



ADVANCING NEAR
FIELD COMMUNICATION
TECHNOLOGY



The NFC Forum

NFC Technology for Developers

7 October 2008

Audio Tips

All audio comes through your computer

Use your computer mixer to adjust master volume

Use Webcast reader audio slide – top center of page –
to fine tune volume

The screenshot shows the NFC Forum webcast player interface. At the top left is the NFC Forum logo. To its right are input fields for 'Name' and 'Email', followed by a text area with the prompt 'Ask a question here, or click help for technical support.' and 'SEND' and 'HELP' buttons. On the far right is a black audio control bar with a play button, a volume slider, and a mute icon. An arrow points from the text 'Use Webcast reader audio slide – top center of page – to fine tune volume' to the volume slider. Below the input fields is a large blue banner with the NFC Forum logo, the text 'ADVANCING NEAR FIELD COMMUNICATION TECHNOLOGY', and 'The NFC Forum NFC Technology for Developers'. The date 'October 2008' is in the bottom right of the banner. At the bottom of the player is a control bar with 'HELP', 'WebcastGroup', and 'RESET' buttons. An arrow points from the text 'Click here for help' to the 'HELP' button.

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Click here for help

Before We Begin

- The Webcast slides and recording will be available after this session at:
<http://www.nfc-forum.org/resources/presentations/>
- You can submit a question at any time during this session using the chat box in the middle of your viewer.

Today's Speaker

Jonathan Main



Chairman

NFC Forum Technical Committee

Vice President

Centre of Excellence for Mobile
Advanced Payments
MasterCard Worldwide

Agenda

- Review of Use Cases
- Architecture Overview
- Modes and Specifications
 - Reader/ Writer
 - Peer-to-Peer
 - Card Emulation
- Relationship to Other Standards
- Status of NFC Forum Technical Work
- About the NFC Forum

