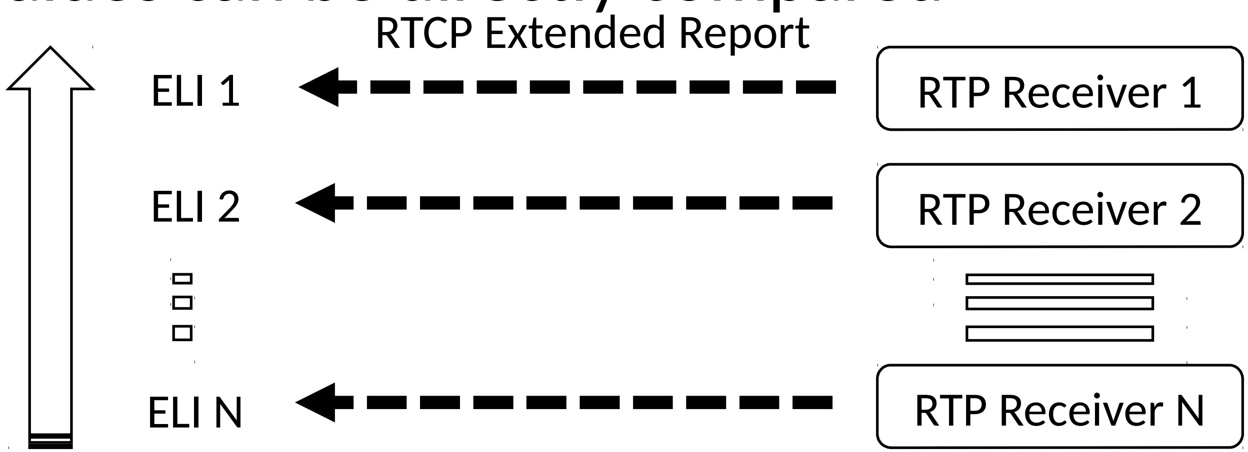
# IETF 100
# draft-zheng-xrblock-effective-loss-index-02

Hui Zheng, Roni Even, Qin Wu, Rong Gu, Rachel Huang

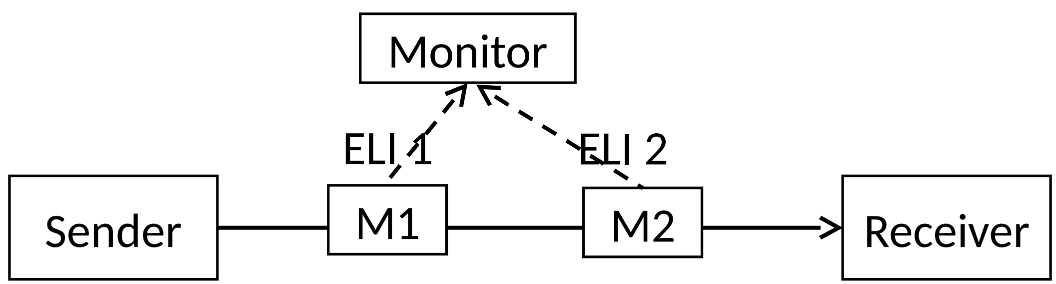
# Introduction

- Effective Loss Index (ELI) intends to be a simple metric that
  - measures the effectiveness of loss repair means.
  - reported values can be directly compared

<u>An example usage 1:</u>
Sort the reported ELIs to find the 5% worst performing RTP endpoints, which might need further treatments.




<u>An example usage 2:</u>
Find out which part of network caused service quality degradation



# Comparing to Other Metrics

- Post-repair loss (RFC7509)
  - Pros: Value can be compared; measures the effectiveness of loss repair
  - Cons: Middle boxes need to implement repair algorithms to support the metrics; Do not consider packet burst.
- Post-Repair Loss Run-length Encoding (RFC5725)
  - Pros: measures the effectiveness of loss repair; bursts can be easily figured out.
  - Cons: Not easily to be compared; Middle boxes need to implement repair algorithms to support the metrics.

# The Model for Calculating ELI

- Effective Loss Index (ELI) assumes a model that
  - loss repair means are applied on RTP packets batch by batch, each batch is equal in size
  - For a batch

```
if Post-Repair Loss > Effective Loss Threshold
     Effective Loss Factor (ELF) = 1
else
     Effective Loss Factor (ELF) = 0
endif
```

- For N batches

```
      ELF(1)+ELF(2)+ ...+ELF(N)
ELI =  ----------------------------
                    N
```

# Example

**Assume that**

- **Batch Size** = 3 (in packets)
- **Effective Loss Threshold** = 1 (in packets)

| Batch of RTP Packets | Post-Repair Loss | Effective Loss Factor |
|---|---|---|
| \| 1 2 3 \| | 2, 3 | 1 |
| \| 2 3 4 \| | 2, 3 | 1 |
| \| 3 4 5 \| | 3 | 0 |
| \| 4 5 6 \| | 5 | 0 |
| \| 5 6 7 \| | 5, 7 | 1 |
| \| 6 7 8 \| | 7 | 0 |
| \| 7 8 9 \| | 7 | 0 |

$$\text{Effective Loss Index} = \frac{1 + 1 + 0 + 0 + 1 + 0 + 0}{7} = 0.4285$$

# The new XR Block

```
0                   1                   2                   3                   4
0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     BT=TBD    |   Reserved    |      Block length = 3         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        SSRC of Source                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    Effective Loss Index       |           Padding             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Effective Loss Index: 16 bits: The value of Effective Loss Index, equivalent to taking the integer part after multiplying the the calculated result of Effective Loss Index (as in Figure 2) by 65535.

# The new SDP Attribute

**ABNF Definitions:**

```
xr-format =/ xr-eli-block

xr-eli-block = "effective-loss-index"
               [ ":" effective-loss-batch-size]
               [ ">" effective-loss-threshold]

effective-loss-batch-size  = 1*DIGIT
effective-loss-threshold   = 1*DIGIT

DIGIT = %x30-39
```

**Examples:**

```
xr-eli-block = "effective-loss-index" : "100" > "2"
xr-eli-block = "effective-loss-index" : "100"
xr-eli-block = "effective-loss-index" > "2"
```

# Applicability

- Applications can prescribe the batch size for themselves without signaling. E.g., set to the number of packets containing source symbols in a source block in the case of FEC

- The number of batches against which ELI is calculated should not be too few, otherwise the result may be too biased. It is suggested to calculate it based on the total number of RTP packets during the measurement interval:

  The number of batches = (The total number of RTP packets / the size of a batch) + 1.

# Thanks

- Comments & questions?
- Adopted as a work item?