



**ADVANCING NEAR
FIELD COMMUNICATION
TECHNOLOGY**



NFC Technology Overview

**Jonathan Main
MasterCard Worldwide
Chairman, Technical Committee**

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Agenda

- Review of Use Cases
- Architecture Overview
- Relationship to Other Standards
- Status of NFC Forum Technical Work

NFC Has Multiple Uses

Get information by touching smart posters



Use your NFC phone as an event ticket



Set up your wireless home office with a touch



NFC Consumer Device



Print from your camera by holding it close to the printer



Share business cards with a touch



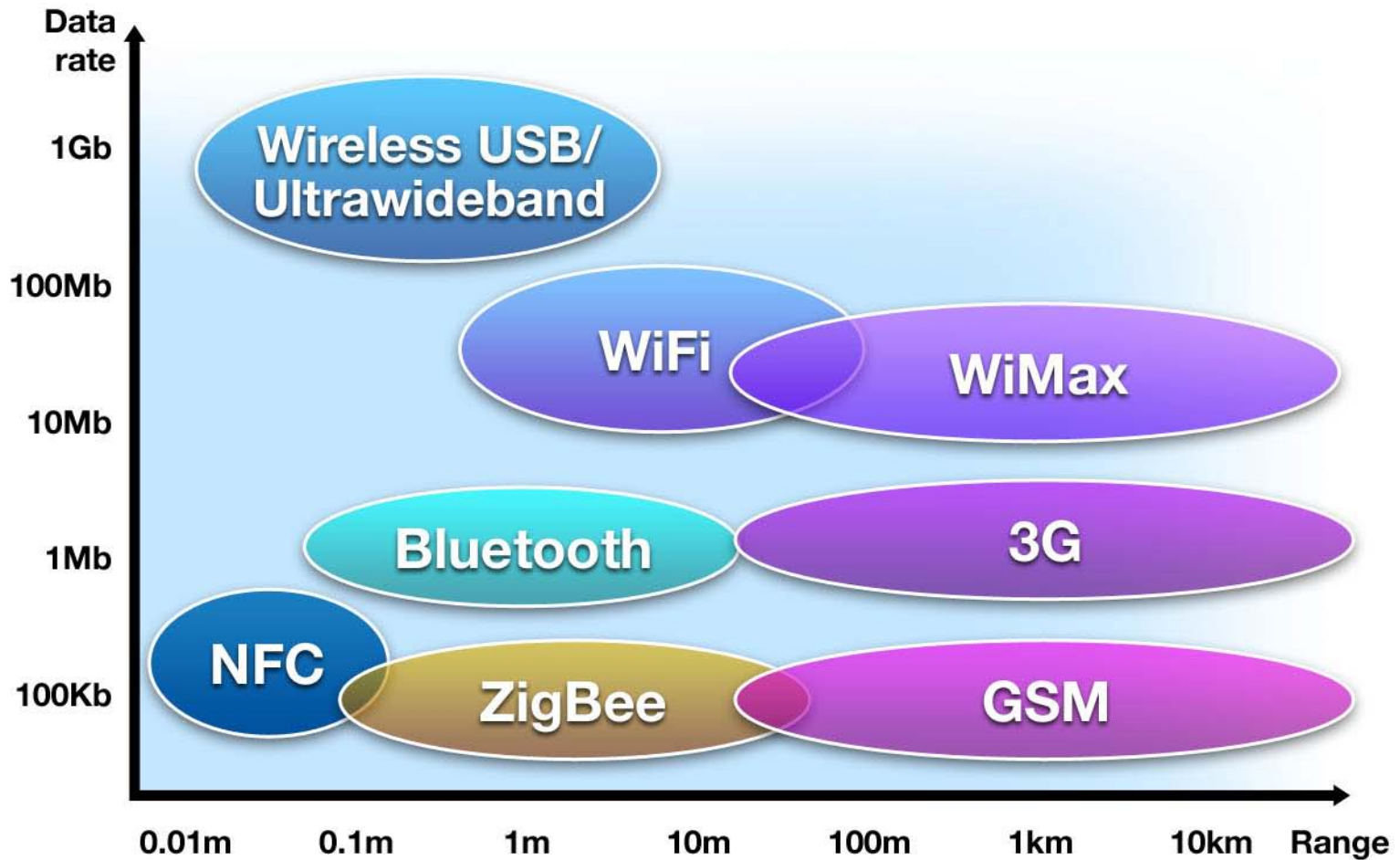
Get on the bus by waving your NFC phone



Pay for goods with a tap of your NFC phone



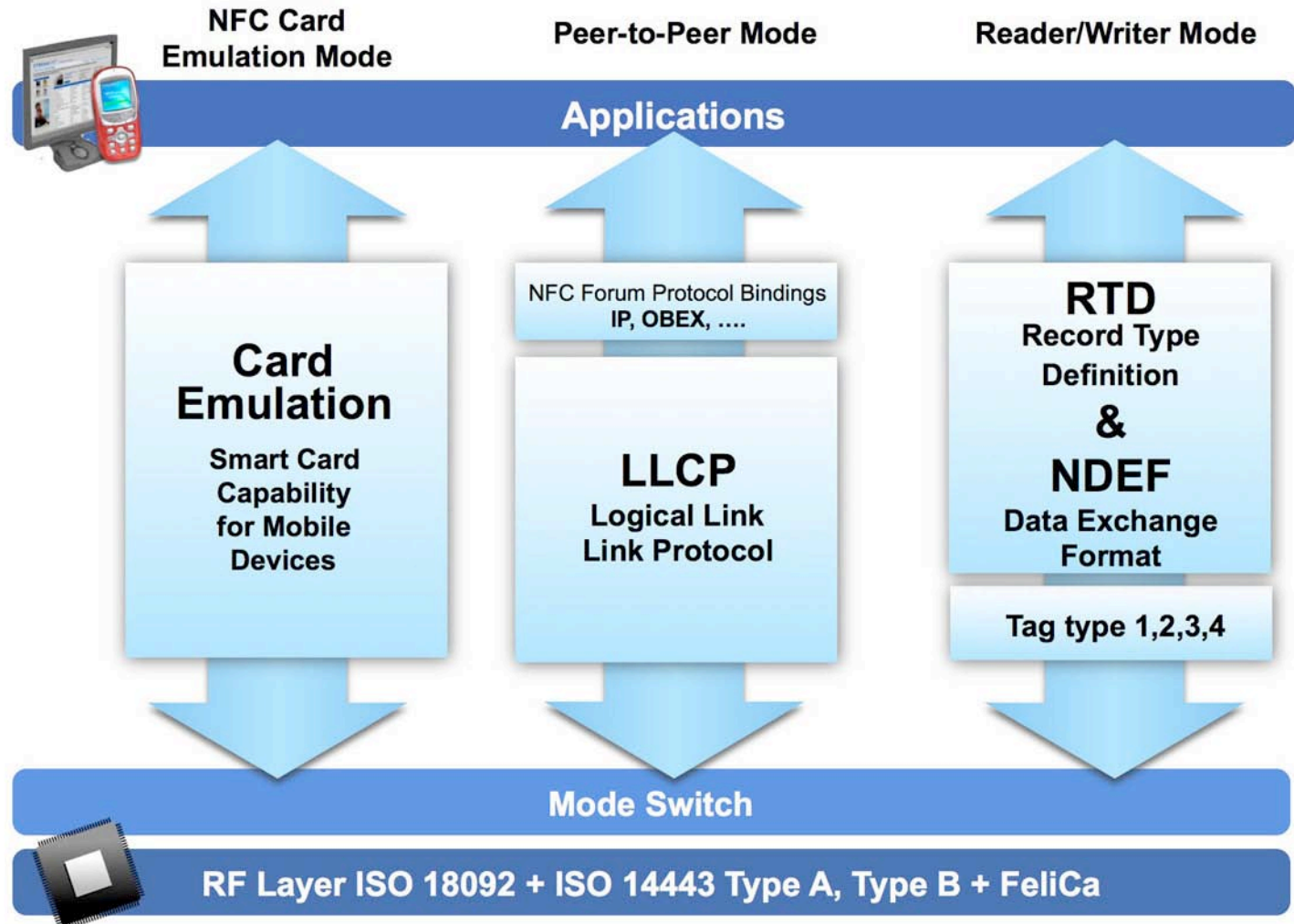
Wireless Market Space



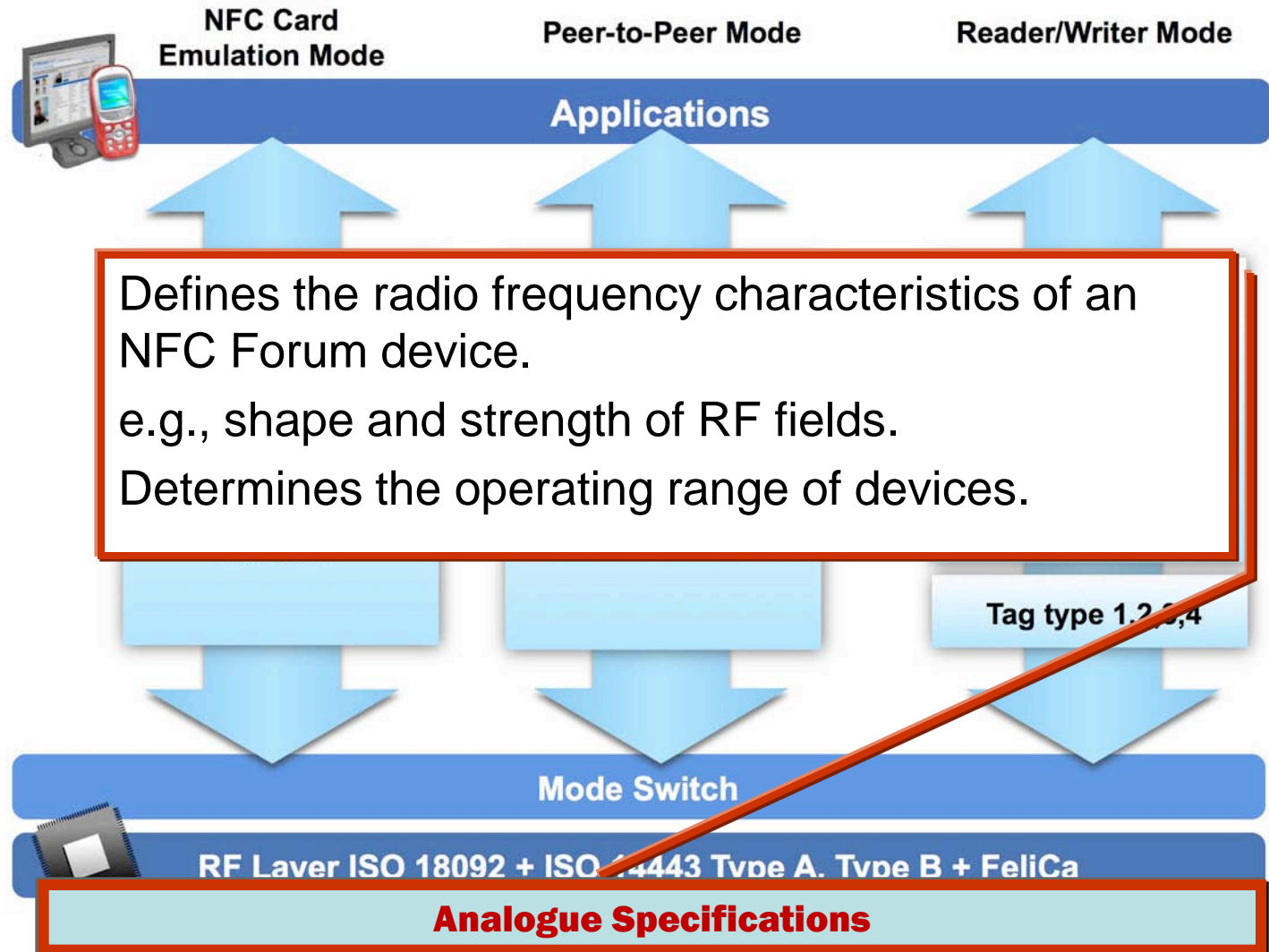
Relationship to Other Standards

- Proximity and Vicinity Standards
 - ISO/IEC 14443
 - Included as a base standard in Digital Protocol and Analogue specifications.
 - ISO/IEC 18092 – NFCIP-1
 - Included as a base standard in Digital Protocol and Analogue specifications.
 - JIS X 6319-4 – FeliCa
 - Included as a base standard in Digital Protocol and Analogue specifications
 - ISO/IEC 15693 – Vicinity
 - Out of scope of NFC Forum work.

