



nfc everywhere

NFC use cases and NXP solutions

Public

BU Security and Connectivity

June 2016



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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

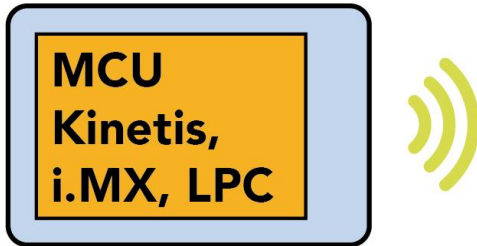
More than **90 %**
of all NFC-equipped
smartphone models
use NXP technology



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 mm² 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

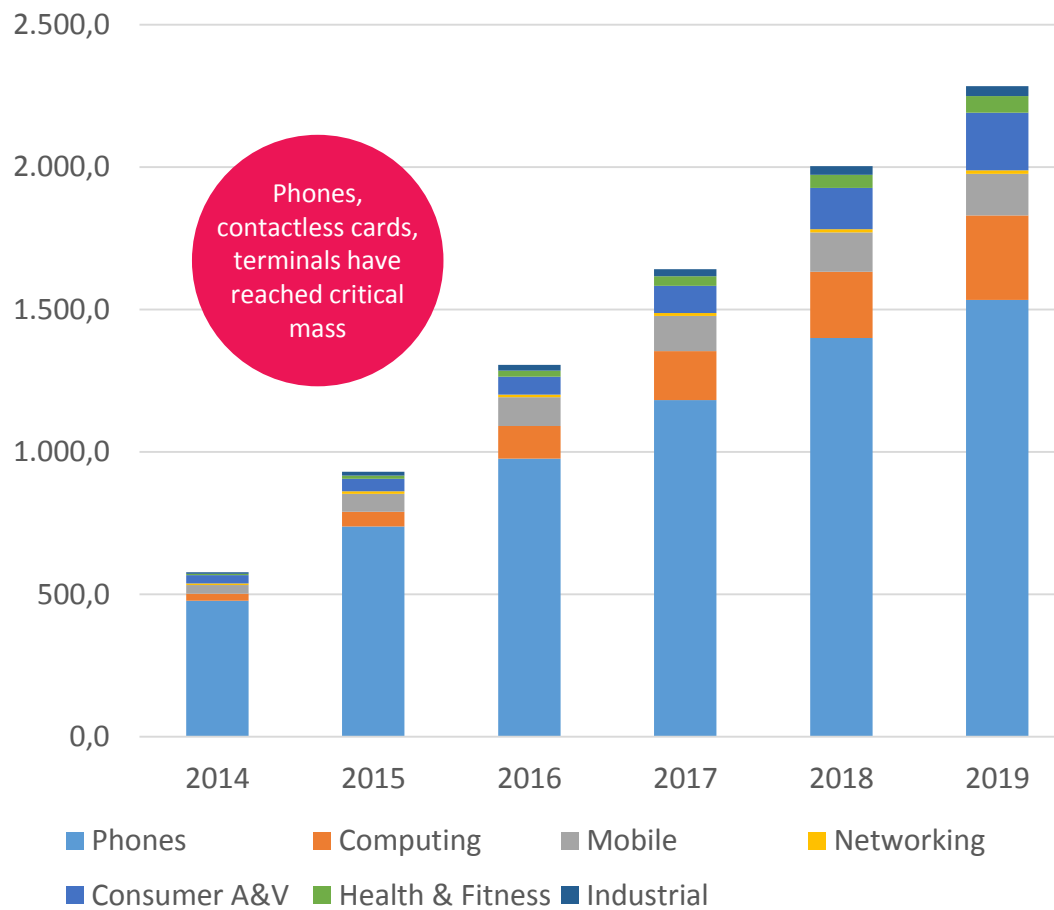
Market update - some key figures

- ▶ **>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/>



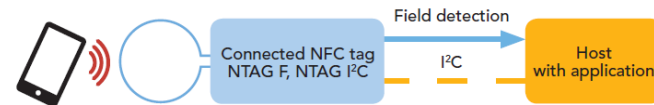
Typical NFC use cases and segments covered

		 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



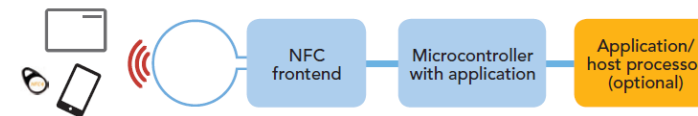
A comprehensive portfolio of NFC Forum type 2 tags covering a broad range of use cases.



