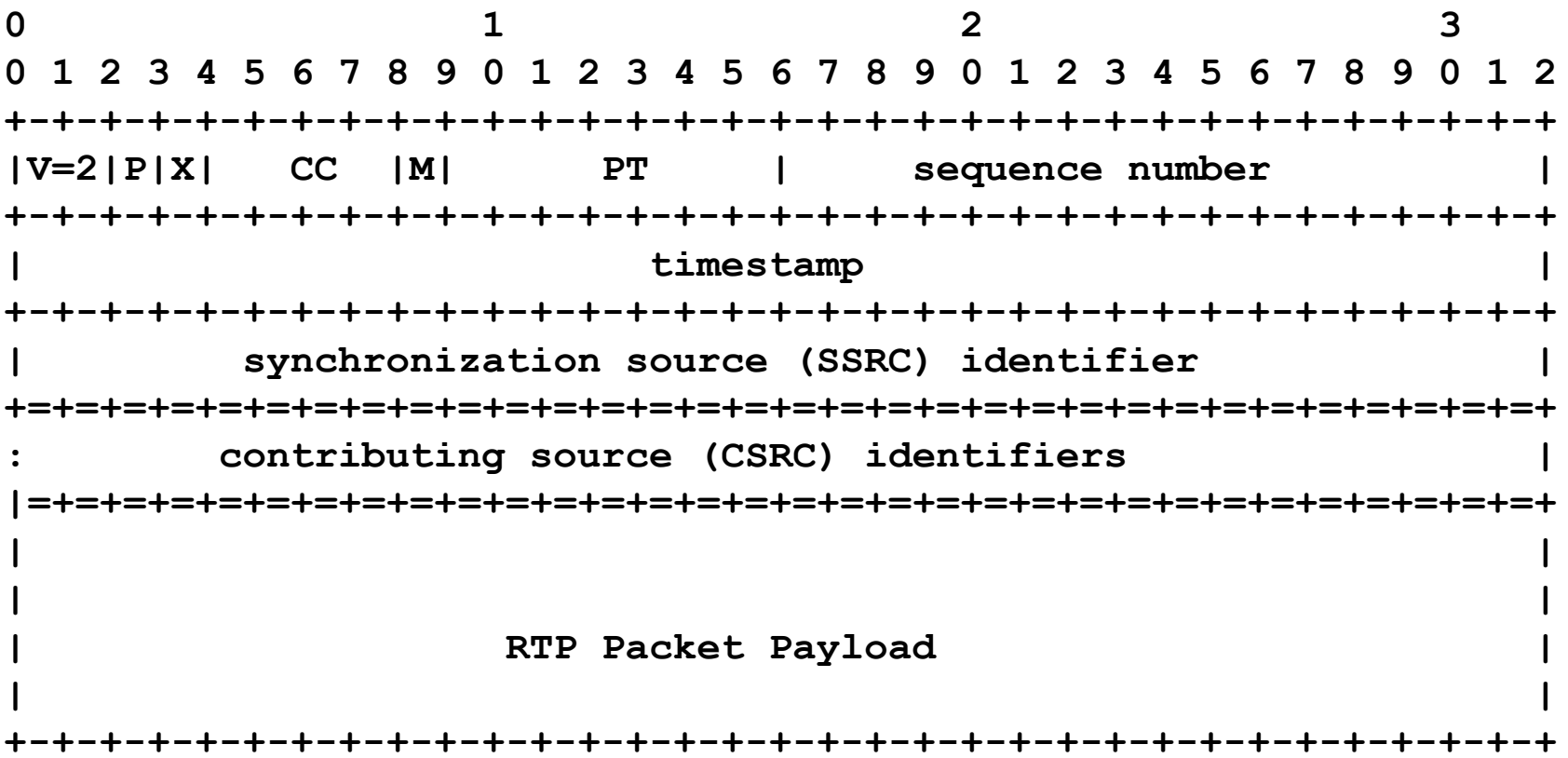
IETF/AVT meeting 10/07/2002

RTP payload for MPEG4 FlexMultiplexed streams

D. Curet, E.Gouleau, C.Roux,	
S.Relier, M. Veillard	FT R&D
P.Clement	Thalès BM
G.Cherry	nCube

An RTP packet for MPEG-4 FlexMux



Points to be solved

1- relation between clock references (FCR) and TS (CTS,DTS)

