UDP based Publication Channel for Streaming Telemetry

draft-ietf-netconf-udp-pub-channel-03

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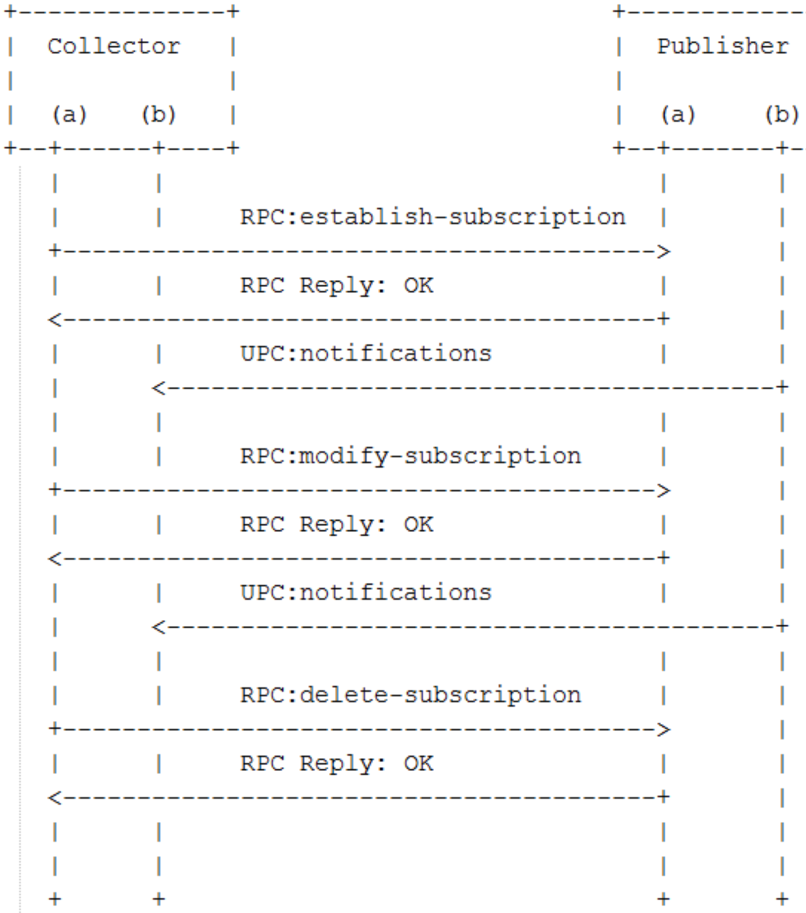
Overview

- UDP vs TCP
  - Data collector will suffer a lot of TCP connections from many line cards equipped on different devices.
  - As no connection state needs to be maintained, UDP encapsulation can be easily implemented by hardware which will further improve the performance.
  - Because of the lightweight UDP encapsulation, higher frequency and better transit performance can be achieved, which is important for streaming telemetry.
- A new UDP based Publication Channel
  - Facilitate the distributed data collection mechanism (e.g., directly push data from line cards of many devices to a collector)
  - Support multiple encoding (including Binary)
  - Adapting to SN/YANG-Push
  - Enable options for extensibility

