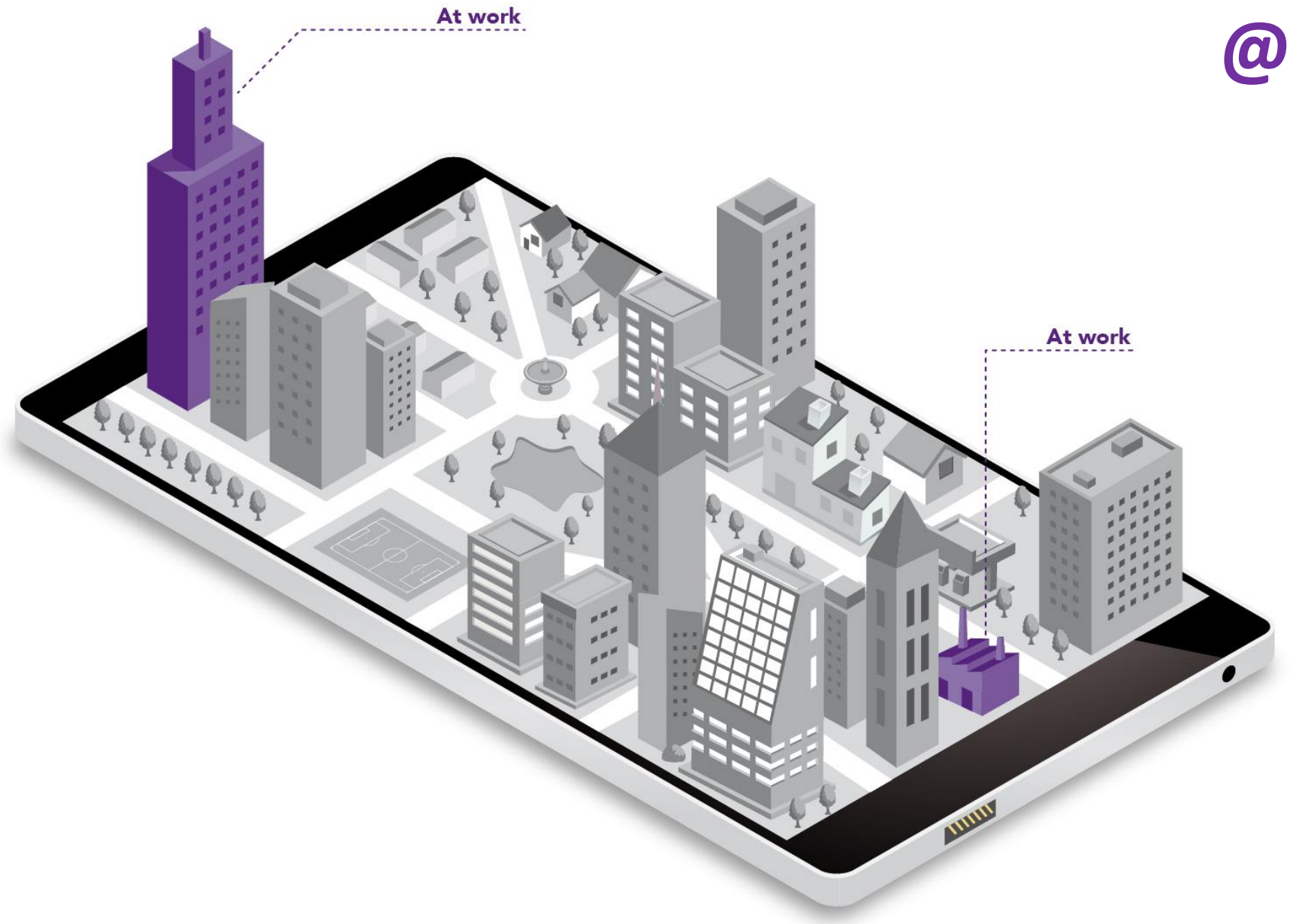
Benefits

- 20x faster than BLE or WiFi Pairing when using buttons
- No need to enter long codes
- Technology hidden behind human gesture

NXP NFC solutions

- NFC connected tags: **NTAG 21xF, NTAG I²C *plus***
- NFC controllers: **PN7120/PN7150**

@work



Physical and logical access control

Secure and convenient access through NFC

Use your badge to access the office

Tap-and-authenticate to workstation

Gives access to a physical door and allows logical access to a machine

Benefits

- Easier management of office security: remote key distribution, time limited access, etc
- Time & attendance tracking
- Future proof

NXP NFC solutions

- NFC frontends: **PN5180, CLRC663**
- NFC controller: **PN7462**

Device-to-device communication

Exchange data with battery-less sensors

Read out water usage data from a sensing device isolated from the main unit

Obtain data associated with a circuit breaker to quickly and easily access information associated with the trip-type event.

