

# **The State of Android Near Field Communication 2010**

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# Introduction

## Scope

With Android version 2.3 (Gingerbread) Google introduced Near Field Communication (NFC) support. This report is intended to give the reader a understanding of current situation and what might be expected within the near future regarding Android and NFC.

## Terminology

NFC – Near Field Communication

API – Application Programming Interface

NDEF - NFC Data Exchange Format

## Hardware Support

As of now there is only one Android phone on the market that supports NFC and that is Google's own *Nexus S*.

### Nexus S

The phone is manufactured by Samsung and is very similar to the Samsung Galaxy S. This leads to strong speculations that Samsung will include NFC in their future products if there is market incentive.

There has been speculations about the write capability of the Nexus S hardware and that a later release might add support for writing to tags as well.

## Software Support

Google released Android version 2.3, called *Gingerbread*, in December 2010. The NFC API only supports reading of tags, not writing.

The API states support for NFC Data Exchange Format (NDEF) messages encoded according to NFC Forum Type 2 specifications [1].

The NFC scanning is user-optional always on. Any application may listen for an [ACTION\\_TAG\\_DISCOVERED](#) intent to take actions once a tag has been read.

This means that the user does not need to start any specific application before physically scanning a tag. This is a major improvement over QR-codes that need a special application to run in the foreground.

Below are two tables that describes the currently supported NDEF messages [2].

Record Type Definitions	Description
<a href="#">RTD_ALTERNATIVE_CARRIER</a>	RTD Alternative Carrier type.
<a href="#">RTD_HANDOVER_CARRIER</a>	RTD Handover Carrier type.

<a href="#">RTD_HANOVER_REQUEST</a>	RTD Handover Request type.
<a href="#">RTD_HANOVER_SELECT</a>	RTD Handover Select type.
<a href="#">RTD_SMART_POSTER</a>	RTD Smart Poster type.
<a href="#">RTD_TEXT</a>	RTD Text type.
<a href="#">RTD_URI</a>	RTD URI type.

Type Name Format	Description
<a href="#">TNF_ABSOLUTE_URI</a>	Indicates the type field contains a value that follows the absolute-URI BNF construct defined by RFC 3986.
<a href="#">TNF_EMPTY</a>	Indicates no type, id, or payload is associated with this NDEF Record.
<a href="#">TNF_EXTERNAL_TYPE</a>	Indicates the type field contains a value that follows the RTD external name specification.
<a href="#">TNF_MIME_MEDIA</a>	Indicates the type field contains a value that follows the media-type BNF construct defined by RFC 2046.
<a href="#">TNF_UNCHANGED</a>	Indicates the payload is an intermediate or final chunk of a chunked NDEF Record.
<a href="#">TNF_UNKNOWN</a>	Indicates the payload type is unknown.
<a href="#">TNF_WELL_KNOWN</a>	Indicates the type field uses the RTD type name format.

When looking into the framework source code we come across the following declarations that might provide the supported types of cards. Please note that this information is not passed to applications but only shows up in logs from the lower JNI layer. [4]

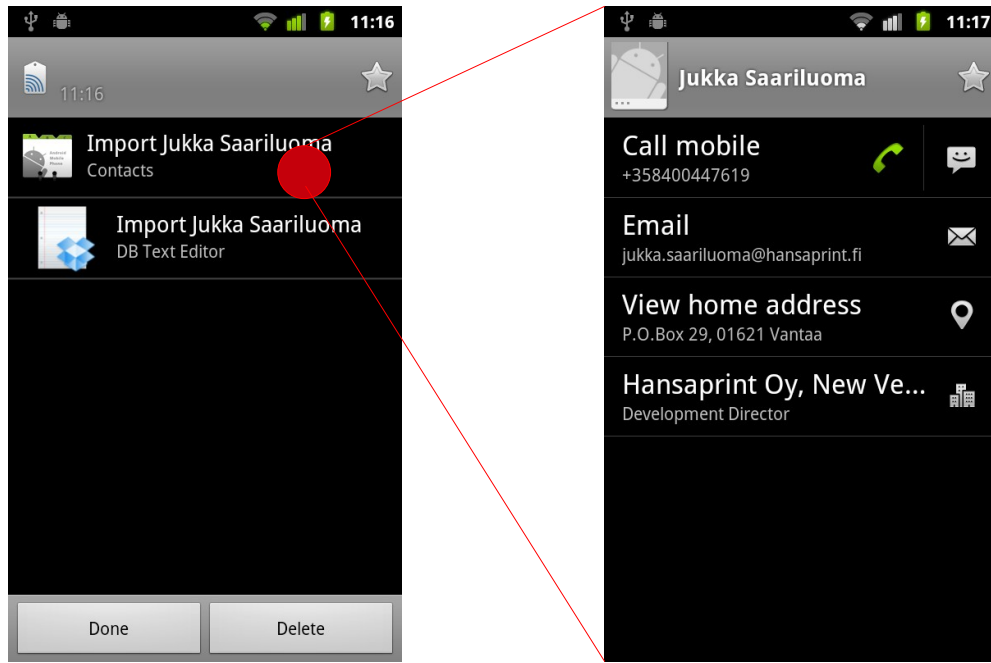
```
/* Name strings for target types */
#define TARGET_TYPE_ISO14443_3A    "Iso14443-3A"
#define TARGET_TYPE_ISO14443_3B    "Iso14443-3B"
#define TARGET_TYPE_ISO14443_4    "Iso14443-4"
#define TARGET_TYPE_ISO15693       "Iso15693"
#define TARGET_TYPE_MIFARE_UL      "MifareUL"
#define TARGET_TYPE_MIFARE_1K      "Mifare1K"
#define TARGET_TYPE_MIFARE_4K      "Mifare4K"
#define TARGET_TYPE_MIFARE_DESFIRE "MifareDESFIRE"
#define TARGET_TYPE_MIFARE_UNKNOWN "Unknown Mifare"
#define TARGET_TYPE_FELICA         "Felica"
#define TARGET_TYPE_JEWEL          "Jewel"
#define TARGET_TYPE_UNKNOWN        "Unknown Type"
```