2- synchronisation beetwen differents streams

3- robustness of flexmux configuration

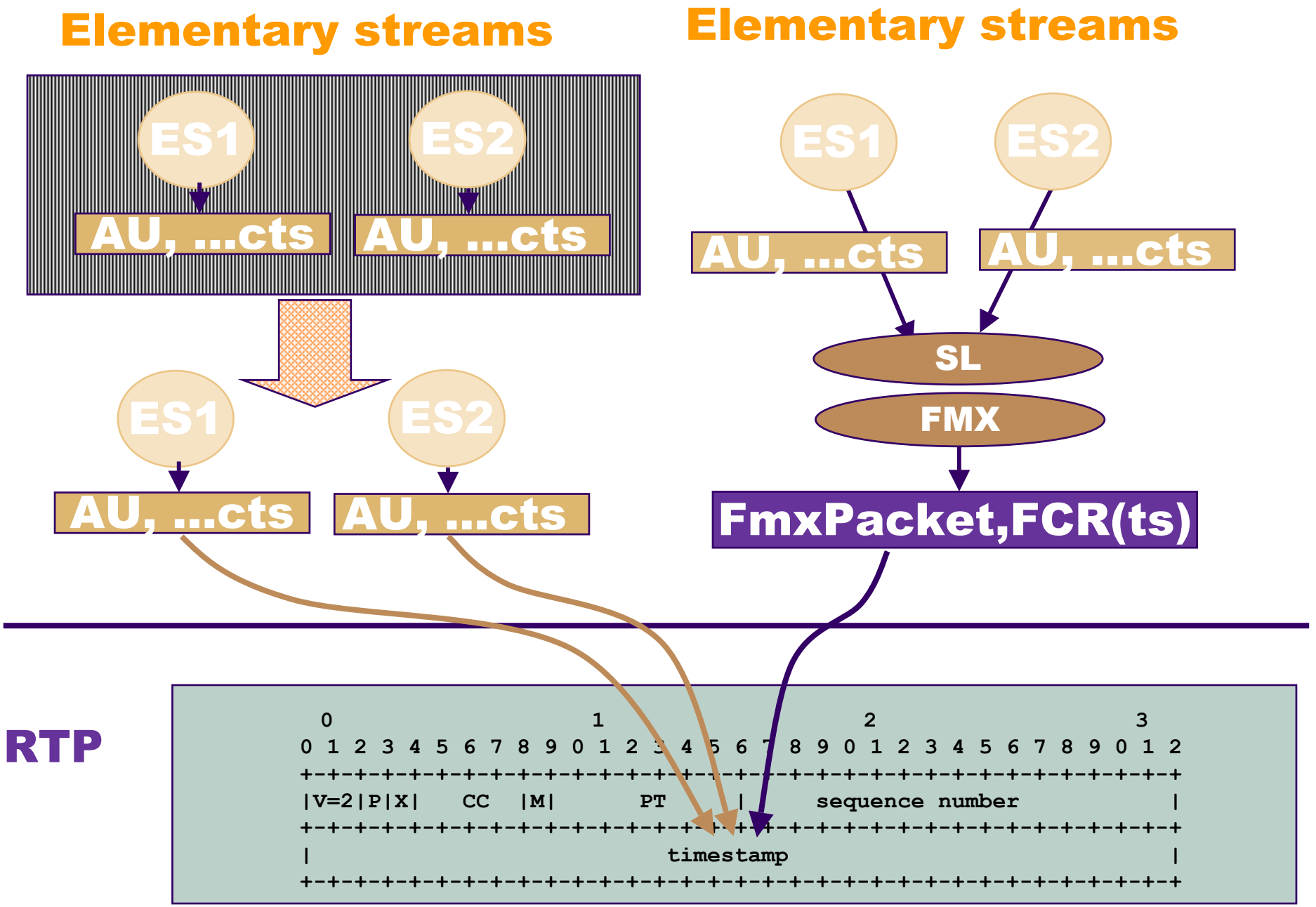
4- SDP syntax for parameters transmission