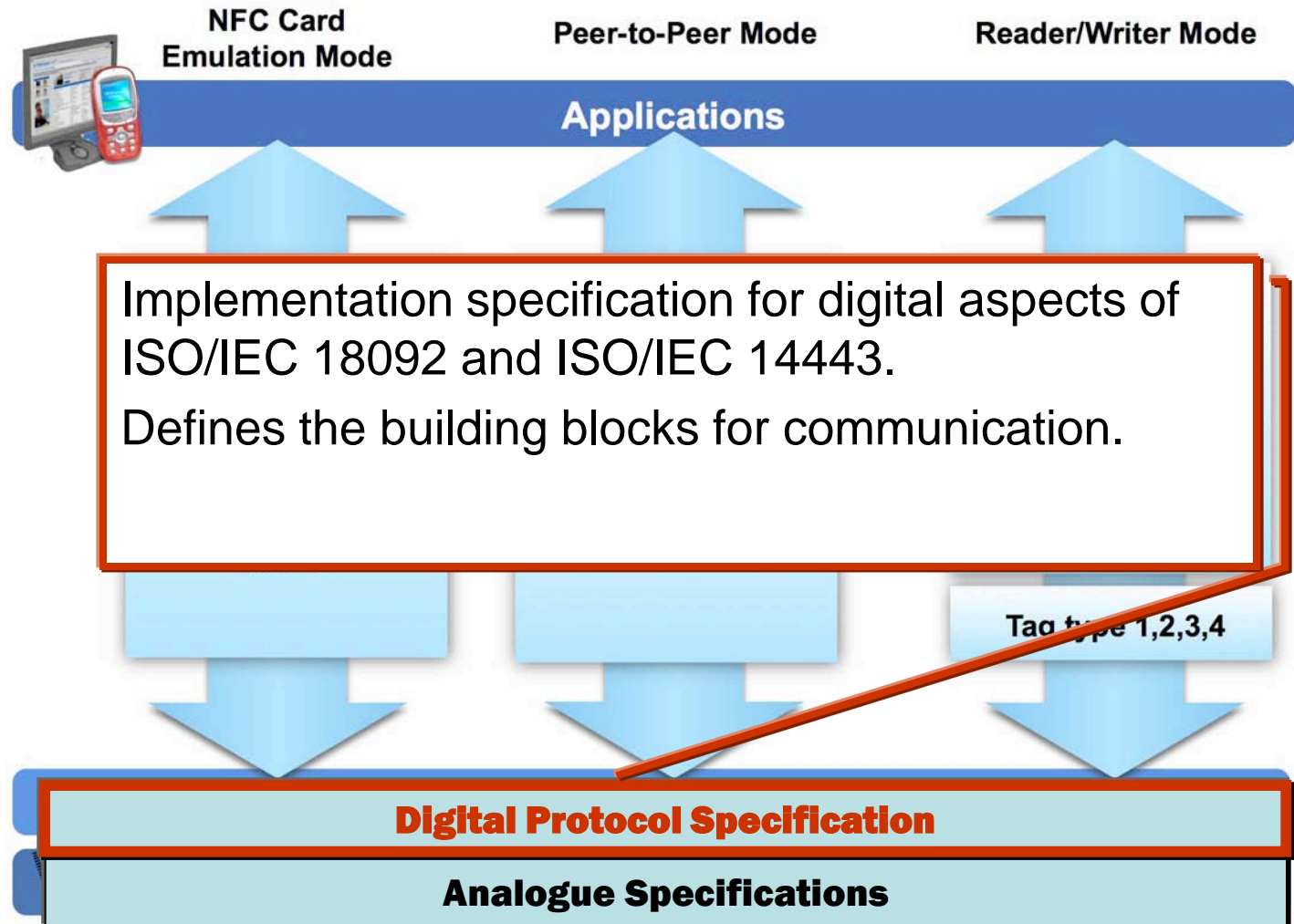
NFC Forum Technology Architecture



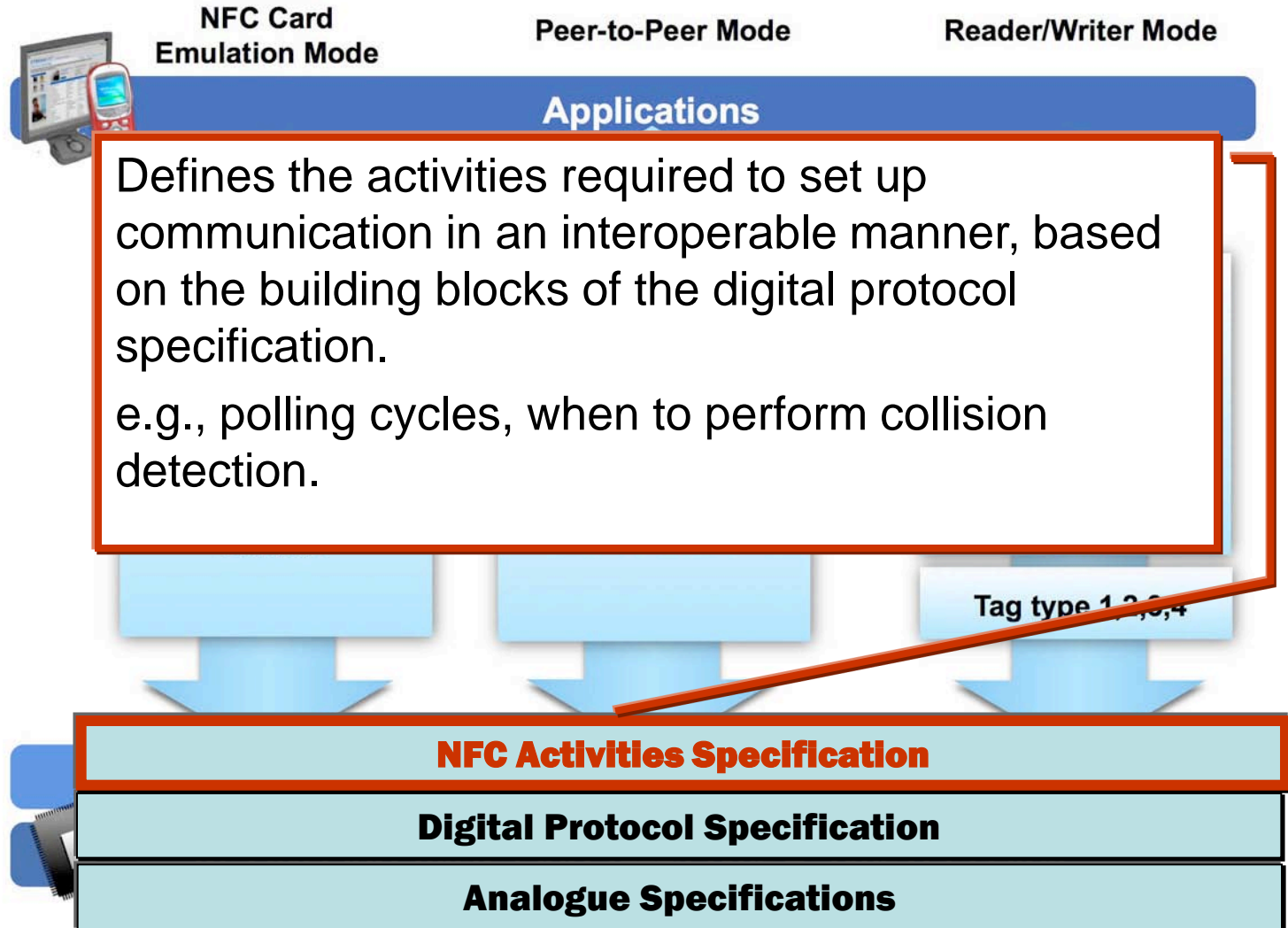
NFC Forum Technology Architecture



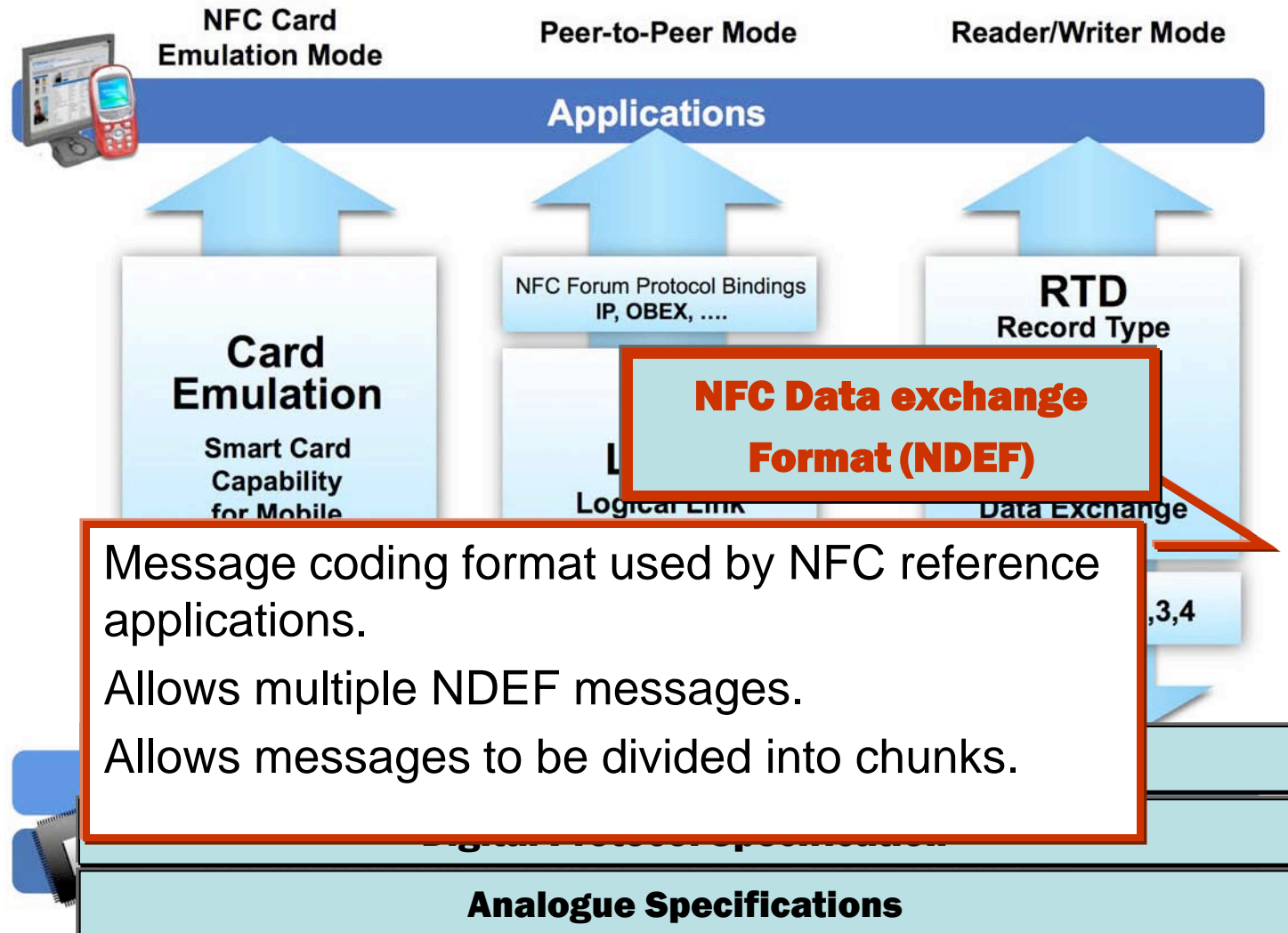
NFC Forum Technology Architecture



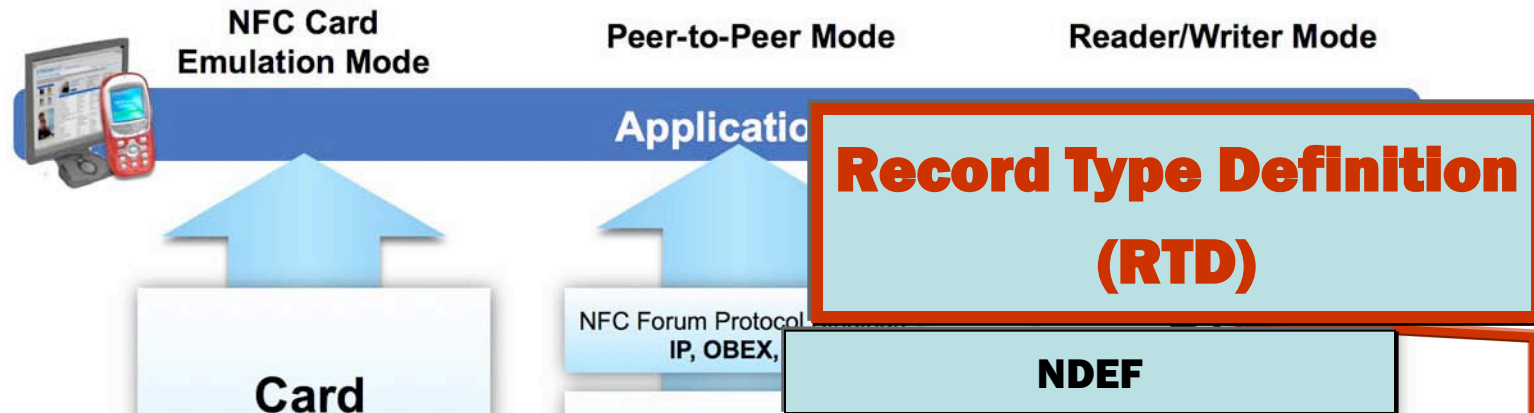
NFC Forum Technology Architecture