Further investigation finds three different modes of communication. *P2P*, *Tag* and *LLCP*. Currently only *Tag* is documented. [4]

## Use Cases

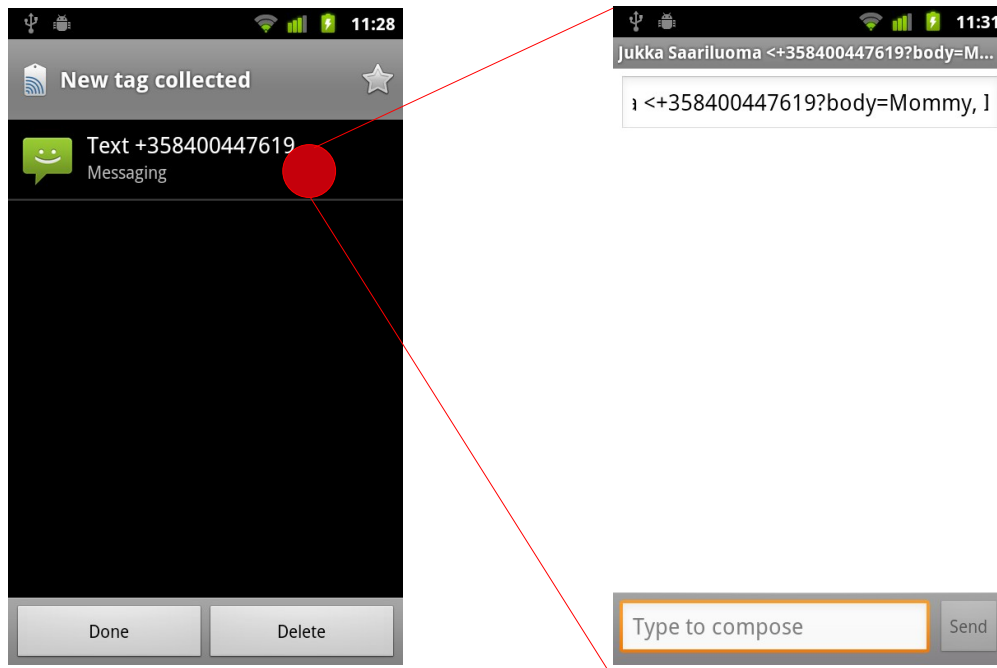
### ***Business Card***

Scanning a VCARD automatically brings up the *Tags* application included with Android 2.3 as shown to the left in the picture below. Tapping the "Import ..." brings up the *Contacts* application and let the user make further actions.



## Action Tag

Scanning the tag should start some sort of action. Here is an example of a tag containing sms-action, phone number and text.



Please note that the text is not correctly parsed as message text but is still in the to-field.

## The Future

If there is enough incentive Android might get tag write/modify capabilities. [3]

There is more functionality than is presently documented. P2P and LLCP communication is very likley to get introduced during 2011.

## References

- [1] <http://developer.android.com/reference/android/nfc/package-summary.html>
- [2] <http://developer.android.com/reference/android/nfc/NdefRecord.html>
- [3] <http://www.nearfieldcommunicationsworld.com/2010/04/23/33506/multiple-nfc-enabled-android-handsets-to-arrive-from-late-2010/>
- [4] Android source code