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

Get on the bus by waving your NFC phone

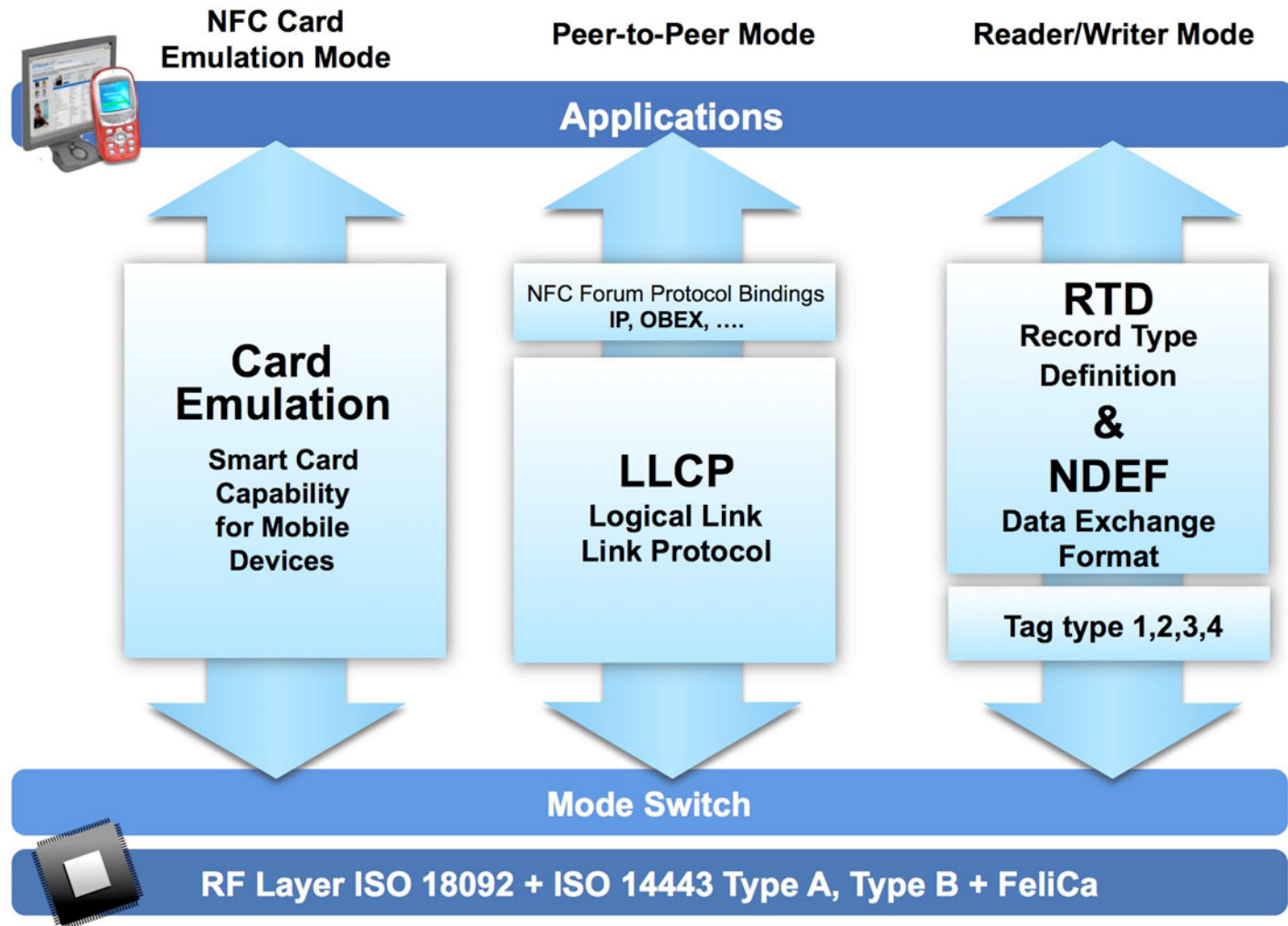


Share business cards with a touch

Pay for goods with a tap of your NFC phone