Communicate with battery less sensors or moving elements to get instantaneous measurements with NFC

Benefits

- Sensors do not require a battery since they utilize energy harvesting from the RF field
- Communication with sensors which can not be connected through wires to the main unit
- Friction-less interactions between components
- Costs savings on device-to-device interaction

NXP NFC solutions

- NFC connected tag: **NTAG I²C *plus***
- NFC frontends: **PN5180, CLRC663**

Zero-power configuration

Smart manufacturing and maintenance

Customize product variants to adjust country settings, feature sets or firmware versions

If a machine stops and requires maintenance, the repair personnel can arrive with the relevant spare parts in hand

Increase factory supply chain flexibility during production, test and service maintenance even with sealed or packaged products

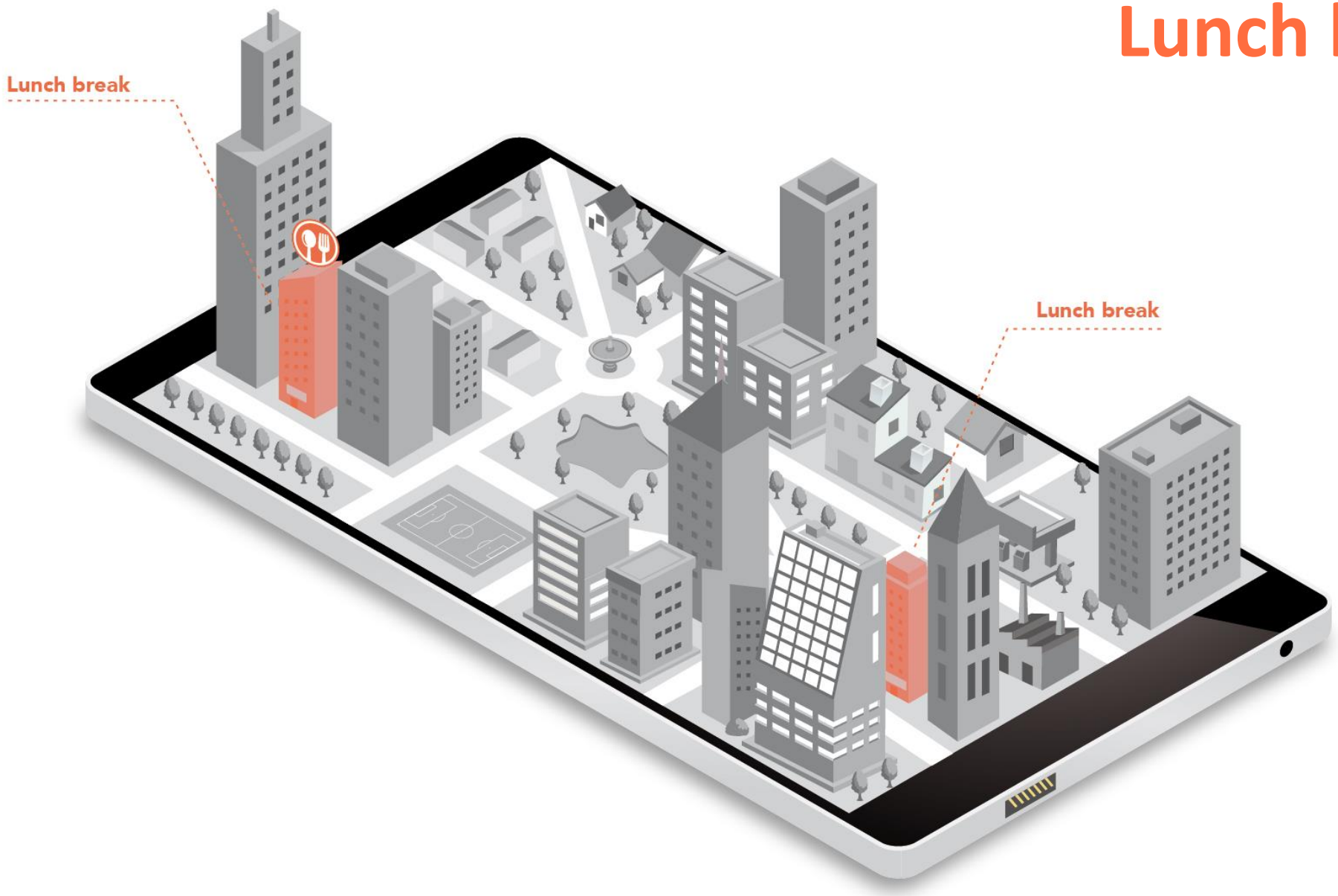
Benefits

- Easy maintenance. No contact interface needed
- Device can be unpowered
- Higher supply chain flexibility
- Easily obtain product serial numbers, firmware version, repair history or activity, or error logs

