



Smart Poster Record Type Definition

Technical Specification

NFC Forum™

SPR 1.1

NFCForum-SmartPoster_RTD_1.0

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Contents

1 Overview	1
1.1 Objectives	1
1.2 Purpose	1
1.2.1 Mission Statement and Goals	1
1.3 Applicable Documents	1
1.4 Administration	2
1.5 Special Word Usage	2
1.6 Name and Logo Usage	2
1.7 Intellectual Property	3
1.8 Acronyms	3
2 Smart Poster	4
2.1 Introduction	4
3 NDEF Structure	5
3.1 Messaging Sequence	5
3.2 Records Mapping	5
3.2.1 Syntax	5
3.2.2 Structure	5
3.3 List of Records	6
3.3.1 The URI Record	6
3.3.2 The Title Record	6
3.3.3 The Recommended Action Record	6
3.3.4 The Icon Record	7
3.3.5 The Size Record	7
3.3.6 The Type Record	8
3.4 Dependencies	8
A. Examples	9
B. Revision History	12

Tables

Table 1. Acronyms	3
Table 2. Action Record Values	6
Table 3. The Size Record Layout	7
Table 4. Example for a Simple URI	9
Table 5. Example for a Complex URI	10
Table 6. Revision History	12

1 Overview

The Smart Poster Record Type Definition defines an NFC Forum Well-known Type on how to put URLs, SMSs, or phone numbers on an NFC Forum Tag or how to transport them between devices.

1.1 Objectives

The objective of this document is to function as a normative reference to the Smart Poster RTD.

1.2 Purpose

1.2.1 Mission Statement and Goals

The URI RTD specifies a way to mark different kinds of URIs and IRIs, but often you need a way to associate metadata with the URI. The purpose of the Smart Poster RTD is to provide the necessary wrapper to fulfill the Smart Poster use case, as defined by the NFC Forum.

In the Smart Poster use case, information about an object, event, etc, is somehow attached onto a physical object. The typical example is a movie poster which contains a tag with the Smart Poster record. When the user touches it with his NFC-enabled device (such as a cell phone or a PDA), a browser window opens and the device connects to the Internet to fetch that data. Another possibility might be that the device (if it's a cell phone) sends an SMS to a number defined on the tag to access some value-added service.

The design goal of the Smart Poster was to provide a simple way to access a remote service by using the touch paradigm.

1.3 Applicable Documents

[JPEG]	E. Hamilton: "JPEG File Interchange Format (version 1.02)". September 1, 1992. http://www.w3.org/Graphics/JPEG/
[NDEF]	"NFC Data Exchange Format Specification", NFC Forum, 2006.
[NFC RTD]	"NFC Record Type Definition (RTD) Specification", NFC Forum, 2006.
[PNG]	"Portable Network Graphics (PNG) Specification (Second Edition)". W3C Recommendation, 10 November 2003. http://www.w3.org/TR/PNG/
[RFC 2119]	S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, Harvard University, March 1997. http://www.apps.ietf.org/rfc/rfc2119.html
[RFC 2046]	N. Freed, N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types" RFC 2046, Innosoft, First Virtual, November 1996.
[RFC 3986]	T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax", RFC 3986, MIT/LCS, U.C. Irvine, Xerox Corporation, January 2005. http://www.apps.ietf.org/rfc/rfc3986.html
[TEXT]	"NFC Text RTD Specification", NFC Forum, 2006.
[URI]	"URI RTD Specification", NFC Forum, 2006.

[URI SCHEME] List of Uniform Resource Identifier (URI) schemes registered by IANA is available at:<http://www.iana.org/assignments/uri-schemes>

1.4 Administration

The NFC Forum Data Exchange Format Specification is an open specification supported by the Near Field Communication Forum, Inc., located at:

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The Devices technical working group maintains this specification.

[List of participating companies in working group goes in this section.]

1.5 Special Word Usage

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in RFC 2119.

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1.7 Intellectual Property

The Smart Poster Record Type Definition Specification conforms to the Intellectual Property guidelines specified in the NFC Forum's Intellectual Property Right Policy, as approved on November 9, 2004 and outlined in the NFC Forum Rules of Procedures, as approved on December 17, 2004.

1.8 Acronyms

This section defines all relevant acronyms used in this specification.

Table 1. Acronyms

Acronyms	Definition
NDEF	NFC Data Exchange Format
URI	Uniform Resource Identifier
URL	Uniform Resource Locator (this is a special case of an URI)
RFU	Reserved for Future Use
RTD	Record Type Description

2 Smart Poster

2.1 Introduction

The Smart Poster is one of the key use cases for NFC technology. The idea is that an object can be made “smart”, i.e., it is capable of storing additional information about itself in the form of an NFC Forum Tag. By touching an NFC Forum Device to the tag, this information can be read and displayed to the user.

The Smart Poster can also contain *actions* that will trigger an application in the device; for example, launching a browser to view a web site, or sending an SMS to a premium service to receive a ring tone.