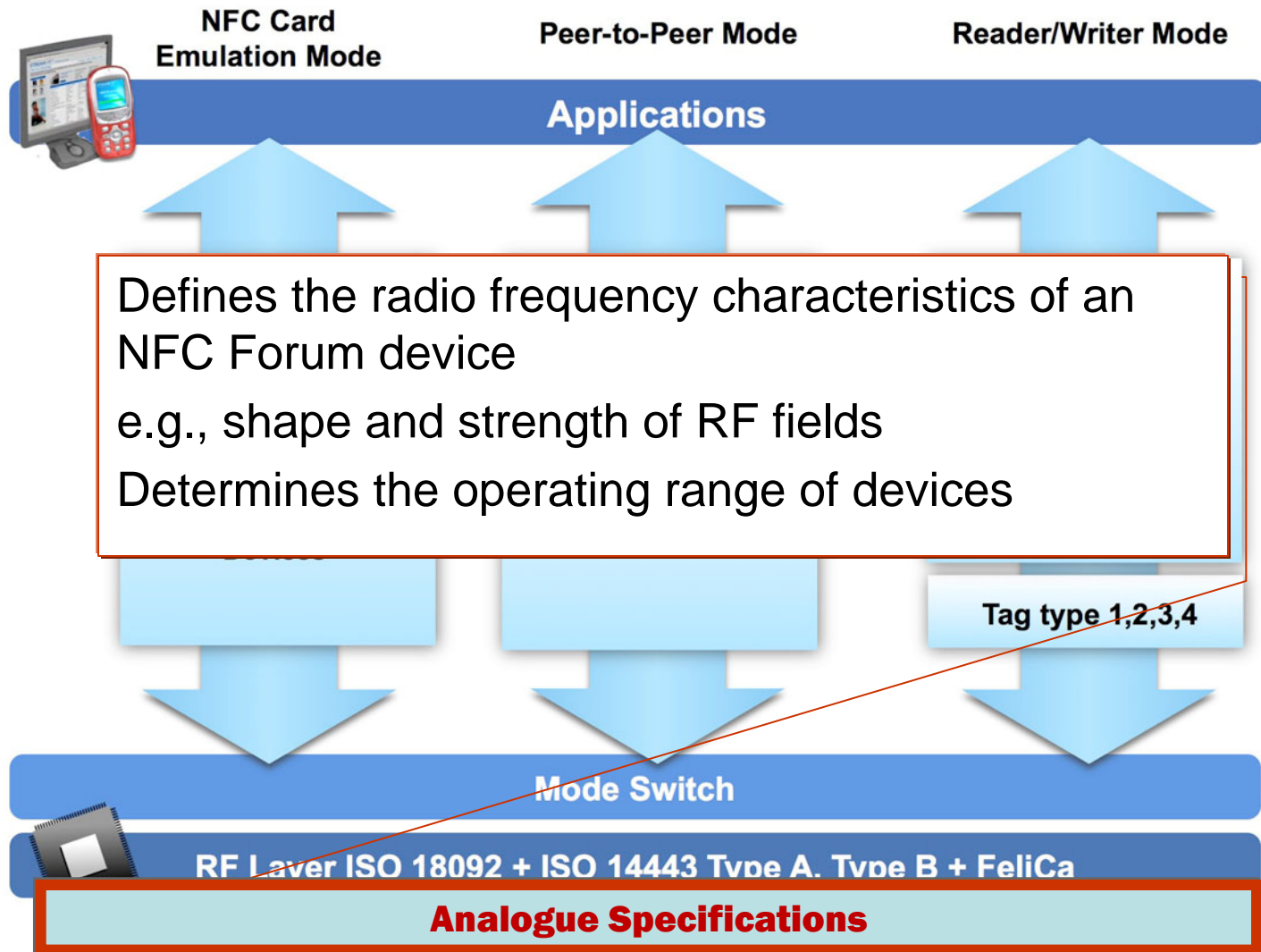


NFC Forum Technology Architecture

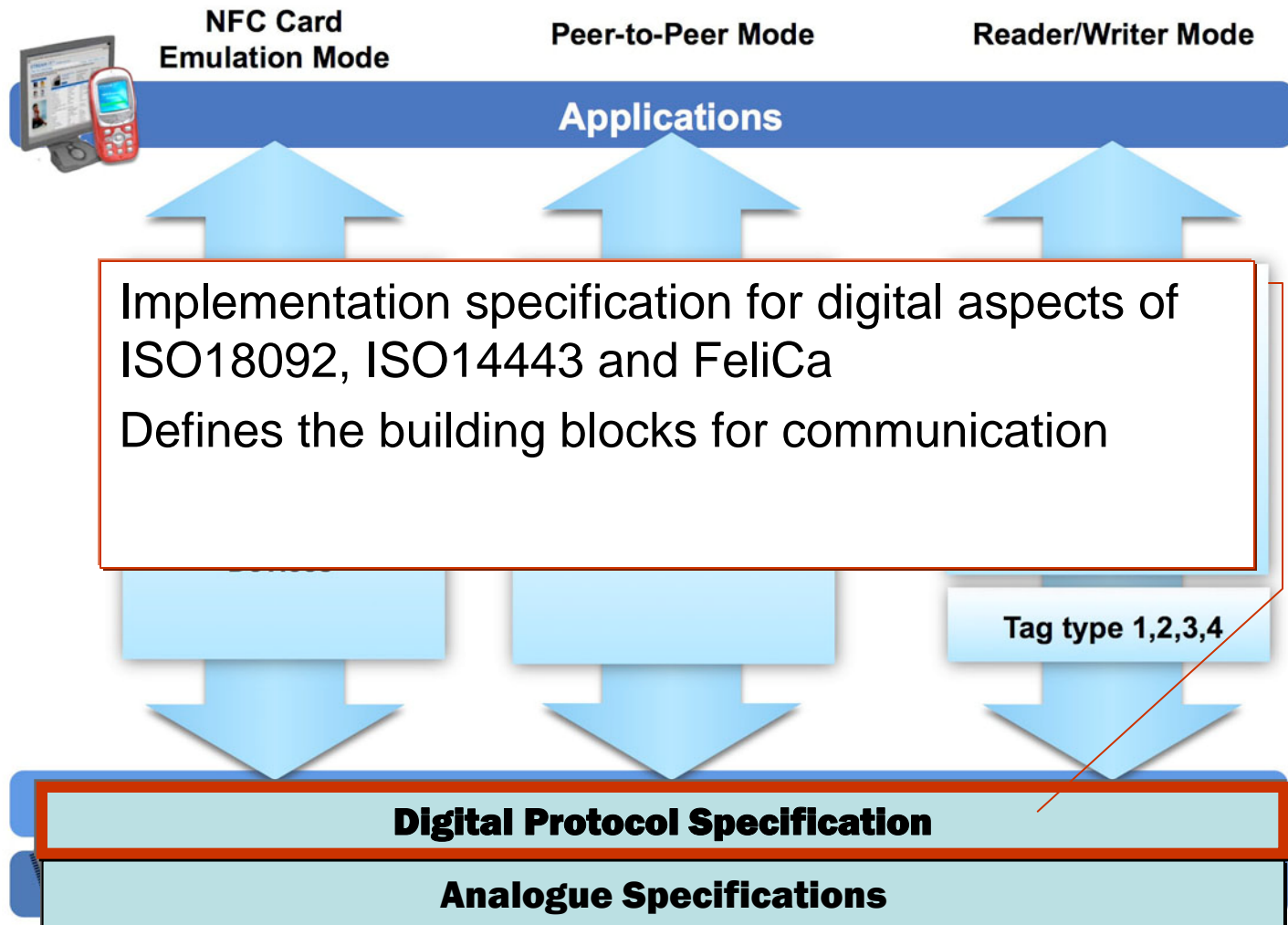


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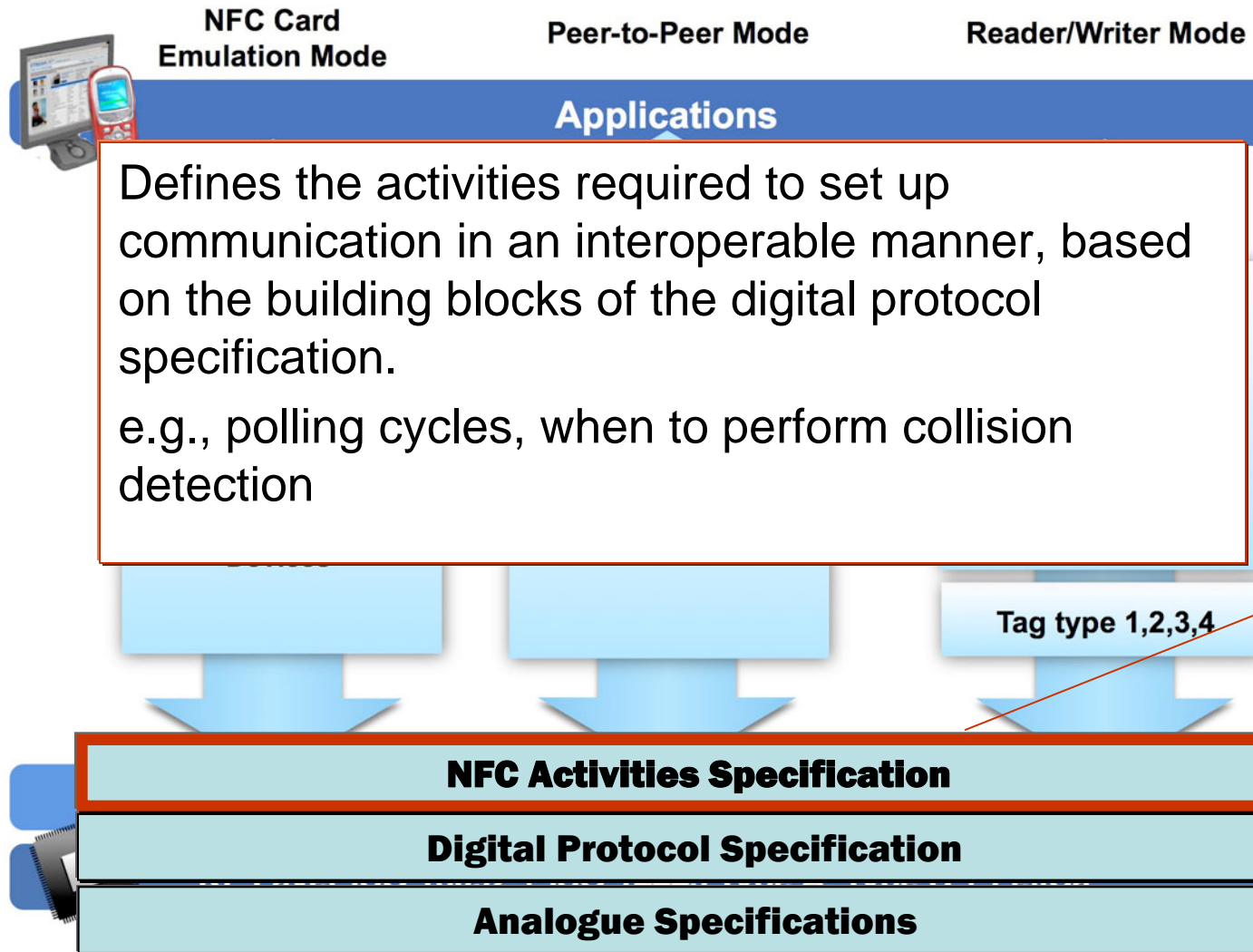
NFC Forum Technology Architecture



