Multiplexing RTP Generically and Efficiently (MuRGE)

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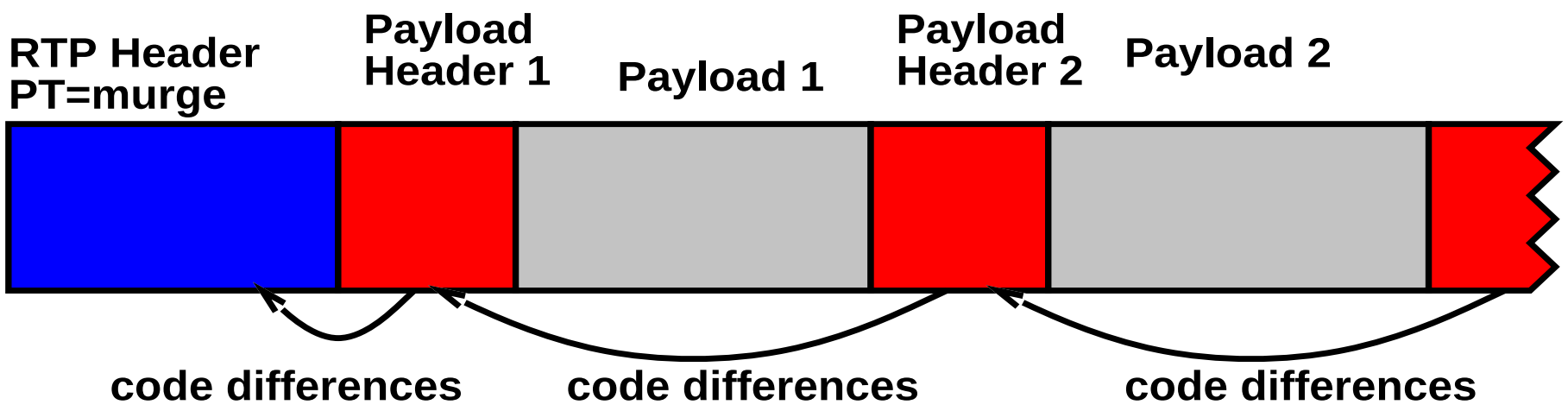
Goals

- **To be able to multiplex generic RTP streams**
- **When gateways cooperate, to have an overhead as low as one byte per multiplexed payload.**
- **When gateways don't cooperate, overhead depends on which traffic gets multiplexed together.**
- **Worst cast: no worse than full RTP header per payload.**