NFC Forum Technology Architecture



NFC Forum Technology Architecture



Record Type Definition (RTD)

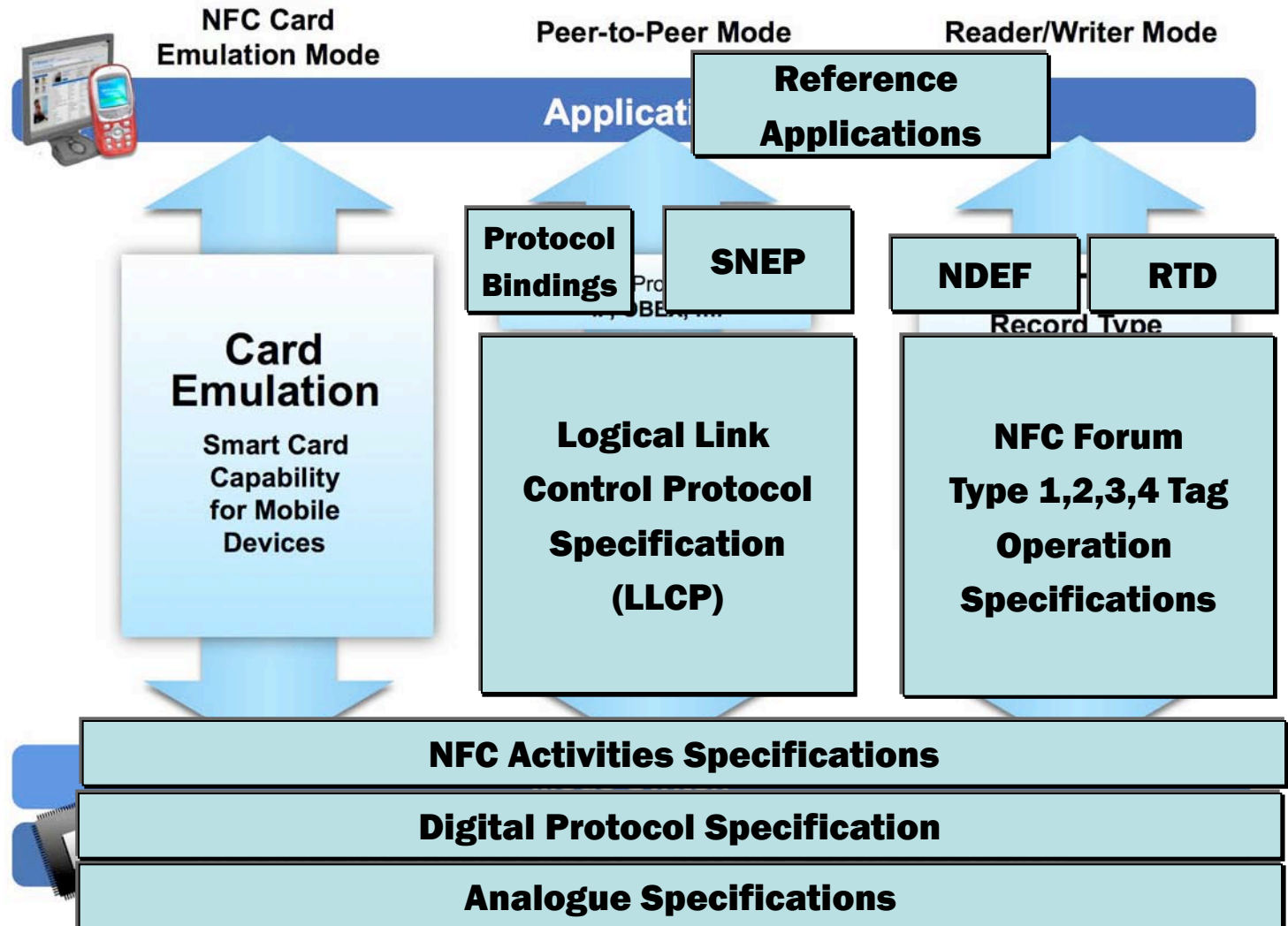
NDEF

Defines how to construct records in NDEF messages.
 Records may contain other records.
 Each record has a type, indicating what it contains.