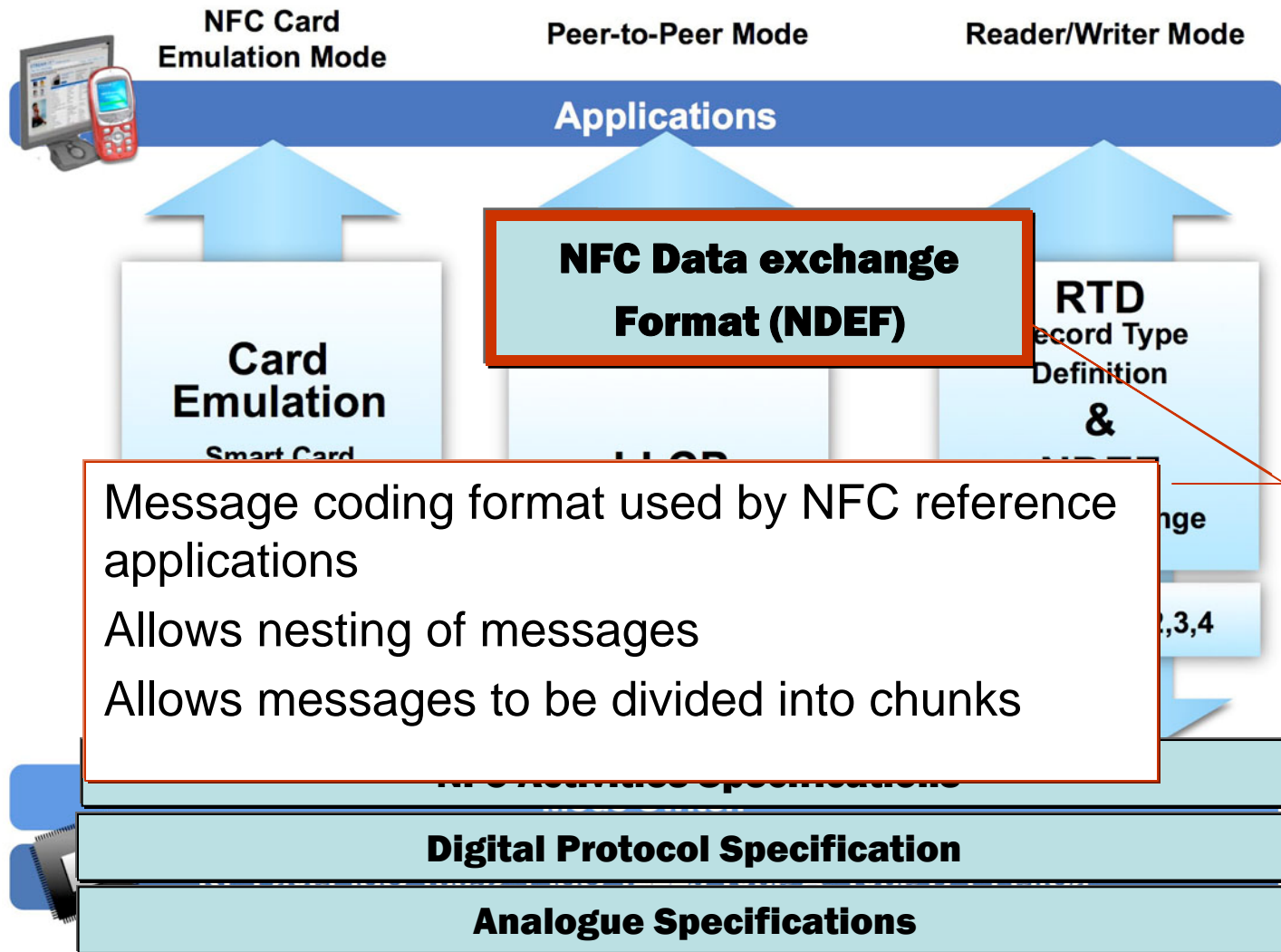
NFC Forum Technology Architecture



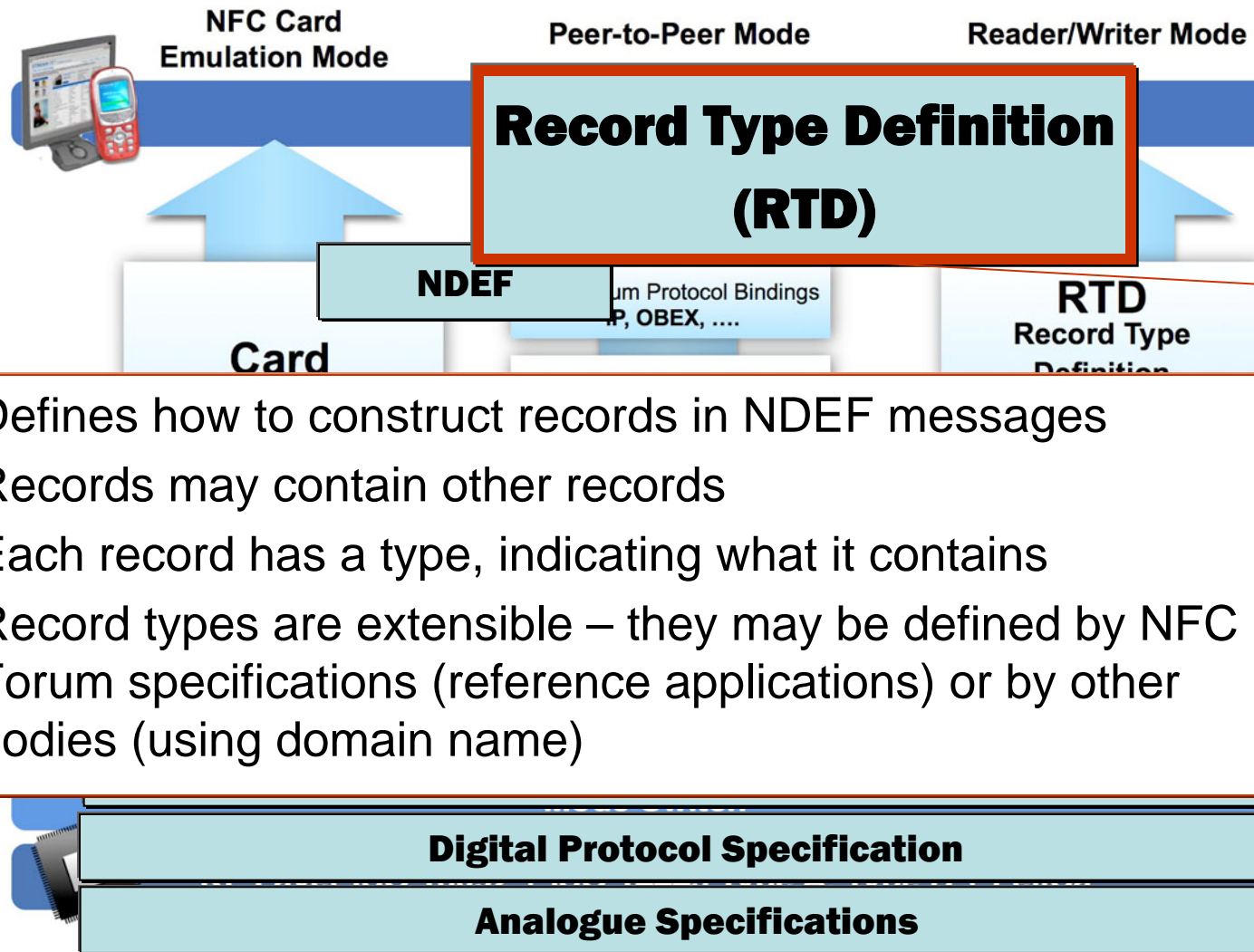
NFC Forum Technology Architecture



NFC Forum Technology Architecture

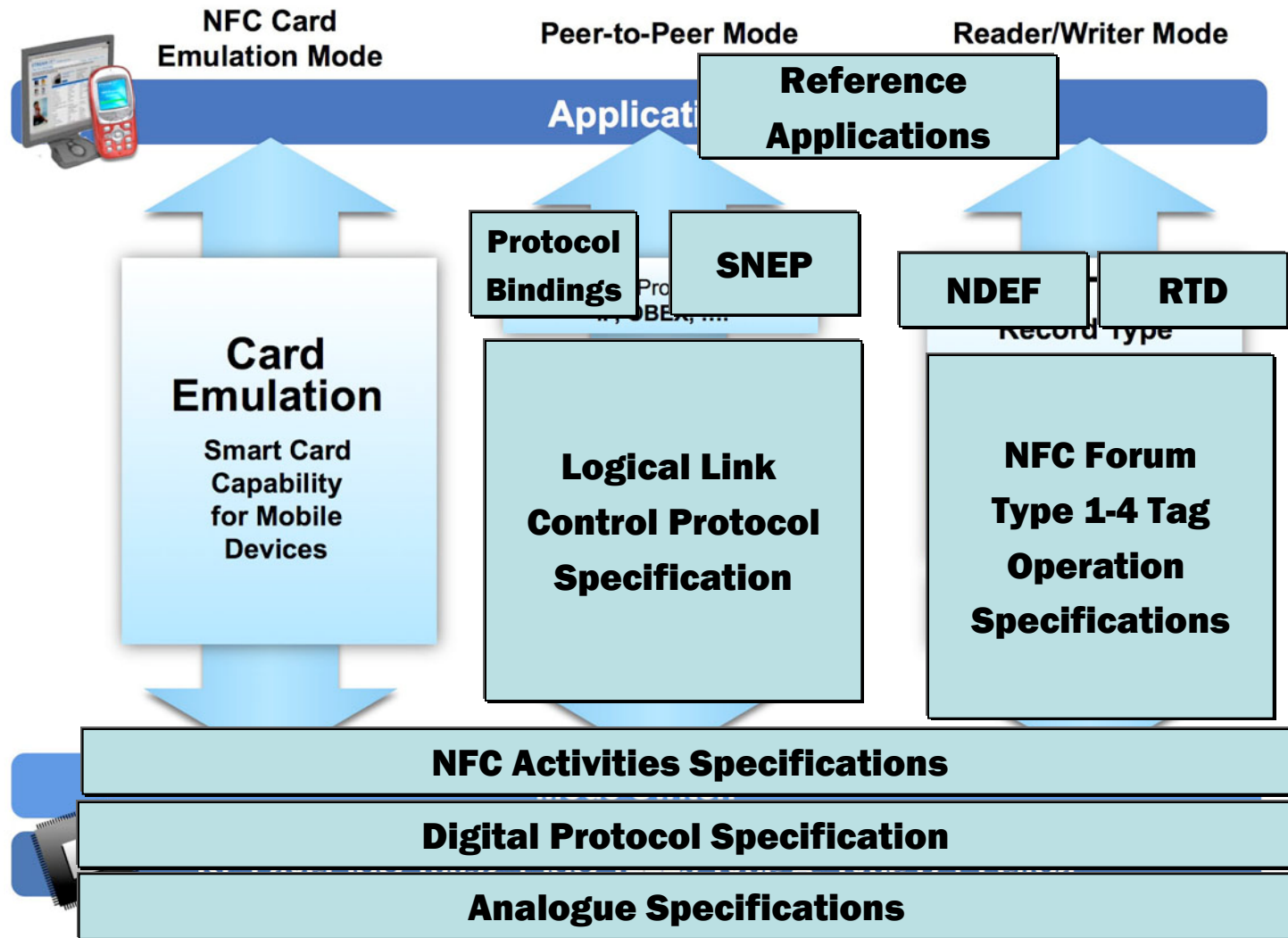


NFC Forum Technology Architecture



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)