NXP NFC solutions

- NFC connected tag: **NTAG I²C *plus***
- NFC controllers: **PN7120/PN7150**

Lunch break



Secure and convenient payment through NFC

Pay for your lunch at the cantina

Get a sandwich from the vending machine

Pay for goods or services with a simple tap

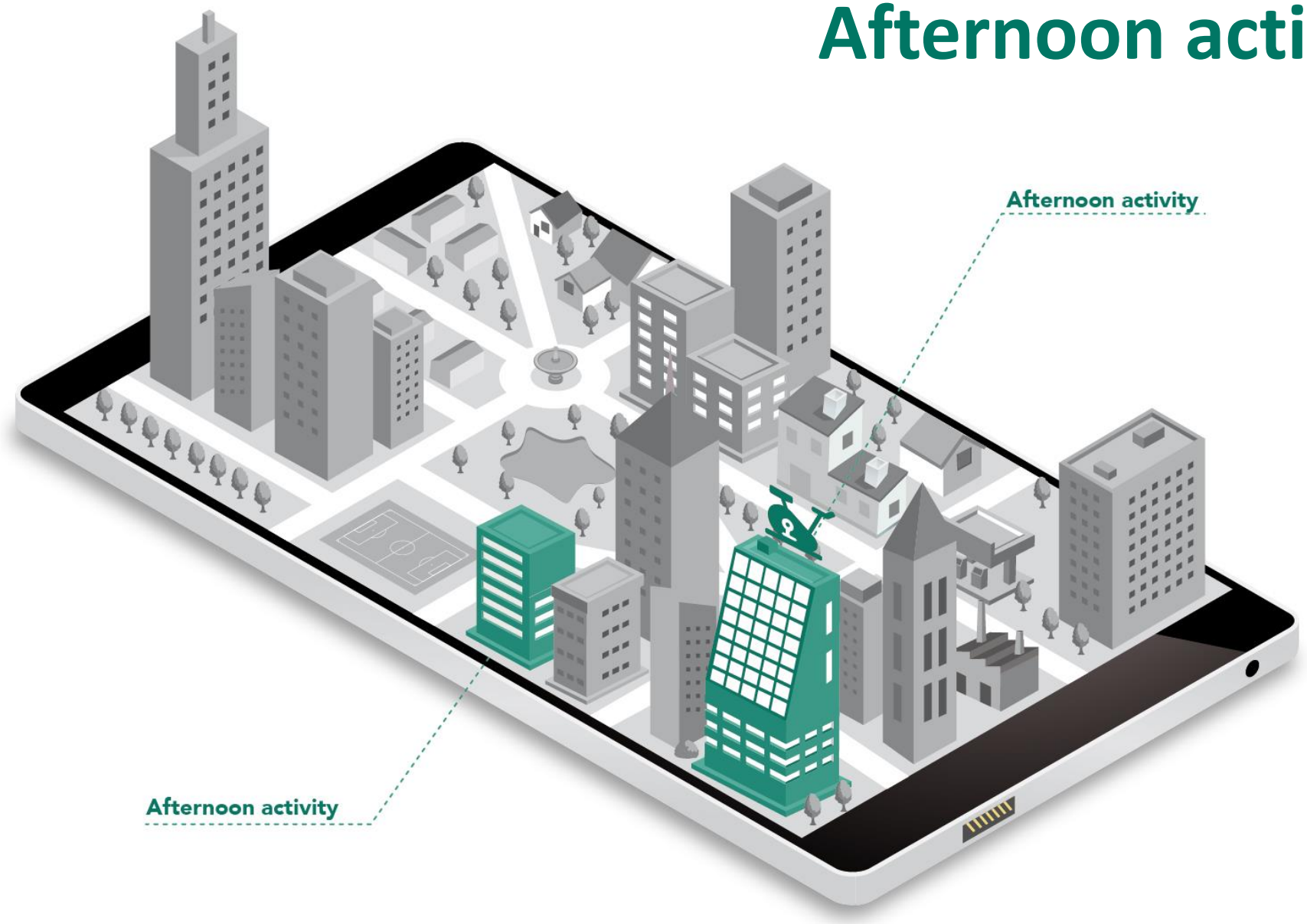
Benefits

- Easier and more convenient (no PIN <20€)
- Cash elimination
- Increased customer engagement

NXP NFC solutions

- NFC frontend: **PN5180**
- NFC controller: **PN7462**

Afternoon activities



Conditional access control

No need to carry cards or keys to access thanks to NFC

Use your bracelet to access the gym

Then open the locker with your bracelet

Gives access to an installation and open the locks

Benefits

- Higher security compared with legacy technology
- Increased customer engagement
- Reduced maintenance costs