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



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

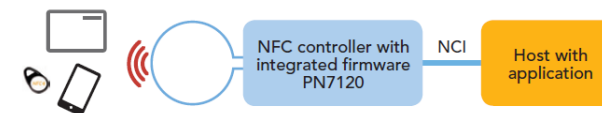


Products: **PN512**, **CLRC663**, **PN5180**



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



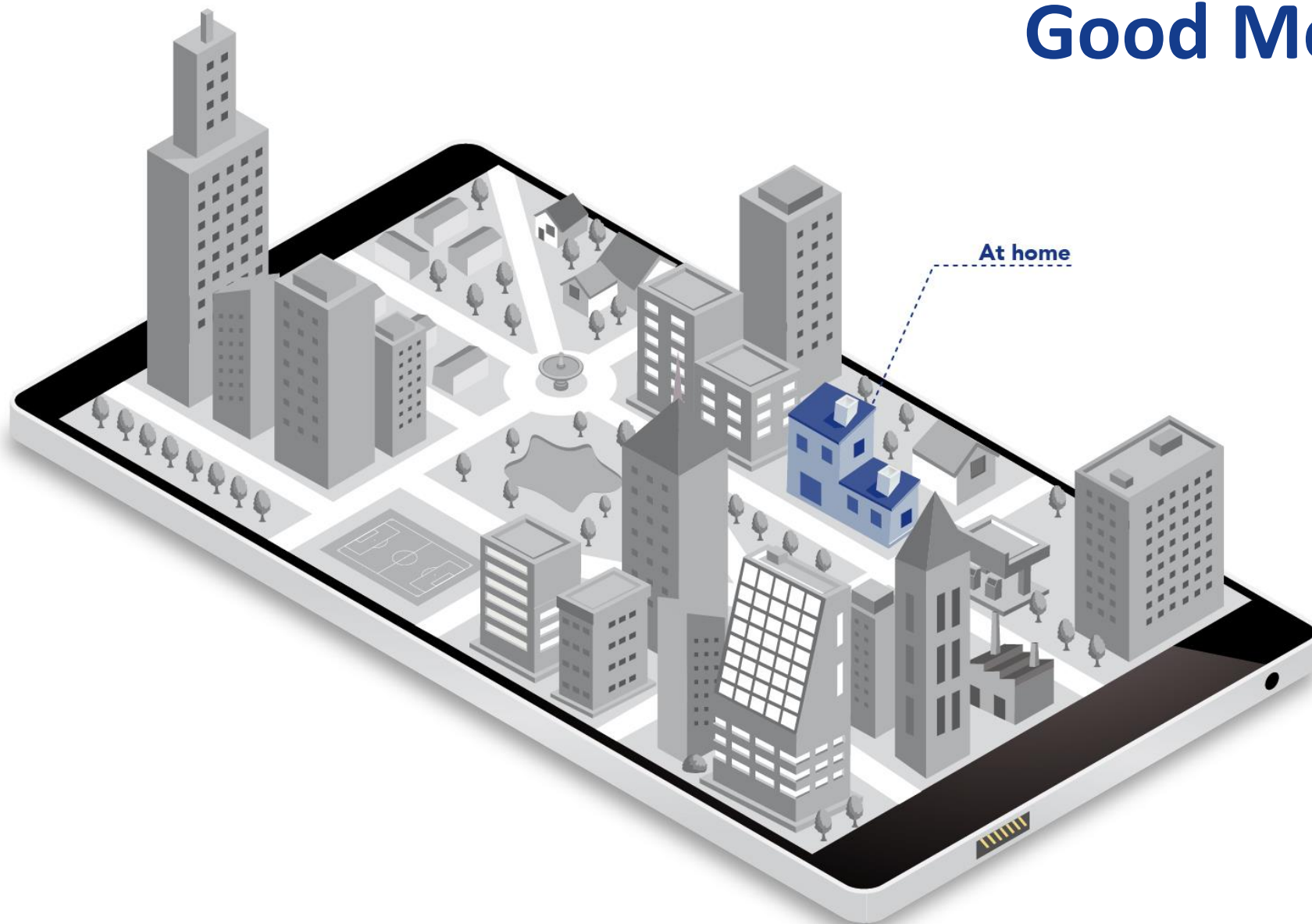