NFC Forum Technology Architecture



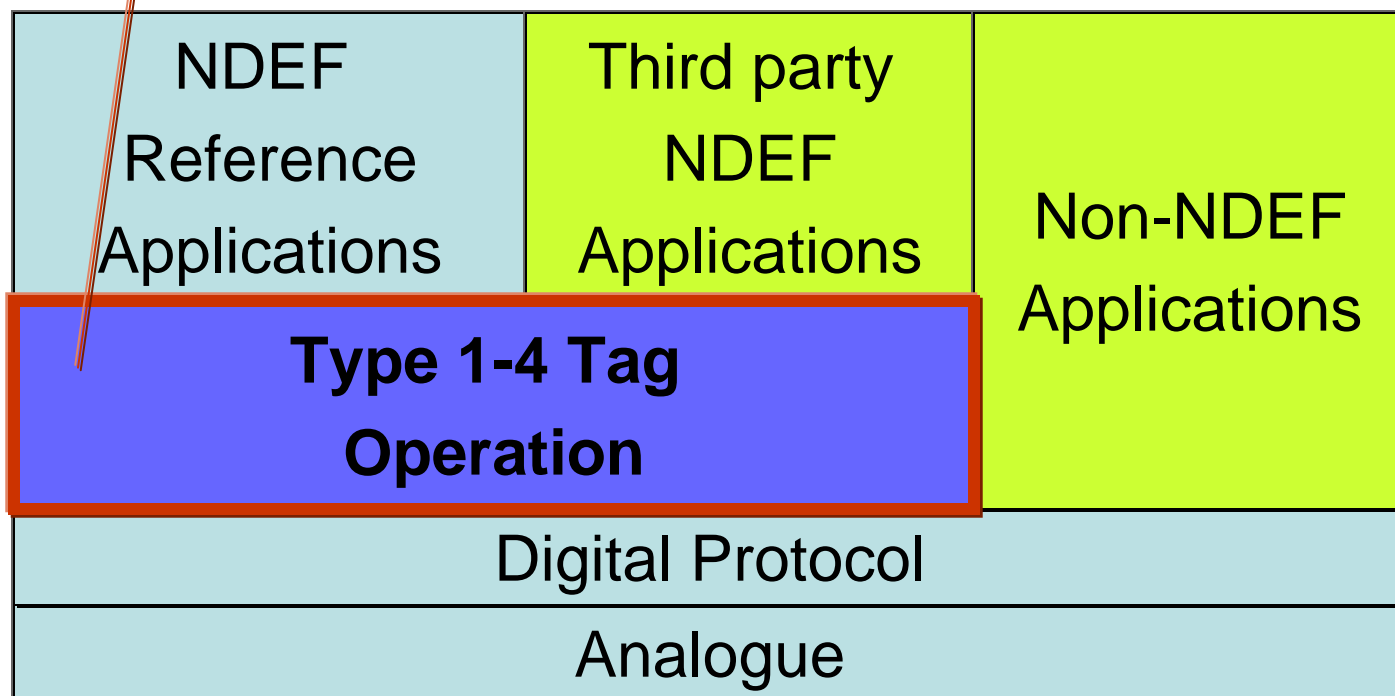
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Reader/Writer Mode

NDEF Reference Applications	Third party NDEF Applications	Non-NDEF Applications
Type 1-4 Tag Operation		
Digital Protocol		
Analogue		