 Record types are extensible – they may be defined by NFC Forum specifications (reference applications) or by other bodies (using domain name).

Digital Protocol Specification

Analogue Specifications

NFC Forum Technology Architecture



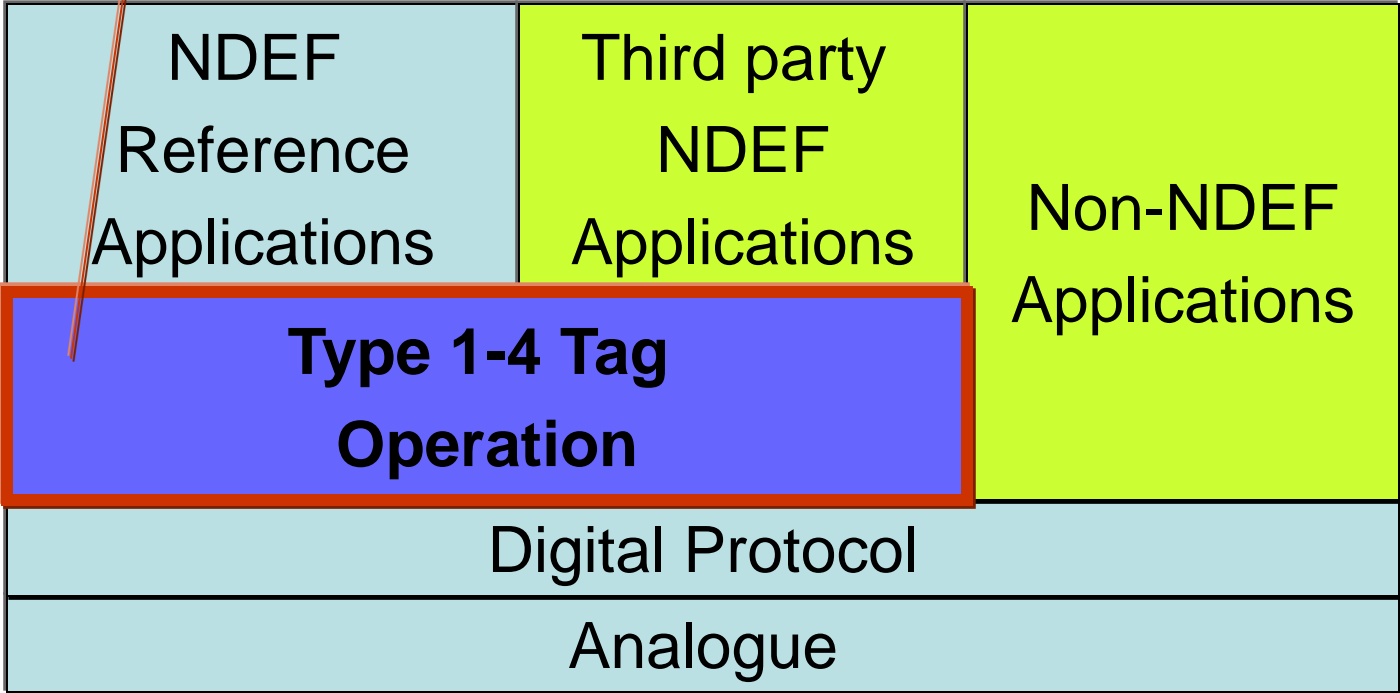
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Reader/Writer Mode

