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MIFARE DESFire Light Quick Start Guide

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Application note
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Document information

Information	Content
Keywords	NXP, MIFARE, MIFARE DESFire Light, NFC, Access Management, Micropayment, NDEF, PTO, Public Transport Operator, Transport Scheme, Transportation
Abstract	This document summarizes all the information required by somebody who wants to use MIFARE DESFire Light as new smartcard IC for an end consumer application.



Revision history

Revision history

Rev	Date	Description
1.0	20190131	Initial version of the document

1 Introduction

1.1 Document purpose – MIFARE DESFire Light Quick Start Guide

This document introduces the MIFARE DESFire Light technical support items and explains which deliverables can be retrieved from NXP to have a quick start with developing new MIFARE DESFire Light applications and infrastructures.

In this document, all the information that is necessary for somebody who is interested in MIFARE DESFire Light is gathered. This bundle of information and support material which is provided is called “Product Support Package” for the MIFARE DESFire Light.

The Product Support Package is a full set of documentation and software deliverables, enabling system integrators, software engineers, card manufacturers, etc. to implement their new solution based on MIFARE DESFire Light very easy and smooth.

1.2 Document audience

This document is dedicated technical as well as business-oriented people who want to gather first knowledge concerning MIFARE DESFire Light. Everybody who is interested on a more detailed and more technical level will be redirected to the full set of material complementing the IC.

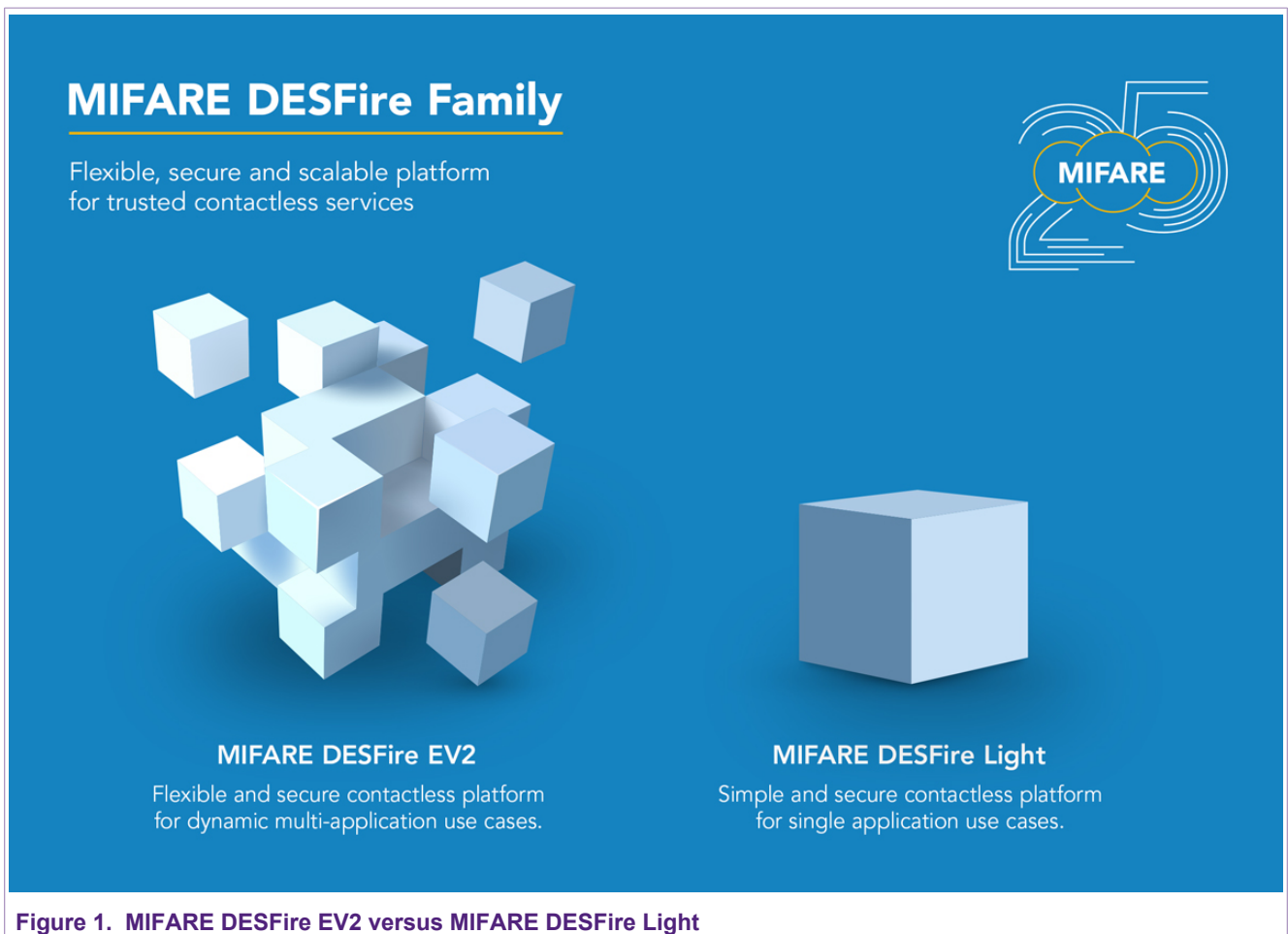
It also addresses developers, project leaders and system integrators who have a general technical understanding and overview of a specific smartcard technology or infrastructure. More in-depth details can be found in the complimentary application notes which are mentioned within this introductory document.