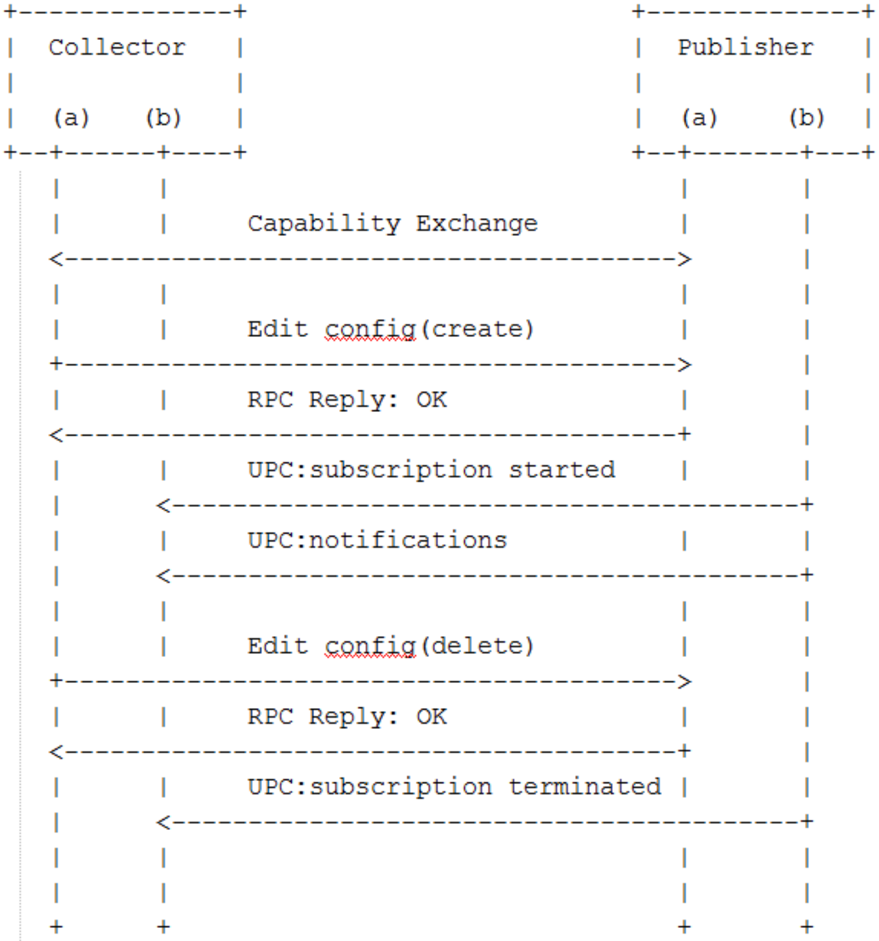
Transport Mechanisms

One way transport from publisher to the collector, adapting to SN/YANG-Push scheme



```
+--------------+                           +--------------+
|  Collector   |                           |  Publisher   |
|              |                           |              |
|  (a)    (b)  |                           |  (a)     (b) |
+--+------+----+                           +--+-------+---+
   |      |                                   |       |
   |      |     RPC:establish-subscription    |       |
   +------------------------------------------>       |
   |      |     RPC Reply: OK                 |       |
   <------------------------------------------+       |
   |      |     UPC:notifications             |       |
   |      <-------------------------------------------+
   |      |                                   |       |
   |      |     RPC:modify-subscription       |       |
   +------------------------------------------>       |
   |      |     RPC Reply: OK                 |       |
   <------------------------------------------+       |
   |      |     UPC:notifications             |       |
   |      <-------------------------------------------+
   |      |                                   |       |
   |      |     RPC:delete-subscription       |       |
   +------------------------------------------>       |
   |      |     RPC Reply: OK                 |       |
   <------------------------------------------+       |
   |      |                                   |       |
   |      |                                   |       |
   +      +                                   +       +
```

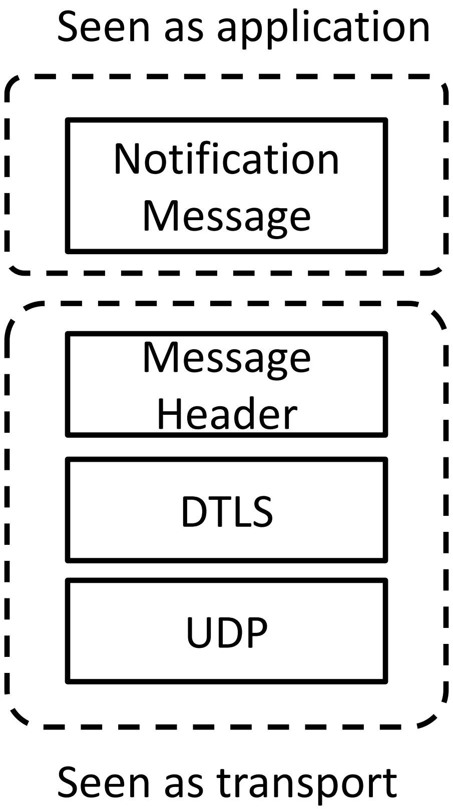
a) Call Flow For Dynamic Subscription



```
+--------------+                           +--------------+
|  Collector   |                           |  Publisher   |
|              |                           |              |
|  (a)    (b)  |                           |  (a)     (b) |
+--+------+----+                           +--+-------+---+
   |      |                                   |       |
   |      |     Capability Exchange           |       |
   <------------------------------------------>       |
   |      |                                   |       |
   |      |     Edit config(create)           |       |
   +------------------------------------------>       |
   |      |     RPC Reply: OK                 |       |
   <------------------------------------------+       |
   |      |     UPC:subscription started      |       |
   |      <-------------------------------------------+
   |      |     UPC:notifications             |       |
   |      <-------------------------------------------+
   |      |                                   |       |
   |      |     Edit config(delete)           |       |
   +------------------------------------------>       |
   |      |     RPC Reply: OK                 |       |
   <------------------------------------------+       |
   |      |     UPC:subscription terminated   |       |
   |      <-------------------------------------------+
   |      |                                   |       |
   |      |                                   |       |
   +      +                                   +       +
```