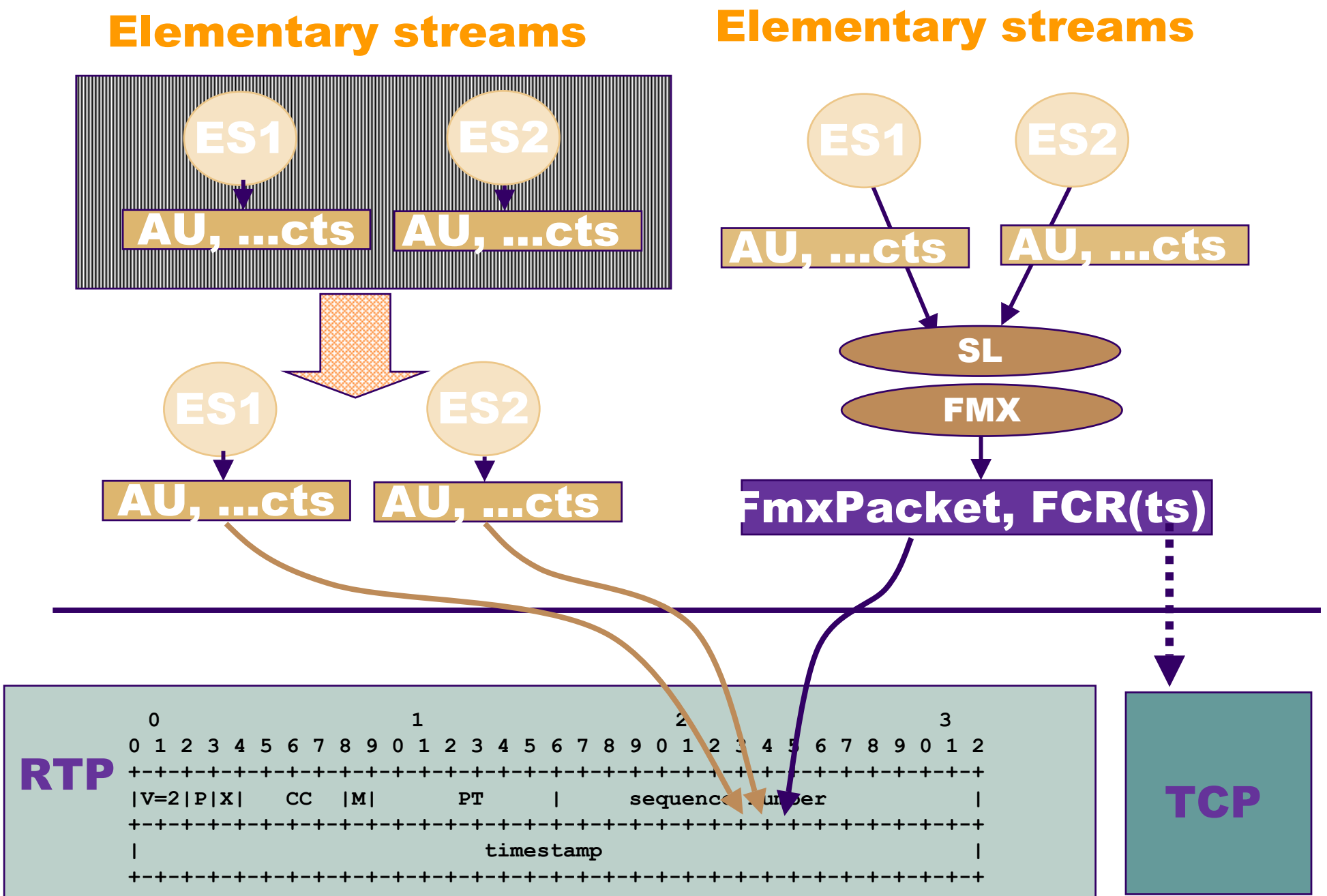
5-Applicability Statements