City

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

Segments



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

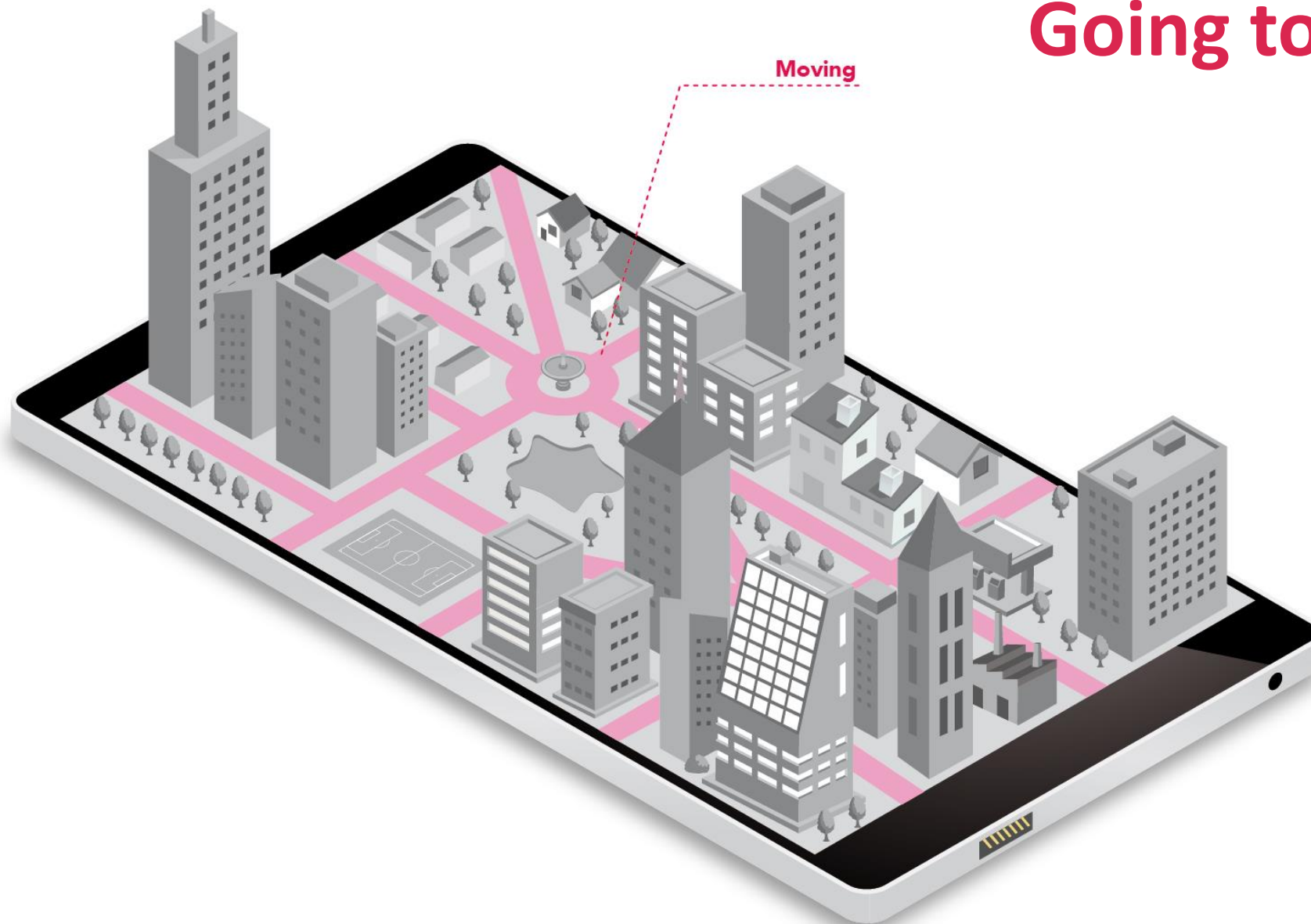
- ▶ No power required
- ▶ Cost reduction
- ▶ Simplified human interface (no complex user manuals)