<p>NDEF Reference Applications</p>	<p>Third party NDEF Applications</p>	<p>Non-NDEF Applications</p>
<p>Type 1-4 Tag Operation</p>		
<p>Digital Protocol</p>		
<p>Analogue</p>		

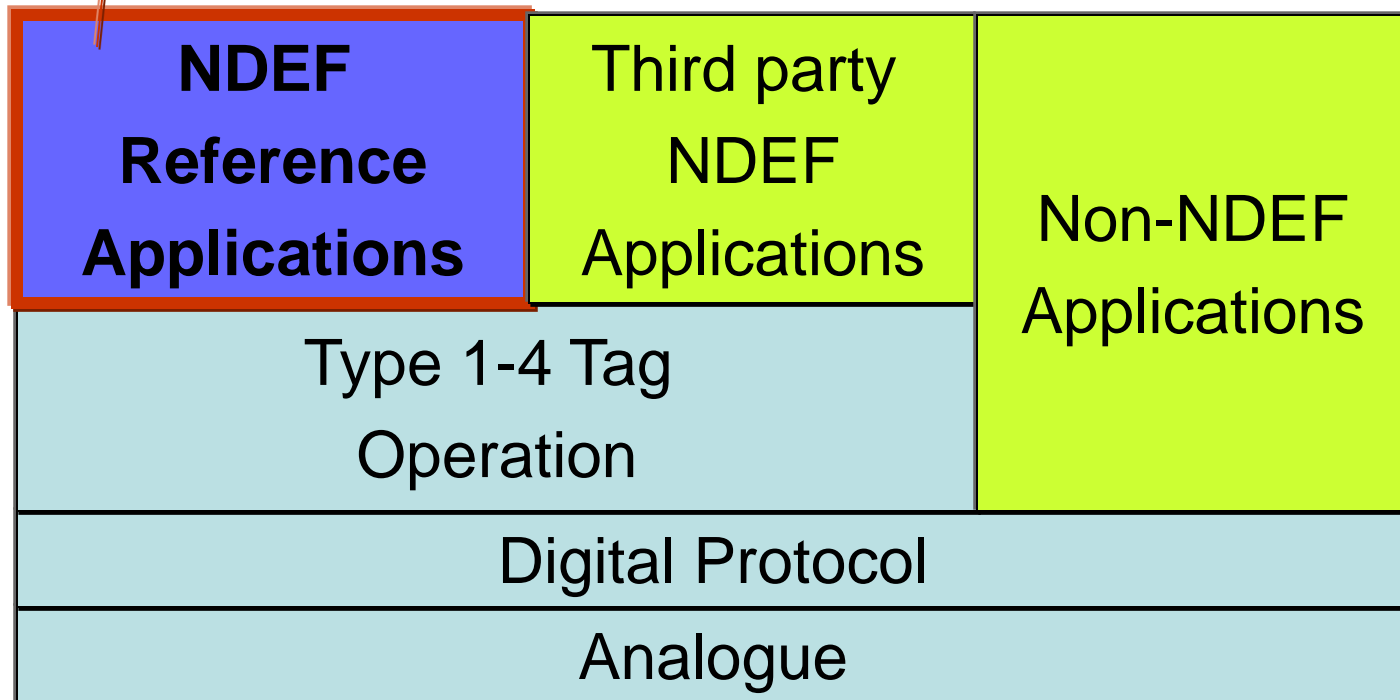
Reader/Writer Mode

Define how to read and write NDEF data from/to a tag
 Types 1 and 2: Proprietary tags based on ISO14443 Type A
 Type 3: Proprietary tag based on FeliCa
 Type 4: Open tag based on ISO 14443 Type A or B and ISO 7816-4



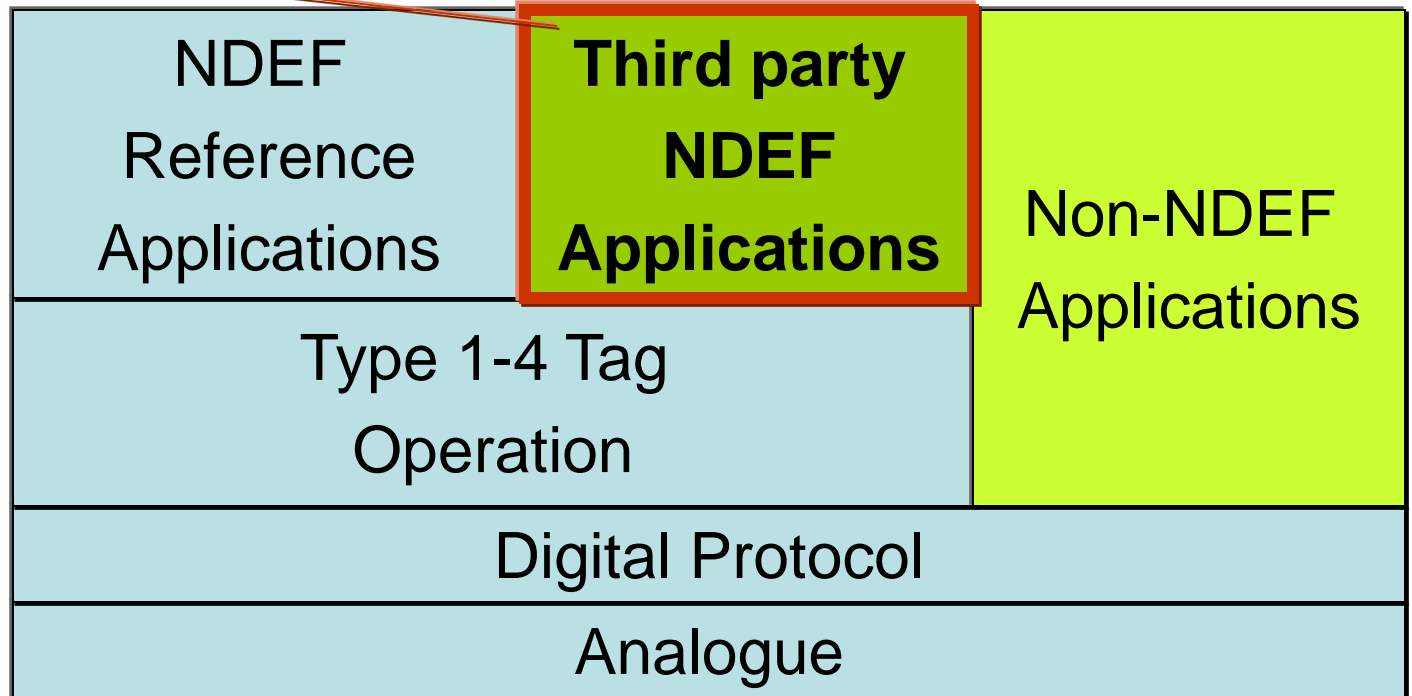
Reader/Writer Mode

NFC Forum-defined reference applications, e.g., connection handover, smart poster