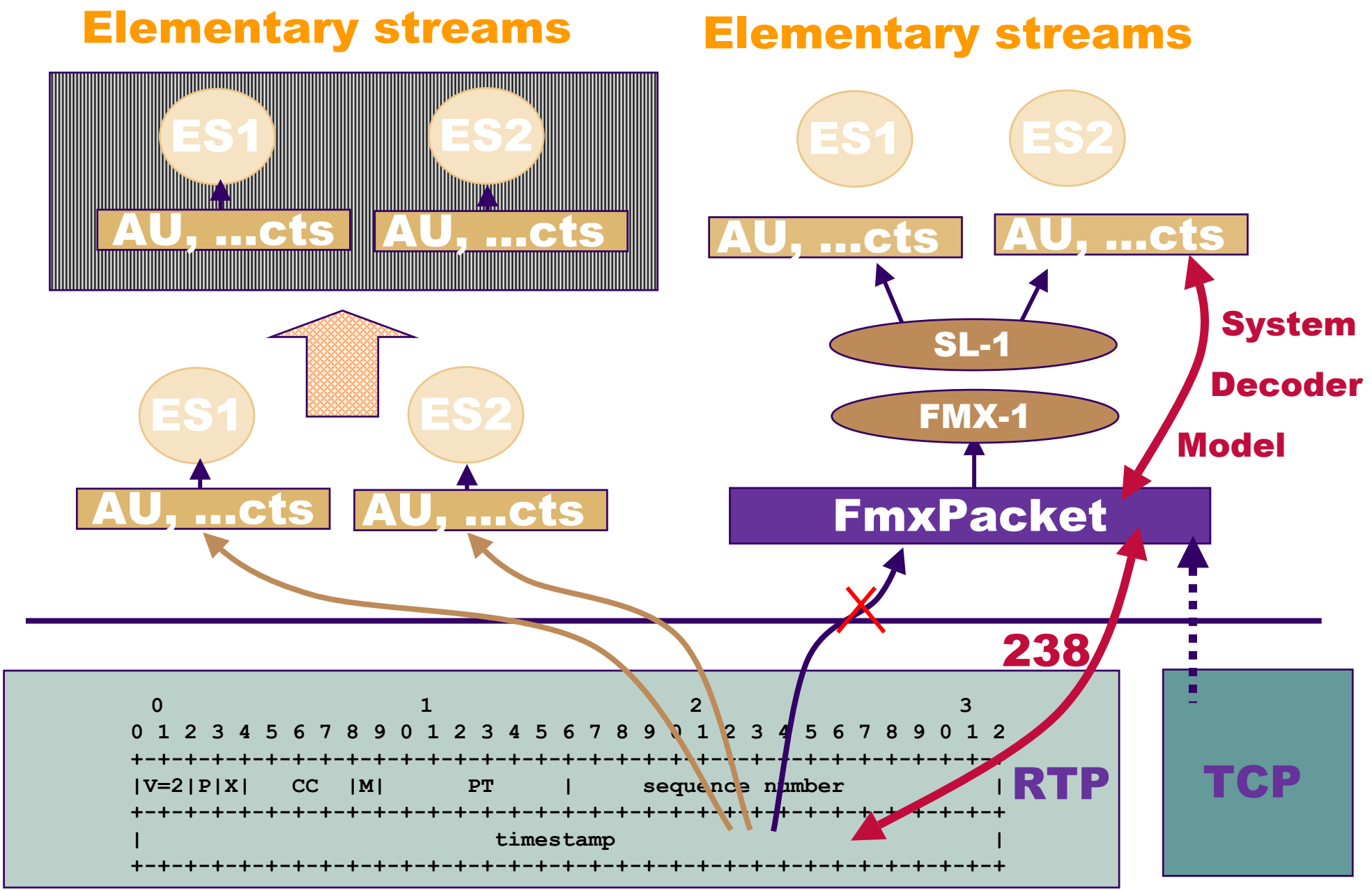
Transport of MPEG-4 FlexMux streams (1)