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

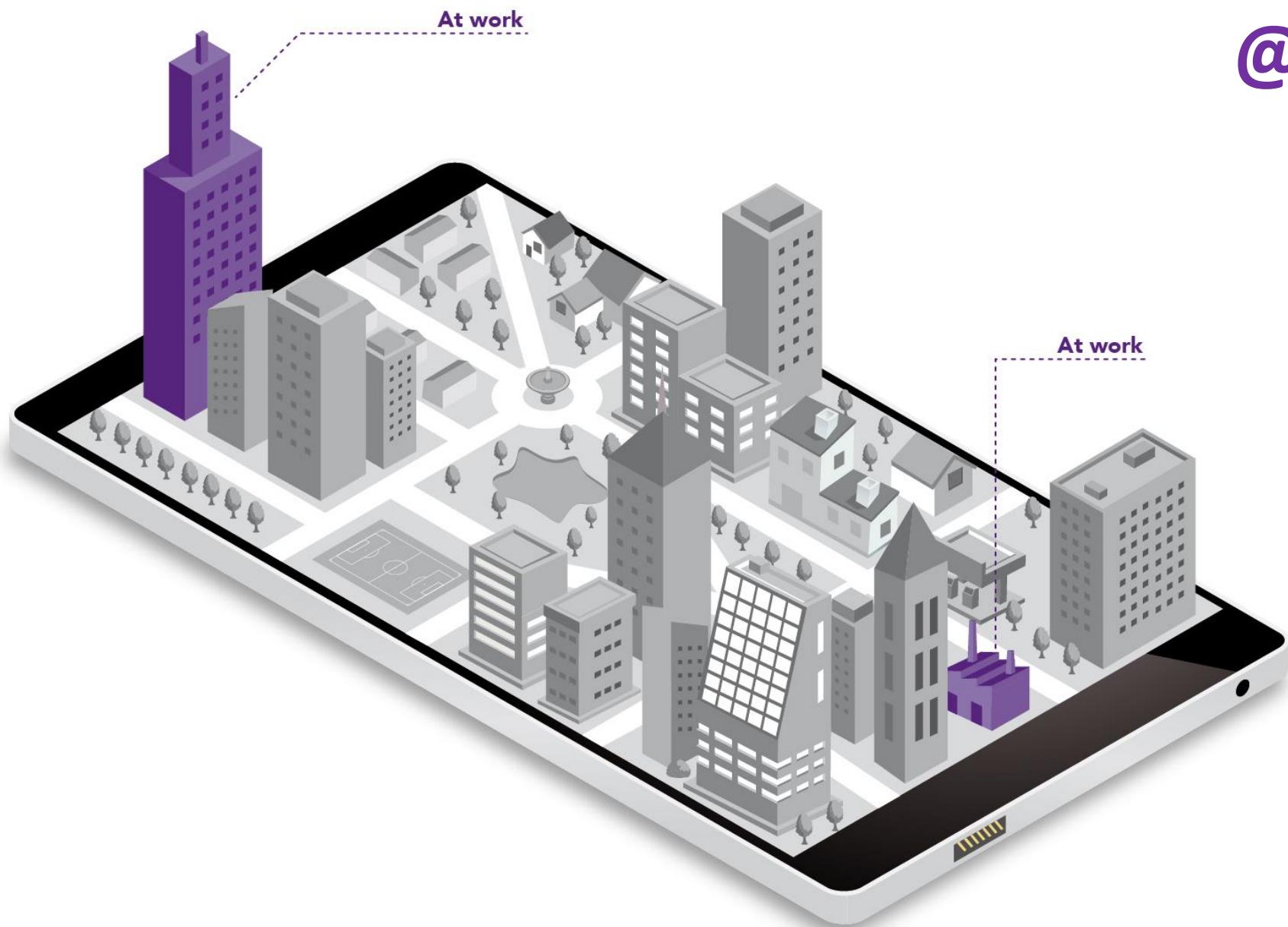
Benefits

- ▶ 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





Payments



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

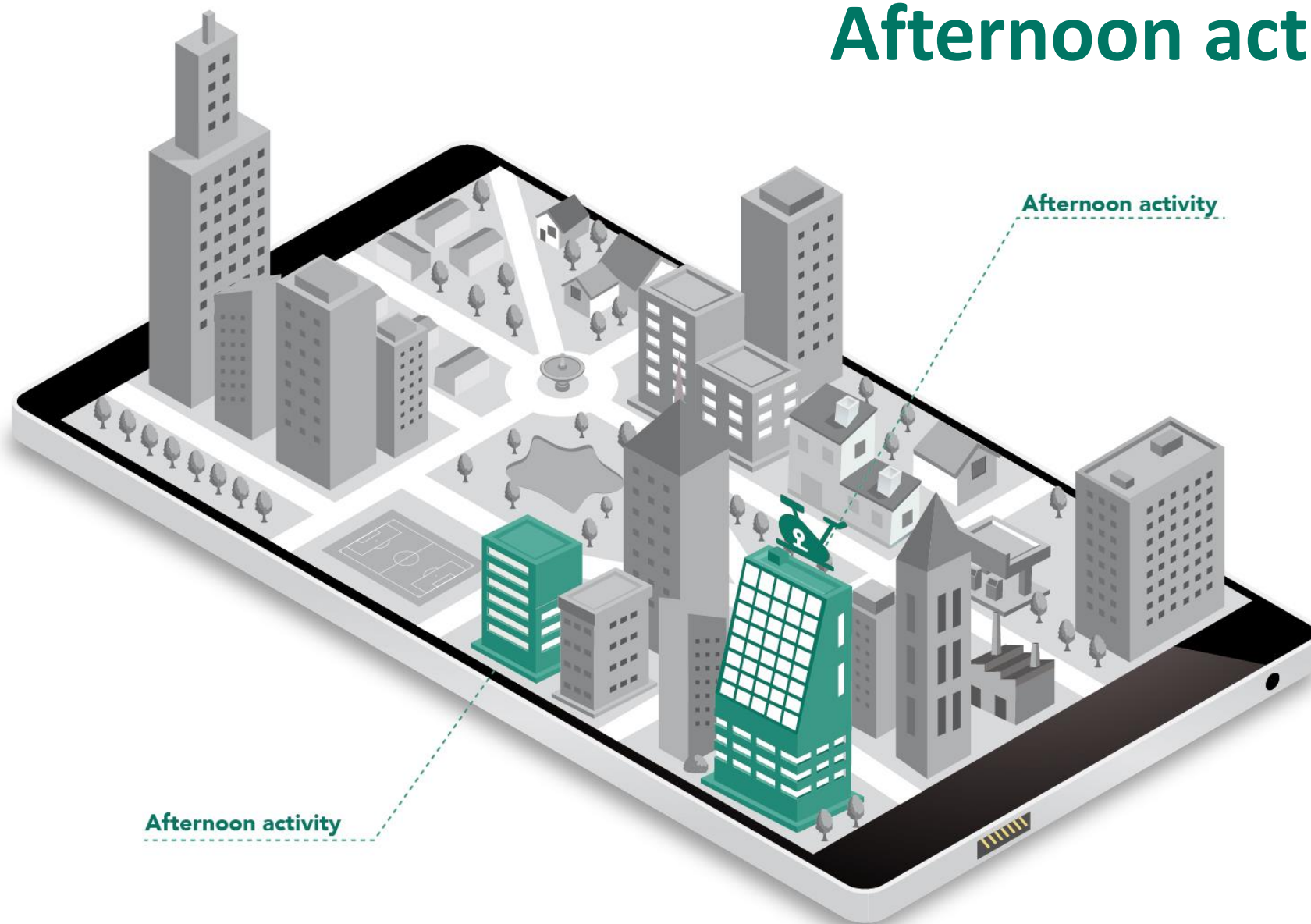
- ▶ Easier and more convenient (no PIN <20€)
- ▶ Cash elimination
- ▶ Increased customer engagement

