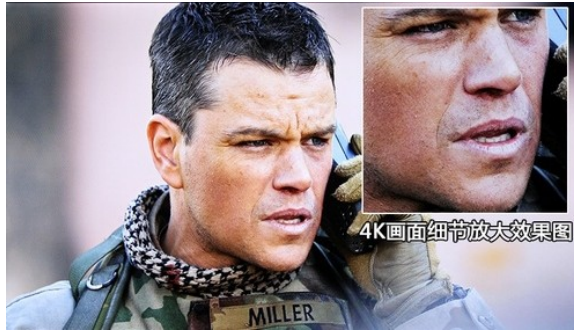# RTCP Feedback Message for Image Control

draft-huang-avtext-feedback-image-control-00

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Motivations

- A detailed image of part of a picture may be preferred by users in some applications:
  - Monitoring applications.
  - Video conferencing calls.
  - Tele-medicine
- Done by the receiver (e.g. displaying SD image from a received 4k image)
  - No need for sender side but requires high bandwidth and processing
- Done by the sender (e.g. using camera zoom and move).

Overview of the New Method

- Use a new RTCP feedback message to signal the area that the receiver requests to enlarge.
- The specific area is a rectangle indicated by the coordinate of the upper left point and the length and width, based on the pixels of the current picture sent by the sender.
  - The new picture may display information outside of the current view (move the camera) but requires consent from the sender

```
2160        @(x,y) is the start point (upper left point)
   |
   |
   |    x               Length
   |.........@****************
   |         *                  *
   |         *                  *width
   |       y *                  *
   |         ****************
   |         .
   |_____._____3840
```
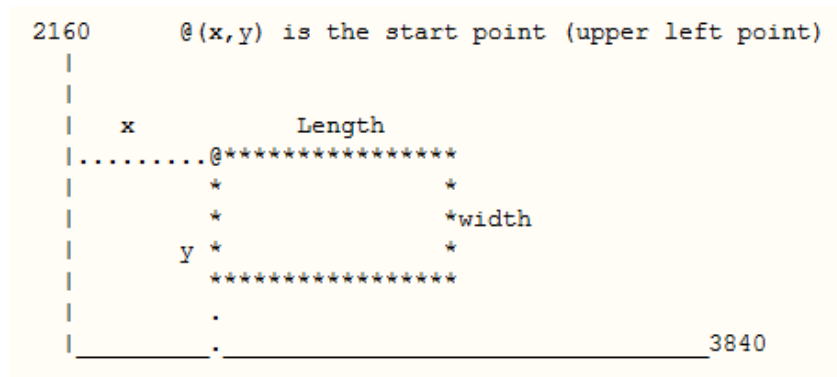
Image Control Request (ICR) Feedback Message

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Seq nr.      |   x axis of start point  |  y axis of start  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| point |           length          |            width         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
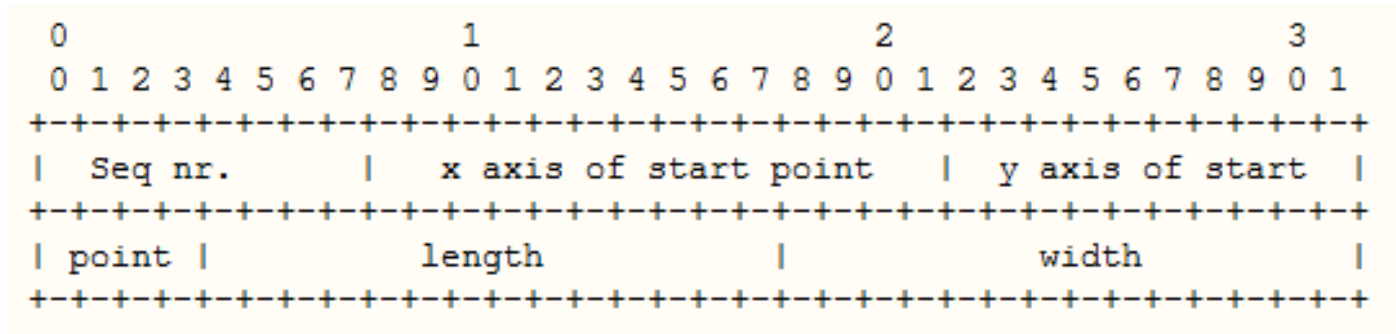
- Sent by a decoder to request a image change to an encoder.

- It indicates the required rectangle based on pixels of the current picture.

- The decoder is allowed to adjust the final presenting of the image if the rectangle does not suit well.

- Mixers should not forward the ICR message, but translators MAY forward the message if it doesn't support the image change.

Image Control Notification (ICN) Feedback Message

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Seq nr.       | R |                 reserved                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
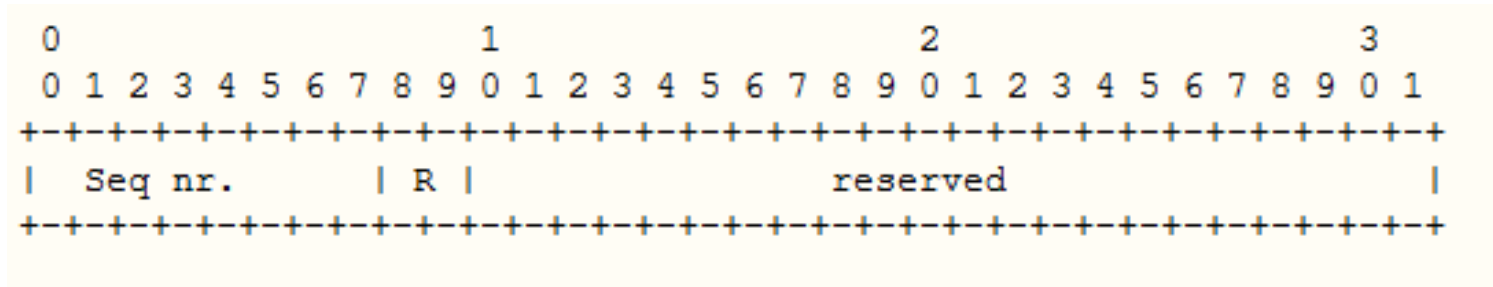
- – R=0: the media sender applies the image change successfully
- – R=1 : the values of ICR message are invalid
- – R=2: the media sender does not support the image change.

- Used by the encoder to acknowledge the reception of an ICR.

- A mixer or translator that acts on an ICR SHOULD send a corresponding ICN.

- A translator that forwards an ICR MAY need to delay the ICN until the ICR it send has been responded to.

Discussion

- Liaison from 3GPP
  - Authors were not aware of the 3GPP work, does not appear in the IANA registration for RTCP feedback messages
  - Have Region Of Interest in 26114-d00
  - Not clear what is "original" picture.
    - The first displayed picture may be a zoomed in picture of the room or just a slide.
  - Does not support move out what was the "original" view

- Suggest adding support allowing receiver to keep current views for later use. (3GPP has a sender side pre-defined)
- Look at having the actual view description in the ICN message and send it as an RTP header extension?
  - Not sure if important since the new view is as seen by the view requestor
- Welcome reviews and suggestions.

THANK YOU