2 MIFARE DESFire Light Overview

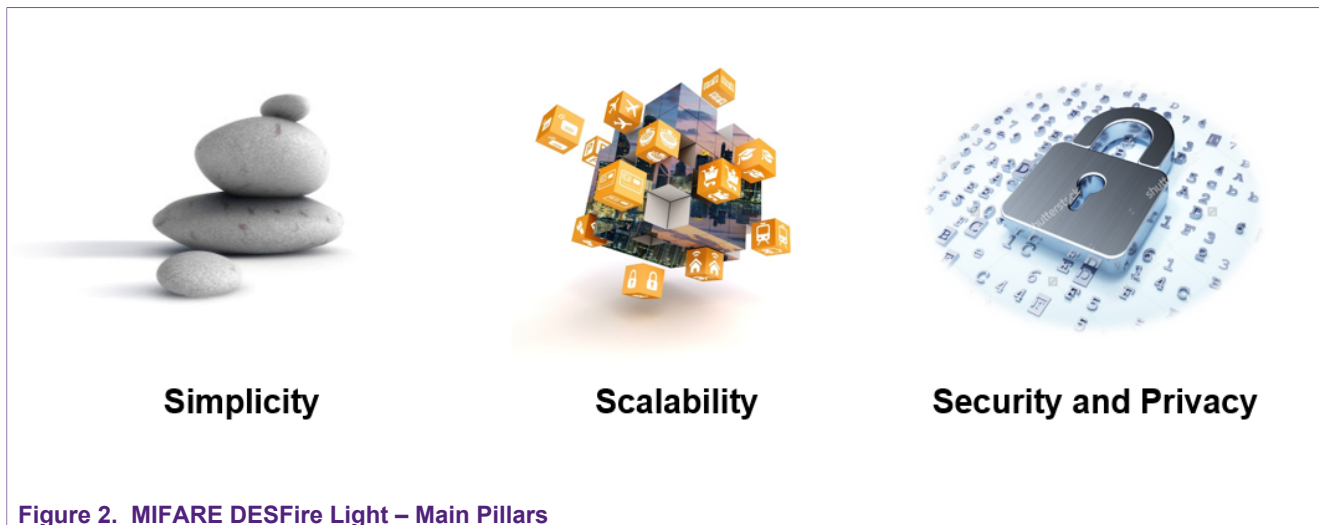
2.1 MIFARE DESFire Light Introduction

MIFARE DESFire Light is the latest member of the MIFARE DESFire family. The MIFARE DESFire family offers products which are based on a flexible, secure and scalable platform, offering continuous innovation and the important aspects security as well as privacy.

As contrast to MIFARE DESFire EV2 which is a very powerful, flexible and complex platform for dynamic multi-application use cases, the MIFARE DESFire Light is a simple and secure platform tailor-made for single application use cases.



The key aspects of MIFARE DESFire Light are simplicity, scalability as well as security and privacy, offering the perfect solution for single application usage scenarios.