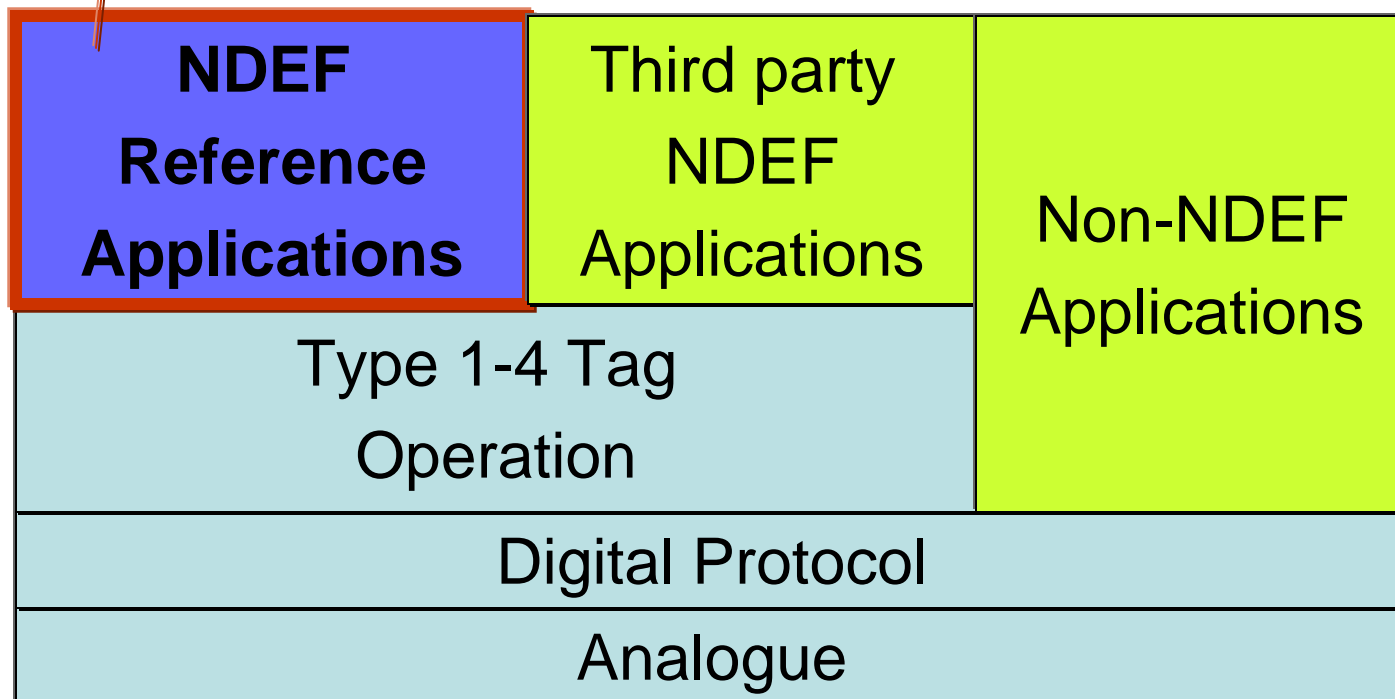
Reader/Writer Mode

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



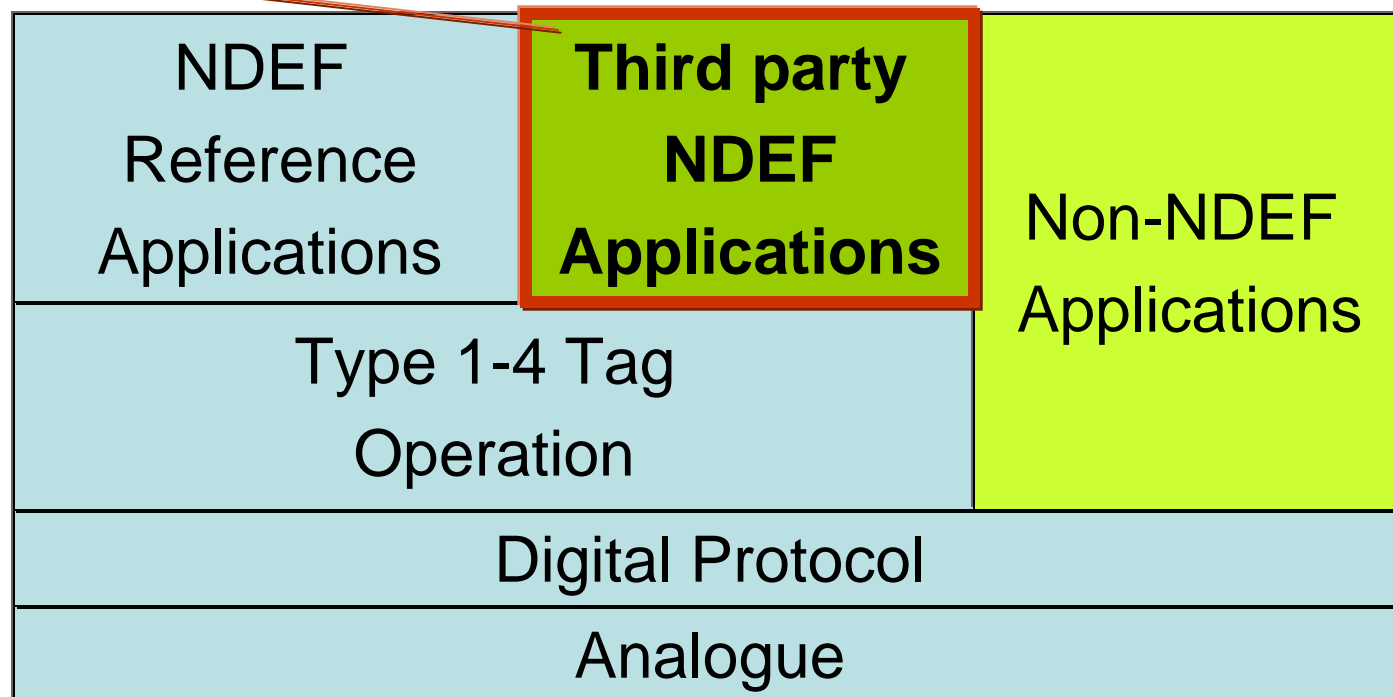
Reader/Writer Mode

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



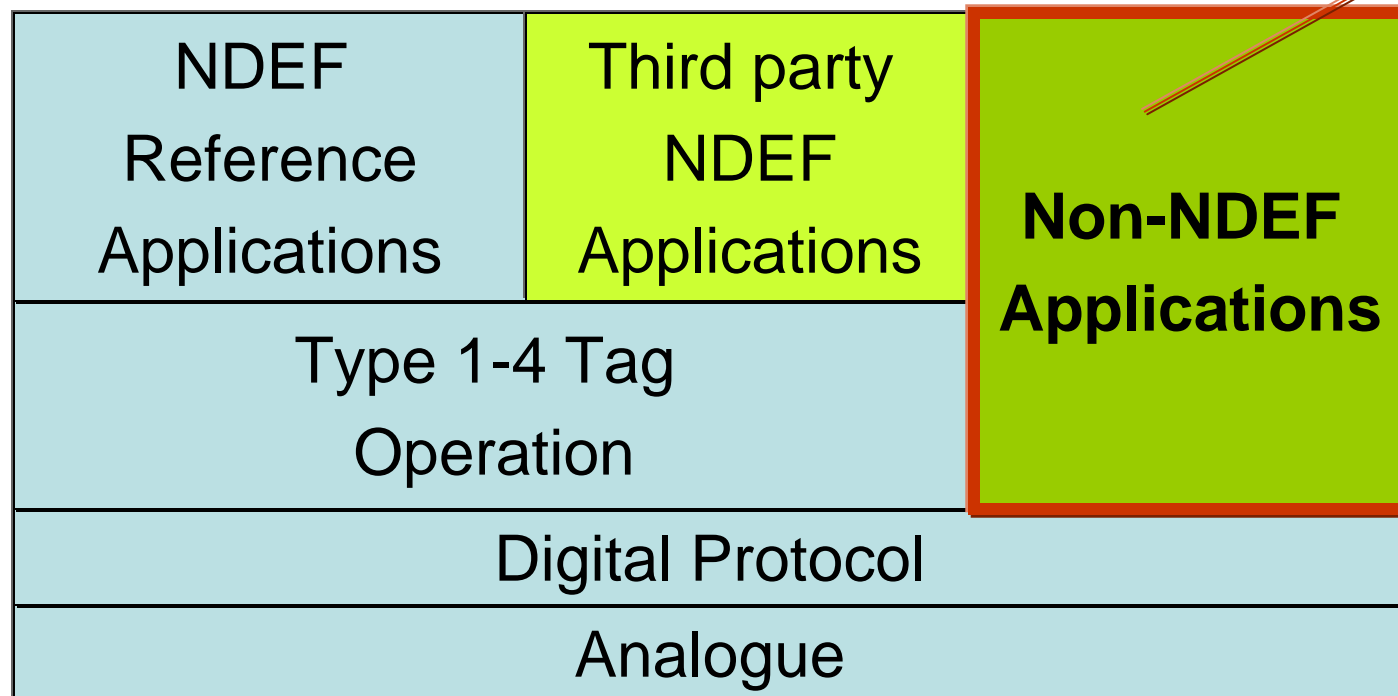
Reader/Writer Mode

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

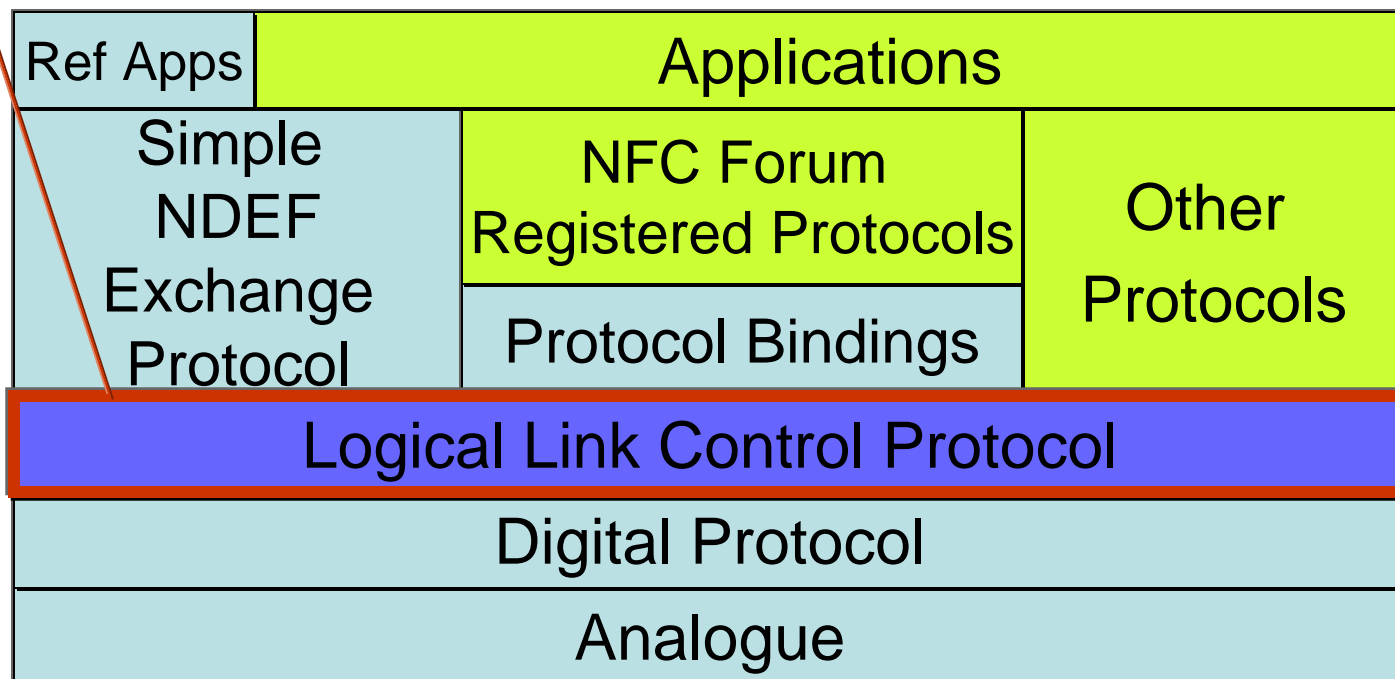


Peer-to-Peer Mode

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

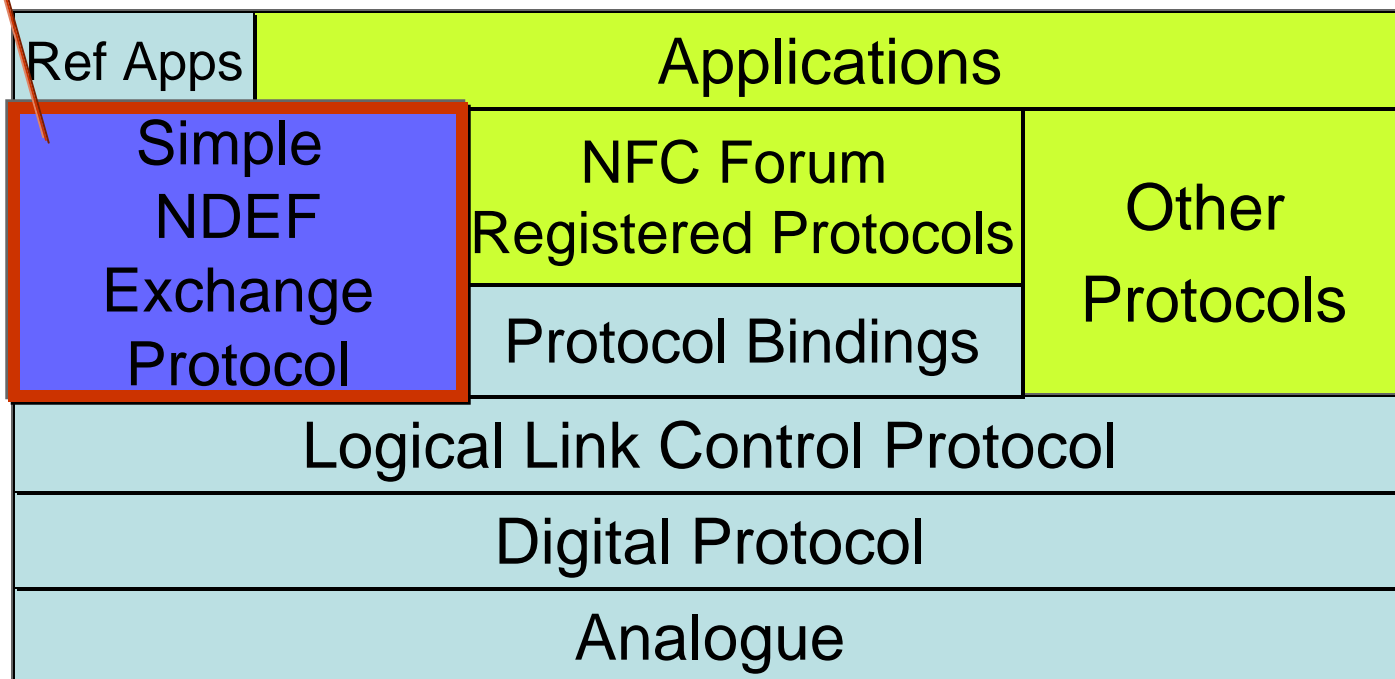
Peer-to-Peer Mode

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



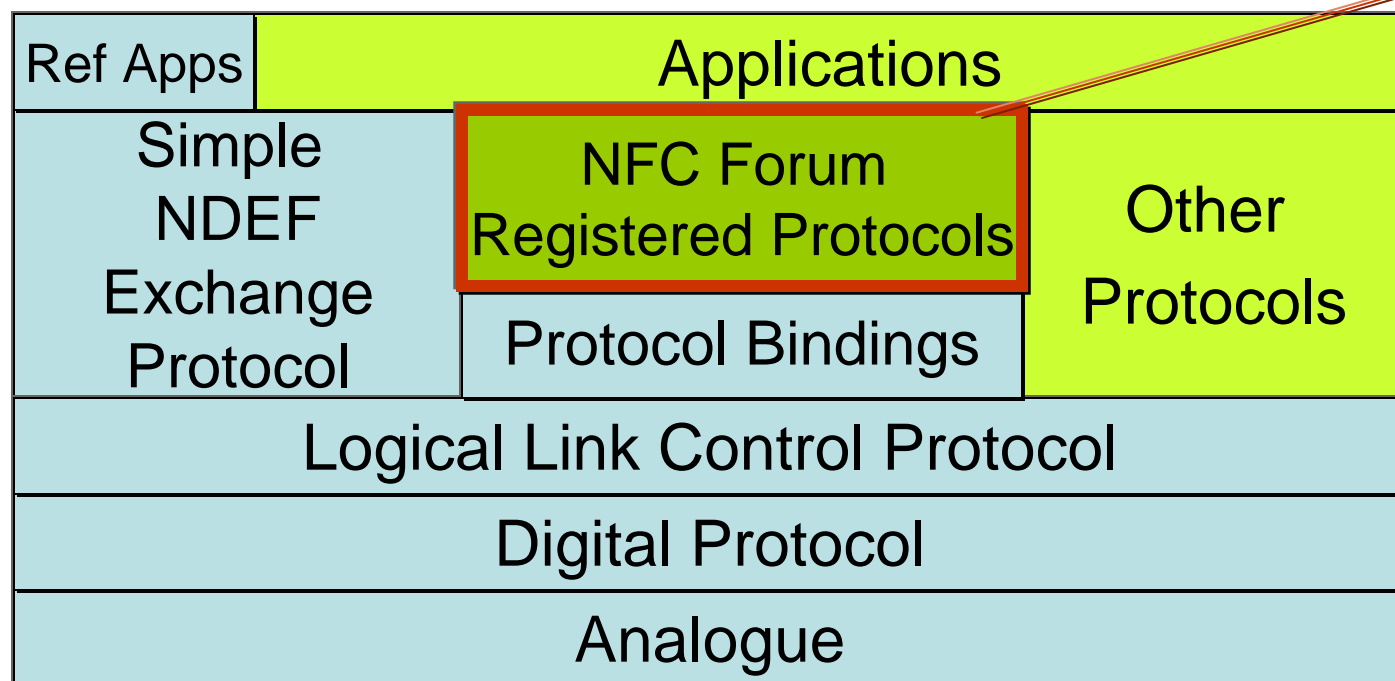
Peer-to-Peer Mode

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

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

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

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

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

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

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

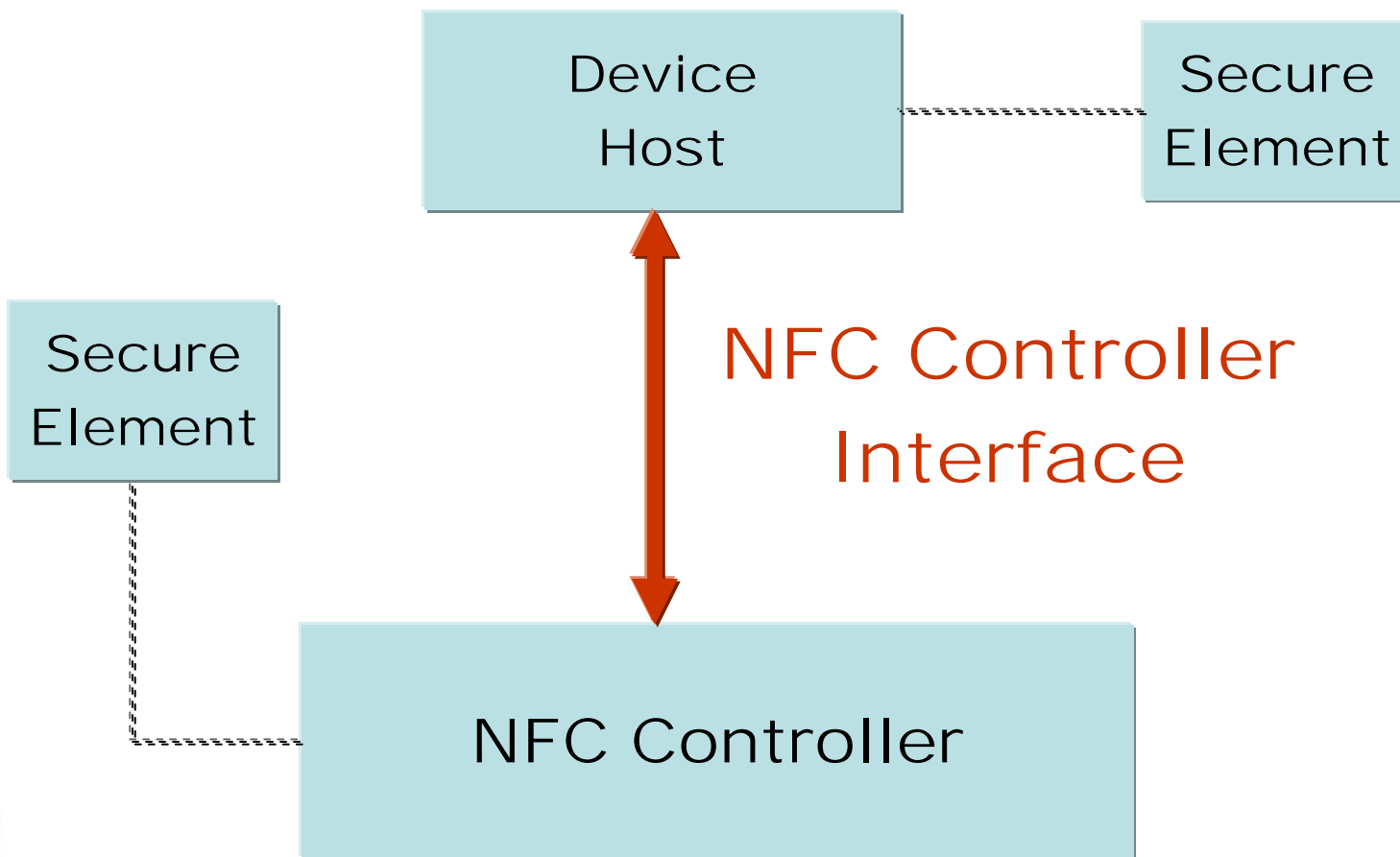
Proprietary contactless card applications
e.g., payment, ticketing, access control
Based on ISO 14443 A/B or FeliCa

Applications

Digital Protocol

Analogue

NFC Controller Interface



NFC Controller Interface

- NCI defines a logical interface between the device host and the NFC Controller
 - Agnostic to the physical interface (e.g., USB, I2C, etc)
- Architecture allows for other devices, such as secure elements, connected to NFC controller