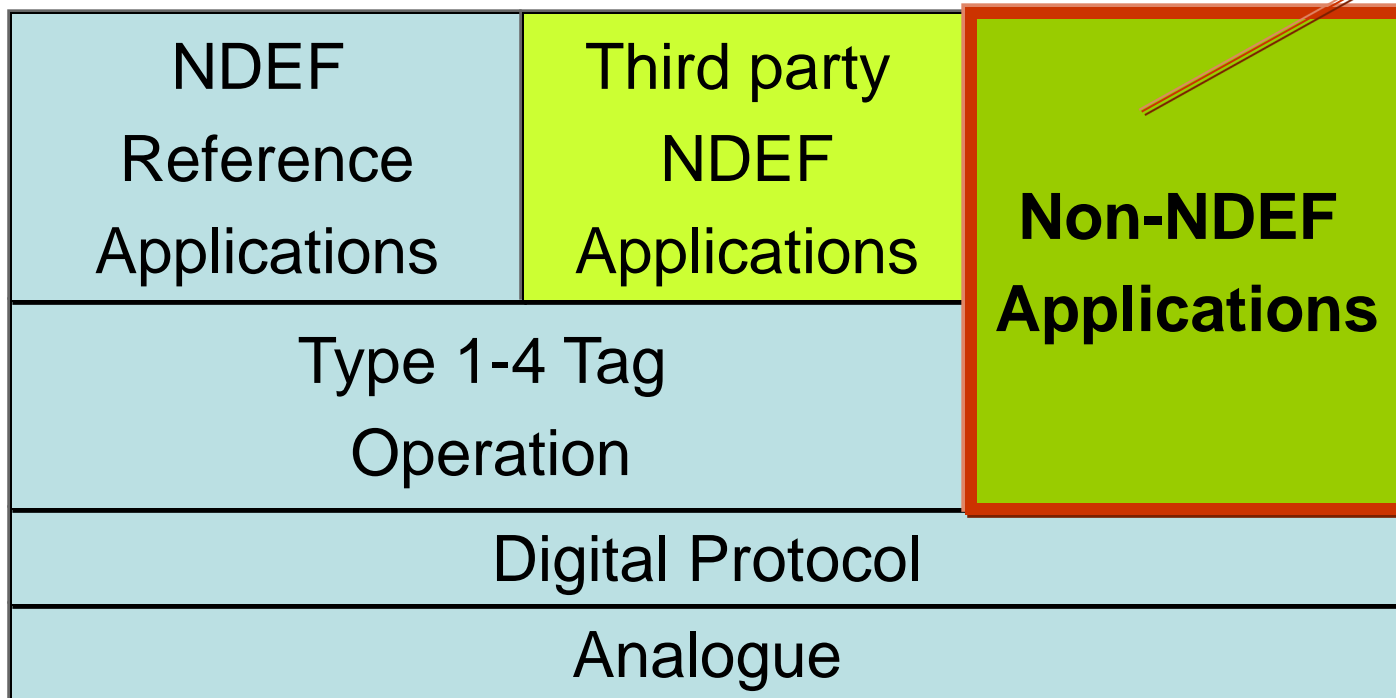
Reader/Writer Mode

Proprietary tag-based applications using NDEF, e.g., reading information on medicine bottles



Reader/Writer Mode

Proprietary applications that communicate with contactless cards, e.g., electronic purse balance reader, contactless ticket reader

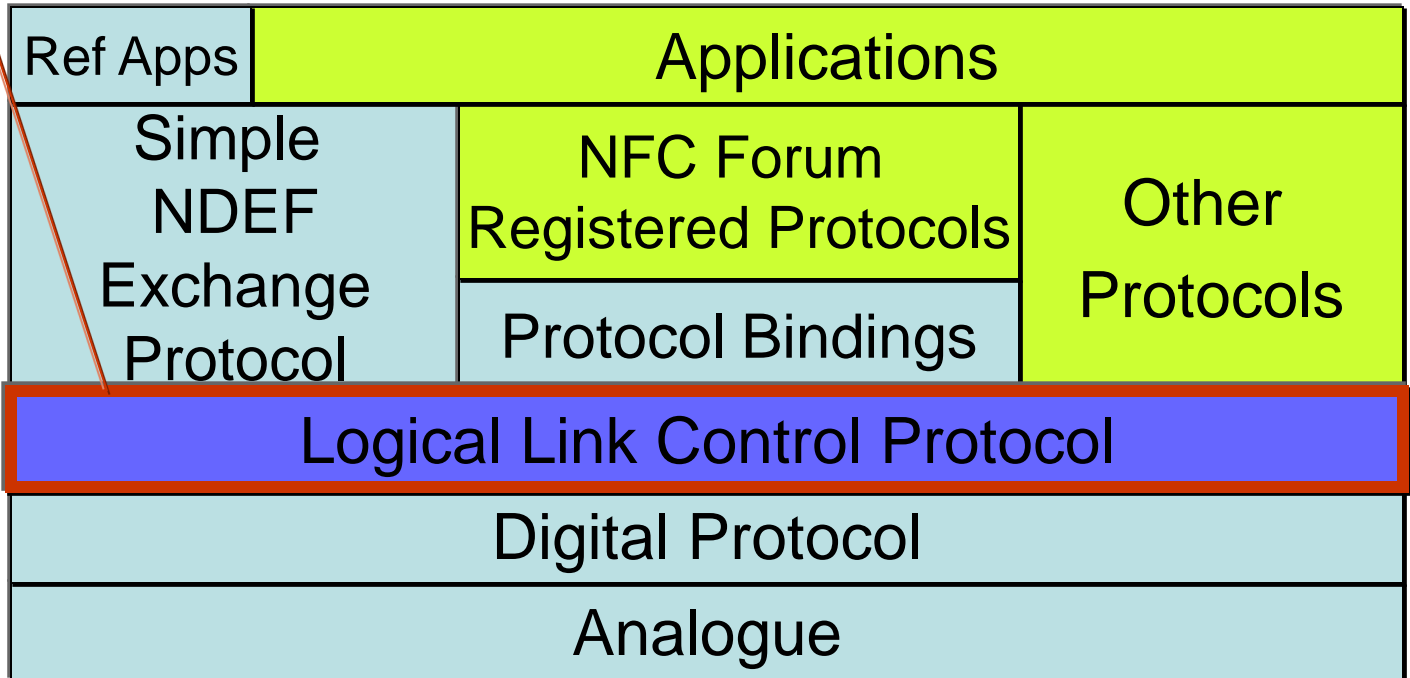


Peer-to-Peer Mode

Ref Apps	Applications	
Simple NDEF Exchange Protocol	NFC Forum Registered Protocols	Other Protocols
	Protocol Bindings	
Logical Link Control Protocol		
Digital Protocol		
Analogue		

Peer-to-Peer Mode

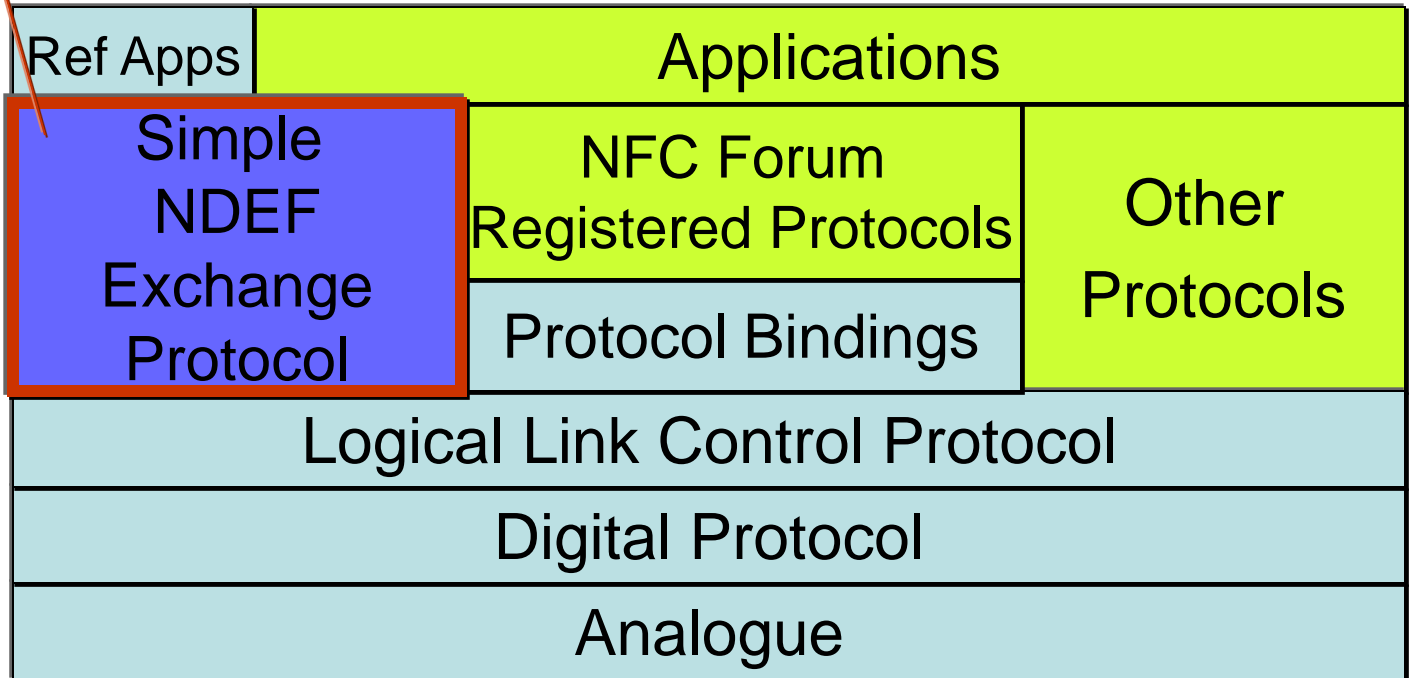
Link activation, supervision, deactivation
 Asynchronous balanced mode
 Protocol multiplexing
 Connectionless transport
 Connection oriented transport