- MPEG-4 FlexMux stream is mapped directly onto the RTP payload

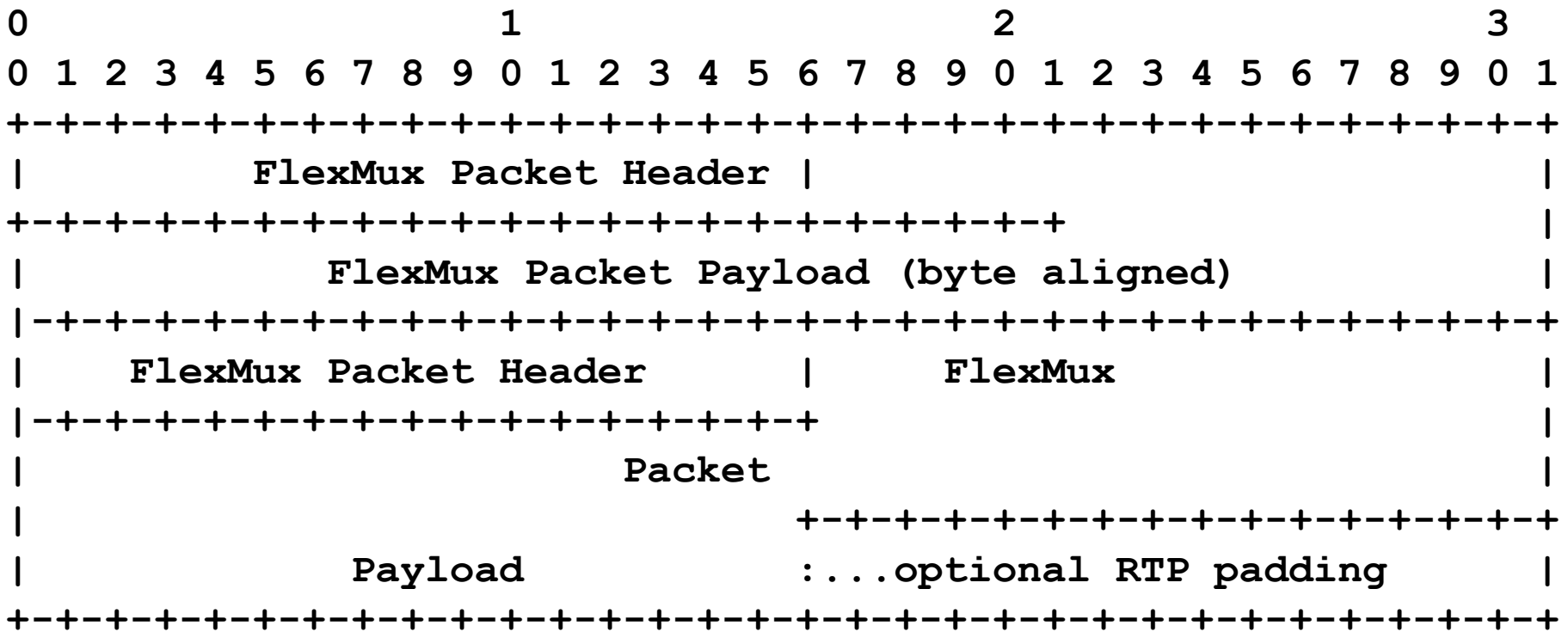
- The RTP timestamp is not considered to be **the media display time-stamp** of the contributing sources but the **emission time** of the multiplexed packets it is mainly used to mesure the network jitter


Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
ES1
ES2
AU, ...cts
AU, ...cts
Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
SL
FMX
FmxPacket,FCR(ts)
RTP
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 2
|V=2|P|X| CC |M| PT | sequence number |
| timestamp |


Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
ES1
ES2
AU, ...cts
AU, ...cts
Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
SL
FMX
FmxPacket, FCR(ts)
RTP
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 2
|V=2|P|X| CC |M| PT | sequence number |
| timestamp |
TCP


Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
Elementary streams
ES1
ES2
AU, ...cts
AU, ...cts
SL-1
FMX-1
FmxPacket
System
Decoder
Model
ES1
ES2
AU, ...cts
AU, ...cts
238
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 2
|V=2|P|X| CC |M| PT | sequence number |
| timestamp |
RTP
TCP

An RTP Payload carrying MPEG-4 FlexMux packets



Transport of MPEG-4 FlexMux streams (2)

- An RTP packet payload should start with the start of a FlexMux packet.
- An RTP packet will contain an integer number of FlexMux packets.
- Fragmentation rules are applied at the SL level.
- The **M** bit is used to indicate one or several AU ends.
- Each « 238 »packet carried as the first FlexMux packet (non mandatory because this condition adds an overhead).

Dynamic FlexMultiplexing (1/3)

Having a more robust mechanism is a concern for

- the signaling part, the FlexMux Channel Table (FMC)
- the signaled parts, the FlexMultiplexed packets

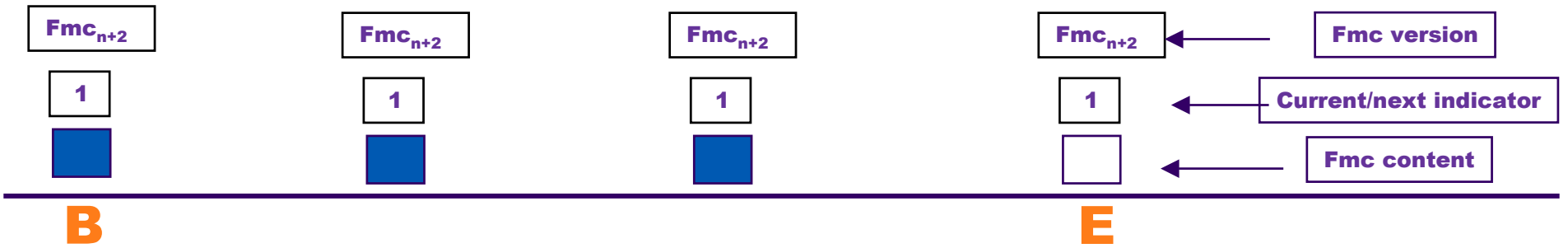
information repetition provides error robustness

