TEMPORAL LAYER ACCESS PICTURES AND CRA

G584
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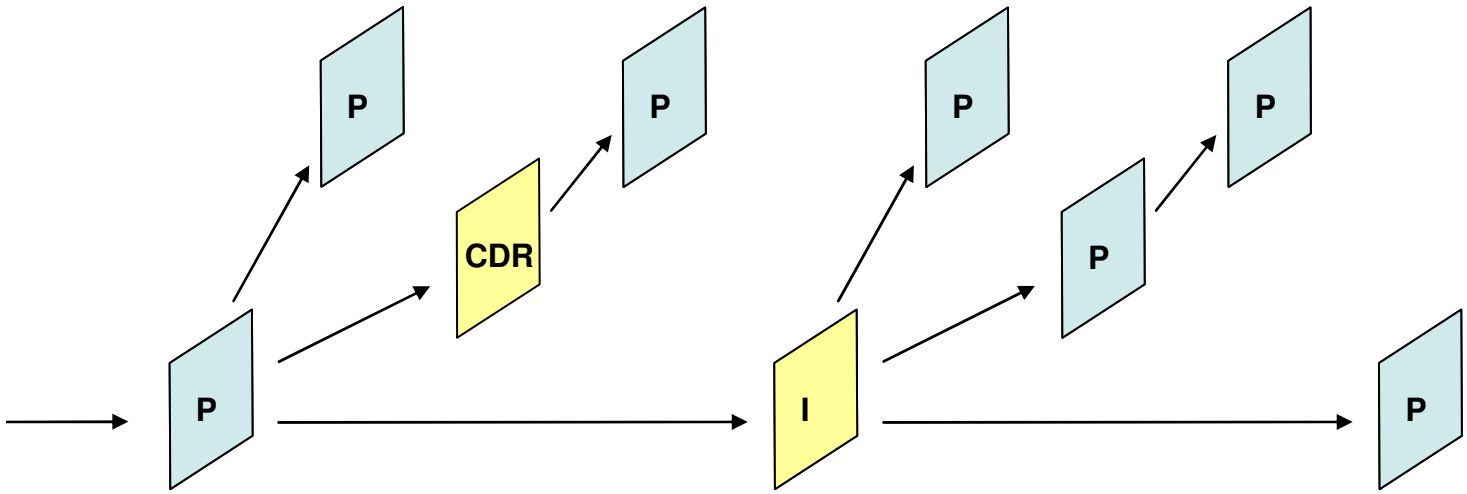
We have made the following observations

- Clean Random Access (CRA) pictures are informative
- CRA information in the NAL unit header is valuable to a network node or other process on system layer
- There is no need for allowing CRA pictures with temporal_id > 0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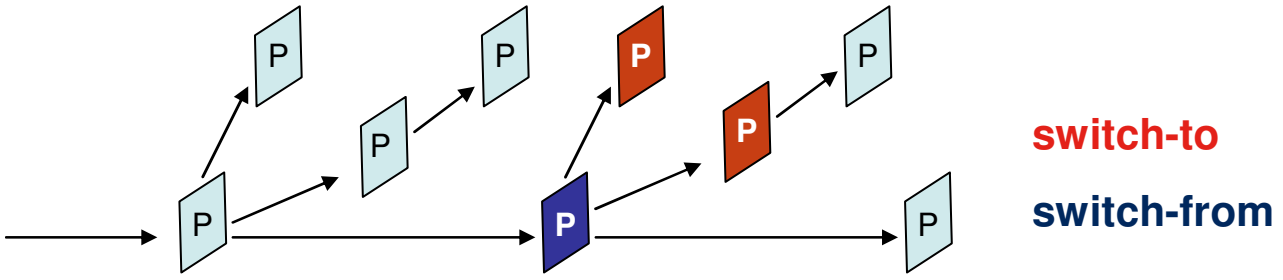
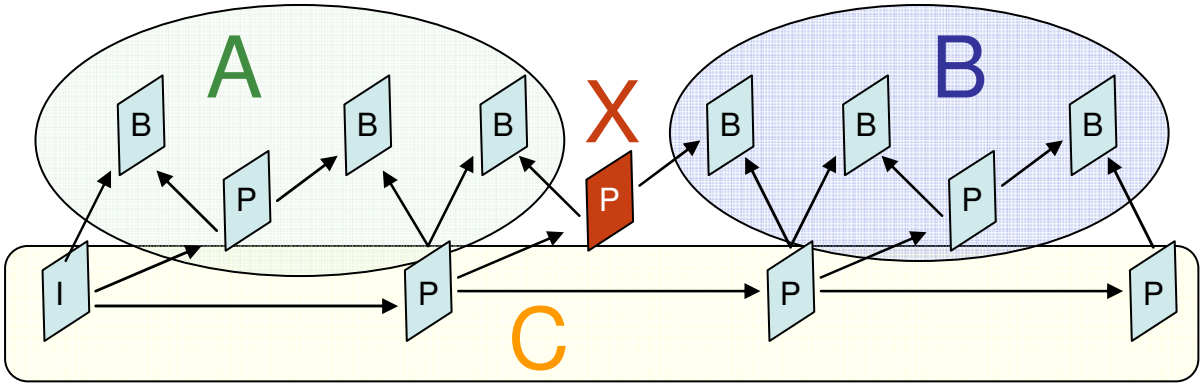
We have also made the following observations

