



TLA PICTURE RESTRICTION

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INTRODUCTION

- › The temporal layer access (TLA) picture was adopted at the 8th JCT-VC meeting, to be signaled as a NAL unit type.
- › The purpose of the TLA picture is to indicate where temporal layer switching can be done, to enable a node in the network to perform switching based on the NAL unit type.
- › From the definition and restriction of the temporal layer access picture it seems allowed for an encoder to generate a conforming bitstream that may become non-conforming if a network node perform TLA-based switching.
- › We propose to add a restriction for TLA to ensure that they work as it was intended.

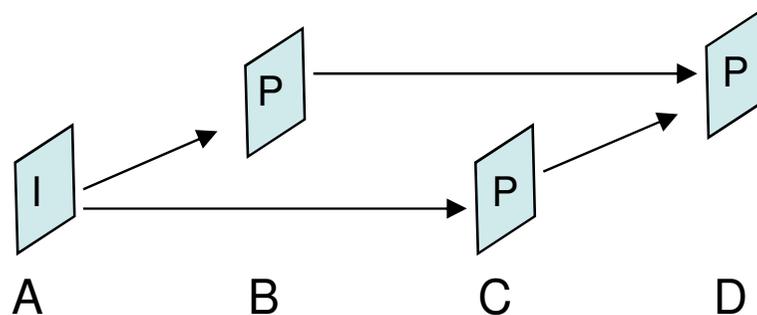
PROBLEM STATEMENT

- › The switching point property of the TLA picture is in the CD text only enforced by the definition of the TLA picture:

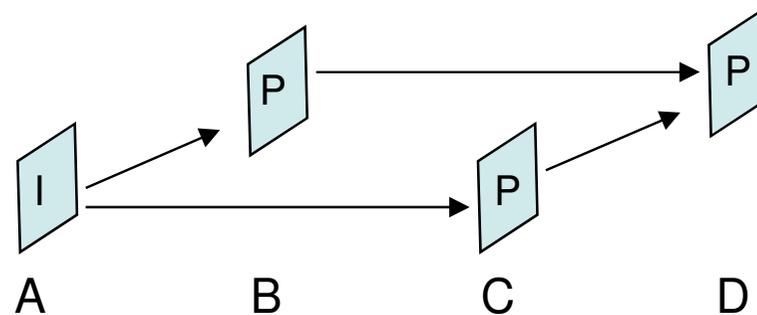
temporal layer access (TLA) picture: A *coded picture* for which each *slice* has *nal_unit_type* equal to 3; the TLA picture and all *coded pictures* with *temporal_id* greater than or equal to the *temporal_id* of the TLA picture that follow the TLA picture in *decoding order* shall not use *inter prediction* from any *picture* with *temporal_id* greater than or equal to the *temporal_id* of the TLA picture that precedes the TLA picture in *decoding order*.

inter prediction: A prediction derived from only data elements (e.g. sample value or motion vector) of reference pictures other than the current decoded picture.

- › These definitions opens up for an encoder to encode a picture D as a TLA picture that includes a picture B in its RPS with the same *temporal_id*. Picture B can currently be signaled with *used_by_curr_pic_flag* equal to one in the RPS of D as long as picture B is actually never used in any inter prediction process.



PROBLEM STATEMENT



- > But if a node in the network decides to switch up on TLA picture D, a decoder decoding the bitstream will not have picture B in its DPB. This means that the switch results in a non-conforming stream due to the third RPS bitstream conformance requirement:
 - When the first coded picture in the bitstream is an IDR picture or the current coded picture is not a leading picture of the first coded picture in the bitstream, there shall be no entry in `RefPicSetStCurrBefore`, `RefPicSetStCurrAfter` or `RefPicSetLtCurr` that is equal to "no reference picture".

PROPOSAL

- › To make TLA pictures work as intended, we propose to add the following bitstream conformance requirement on the reference picture set (RPS):
 - When the current picture is a TLA picture, there shall be no reference picture included in the reference picture set with `temporal_id` greater than or equal to the `temporal_id` of the current picture.
- › The proposed requirement would be analog to the situation for the CRA picture type where the current CD definition and restriction states:

clean random access (CRA) picture: A *coded picture* containing only *I slices* and for which each *slice* has `nal_unit_type` equal to 4; all *coded pictures* that follow the CRA picture both in *decoding order* and *output order* shall not use *inter prediction* from any *picture* that precedes the CRA picture either in *decoding order* or *output order*; and any *picture* that precedes the CRA picture in *decoding order* also precedes the CRA picture in *output order*.

- There shall be no reference picture included in the reference picture set that precedes, in output order, any CRA picture that precedes the current picture both in decoding order and output order.



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