Transmission of IPv6 Packets over Near Field Communication

draft-ietf-6lo-nfc-14 & 15
(Since the reviews of 1st TELECHAT)

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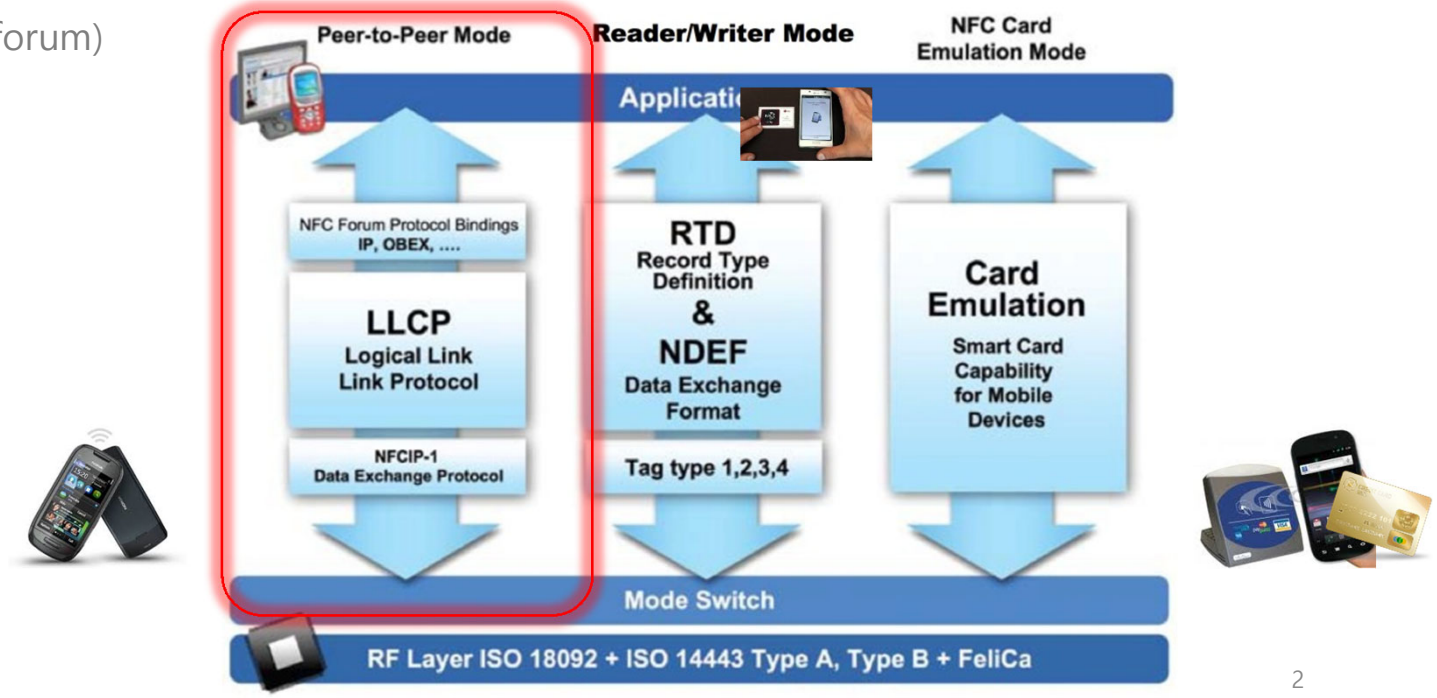
6lo WG Meeting@IETF105 – Montreal, Canada
2019. 7. 22.

What is Near Field Communication (NFC) ?

- NFC technology enables (Source: NFC Forum)
  - simple and safe two-way interactions between electronic devices, allowing consumers to perform contactless transactions, access digital content, and connect electronic devices with a single touch.
- NFC Functions

(Source: NFC forum)



History and status of IPv6-over-NFC

- **WG Adoption: draft-ietf-6lo-nfc-00** (Mar 03, 2015)
  - Update Stateless address autoconfiguration

- **1st ~ 5th Revision**
  - **ver-01** (July, 2015)
    - MAC PDU size and MTU
    - SLAAC and IPv6 link local address
    - Fragmentation and Reassembly
  - **ver-02** (Oct, 2015) @Buenos Aires
    - Dispatch Header (added)
    - Header Compression (modified for GHC)
  - **ver-03** (Apr. 2016) @Berlin, DE
    - Some typos fixed
    - Section 7. Security Considerations
  - **Ver-04** (Jul. 2016)
    - NFC FAR-related sentence updated
    - Related to "multi-hop topologies"
  - **ver-05** (Oct. 2016) @Seoul, KR
    - Feedback from NFC forum
    - IID generation (feedback from Dave)