Dynamic FlexMultiplexing (2/3)

The FlexMux Channel Table (FMC):

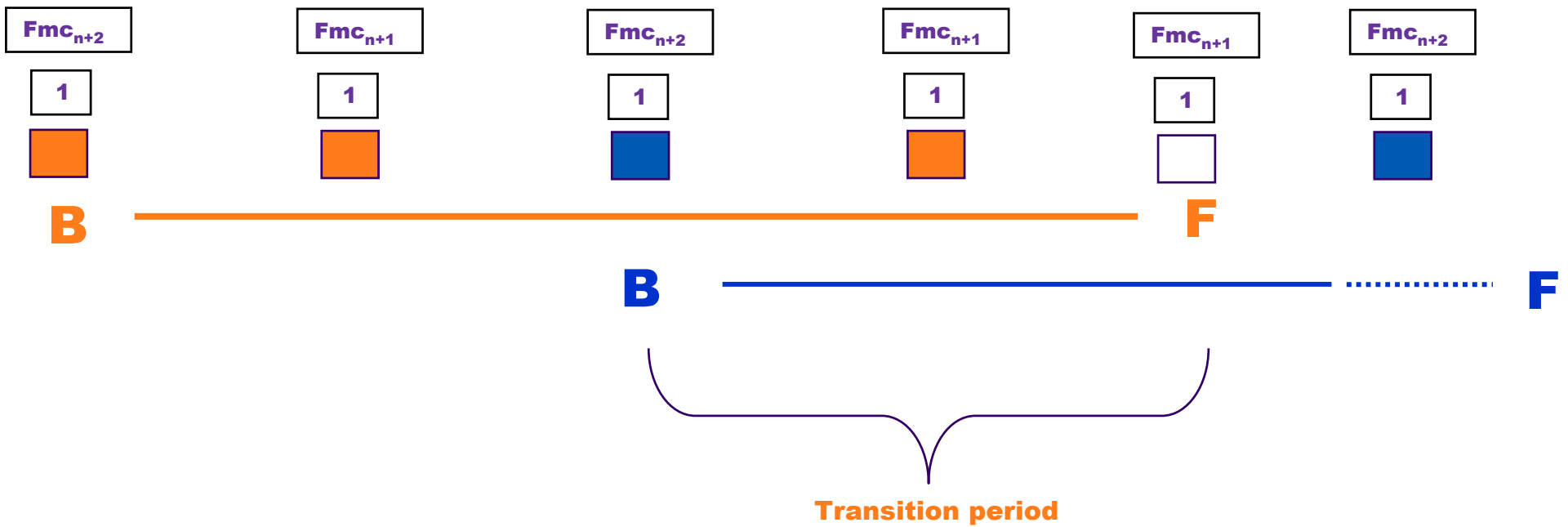
A version number ‘n’ and a current_next_indicator are associated with each FMC

A validity period of time is defined for each version ‘n’ of a FMC. Such a period starts with the first occurrence of a non empty ‘current’ FMC $_n$, and ends with the first occurrence of an empty ‘current’ FMC $_n$