Peer-to-Peer Mode

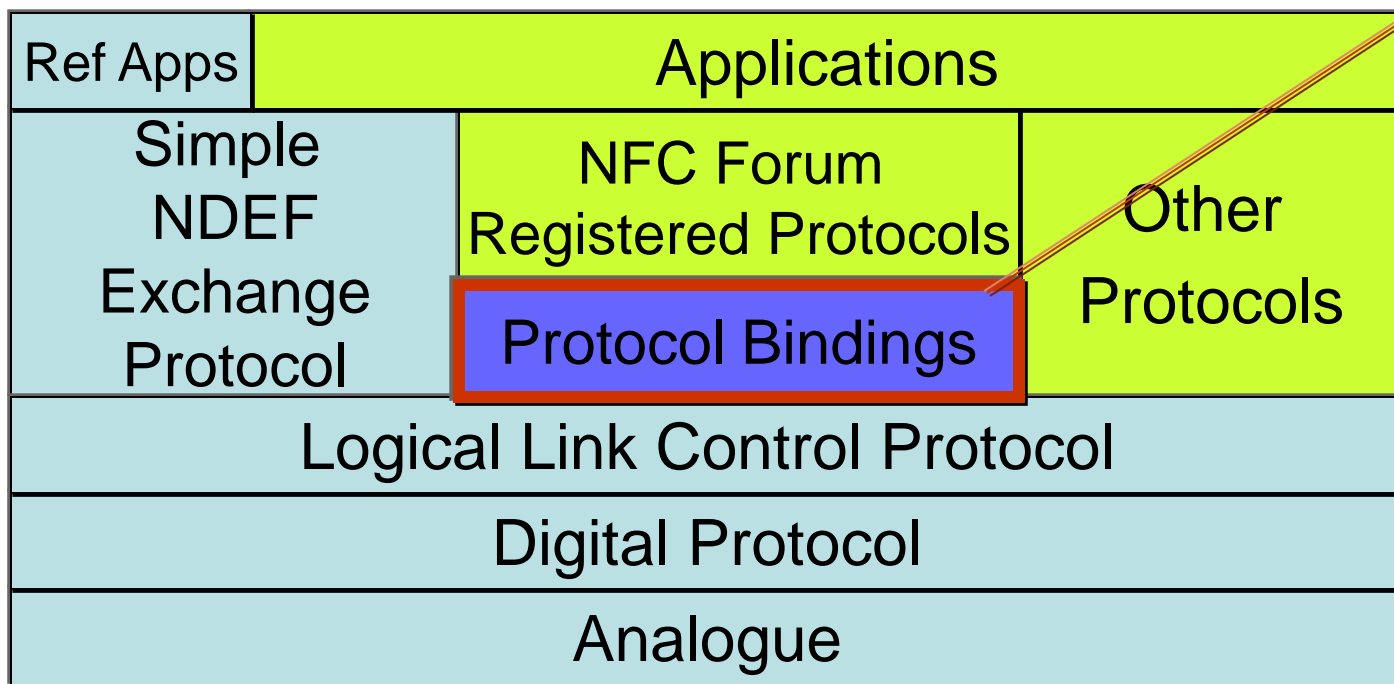
Protocol to allow the exchange of NDEF messages in Peer Mode

Analogous to tag operation specifications



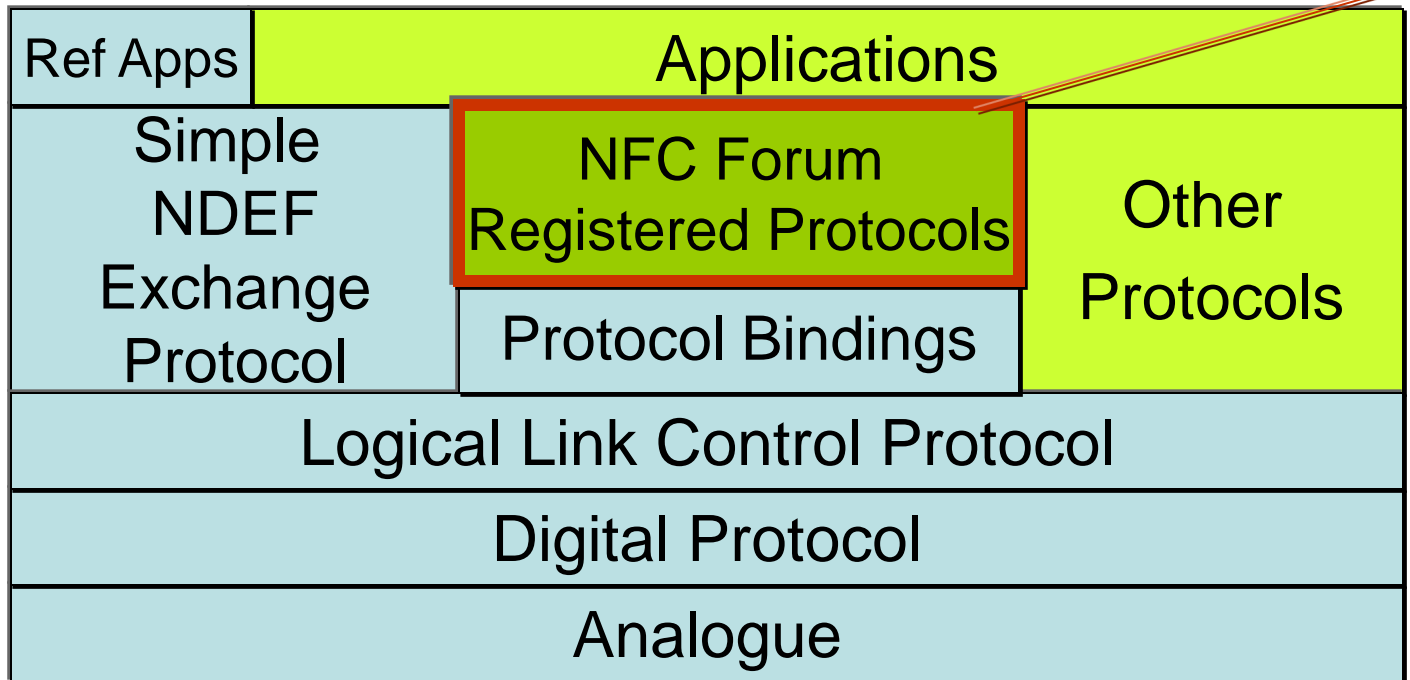
Peer-to-Peer Mode

Provides standard bindings (e.g., port numbers) to NFC Forum registered protocols. Allows interoperable use of registered protocols