The Smart Poster concept is built around URIs (Uniform Resource Identifiers [RFC 3986]), which have become the standard for referencing information around the Internet. URIs are very powerful, and they can represent anything from unique identifiers to EPC codes to web addresses to SMS messages to phone calls and beyond. The Smart Poster Record defines a superstructure that associates a URI with various types of metadata.

3 NDEF Structure

3.1 Messaging Sequence

There is no specific messaging sequence, as the information is just read and acted upon. The receiving device is not assumed to reply to the source device.

3.2 Records Mapping

3.2.1 Syntax

The content of a Smart Poster payload is an NDEF message. The contents of this message consist of several NDEF records. The Smart Poster can have zero, one, or more of the following components:

- **The Title record** for the service (there can be many of these in different languages, but a language **MUST NOT** be repeated). This record is optional.
- **The URI record**. This is the core of the Smart Poster, and all other records are just metadata about this record. There **MUST** be one URI record and there **MUST NOT** be more than one.
- **The Action record**. This record describes how the service should be treated. For example, the action may indicate that the device should save the URI as a bookmark or open a browser. The Action record is optional. If it does not exist, the device may decide what to do with the service. If the action record exists, it should be treated as a strong suggestion; the UI designer may ignore it, but doing so will induce a different user experience from device to device.
- **The Icon record**. A Smart Poster may include an icon by including one or many MIME-typed image records within the Smart Poster. If the device supports images, it **SHOULD** select and display one of these, depending on the device capabilities. The device **SHOULD** display only one. The Icon record is optional.
- **The Size record**. If the URI references an external entity (e.g., by URL), the Size record may be used to tell how large the object is. This is useful if the reader device needs to decide in advance whether it has the capability to process the referenced object. The Size record is optional.
- **The Type record**. If the URI references an external entity (e.g., via a URL), the Type record may be used to declare the MIME type of the entity. This can be used to tell the mobile device what kind of an object it can expect before it opens the connection. The Type record is optional.

There **MAY** be other records, which can be treated in an application-specific manner. For example, some application might include a vCard contact card using the proper MIME type. Applications **MAY** ignore any extra records inside the Smart Poster.

The Well-known Type for the Smart Poster record type is “Sp” (in NFC binary encoding: 0x53, 0x70)

3.2.2 Structure

The Smart Poster RTD does not assume any particular order for the NDEF records inside the master record.

3.3 List of Records

3.3.1 The URI Record

There is only one URI record per Smart Poster record. This is also the only mandatory record within a Smart Poster.

The device is not required to support any particular URI protocol, but if the device does not support the referenced protocol, it **MUST** discard the entire Smart Poster record.

3.3.2 The Title Record

The Title record is an instance of a Text RTD Record [TEXT]. There **MAY** be an arbitrary number of title records in the Smart Poster. However, there **MUST NOT** be two or more records with the same language identifier.

The Title record **SHOULD** be shown to the user.

NOTE TO IMPLEMENTERS: The implementer should be aware of the fact that by putting malicious information to the Title record and thus misrepresenting the service, it might be possible to fool the user into thinking that the tag contents might be something else entirely. This is a so-called *phishing* technique. For example, if the Title record contains the text “http://www.internetbanking.com”, and the URI record the text “http://myevilsite.com”, the user might be fooled into giving his banking information, if the Title record is the only one that is shown to the user.

3.3.3 The Recommended Action Record

The Action record is a Local Type specific to the Smart Poster. It suggests a course of action that the device should do with the content. The syntax is as follows:

The NFC Local Type Name for the action is “act” (0x61 0x63 0x74). The action record is defined as having a local scope only, and therefore it has meaning only within a Smart Poster record. A lone “act” –record **SHALL** be considered an error.

The content is a single byte, which **SHALL** be interpreted as follows:

Table 2. Action Record Values

Value	Action
0	Do the action (send the SMS, launch the browser, make the telephone call)
1	Save for later (store the SMS in INBOX, put the URI in a bookmark, save the telephone number in contacts)
2	Open for editing (open an SMS in the SMS editor, open the URI in an URI editor, open the telephone number for editing).
3..FF	RFU

The device **MAY** ignore this suggestion. The default (i.e., the Action record is missing from the Smart Poster) is not defined. For example, the device might show a list of options to the user.

If the device encounters a value marked as RFU, it MAY treat it as value zero, or ignore the entire “act” record.

3.3.4 The Icon Record

The Smart Poster may also contain a number of Icon records that have an image NDEF MIME type [NDEF], [RFC2046]. For example, “image/jpeg”, “image/png”, etc. There might also be animated Icon records, using common media types such as “video/mpeg”. A reader device SHOULD display one (and only one) of these Icons to the user prior to acting on the URI record.

A reader device is not required to support any particular image format, but it is RECOMMENDED that implementers stick to well-known, well-compressed formats such as PNG [PNG] and JPEG [JPEG].

3.3.5 The Size Record

The Size Record contains a four-byte, 32-bit, unsigned integer, which contains the size of object that the URI field refers to. Note that in practice this is limited to URLs (http://, ftp:// and similar).

The Size Record’s Local Type Name is “s”.

The size is expressed in network byte order (most significant byte first).