NXP NFC solutions

- NFC frontends: **PN5180, CLRC663**

Pairing

Easy pairing with fitness equipment thanks to NFC

Tap your phone to your fitness tracker to pair it

Tap your fitness tracker to the gym equipment to pair it

Tap to trigger pairing with Bluetooth or other RF technologies

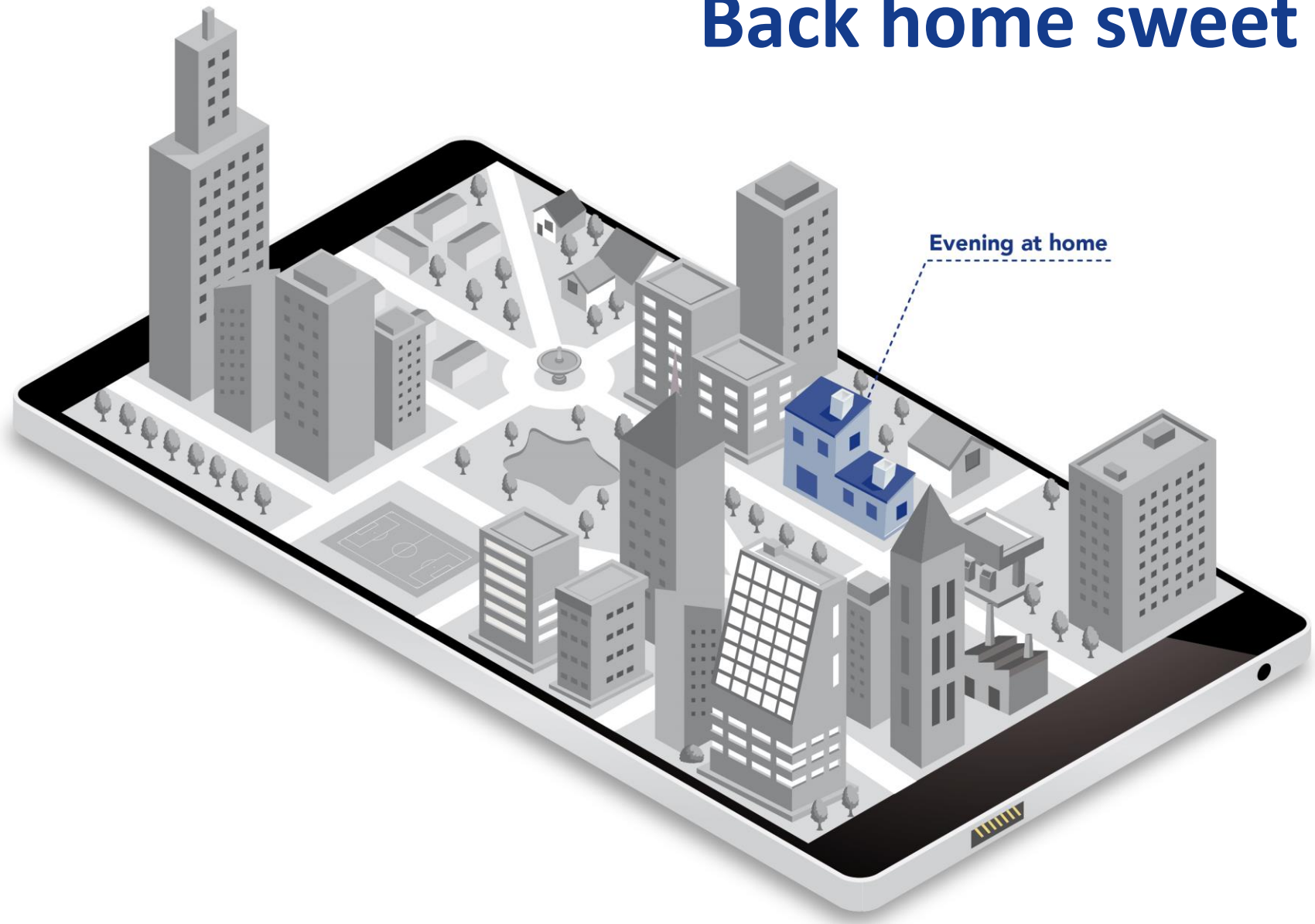
Benefits

- 20x faster than BLE or WiFi Pairing when using buttons
- No need to enter long codes
- Technology hidden behind human gesture

NXP NFC solutions

- NFC connected tag (for fitness tracker): **NTAG I²C *plus***
- NFC controllers (for machine): **PN7120/PN7150**

Back home sweet home



Medical device-to-device communication

Automatized and secured through NFC

Keep control of insulin level and ensure proper dose is given.

Fever tracking through just a tap away

Tap the insulin pump on the glucose meter to set automatically optimum dose, tap the plaster to instantly retrieve the temperature

Benefits

- Minimize risk of errors
- Monitor medication remotely
- Convenient and time efficient

NXP NFC solutions

- NFC connected tags: **NTAG21x(F), NTAG I²C *plus***
- NFC controllers: **PN7120/PN7150**

Gaming

Magical experiences thanks to NFC

Videogames are much more entertaining...
than doing homework

Toys can interact with other toys, video game accessories, bridging physical and virtual worlds

Benefits

- Toys keep scores/credentials
- Physical toys trigger events in virtual world
- New revenue streams for gaming industry

NXP NFC solutions

- NFC connected tags: **NTAG 21x(F), NTAG I²C *plus***
- NFC frontend: **MFRC630**
- NFC controller: **PN7462**

Commissioning

Simple interactions with technology thanks to NFC

Connect a new light bulb to your home network

Installing and connecting the new set top box with just a tap

Bring a wireless node securely into a network (IoT)

Benefits

- Shorter installation time, reduced customer support
- Secure credential exchange
- Covering any smart network protocol (NFC as trigger)
- No manual entry

NXP NFC solutions

- NFC connected tags: **NTAG21x(F), NTAG I²C *plus***
- NFC controllers: **PN7120/PN7150**

Zero-power configuration

Simple personalization of preferences thanks to NFC

Configure the new set top box with your preferred adjustments, favorite channels, audio selection

Use a phone as external user interface to adjust the configuration to your specific needs.

Benefits

- No power required
- Cost reduction
- Simplified human interface (no complex user manuals)
- Recover previous configurations for new devices