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

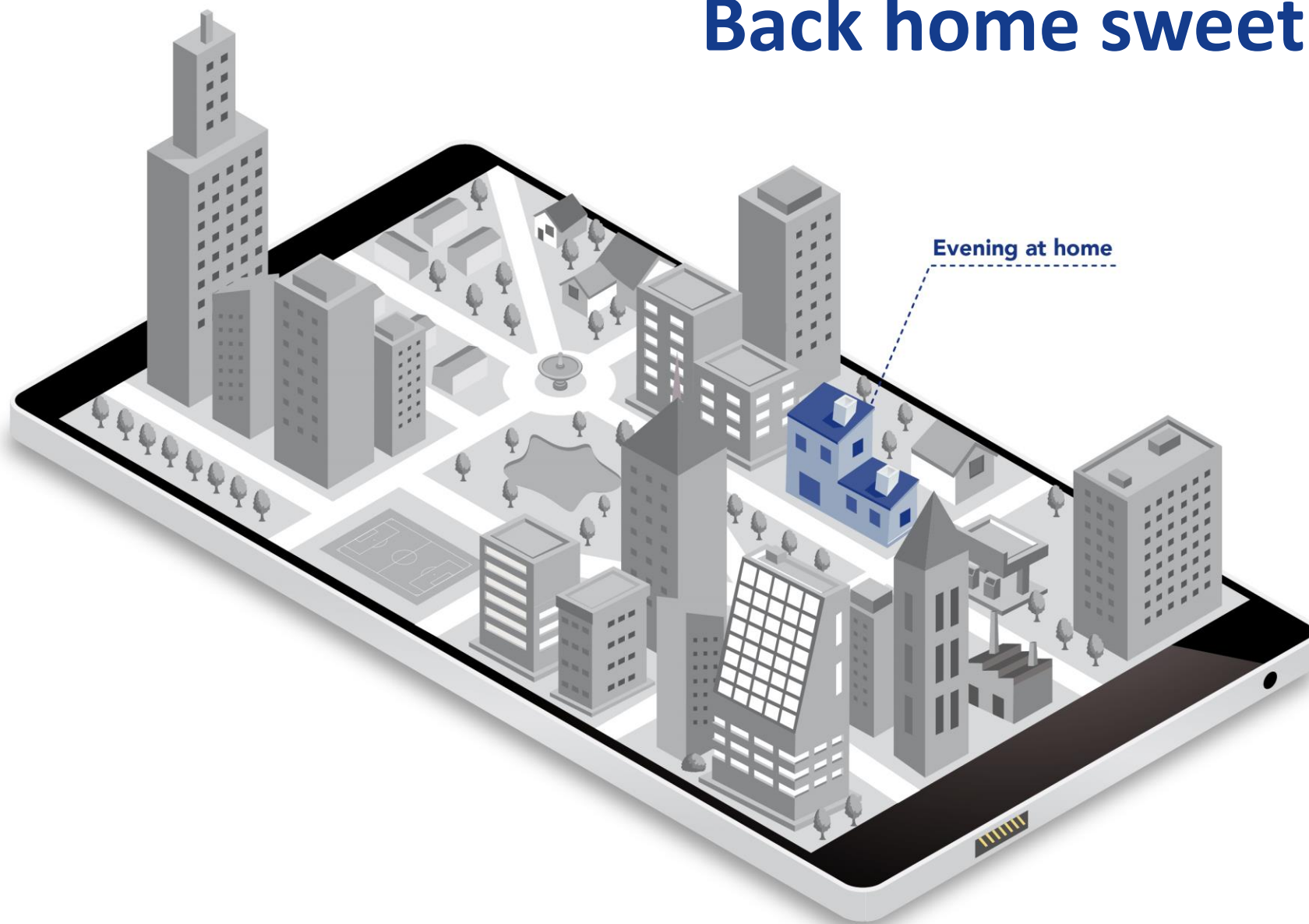
- ▶ 20x faster than BLE or WiFi Pairing when using buttons
- ▶ No need to enter long codes
- ▶ Technology hidden behind human gesture