- **Revisions for WGLC**
  - **ver-06** (by Dave Thaler, Sep. 2016)
    - IID generation (2nd rev.)
  - **ver-07** (by James Woodyett Jun. 2017)
    - IID generation (4th rev.) ->RFC7217
    - Neighbor Discovery -> Reworded
  - **ver-08,-09** (by Pascal Thubert, Nov. 2017)
    - Neighbor Discovery -> Reworded
  - **ver-10, -11** (by Shepherd, Jul. 2018)
    - Revised texts for clarification about NFC MTU & FAR, ND, Security
- **No more feedback from NFC forum** (since Jan. 2017)
- **WGLC** (Mar. 2018~Jul. 2018)
  - **New Shepherd**: Samita Chakrabarti
- **ver-11, -12** (by IOTdir & INTdir, Nov. 2018)
- **ver-13** (1st IESG reviews, Mar. 2019)
- **ver-14, -15 (Montreal, Jul. 2019)**

1st IESG Reviews (1/5)

- **Marketing Expressions**
  -> Removed or Reworded with only technical point

  - § 5.2, outstanding performance ("outstanding" is removed)
  - § 1, "NFC builds upon RFID systems by allowing two-way communication between endpoints, where earlier systems such as contactless smart cards were one-way only"
    -> "NFC builds upon RFID systems by allowing two-way communication between endpoints." :
  - § 1, "NFC also has the strongest ability (e.g., secure communication distance of 10 cm) to prevent a third party from attacking privacy."
    -> "NFC can provide secured communications with its short transmission range."
  - § 3, "NFC technology enables simple and safe two-way interactions between electronic devices"
    -> "NFC enables simple and two-way interaction between two devices" :
  - § 3, "NFC's bidirectional communication ability is ideal for establishing connections with other technologies by the simplicity of touch." (removed)

- **Editorial Changes**

  - Abstract. "no more than 10 cm" -> "no more than 10 cm apart", "6LowPAN" -> "6LoWPAN"
  - § 1, "It had been used" -> "It has been used", "It was expected" -> "It is expected", "running the other operating systems" ->"running other operating systems", remove "potential for".
  - § 5.1, "the a 6LBR" --> "a 6LBR", "LNs" --> "6LNs"
  - § 5.2, "LRs" --> "6LRs"
  - about RFC2119, "SHOULD, MAY, MUST, NOT RECOMMEND..."

1st IESG Reviews (2/5)

- § 3.4, about MIUX

MIU = 128 + MIUX.

According to [LLCP-1.3], Figure 2 shows an example of the MIUX parameter TLV. Each of TLV Type and TLV Length field is 1 byte, and TLV Value field is 2 bytes.

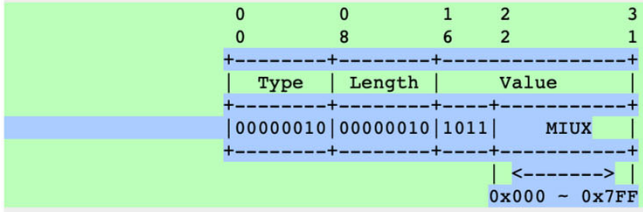


Figure 2: Example of MIUX Parameter TLV

Revised for clarification

MTU = MIU = 128 + MIUX.

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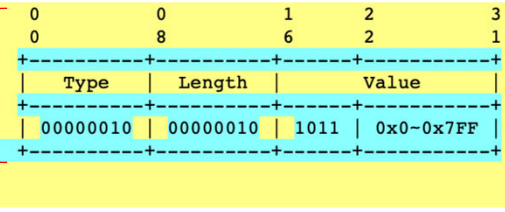

Figure 2: Example of MIUX Parameter TLV

1st IESG Reviews (3/5)

- § 4.1, about Figure 3..

4.1. Protocol Stacks

Figure 3 illustrates IPv6 over NFC. Upper layer protocols can be transport layer protocols (TCP and UDP), application layer protocols, and others capable running on top of IPv6.