2.2 MIFARE DESFire Light Key Features

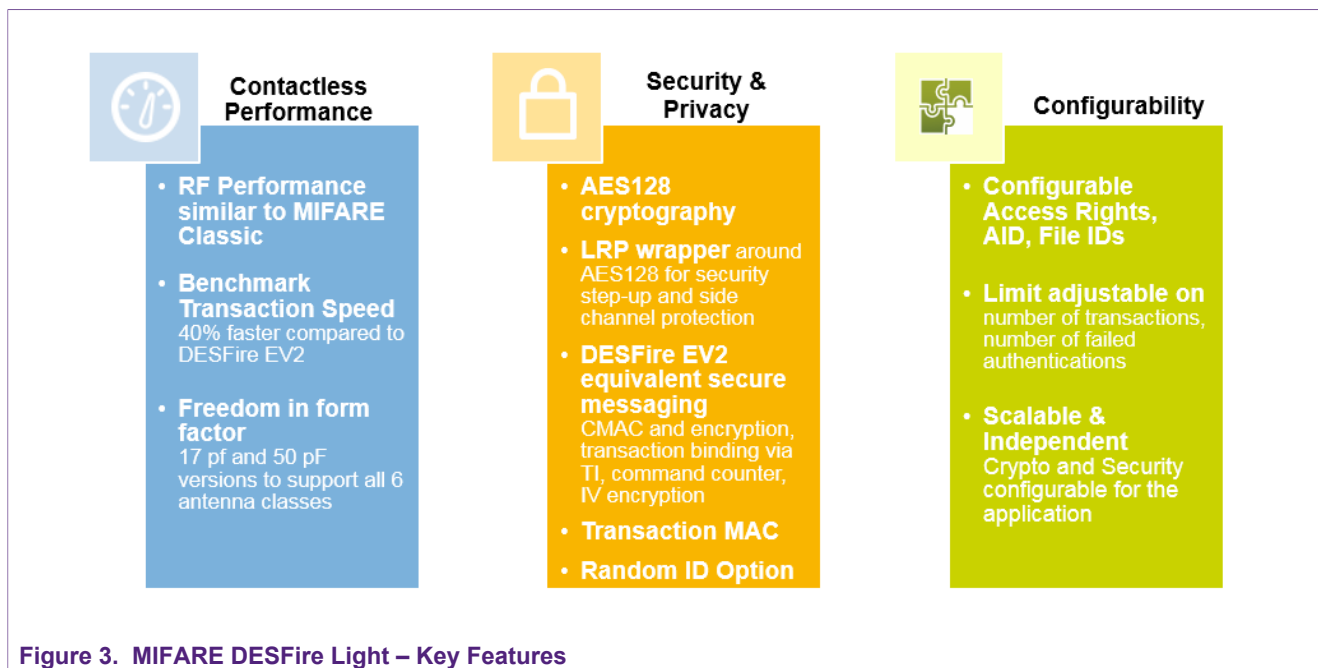
MIFARE DESFire Light is the product for single application solutions. It provides superior total transaction times as well as maximum cost efficiency.

The IC is fully compatible and up-scalable with MIFARE DESFire EV2, supporting a subset of the well-known MIFARE DESFire EV2 commands including the latest and most advanced secure messaging protocol.

Furthermore MIFARE DESFire Light applications are compatible with the NXP AppXplorer, bringing the possibility of installing the same application on any other MIFARE DESFire EV2 form factor as well.

The three most mentionable key aspects and key features of the IC, as seen in [Figure 3](#), are:

1. Contactless Performance
2. Security and Privacy
3. Configurability



2.3 LRP – a new innovative cryptographic primitive

Additionally to the AES secure messaging, MIFARE DESFire Light is equipped with a new secure messaging mode, called LRP secure messaging.

LRP stands for Leakage Resilient Primitive, being a new cryptographic algorithm that is introduced in this IC.

MIFARE DESFire Light offers the optional usage of LRP for authentication and secure messaging purposes. LRP increases the overall card security and protects the IC from side channel attacks.