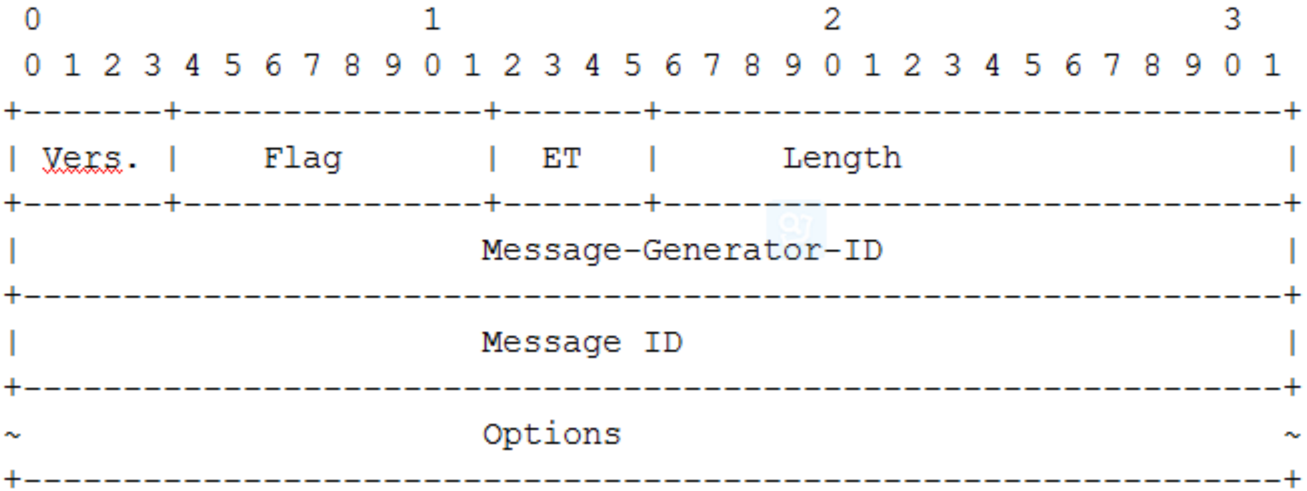
b) Call Flow For Configured Subscription

Transport Overview



- DTLS: provide reusable security and authentication functions over UDP
- Message Header: some important information before de-serializing the notification.
  - Encoding method: GPB, CBOR, JSON, XML
  - Message generator ID
  - Sequence number
  - Fragmentation
  - Options for extensibility
- Notification:
  - include a notification header, as defined in draft-ietf-netconf-notification-messages-03
  - Encoded with the content.

Data Format of the UPC Message Header



```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-------+---------------+-------+-------------------------------+
| Vers. |     Flag      |  ET   |          Length               |
+-------+---------------+-------+-------------------------------+
|                    Message-Generator-ID                       |
+---------------------------------------------------------------+
|                    Message ID                                 |
+---------------------------------------------------------------+
~                    Options                                    ~
+---------------------------------------------------------------+
```

Version=0
Flag (1 byte)=bit 0 (reliability), bit 1 (fragmentation)
Encoding Type(4 bits)= 0(GPB), 1(CBOR), 2(JSON), 3(XML)
Length(2bytes)
Message-Generator-ID: is a 32-bit identifier of the process which created the notification message.
Message ID: is generated continuously by the message generator.

Next

- Augment the SN model to add the UPC configurations.
- Security considerations.
- Any other to consider or address?

Thank you