Table 3. The Size Record Layout

0	1	2	3
Byte 0	Byte 1	Byte 2	Byte 3

For example, if Byte 0 contains 0x12, Byte 1 contains 0x34, Byte 2 contains 0x56, and Byte 3 0x78, the size of the referred object is 0x12345678 bytes.

The size record MAY be used by the device to determine whether it can accommodate the referenced file or not. For example, an NFC tag could trigger the download of an application to a cell phone. Using a combination of the Type Record and the Size Record, the mobile phone could determine whether it can accommodate such a program or not.

The Size Record is for informational purposes only. Since the object size in the network may vary (for example, due to updates), this value should be used as a guideline only.

The Size Record is optional to support.

3.3.6 The Type Record

The Payload of the Type Record is a UTF-8–formatted string that describes a MIME type [RFC 2046] which describes the type of the object that can be reached through the URI. (In practice this is limited to URLs only, much like the Size Record.)

The Local Type Name for the Type Record is “t”.

The length of the payload string is the same as the length of the payload, so there is no need for separate length information or termination.

The Type Record MAY be used by the device to determine whether it can process the referenced file or not. For example, an NFC tag could trigger a media file playback from an URL. If the Type Record references an unknown media type, the reader device (e.g. a cell phone) does not need to even initiate the playback.

The Type Record is optional to support.

3.4 Dependencies

If an NDEF message contains one or multiple URI [URI] records in addition to the Smart Poster record at the top level (i.e., not nested), the Smart Poster record overrides them. The NDEF application MUST use only the Smart Poster record.

A. Examples

The following examples display a full NDEF message, as if it was read from a tag or received from another NFC device. The bit combination in the NDEF header may vary if you are embedding the Smart Poster in some other NDEF message.

A.1 Simple URI on a Tag

The contents of the record would look like this (total length 23 bytes).

Table 4. Example for a Simple URI

Offset	Content	Length	Explanation
0	0xD1	1	NDEF header. TNF = 0x01 (Well Known Type). SR=1, MB=1, ME=1
1	0x02	1	Record name length (2 bytes)
2	0x12	1	Length of the Smart Poster data (18 bytes)
3	“Sp”	2	The record name
5	0xD1	1	NDEF header. TNF = 0x01, SR=1, MB=1, ME=1
6	0x01	1	Record name length (1 byte)
7	0x0E	1	The length of the URI payload (14 bytes)
8	“U”	1	Record type: “U”
9	0x01	1	Abbreviation: “http://www.”
10	“nfc-forum.org”	13	The URI itself.

A.2 A URI with a Title and Launching a Browser

In this example, the NDEF message consists of an action record, and it also has two title records to be displayed. It is up to the device to decide which title record to show. For example, if the current locale of the device is Finnish, then a well-designed device would show the Finnish language version of the text; otherwise, it would default to English.

This example displays the use of the non-short message format, even if strictly speaking it is not necessary due to the short lengths of the things involved. You can mix short and long records.

The contents of the NDEF message would be as follows (total length 69 bytes):

Table 5. Example for a Complex URI

Offset	Content	Length	Explanation
0	0xD1	1	NDEF header. TNF = 0x01 (Well Known Type). SR=1, MB=1, ME=1
1	0x02	1	Record name length (2 bytes)
2	0x49	1	Length of the Smart Poster data (73 bytes)
3	“Sp”	2	The record name
5	0x81	1	NDEF header. TNF = 0x01, SR=0, MB=1, ME=0
6	0x01	1	Record name length (1 byte)
7	0x00, 0x00, 0x00, 0x0E	4	The length of the URI payload (14 bytes) (long format)
11	“U”	1	Record type: “U”
12	0x01	1	Abbreviation: “http://www.”
13	“nfc-forum.org”	13	The URI itself.
26	0x11	1	NDEF record header (SR=1, TNF=0x01)
27	0x03	1	The length of the record name
28	0x01	1	The length of the “act” payload.
29	“act”	3	Record type: “act”
32	0x00	1	Action = Launch browser
33	0x11	1	NDEF record header (SR=1, TNF=0x01)
34	0x01	1	Length of the record name
35	0x12	1	Length of the record payload (18 bytes)
36	“T”	1	Record type: “T” (=Text)
37	0x05	1	Status byte for the Text (UTF-8, five-byte code)
38	“en-US”	5	ISO Language code: US-English
43	“Hello, world”	12	The text: “Hello world”, encoded in UTF-8.

Offset	Content	Length	Explanation
55	0x51	1	NDEF record header (SR=1, TNF= 0x01, ME=1)
56	0x01	1	Record name length
57	0x13	1	Length of the Text payload (19 bytes)
58	“T”	1	The name of the Text record (“T”)
59	0x02	1	Status byte: UTF-8, two-byte language code
60	“fi”	2	ISO two-character language code: Finnish
62	“Morjens, maailma”	16	The text “Morjens, maailma” encoded in UTF-8

B. Revision History

The following table outlines the revision history of Smart Poster Record Type Definition.

Table 6. Revision History

Document Name	Revision and Release Date	Status	Change Notice	Supersedes
NFCForum-SmartPoster_RTD_1.0	1.0, July 2006	Final	None	