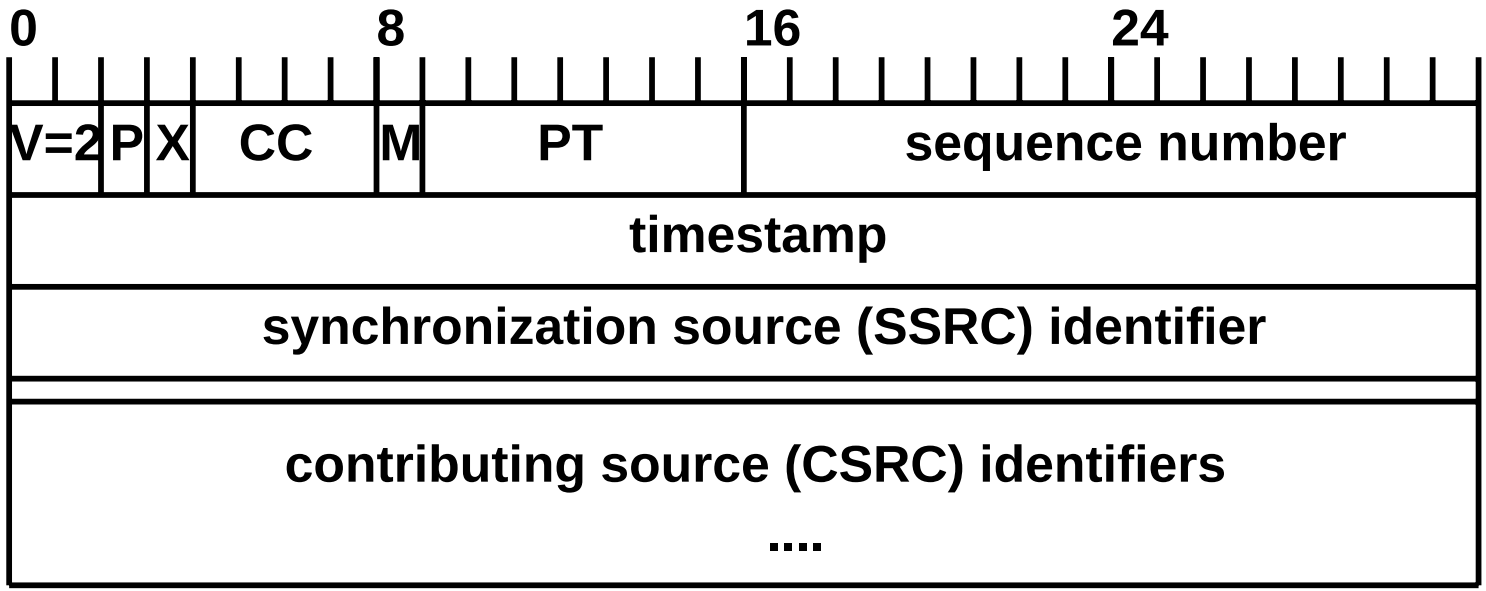
Approach

- **Similar to IP/UDP/RTP compression:**
  - Code each payload of the previous one.
  - Predict the differences between payloads.
- **But do this within a mux packet rather that along each stream.**
  - All state re-initiatized in every packet.