 - NCI does not define the interface to these other devices

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
 - ISO/IEC 15693 – Vicinity
 - Out of scope of NFC Forum work

ETSI Standards

- ETSI TS 102 613 – Single Wire Protocol
 - Specification for the physical connection between UICC and Contactless Front end (CLF)
 - Out of scope of NFC Forum work
- ETSI TS 102 622 – Host Controller Interface
 - Complementary standard to NCI
 - Specific to the control of the CLF by the UICC

Completed Specifications

- Completed specifications are available on our website at no charge at <http://www.nfc-forum.org/specs/>
- Data Exchange
 - NFC Data Exchange Format (NDEF) Technical Specification
- Record Types
 - NFC Record Type Definition (RTD) Technical Specification
 - NFC Text RTD Technical Specification
 - NFC URI RTD Technical Specification
 - NFC Smart Poster RTD Technical Specification
 - NFC Generic Control RTD Technical Specification
- Tag Types
 - NFC Forum Types 1-4 Tag Operation Specifications
- Reference Applications
 - NFC Forum Connection Handover Candidate Technical Specification (candidate)

Work in Progress

- Specifications in progress
 - Digital Protocol Specification
 - NFC Activities Specification
 - LLCP
 - Signed NDEF RTD
 - Simple NDEF Exchange Protocol
 - NFC Controller Interface
 - Analog
- Check for updates at:
<http://www.nfc-forum.org/specs/>

Questions?

Submit questions using the chat box
at the top center of your screen

The NFC Forum

The mission of the NFC Forum is to advance the use of NFC technology by:

- Developing standards-based specifications that ensure interoperability among devices and services
- Encouraging the development of products using NFC Forum specifications
- Educating the market globally about NFC technology
- Ensuring that products claiming NFC capabilities comply with NFC Forum specifications

We do NOT sell NFC services or products!

Why Join?

- Gain an in-depth understanding of how NFC works and its many applications
- Influence how the technical specifications are written and get an advance look at how the technology will evolve
- Meet other organizations that are working with NFC and jointly find new uses for the technology to create new business opportunities
- Contribute your knowledge to build the infrastructure faster and more profitably
- Highlight your company as “tech savvy” and consumer friendly
- Create a platform to be represented at global trade shows, have speaking opportunities and participate in meetings

Upcoming NFC Forum Events

- NFC Forum at Mobile Internet World
 - October 22, Boston
- NFC Forum at Cartes
 - November 4-6, Paris
- NFC Webcast #3: Use Cases
 - November 17, *Register today!*
- NFC Forum Members Meeting
 - December 1-5, Monaco

2009 NFC Forum Global Competition

Watch www.nfc-forum.org for entry details

Awards Ceremony at WIMA, Monaco, April 2009

Want More Information? Visit www.nfc-forum.org

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