- Temporal switching information would be valuable in the NAL unit header
- With a “switch-to” definition of switching points there is no need to signal switching point pictures with temporal_id = 0



What we propose:

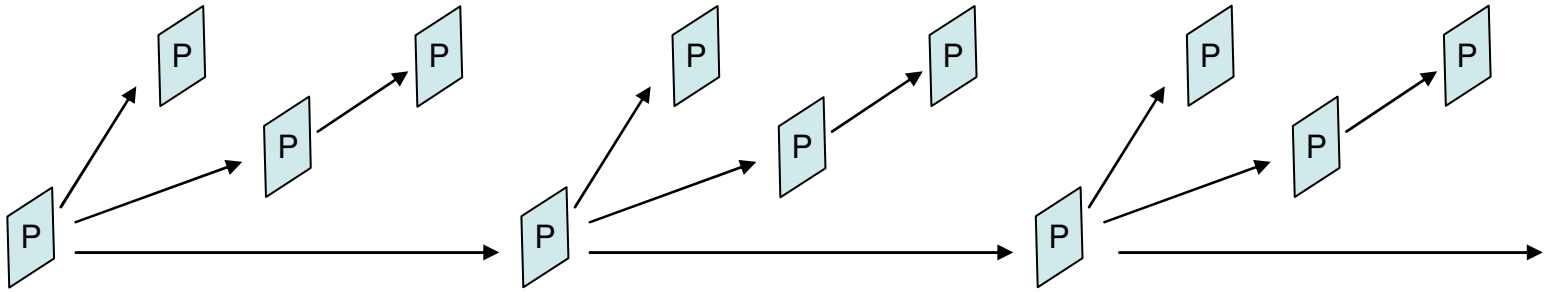
- Unify temporal layer switching points and Clean Random Access Pictures in **Temporal Layer Access pictures**



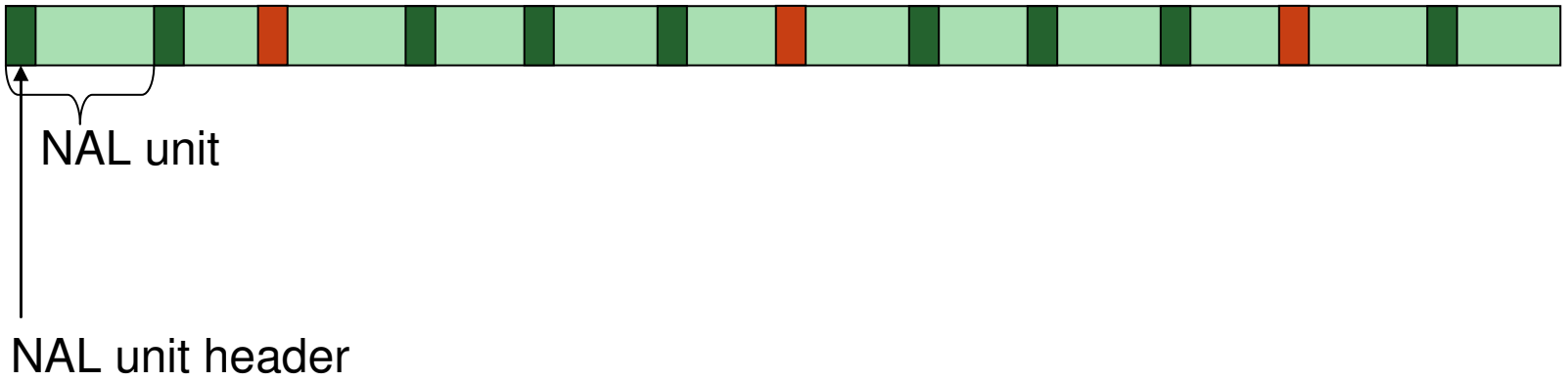
- Informal definition:
  1. X and all pictures in B do not use any picture in A for prediction.
  2. No picture in B precedes X in decoding order.

Proposed scheme for switching

Coding structure:

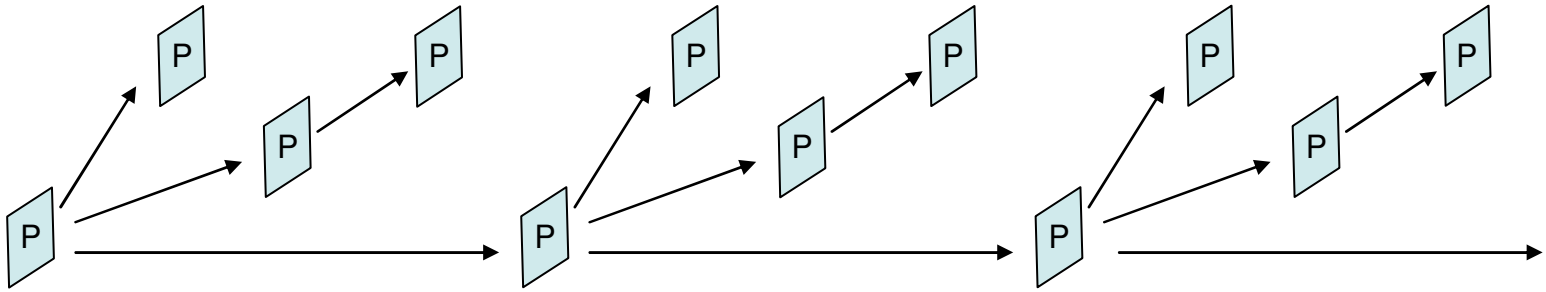


Bitstream:

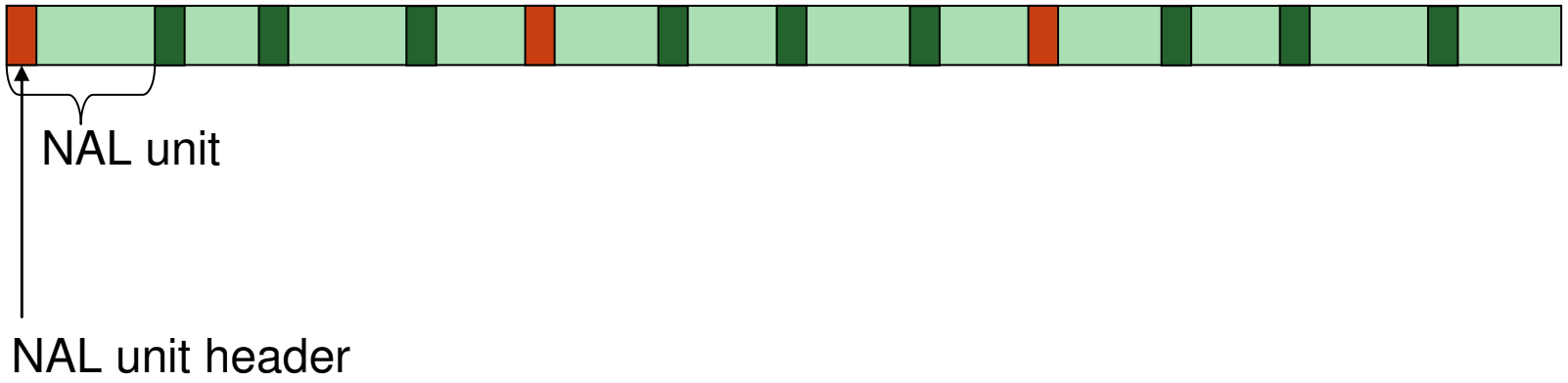


Current scheme for switching

Coding structure:



Bitstream:



Formal definition

temporal layer access (TLA) picture: A *coded picture* that fulfills the requirement that the TLA picture and all *coded pictures* with temporal_id higher than or equal to the temporal_id of the TLA picture that follow the TLA picture both in *decoding order* and *output order* shall not use *inter prediction* from any *picture* with temporal_id higher than or equal to the temporal_id of the TLA picture that precedes the TLA picture either in *decoding order* or *output order*; and any *picture* with temporal_id higher than or equal to the temporal_id of the TLA picture that precedes the TLA picture in *decoding order* also precedes the TLA picture in *output order*.

clean random access (CRA) picture: A *temporal layer access picture* for which temporal_id equals 0.

Formal definition alternative 2

Higher or Equal Temporal Layer (HETL) picture: A *picture* with temporal_id higher than or equal to the temporal_id of the current picture.

temporal layer access (TLA) picture: A *coded picture* that fulfills the requirement that the TLA picture and all *HETL pictures* that follow the TLA picture both in *decoding order* and *output order* shall not use *inter prediction* from any HETL *picture* that precedes the TLA picture either in *decoding order* or *output order*; and any HETL *picture* that precedes the TLA picture in *decoding order* also precedes the TLA picture in *output order*.

clean random access (CRA) picture: A *temporal layer access picture* for which temporal_id equals 0.

Proposed syntax and semantics changes

- No syntax changes proposed
- Replace CRA NAL unit type with TLA NAL unit type

nal_unit_type	Content of NAL unit and RBSP syntax structure	NAL unit type class
0	Unspecified	non-VCL
1	Coded slice of a non-IDR and non-~~CRA~~ TLA picture slice_layer_rbsp( )	VCL
2-3	Reserved	n/a
4	Coded slice of a ~~CRA~~ TLA picture slice_layer_rbsp( )	VCL
5	Coded slice of an IDR picture slice_layer_rbsp( )	VCL
…	…	…

Proposal summary

- Restrict CRA to temporal layer 0
- Unify the definitions of temporal layer switching point and Clean Random Access pictures
- Replace CRA NAL unit type with TLA NAL unit type

Advantages

- Makes temporal layer switching point information available in the NAL unit header
  - Makes it possible to perform switching without parsing slice header and PPS
- Does not need bits in NAL unit header and does not increase the number of NAL unit types

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