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

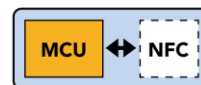
Tap the insulin pump on the glucose meter to set automatically optimum dose, tap the plaster to instantly retrieve the temperature

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**





Magical experiences thanks to NFC



Videogames are much more entertaining...
than doing homework

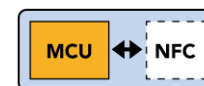
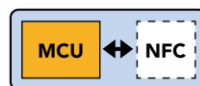
Toys can interact with other toys, video game accessories, bridging physical and virtual worlds

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

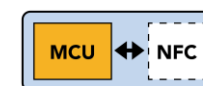
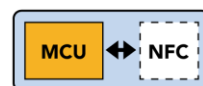
Bring a wireless node securely into a network (IoT)

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

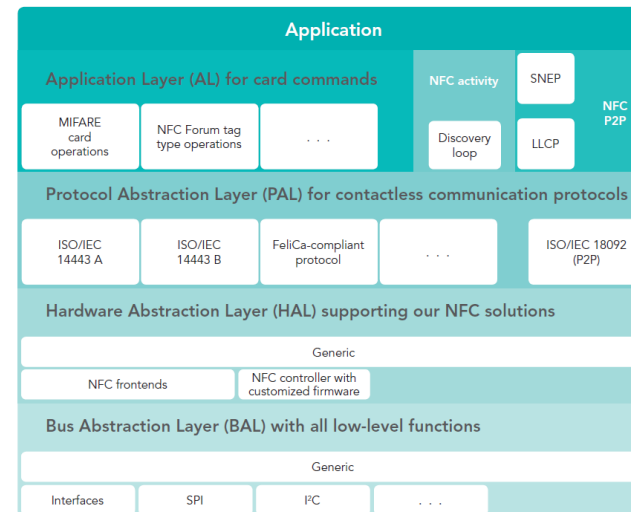
NXP SUPPORT



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

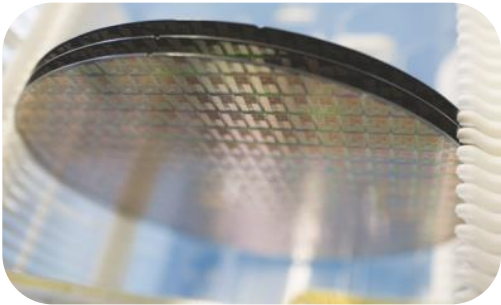
- ▶ NFC Reader Library
- ▶ The comprehensive library uses a layered, modular approach for optimized performance:
 - ▶ C-based stack and application
 - ▶ Interfaces, contactless protocol, drivers, command set
 - ▶ Peer-to-Peer Mode
 - ▶ Project examples
 - ▶ Common Criteria compatible
 - ▶ Modular, platform-independent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

NXP > Identification and Security > NFC and Reader ICs > NFC Technology Hub

NFC Technology Hub

Near Field Communication is hot. In today's increasingly connected world, this simple, intuitive technology lets you interact securely with the world around you with a simple touch. NFC is available in hundreds of millions of smartphones, tablets, and other consumer electronics, with new devices arriving almost daily. We are convinced to see NFC everywhere very soon. This hub gives you technology insights as well as the latest news about NFC solutions from NXP.

With NFC being a specialized subset of RFID, also check out our dedicated RFID technology page.

NFC News

NFC pairing - More time to relax, entertain, and connect at home

With just a tap, new purchases can perform service discovery, connect to the home network, or pair with other components, such as high-end speakers...