NXP NFC solutions

- NFC connected tag: **NTAG I²C *plus***

Summary of segments/use cases and products

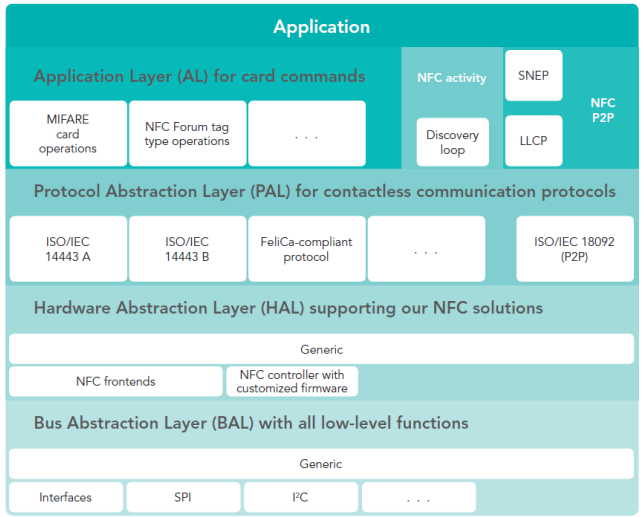
		Access	Industrial & Appliances	Medical	Consumer & IoT	Payment
Conditional access		NFC frontends: **PN5180/CLRC663** NFC controller: **PN7462**	NFC frontends: **PN5180/CLRC663** NFC controllers: **PN7120/PN7150**	NFC frontends: **PN5180/CLRC663** NFC controller: **PN7462**		
Commissioning and pairing			NFC connected tags: **NTAG 21x(F), NTAG I²C *plus*** NFC controllers: **PN7120/PN7150**		NFC connected tags: **NTAG 21x(F), NTAG I²C *plus*** NFC controllers: **PN7120/PN7150**	
Authentication			NFC frontend: **MFRC630** NFC controllers: **PN7120/PN7150**	NFC frontend: **MFRC630** NFC controllers: **PN7120/PN7150**	NFC frontend: **MFRC630** NFC controllers: **PN7120/PN7150**	
Zero-power configuration			NFC connected tag: **NTAG I²C *plus***		NFC connected tag: **NTAG I²C *plus***	
Device-to-device communication			NFC connected tag: **NTAG I²C *plus*** NFC frontends: **PN5180/CLRC663** NFC controllers: **PN7120/PN7150**	NFC connected tags: **NTAG 21x(F), NTAG I²C *plus*** NFC controllers: **PN7120/PN7150**	NFC connected tag: **NTAG 21XF, NTAG I²C *plus*** NFC frontend: **MFRC630**	
Payment						NFC frontend: **PN5180** NFC controller: **PN7462**

NXP SUPPORT

Hardware and Software tools

- Growing selection of demoboards supported by NFC Reader Library
- Downloadable app notes, user manuals, software tools, sample source code
- Compatible with NXP's LPC-Link prototyping board
- NFC Forum-compliant options
- Support for Arduino: Kinetis and i.MX boards
- Support for Raspberry Pi

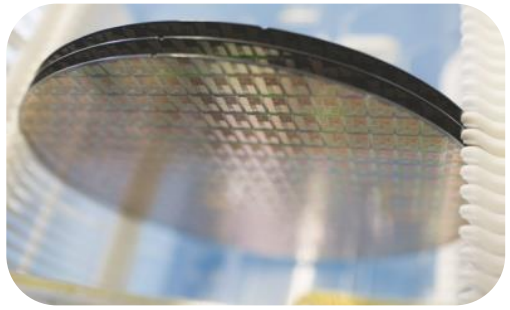
- NFC Reader Library
- The comprehensive library uses a layered, modular approach for optimized performance:
  - C-based stack and application
  - Interfaces, contactless protocol, drivers, command set
  - Peer-to-Peer Mode
  - Project examples
  - Common Criteria compatible
  - Modular, platform-independent format



CONCLUSION

Why choose NXP?