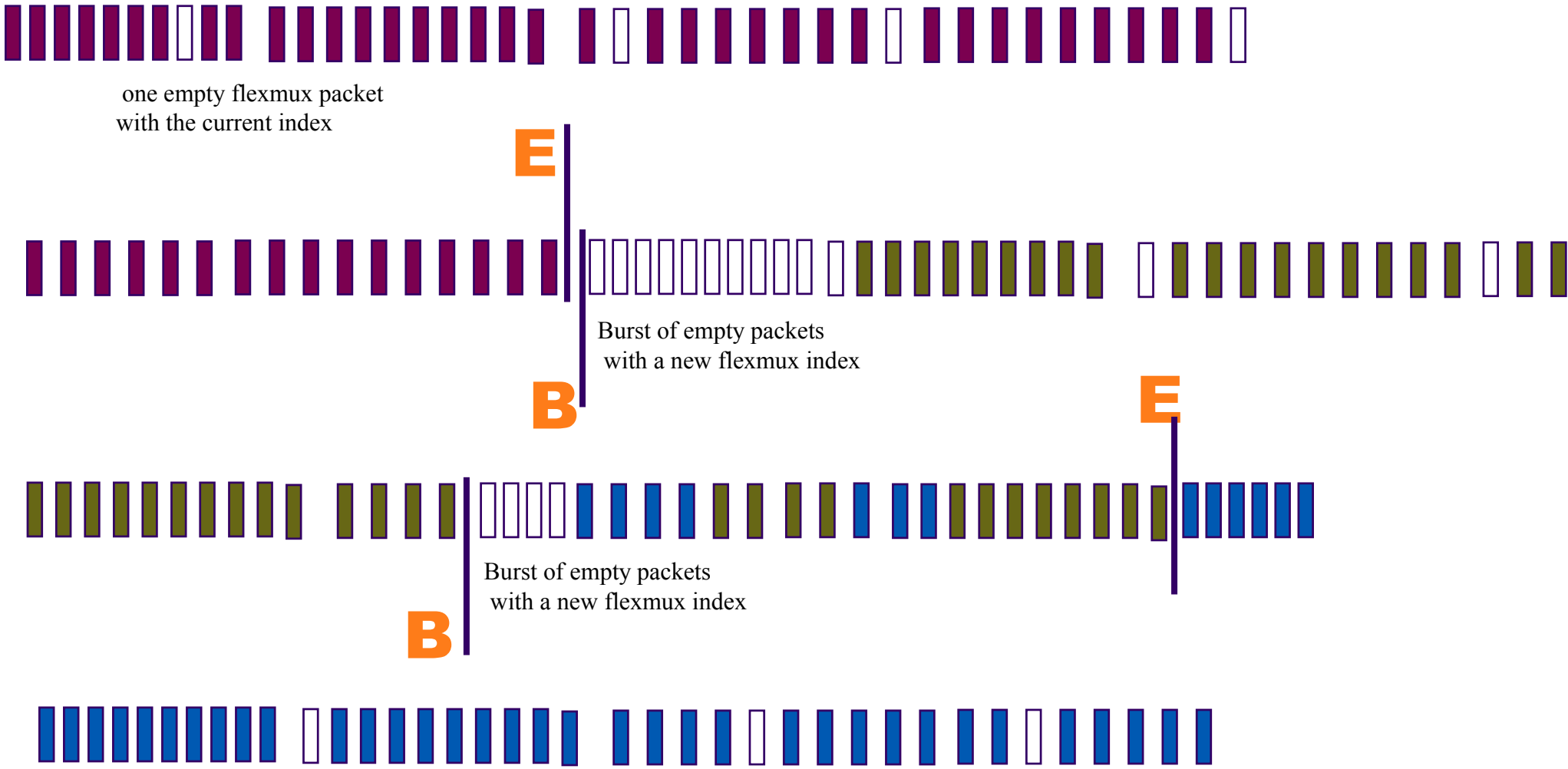


signaling part

A transition period may exist between the FMC $_{n}$ and the next FMC $_{n+1}$, where both FMC $_{n}$ and FMC $_{n}$ are applicable.