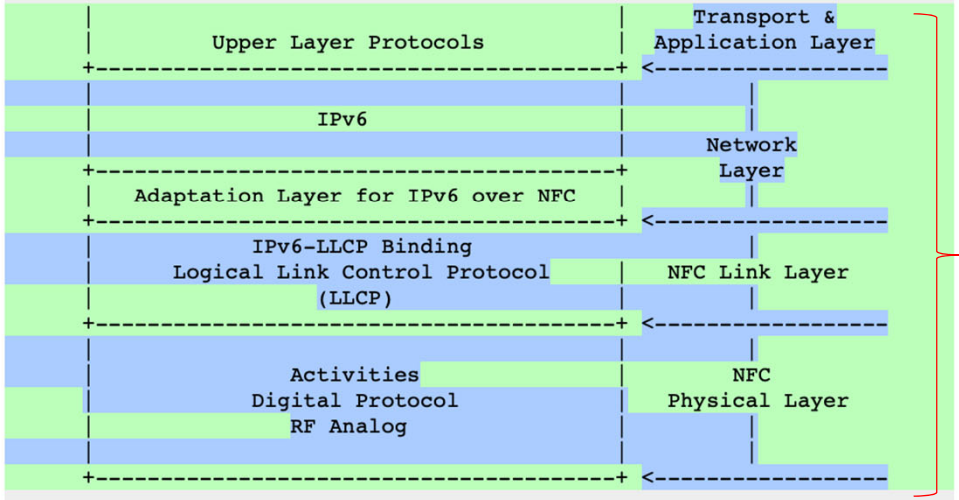

Figure 3: Protocol Stacks for IPv6 over NFC

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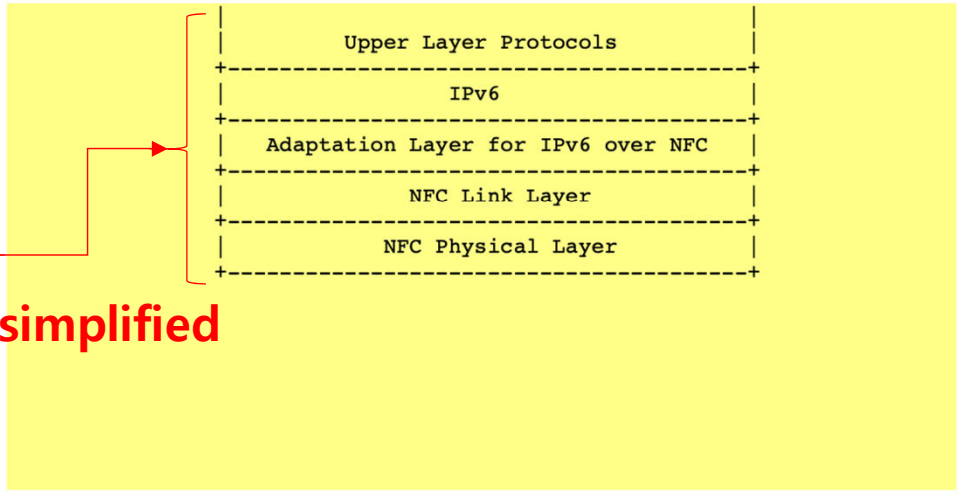

simplified

Figure 3: Protocol Stacks for IPv6 over NFC

1st IESG Reviews (4/5)

- § 4.5, about ND

4.5. Neighbor Discovery

Neighbor Discovery Optimization for 6LoWPANs ([RFC6775]) describes the neighbor discovery approach in several 6LoWPAN topologies, such as mesh topology. NFC does not support a complicated mesh topology but only a simple multi-hop network topology or directly connected peer-to-peer network. Therefore, the following aspects of RFC 6775 are applicable to NFC:

- When an NFC-enabled device (6LN) is directly connected to a 6LBR, an NFC 6LN MUST register its address with the 6LBR by sending a Neighbor Solicitation (NS) message with the Address Registration Option (ARO) and process the Neighbor Advertisement (NA) accordingly. In addition, if DHCPv6 is used to assign an address, Duplicate Address Detection (DAD) is not necessary.

- When two or more NFC 6LNs(or 6LRs) meet, there are two cases. One is that three or more NFC devices are linked with multi-hop connections, and the other is that they meet within a single hop range (e.g., isolated network). In a case of multi-hops, all of 6LNs, which have two or more connections with different neighbors, MAY be a router for 6LR/6LBR. In a case that they meet within a single hop and they have the same properties, any of them can be a router. When the NFC nodes are not of uniform category (e.g., different MTU, level of remaining energy, connectivity, etc.), a performance-outstanding device can become a router. Also, they MUST deliver their MTU information to neighbors with NFC LLCP protocols during connection initialization. The router MAY also communicate other capabilities which is out of scope of this document.

