Transmission of IPv6 Packets over Near Field Communication

*draft-ietf-6lo-nfc-03*

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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

• **WG document: draft-ietf-6lo-nfc-00** (Mar 03, 2015)
  • Update Stateless address autoconfiguration (RFC7136)

• **1st Revision: draft-ietf-6lo-nfc-01** (July 05, 2015)
  • MAC PDU size and MTU
  • SLAAC and IPv6 link local address
  • Fragmentation and Reassembly

• **2nd Revision: draft-ietf-6lo-nfc-02** (Oct. 17, 2015)
  • Dispatch Header (added)
  • Header Compression (modified for GHC)

• **3rd Revision : draft-ietf-6lo-nfc-03** (Apr. 07, 2016)
  • Some typos fixed
  • Section 7. Security Considerations
7. Security Considerations

- Various Threats
  - correlation of activities over time, location tracking, device-specific vulnerability exploitation, and address scanning
  - From the I-D., draft-ietf-6lo-privacy-considerations-00 (D. Thaler)

- NFC technology uses IPv6 IIDs
  - formed from “Short Address”
  - a set of well-known constant bits (such as padding with ‘0’s)
  - for the modified EUI-64 format

→ Thus, it is exposed from the various threats
7. Security Considerations (cont’d)

• However, NFC technology
  • is operated **single touch-based** approaches
    (This means extremely short-lived links)
→ This mitigates the threats of **correlation of activities over time**.

• IPv6-over-NFC will be (**see the bellow figure in use cases**)
  • NOT used for big size data transfer or multimedia streaming (long-lived links),
    BUT used for **ID verification and mobile payment** (extremely short-lived links).
Updates Since the IETF 94 (3/3)

7. Security Considerations (cont’d)

• The 6-bit short address of NFC link layer is not generated as a physically permanent value but logically generated value for each connection
• Every single touch connection can use a different short address of NFC link with an extremely short-lived link

→ This can mitigate address scanning as well as location tracking and device-specific vulnerability exploitation.
Others

• **1ST ETSI 6lo plugtests**
  • in Yokohama (Japan), IETF 94
  • A testbed between two different NFC-enabled devices
    • Intel Edison board (Yacto Linux 3.10.17)
    • Laptop PC (Fedora, Linux kernel 4.0.4)
  • Results
    • 2/12 test items (passed) in the test description for IPv6 over NFC.
    • NOT only Node-to-Node mode but also Node-to-Router mode in next plugtest

• **Informing the NFC Forum**
  • Email response from Paula Hunter (NFC Forum Executive Director) (Oct.6.2015)
  • And, we will participate in the NFC Forum Member Meeting
    • June 2016, Dallas, TX, USA
    • to inform them of the work item, “IPv6-over-NFC”
Next Steps

• Ready for WGLC?

• Implementations & 2nd ETSI 6lo plugtests in Berlin
  • A testbed between two different NFC-enabled devices
    • Intel Edison board (Yacto Linux 3.10.17)
    • Laptop PC (Fedora, Linux kernel 4.0.4)
  • Further considerations
    • IID redundancy based on 6 bits of NFC Node ID
    • NOT support for MTU extension in NFC PN532 chipset (partially resolved)
    • Implementations for MAC procedures in ND functionality