We have the technology



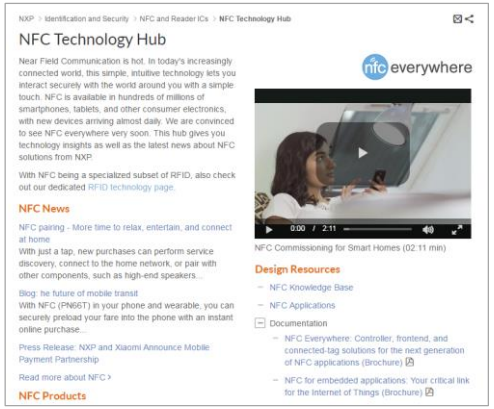
We are NFC

We have the know-how

We enable new experiences

Find your NFC toolkit at: www.nxp.com

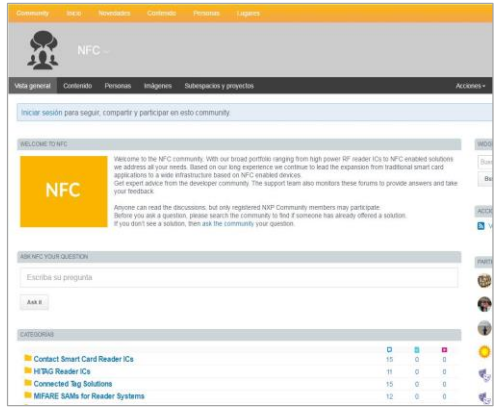
NFC use cases



Use cases & products

@ NFC Everywhere
www.nxp.com/NFC

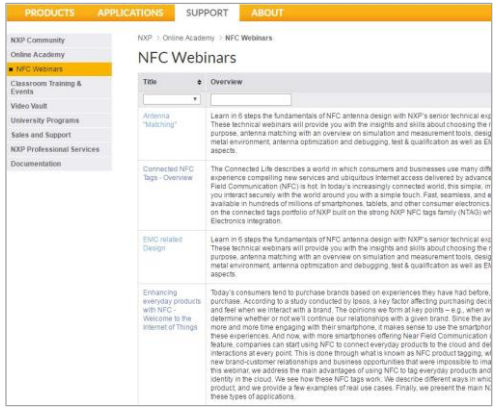
NFC community



Online community & technical support:

Support -> NXP community -> NFC
NXP community NFC

NFC training



Recorded Webinars:

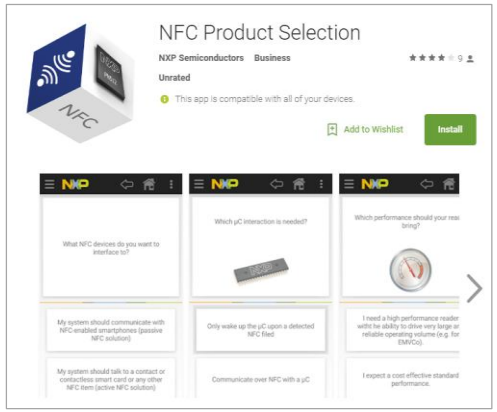
Support -> online academy -> NFC webinars
NFC webinars

Next NFC webinar: Fri, Jun17, 2016

NXP's NFC product portfolio

Register now!

NFC product selection guide



NFC product selection guide app available:

Google Play
App Store

NXP Partner Program

Partner List

PRODUCTS APPLICATIONS SUPPORT ABOUT

NXP > NXP Partner Program > Partner List

Partner List

Our partners are listed in an alphabetical order below. Click on the company name to view a description of the company, their contact information, and a link to their website.

Show 10 entries Search: NFC

Company name	Type	Region	Country	Application areas	Product foc us
Beijing Strong Tech Co., Ltd.	IDH	Greater China	China	Smart appliances NFC and reader IC's	MCU, Logic, GA, Interface, NFC
Britestone Limited	IDH	Greater China	China	NFC and reader IC's	NFC, MCU, Thyristors and Sensor
Engicam	IDH	EMEA	Italy	Smart appliances NFC and reader IC's	MCU, RFID, IPCamera
GOLD FULL ELECTRONICS (H.K.) CO., LIMITED	IDH				Logic, NFC tag module, GA
Golden IC Technology CO.,Ltd	IDH	Greater China	Taiwan	Smart appliances NFC and reader IC's	LPC8xx, LPC11xx, LPC1768, LPC4088, LPC4350, NFC, Logic IC.
IMST	IDH	EMEA	Germany	NFC and reader IC's	NFC
ipTronix	IDH	EMEA	Italy	NFC and reader IC's	NFC
Kronegger GmbH	IDH	EMEA	Austria	NFC and reader IC's	NFC, RFID
MobileKnowledge	IDH	EMEA	Spain	NFC and reader IC's	NFC
New rFid Concept	IDH	EMEA	France	NFC and reader IC's	NFC

NXP > Support > NXP Partner Program > Partner List

Partner list (and search for NFC)

NFC use cases

Carlos Paternain (Speaker) / Angela Gemio (Host)

Time for

Q & A

MobileKnowledge

We are a team of HW & SW system engineers experts in **Smart, Connected and Secure technologies** and their related applications: **NFC**, secure micro-controllers, smart cards, mobile applications, reader ICs, smart tags and labels, RFID, MIFARE family, authentication devices, IoT.