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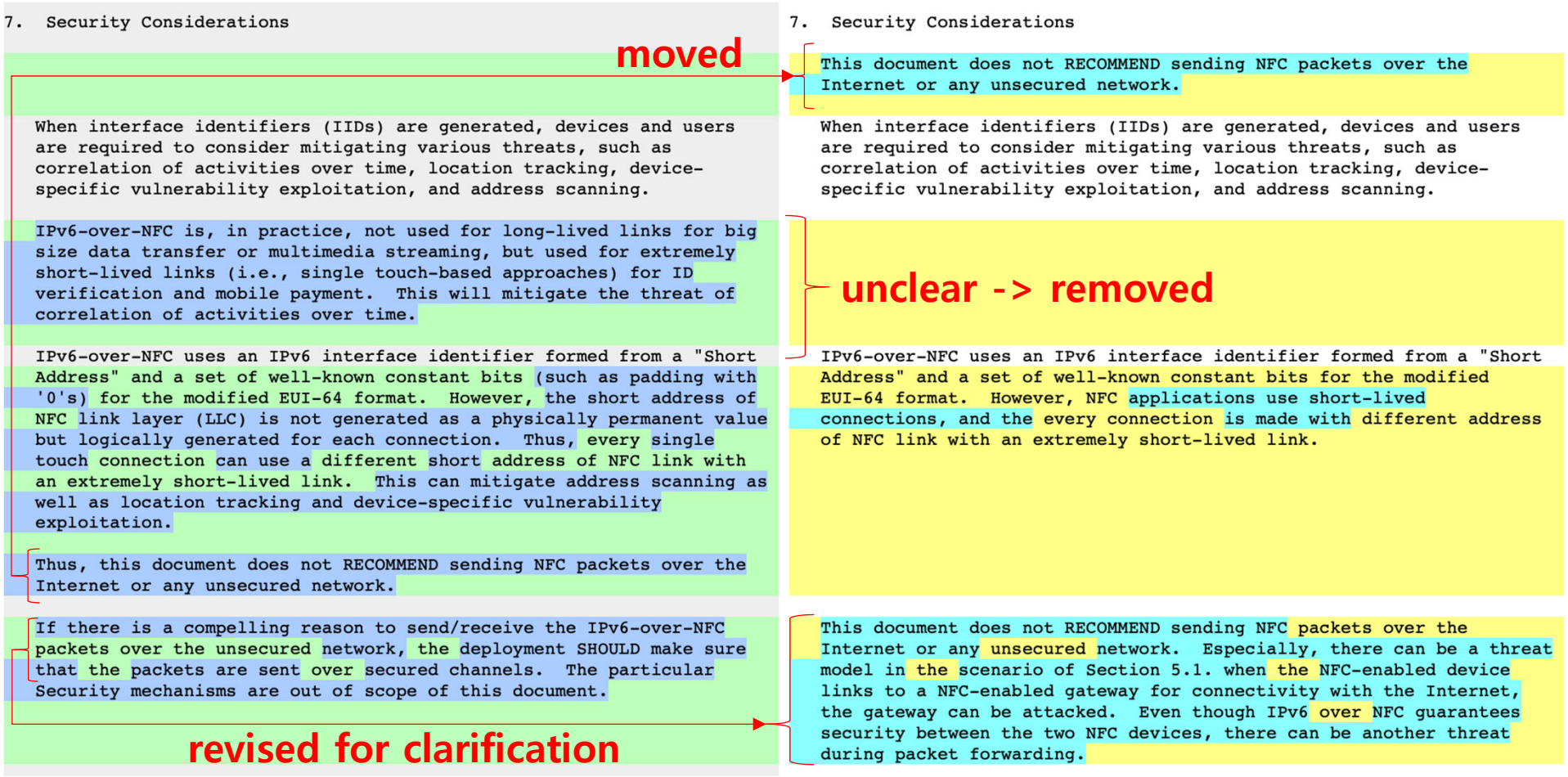
- When an NFC-enabled device (6LN) is directly connected to a NFC-enabled 6LBR, an NFC 6LN MUST register its address with the 6LBR[RFC4944] by sending a Neighbor Solicitation (NS) message with the Address Registration Option (ARO) and process the Neighbor Advertisement (NA) accordingly. In addition, when the 6LN and 6LBR are directly connected, DHCPv6 is used for address assignment. Therefore, Duplicate Address Detection (DAD) is not necessary between them.

- When two or more NFC 6LNs[RFC4944](or 6LRs) are connected, there are two cases. One is that three or more NFC devices are linked with multi-hop connections, and the other is that they meet within a single hop range (e.g., isolated network). In a case of multi-hops, all of 6LNs, which have two or more connections with different neighbors, is a router for 6LR/6LBR. In a case that they meet within a single hop and they have the same properties, any of them can be a router.

Under-specified -> removed

1st IESG Reviews (4/5)

- § 7, about Security considerations



Any Questions & Comments?