NB-IoT Network

NGW, which of 4?

Radio Access Network

Visited PLMN

Home PLMN

Public Internet

App

UE (Device)

eNodeB

SGW (4G)

SGSN (3G)

CSGN

NGW

MME

IWK-SCEF

SGW (4G)

SGSN (3G)

HSS (4G)

HLR (3G)

PGW (4G)

SGW

SCEF

Full IP (TCP+UDP)

Full IP (TCP+UDP)

S8

S1-U

S1-MME

S11

T6a

T6ai

T7

T8

NGW

NGW

AS

NIDD in UDP

RESTful APIs

SMPP Interface name

5G

SGP

NGW

NGW

NGW

NGW

App
UseCase1: IP based Data Transmission

- SCHC over User Plane
  - Data transport
  - SCHC Compression/Decompression as RoHC
  - No SCHC Fragmentation
  - No major changes in the 3GPP specification

<table>
<thead>
<tr>
<th>IP</th>
<th>PDCP (SCHC)</th>
<th>GTP-U</th>
</tr>
</thead>
<tbody>
<tr>
<td>UE</td>
<td>eNB</td>
<td>Device</td>
</tr>
</tbody>
</table>

- Rule ID dynamically set
- Rule ID up to 9 bits
- No Fragmentation
- MAX_PKT_SIZE = 1 byte

![Diagram showing the network architecture of LPWAN over IETF108, including the use of SCHC over User Plane, data transport, and compression/decompression as RoHC.](draft-ietf-lpwan-schc-over-nbiot-03)
UseCase2: IP based Data Transmission

- SCHC over Control Plane (DoNAS)
  - Data transport over signaling network
  - SCHC Compression/Decompression
  - Small quantities of data

- Rule ID dynamically set
- Rule ID up to 9 bits
- Fragmentation may be used
- MAX_PCKT_SIZE = 1 byte
Non-IP based Data Transmission

- E2E transmission
  - SCHC in Application layer
  - Context is handled by the application layer

- Rule ID dynamically set
- Rule ID up to 9 bits
- Max_Pckt_Size = 1358 bytes
- Fragmentation may be used
Fragmentation Configuration

• Use of ACK_on_Error mode

• The Transfer Block
  • From 16 bits to 1000 bits varying of 16 bits
  • Header needs to be multiple of 4 bits
  • When Fragmenting Tiles may keep a fixed size of 4 or 8 bits (avoid pad)

• 2 Configuration
  • 8-bits header size (<300 bits):
    • RuleID 3 bits
    • Dtag 1 bit
    • FCN 3 bits
    • W 1 bit
  • 16-bits header size (>300bits):
    • RuleID 8-10 bits
    • Dtag 1 or 2 bits
    • FCN 3 bits
    • W 2 or 3 bits
Cont. Parameters

• Timers
  • Following the TS24.008 for power consumption
  • The range goes from 1 hour to 10 hours
    • Inactivity timer at the range
    • Retransmission timer below the range
Thank you

• Questions?
• Reviewers?

• L-C?