Software development in Android and iOS platforms
Embedded software for MCUs
JCOP, Java Card operating Systems

Hardware design and development; digital, analog, sensor acquisition, power management
Wireless communications WiFi, ZigBee, Bluetooth, BLE
Contactless antenna RF design, evaluation and testing

MIFARE applications, end-to-end systems, readers and card-related designs
EMVco applications, Readers, cards, and design for test compliancy (including PCI)
Pre-certification testing (PCI, EMVco, ISO)

Secure Element management. GlobalPlatform compliant backend solutions
Secure services provisioning. OTA, TSM services

NXP Partner IDH Independent Design House

MIFARE Accredited Training Partner

MOBILE WORLD CAPITAL BARCELONA

MobileKnowledge

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08018 Barcelona (Spain)
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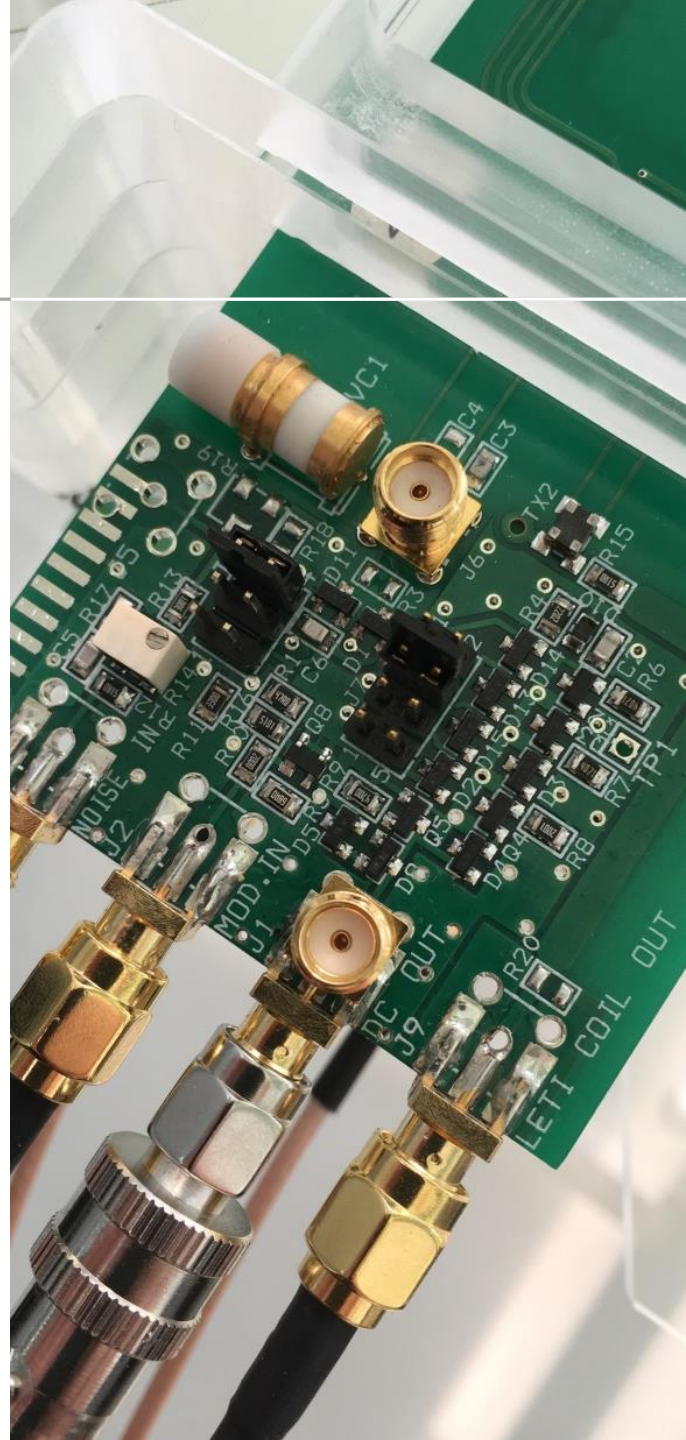
mk@themobileknowledge.com
http://www.themobileknowledge.com
GPS: 41º 24' 8.59" N, 2º 11' 40.83"



Thank you for your kind attention