Switching for multicast short time-shift
draft-yang-avt-switch-multicast-short-timeshift-00

IETF#79, November 2010, Beijing, China

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Providing interactive service for multicast sessions

- **Conventional multicast session serves multiple users**
- **When a user wants to use interactive service (e.g. pause, rewind…) typically a unicast session is created for this user.**
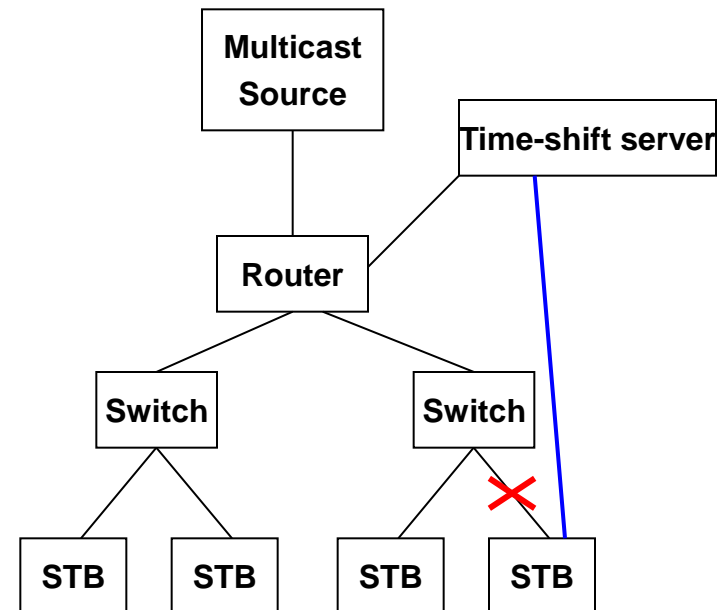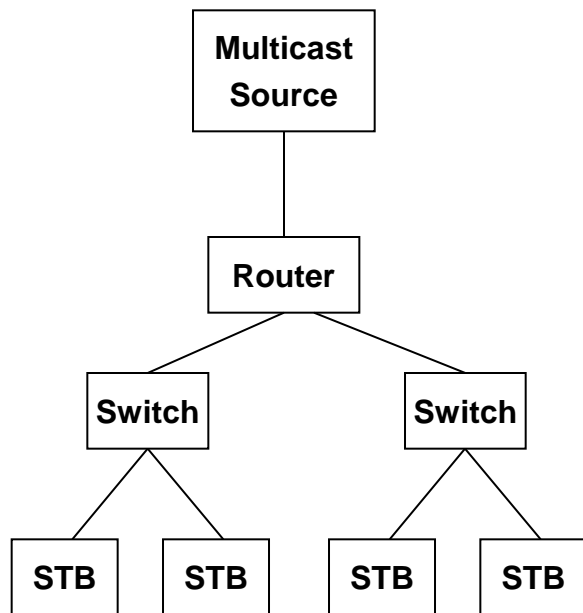
The problem to address

- **When many users use interactive services at the same time multiple unicast sessions are established using more bandwidth. The worse case is all users keeping unicast connections.**
- **The objective will be to resume the connection to the multicast session as soon as possible.**

Proposed solution

- **For short time-shift case can slightly speeding up the unicast playback until it catch up to the primary multicast stream.**

- **This has an added user advantage that there is no loss of video information.**

- **Short time-shift duration is limited by the playback speed.**

RTSP time-shift

- **RTSP can provide interactive time-shift function with different scale and speed, and an initial switch from multicast session to unicast session**

- **RTSP does not provide a way to switch back from unicast session of time-shift to the original multicast session**

Multicast short time-shift based on RTCP

- **The proposed solution using RTCP feedback will be independent of a specific streaming control protocol like RTSP.**
- **It addresses the synchronization between a primary multicast RTP stream and a parallel time-shifted unicast RTP stream.**