- It is based on the well-known AES algorithm
- Basically it is a software layer wrapping around AES, calling AES functionality like encryption, MACing, etc for several computation rounds
- LRP uses pseudo-random functions altering the effectively used key for each individual encryption / decryption procedure
- It needs to have a counterpart in the infrastructure, meaning on the reader terminal firmware, LRP needs to be implemented if it is intended to be used
- Enhances the robustness of the IC against side channel and fault injection attacks even more, to the next higher level

More information to LRP can be found in [\[8\]](#).



Figure 4. Leakage Resilient Primitive

2.4 MIFARE DESFire Light – Product Support Package

The Product Support Package (PSP) for the MIFARE DESFire Light IC is composed of the following deliverables:

1. **Data sheet – MIFARE DESFire Light**
Product Data sheet, available in NXP DocStore (doc.no. 4307xx*¹ and on the NXP website under the following weblink: https://www.nxp.com/docs/en/data-sheet/MF2DL_H_x0.pdf
2. **Application note – AN12341 MIFARE DESFire Light Quick Start Guide**
available in NXP DocStore, document number 5224xx and on the NXP website under the following weblink: <https://www.nxp.com/docs/en/application-note/AN12341.pdf>
3. **Application note – AN12343 MIFARE DESFire Light Features and Hints**
available in NXP DocStore, document number 5225xx and on the NXP website under the following weblink: <https://www.nxp.com/docs/en/application-note/AN12343.pdf>
4. **Application note – AN12342 MIFARE DESFire Light Card Coil Design Guide**
available in NXP DocStore, document number 5226xx and on the NXP website under the following weblink: <https://www.nxp.com/docs/en/application-note/AN12342.pdf>
5. **Application note – AN12344 MIFARE DESFire Light Target Applications and Usage**
will be available in NXP DocStore, document number 5227xx
6. **Product Qualification Package – PQP5235 MIFARE DESFire Light**
available in NXP DocStore, document number 5235xx
7. **Wafer Specification – WS4475 MIFARE DESFire Light Wafer Specification**
available in NXP DocStore, document number 4475xx
8. **Application note – AN12304 Leakage Resilient Primitive (LRP) Specification**
available in NXP DocStore, document number 4660xx and on the NXP website under the following weblink: <https://www.nxp.com/docs/en/application-note/AN12304.pdf>
9. **TapLinx**
An Android SDK offering easy implementation of Android Apps interacting with any of the NXPs offered contactless NFC-based ICs. Available via the NXP website under the following weblink: <https://www.mifare.net/en/products/tools/taplinx/>
10. **RFID Discover**
A Windows-based software tool that can be used for NXP product-specific command exchange with the MIFARE DESFire Light IC. Available in NXP DocStore and on the NXP website under the following weblinks:
<https://www.nxp.com/search?category=softwaretools&keyword=rfiddiscover>

¹ xx ... document version number

<https://www.mifare.net/en/products/tools/rfiddiscover/>

11. NXP Card Test Framework

A Windows-based software tool that can be used for NXP product-specific command exchange with the MIFARE DESFire Light IC. Especially suitable for generating transactions and scripts that can be used for chip configuration, personalization, transaction testing and much more. Available in NXP DocStore.

12. Android Applications – TagInfo and TagWriter

Android Apps offering the possibility to interact with the MIFARE DESFire Light smartcards as well as any other of the NXPs offered contactless NFC based ICs.

Available via the NXP Website under the following weblinks: <https://www.mifare.net/en/products/tools/nfc-taginfo-app/>

<https://www.mifare.net/en/products/tools/nfc-tagwriter-app/>

13. MIFARE DESFire Light Sample Cards

Sample cards can be requested directly at your NXP representative or contact person (sales, marketing, business development) or ordered via the NXP website under the following weblink: https://www.nxp.com/products:MIFARE_DESFIRE_LIGHT

14. MIFARE DESFire Light Demo Kit

A demo kit, ready to go and to explore the MIFARE DESFire Light IC as smooth as possible. Includes a small handy USB reader, several MIFARE DESFire Light sample cards and sample tokens in smaller form factors. Also includes access to the MIFARE DESFire Light Android App, giving you access to demo transactions and interactive learning material.

Available in NXP DocStore and on the NXP website under the following weblink:

https://www.nxp.com/products:MIFARE_DESFIRE_LIGHT

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