Blog: the future of mobile transit

With NFC (PN66T) in your phone and wearable, you can securely prebook your fare into the phone with an instant online purchase.

Press Release: NXP and Xiaomi Announce Mobile Payment Partnership

Read more about NFC >

NFC Products

NFC Everywhere: Controller, frontend, and connected tag solutions for the next generation of NFC applications (Brochure) [\[PDF\]](#)

NFC Applications

Documentation

NFC Everywhere: Controller, frontend, and connected tag solutions for the next generation of NFC applications (Brochure) [\[PDF\]](#)

NFC for embedded applications. Your critical link for the Internet of Things (Brochure) [\[PDF\]](#)

NFC Commissioning for Smart Homes (02:11 min)

Design Resources

- NFC Knowledge Base
- NFC Applications
- Documentation

NFC Everywhere: Controller, frontend, and connected tag solutions for the next generation of NFC applications (Brochure) [\[PDF\]](#)

NFC for embedded applications. Your critical link for the Internet of Things (Brochure) [\[PDF\]](#)

Use cases & products

@ NFC Everywhere
www.nxp.com/NFC



NFC community

Community > NFC > Overview

NFC

¡Iniciar sesión para seguir, compartir y participar en esta comunidad!

WELCOME TO NFC

Welcome to the NFC community. With our broad portfolio ranging from high power RF reader ICs to NFC-enabled solutions we address all your needs. Based on our long experience we continue to lead the expansion from traditional smart card applications to a wide infrastructure based on NFC-enabled devices. Get expert advice from the developer community. The support team also monitors these forums to provide answers and take your feedback.

Anyone can read the discussions, but only registered NXP Community members may participate. Before you ask a question, please search the community to find if someone has already offered a solution. If you don't see a solution, then ask the community your question.

ASK NFC YOUR QUESTION

Escriba su pregunta

Ask a question

QUESTIONS

Question	Answers	Views	Replies
Contact Smart Card Reader ICs	15	0	0
HTBQ Reader ICs	11	0	0
Connected Tag Solutions	15	0	0
RFIDABLE Skills for Reader Systems	12	0	0

Online community & technical support:

Support -> NXP community -> NFC
[NXP community NFC](http://www.nxp.com/NFC)



NFC training

PRODUCTS > APPLICATIONS > SUPPORT > ABOUT

NFC Webinars

NXP > Online Academy > NFC Webinars

Antenna "Technology"

Learn in 6 steps the fundamentals of NFC antenna design with NXP's senior technical and design experts. This technical webinar will provide you with the insights and skills about choosing the right antenna matching with an overview on simulation and measurement tools, design methodology, antenna optimization and debugging, test & qualification as well as ESD aspects.

Connected NFC Tags - Overview

The Connected Life describes a world in which consumers and businesses use many different experiences competing new services and ubiquitous Internet access delivered by advanced Field Communication (NFC) is hot. In today's increasingly connected world, this simple, intuitive technology lets you interact securely with the world around you with a simple touch. Fast, seamless, and available in hundreds of millions of smartphones, tablets, and other consumer electronics, on the connected tags portfolio of NXP built on the strong NXP NFC tags family (NTAG) at Electronics integration.

EMV related Design

Learn in 6 steps the fundamentals of NFC antenna design with NXP's senior technical and design experts. This technical webinar will provide you with the insights and skills about choosing the right antenna matching with an overview on simulation and measurement tools, design methodology, antenna optimization and debugging, test & qualification as well as ESD aspects.

Enhancing everyday products with NFC

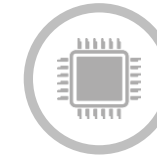
Today's consumers tend to purchase brands based on experiences they have had before. purchase. According to a study conducted by Ipsos, a key factor affecting purchasing decisions and how we interact with a brand. The options we form at key points - e.g., when we determine whether or not we will continue our relationship with a given brand. Since the aim is to enhance our relationship with their smartphones, it makes sense to use the smartphone these experiences. And now, with more smartphones offering Near Field Communication (NFC), companies can start using NFC to connect everyday products to the cloud and deliver interactions at every point. This is done through what is known as NFC product tagging, where new brand-customer relationships and business opportunities that were inaccessible in the past, we address the main advantages of using NFC to tag everyday products and identify in the cloud. We use these NFC tags with our design-efficient ways in which product, and we provide a few examples of real use cases. Finally, we present the main NFC three types of applications.

Recorded Webinars:

Support -> online academy -> NFC webinars
[NFC webinars](http://www.nxp.com/NFC)

Next NFC webinar: Fri, Jun17, 2016

NXP's NFC product portfolio
[Register now!](#)



NFC product selection guide

NFC Product Selection

NXP Semiconductors Business

Unrated

This app is compatible with all of your devices.