The procedure of MST

-

```
                  --------------------------
                  |        MST   Server      |
  -----------     |  ------   -----------    |  --------   -----------
 | Multicast |    | |  FT  | | Burst/Ret. |  | |        | |    RTP    |
 | Source    |    | |      | | Source     |  | | Router | | Receiver  |
 |           |    | | ------ | ----------- |  | |        | | (RTP_Rx)  |
  -----------     |  ------   -----------    |  --------   -----------
       |          |                         |       |           |
       |           --------------------------        |           |
       |                     |                       |           |
       |--- RTP Multicast->------------------->|     |           |
       |                     |                       |           |
       |          ...............................................
       |          .                                             .
       |          .      <::Time-shift control commands ::>      .
       |          .        ..Time-shift media stream     ..>     .
       |          ...............................................
       |                 |                 |        |           |
       |                 |<'''''''' RTCP MSTST-PReq''''''''|     |
       |                 |'''''''' RTCP MSTST-PRes''''''''>|     |
       |                 |                 |        |           |
       |                 |                 |        |           |
       |                 |....... Unicast RTP Burst .......>|    |
       |                 |                 |        |           |
       |                 |                 |        |           |
       |                 |'''''''' RTCP MSTST-SInd'''''''>|      |
       |                 |<'''''''' RTCP MSTST-SRes'''''''|      |
       |                 |                 |        |           |
       |                 |                 |        |           |
       |                 |                 |        |<~SFGMP Join~|
       |                 |                 |        |           |
       |                 |                 |        |           |
       |----------------- RTP Multicast ------------------->|    |
       |                 |                 |        |           |
       |                 |                 |        |           |
       |                 |<'''''''' RTCP MSTST-TReq'''''''|      |
       |                 |'''''''' RTCP MSTST-TRes ''''''>|      |
       |                 |                 |        |           |
       |                 |                 |        |           |
       |                 |<'''''''' (RTCP BYE) '''''''''''|      |
       |                 |                 |        |           |
```
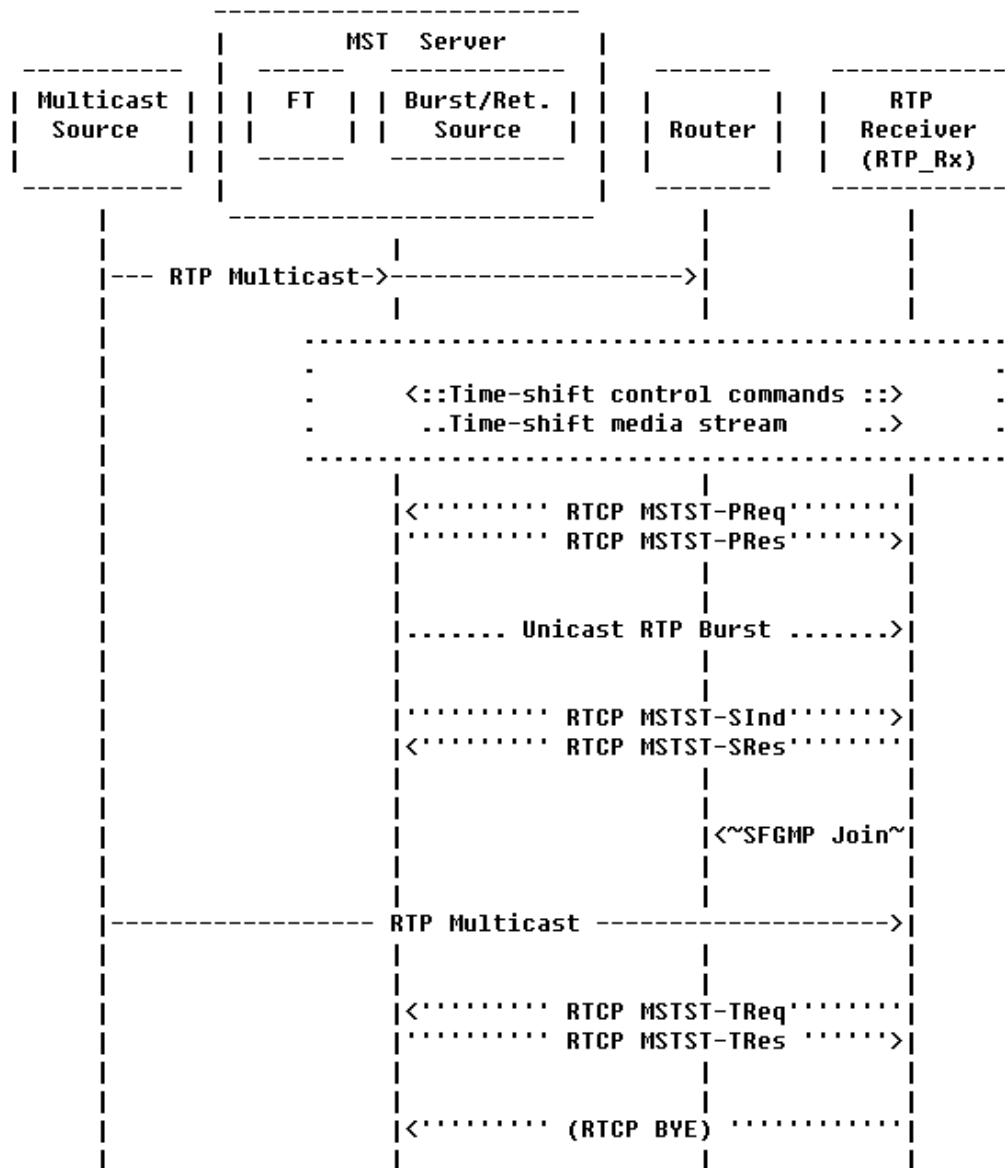
Advantage of the proposal

- **Switching back to the multicast session from the unicast session of time-shift, and effectively saving bandwidth.**
- **Adding user advantage that there is no loss of video information.**

Thank you

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