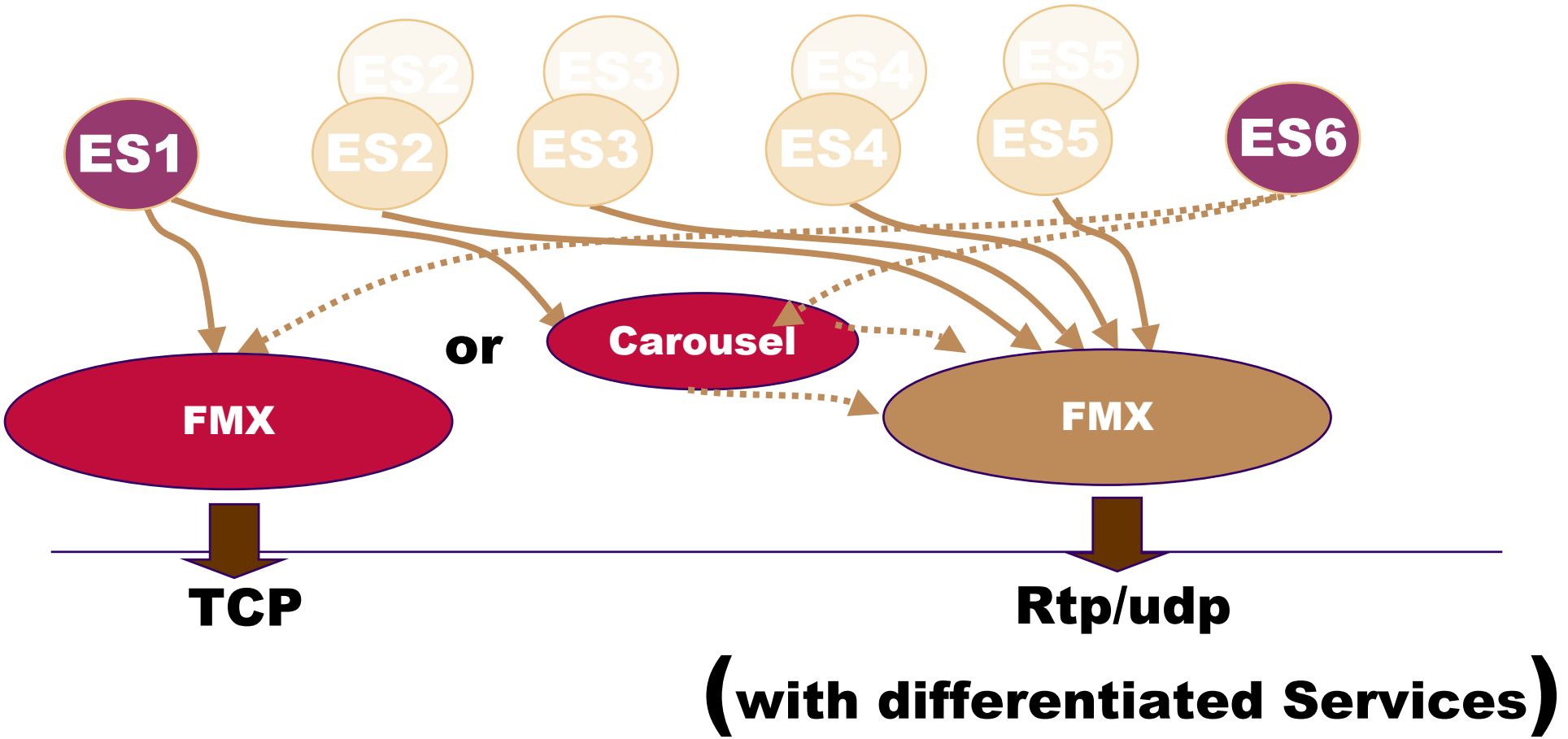
The FlexMultiplexed packets:



Dynamic FlexMultiplexing (3/3)

-time beetwen the emission of consecutive tables and the length of the empty flexmux packets depends on the network caracteristics

Error sensitive Streams Transmission



Transmission on TCP is used in unicast mode and carousel is used in multicast mode
In unicast mode the UDP Fmx stream is transmitted is transmitted after the TCP FMX theDelay depends on the network caracteristics

SDP Session descripton Syntax
Attributes

m = <media> <port> <transport> <payload list>

<media> application
<media> video
<media> audio

(ref avt-simple)

<transport> RTP/AVP

<payload list> dynamic payload number

a = rtpmap:<payload> <encoding name>/<time scale>/<parameters>

<payload> is the dynamic payload number

<encoding name> **mpeg4-flexmux** indicates FlexMux stream.

<time scale> is the time scale of the RTP time stamps.

<parameters> specialise <name>

Specific parameters :

m = application 4444 RTP/AVP 97

a = rtpmap:97 mpeg4-flexmux/1000

a = fmtp :<format> info= <fmxInfodescr>;fmxident=...;
fmxtiming=... ; fmxfmctable=...;fmxbuffersize=... ;
fmxcodetablentry=

Specific parameters are defined in block by
fmxInfoDescr is an hexadecimal representation of an octet String that expresses the FMX descriptor

Or separately by
Fmxident,fmxtiming, fmxfmctable, fmxbuffersize, fmxcodetablentry

Examples

```
m=application 1234  RTP/AVP 99
a=rtpmap:99 mpeg4-flexmux/1000
a=fmtp:99 info="7ab3742134bab347"

m=application 1234  RTP/AVP 99
a=rtpmap:99 mpeg4-flexmux/1000
a=fmtp:99 fmxident=FlexO1/0/1;fmxtiming=05/1000/16/16
```

MIME TYPE registration

```
mime media type name :application
mime subtype    name :mpeg4-flexmux
```

Open issues