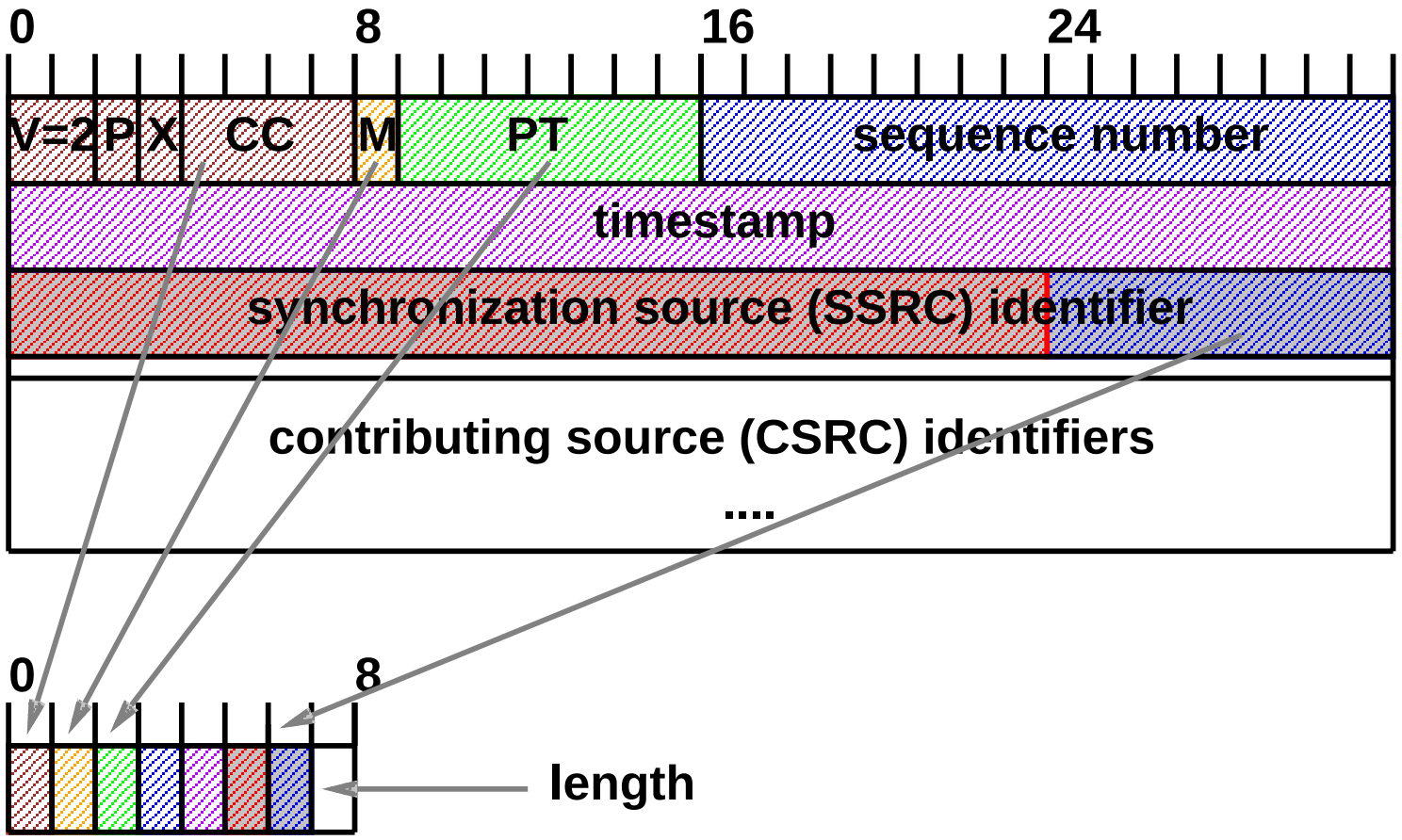
Difference Coding



RTP Header


0
8
16
24
V=2
P
X
CC
M
PT
sequence number
timestamp
synchronization source (SSRC) identifier
contributing source (CSRC) identifiers
....

MuRGE Header



MuRGE Bits

- **Bit 0:**
  - zero=>Byte 1 unchanged (V=same, P=zero, CC=same)
  - one=>Byte 1 follows.
- **Bit 1:**
  - zero=>PT unchanged, one=>PT follows
- **Bit 2: M bit**
- **Bit 3: zero=>seq number unchanged**
- **Bit 4: zero=>timestamp unchanged**
- **Bit 5: zero=>SSRC (3 MS bytes unchanged)**
- **Bit 6: zero=>SSRC (LS byte unchanged)**
- **Bit 7:**
  - zero=>length unchanged
  - one=>one byte length field follows

Using MuRGE

- **Outer RTP header has PT indicating Mux.**
- **Every payload (including the first) gets a MuRGE header.**
  - First payload always ends up not compressing the PT.
- **Outer header can copy all other fields directly from 1st payload.**
  - In some cases, possibly want separate Mux seq number, so first payload SeqNo may not be compressed out.

How good is the compression?

Between POTS/IPtel gateways:

- **Entry Gateway:**
  - does the encoding and compression
  - allocates SSRC consecutively
  - uses same codec
  - uses same timestamp
  - uses synchronized seq no (sends silence packets!)
- **One byte per payload. Everything is predictable.**

Between generic mux gateways

Take RTP off the net, mux it. Demux it at exit gateways to produce identical streams.

- **If we're careful about muxing similar streams:**
  - PT and Length and Byte 1 compress out.
  - Seq no, TS, and SSRC go uncompressed.
- **11 bytes per payload.**

Between generic mux gateways

Take RTP off the net, mux it. Demux it at exit gateways to produce identical streams.

- **If we add additional signalling between entry and exit g/w.**
  - Can do SSRC mapping/unmapping.
  - SSRC also compresses out.
  - Seq no and TS go uncompressed.
- **7/8 bytes per payload.**

May be possible to signal TS/SeqNo mapping too in some restricted circumstances.

- **Possibly one byte per payload.**