Add to Wishlist

Install

What NFC devices do you want to interface with?

Which NFC interaction is needed?

Which performance should your reader have?

My system should communicate with NFC-enabled smartphones (passive NFC solution)

Only wake up the µC upon a detected NFC field

I need a high-performance reader with the ability to drive very large or reliable operating volume (e.g. for EMVCo)

My system should talk to a contact or contactless smart card or any other NFC item (active NFC solution)

Communicate over NFC with a µC

I expect a cost-effective standard performance

NFC product selection guide app available:

[Google Play](#)
[App Store](#)



NXP Partner Program



Partner List

PRODUCTSAPPLICATIONSSUPPORTABOUT

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 focus
Beijing Strong Tech Co., Ltd.	IDH	Greater China	China	Smart appliances NFC and reader IC's	MCU, Logic, GA, Interface, NFC
Bristone 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



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)

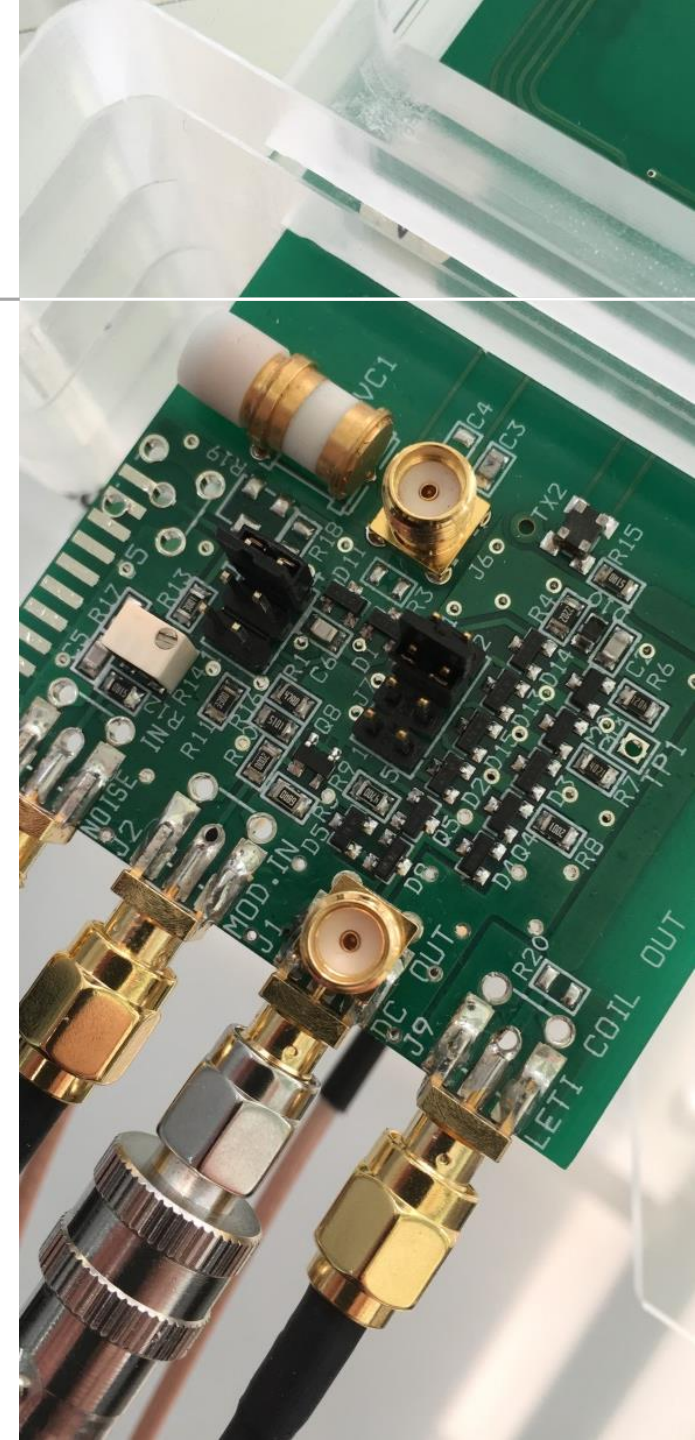
Secure Element management. GlobalPlatform compliant backend solutions
Secure services provisioning. OTA, TSM services



MobileKnowledge

Roc Boronat 117, P3M3
08018 Barcelona (Spain)
GPS: 41° 24' 8.59" N, 2° 11' 40.83"

mk@themobileknowledge.com
<http://www.themobileknowledge.com>
GPS: 41° 24' 8.59" N, 2° 11' 40.83"





nfc everywhere

Thank you for your kind attention