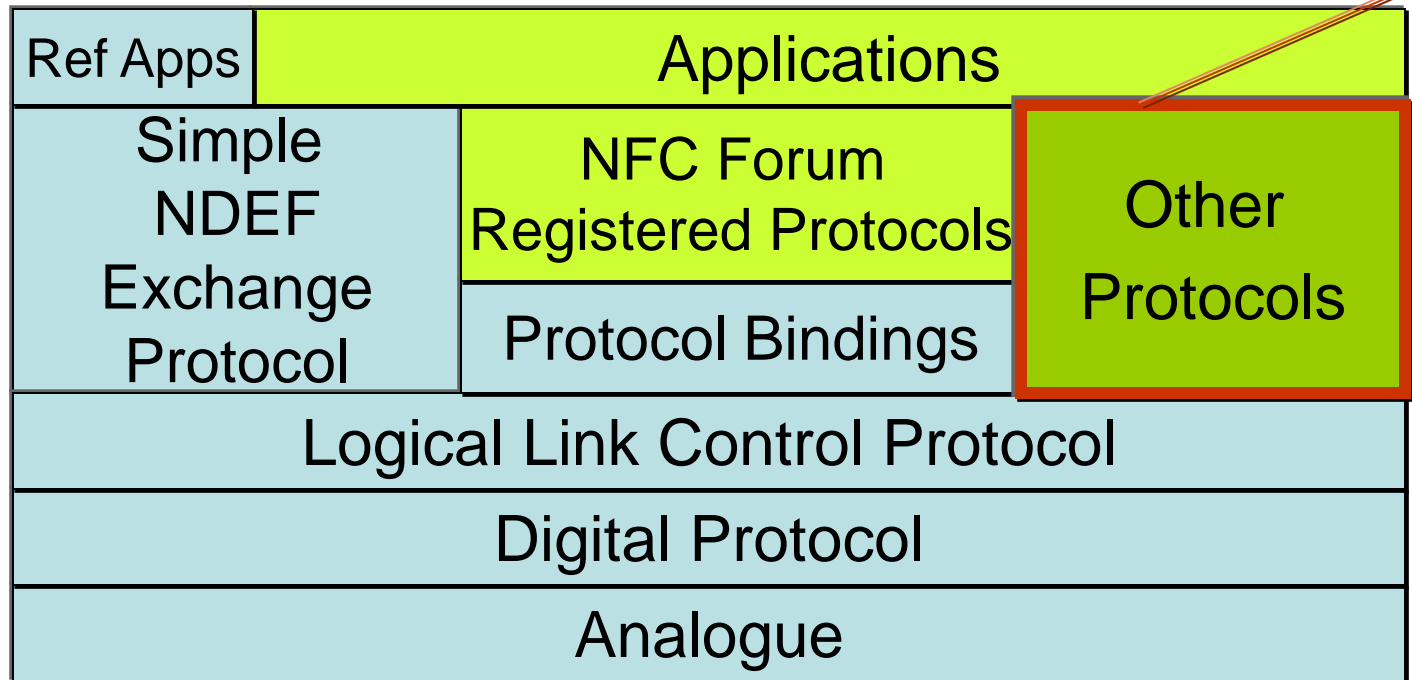
Peer-to-Peer Mode

Protocols for which the NFC Forum defines a binding to LLCP
e.g., OBEX, IP



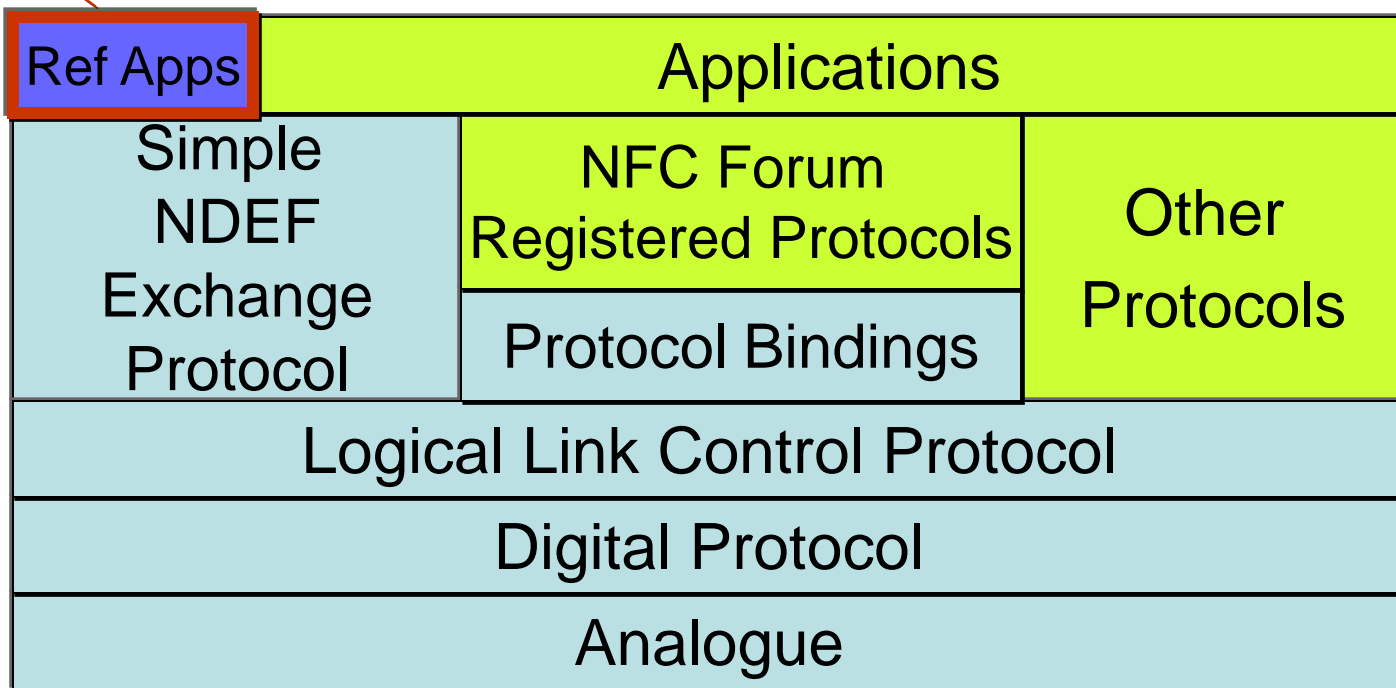
Peer-to-Peer Mode

Any other protocols which may run over the link layer provided by LLCP. Bindings to LLCP are not provided by NFC Forum



Peer-to-Peer Mode

NFC Forum reference applications may be run over the Simple NDEF exchange protocol



Peer-to-Peer Mode

Peer to peer applications – e.g., printing from a camera, business card exchange, third party NDEF applications

Ref Apps	Applications	
Simple NDEF Exchange Protocol	NFC Forum Registered Protocols	Other Protocols
	Protocol Bindings	
Logical Link Control Protocol		
Digital Protocol		
Analogue		

Card Emulation Mode

Applications

Digital Protocol

Analogue

Card Emulation Mode

Proprietary contactless card applications
e.g., payment, ticketing, access control
Based on ISO 14443 A/B or FeliCa

Applications

Digital Protocol

Analogue

Eleven Specifications Released to Date

Specification

Purpose

<ul style="list-style-type: none"> • NFC Data Exchange Format (NDEF) 	<ul style="list-style-type: none"> • Common data format for devices and tags
<ul style="list-style-type: none"> • NFC Record Type Definition (RTD) <ul style="list-style-type: none"> • Smart Poster RTD 	<ul style="list-style-type: none"> • Standard record types used in messages between devices/tags • For posters with tags with text, audio or other data
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Text RTD 	<ul style="list-style-type: none"> • For records containing plain text
<ul style="list-style-type: none"> • Uniform Resource Identifier (URI) RTD 	<ul style="list-style-type: none"> • For records that refer to an Internet resource
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Generic Control RTD 	<ul style="list-style-type: none"> • Way to request an action
<ul style="list-style-type: none"> • Connection Handover 	<ul style="list-style-type: none"> • How to establish a connection with other wireless technologies
<ul style="list-style-type: none"> • NFC Tag Types 1-4 Operation 	<ul style="list-style-type: none"> • Defines R/W operation for NFC tags

Work in Progress

- Candidate Specifications (Publicly available from NFC Forum website)
 - Digital Protocol
 - LLCP
- Other Specifications in progress
 - Signed NDEF RTD
 - Simple NDEF Exchange Protocol (SNEP)
 - NFC Controller Interface (NCI)
 - RF Analogue
 - NFC Activities Specification
- Check for updates at:
 - <http://www.nfc-forum.org/specs/>