TEMPORAL LAYER ACCESS PICTURES

JCTVC-H0566

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THE FOLLOWING IS PROPOSED:

1. Restrict CRA pictures to have temporal_id equal to 0

2. Introduce Temporal Layer Access (TLA) pictures (to represent switching points) with temporal_id > 0

3. Let CRA pictures and TLA pictures share the same NAL unit type (4)

4. Remove temporal layer switching point syntax in PPS

WHY?

With temporal layer switching point information in the NAL unit header a network node can perform temporal layer switching by only looking at the NAL unit header. Significantly easier than having to parse slice header, follow the link to the active PPS and parse temporal layer switching point information.

HOW?

› By restricting CRA pictures to temporal layer zero the same NAL unit type can be used for temporal layer switching points

› Thus it is possible to make this information available in the NAL unit header with no additional bits and no additional NAL unit type.

› Temporal layer access pictures can further be used in specification of bitstream subsets as proposed in JCTVC-H0568

nal_unit_type	temporal_id	Current WD	Proposed
4	0	CRA	CRA
4	1	CRA?	temporal layer switching point from temporal layer 0 to any temporal layer >= 1
4	2	CRA?	temporal layer switching point from temporal layer 1 to any temporal layer >= 2

DEFINITIONS

clean random access (CRA) access unit: An *access unit* in which the *primary coded picture* is a *CRA picture*.

clean random access (CRA) picture: A *coded picture* containing only *I slices* and for which each *slice* has nal_unit_type equal to 4 and temporal_id equal to 0; 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*.

temporal layer access (TLA) unit: An *access unit* in which the *primary coded picture* is a *TLA picture*.

temporal layer access (TLA) picture: A *coded picture* for which each *slice* has nal_unit_type equal to 4 and temporal_id greater than 0; 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*.

SEMANTICS

For the semantics of nal_unit_type, the following is proposed to be added:

When the value of nal_unit_type is equal to 4 for a NAL unit containing a slice of a particular picture, the picture shall not contain NAL units with nal_unit_type equal to 1 or 5. If temporal_id of such a picture is equal to 0 it is referred to as a CRA picture. Otherwise (if temporal_id is greater than 0), such a picture is referred to as a TLA picture.

When the value of nal_unit_type is equal to 5 for a NAL unit containing a slice of a particular picture, the picture shall not contain NAL units with nal_unit_type equal to 1 or 4. For coded video sequences conforming to one or more of the profiles specified in Annex A that are decoded using the decoding process specified in clauses 2-9, such picture is referred to as an IDR picture.
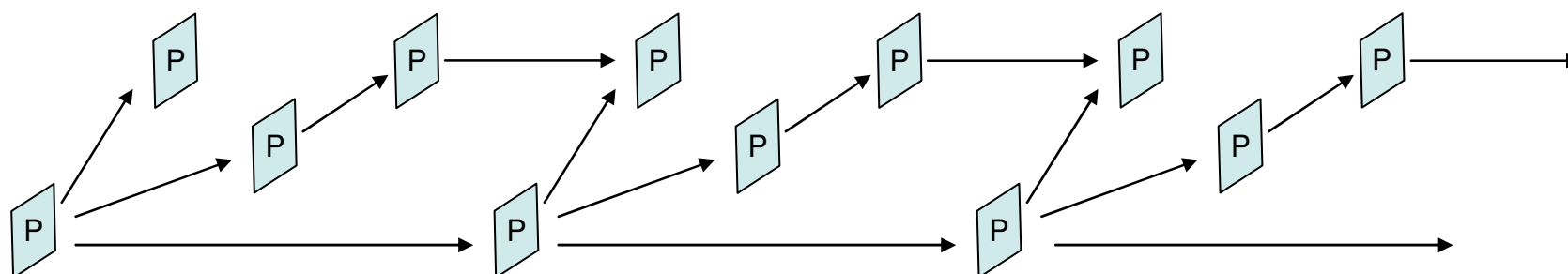
For the semantics of temporal_id, the following is proposed to be added:

temporal_id specifies a temporal identifier for the NAL unit. The value of temporal_id shall be the same for all NAL units of an access unit. When an access unit contains any NAL unit with nal_unit_type equal to 5, temporal_id shall be equal to 0. When nal_unit_type is equal to 4 and slice_type is not equal to I, temporal_id shall not be equal to 0.

SEMANTICS
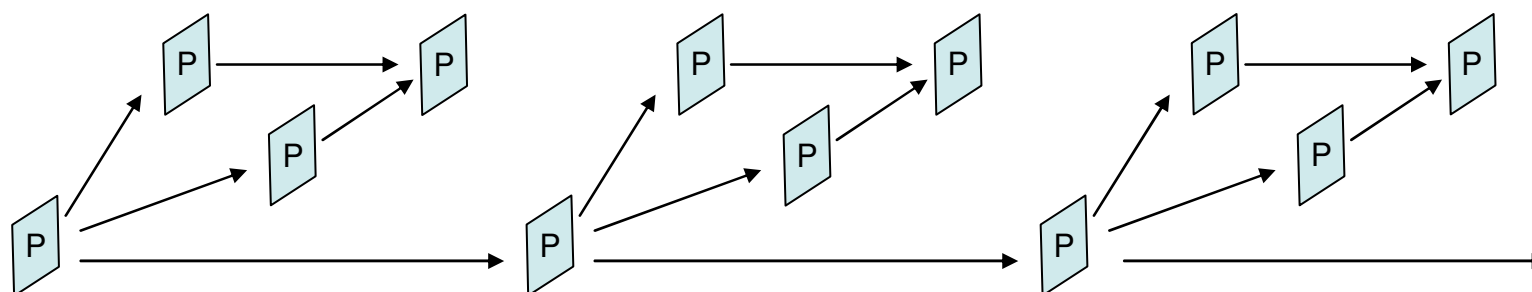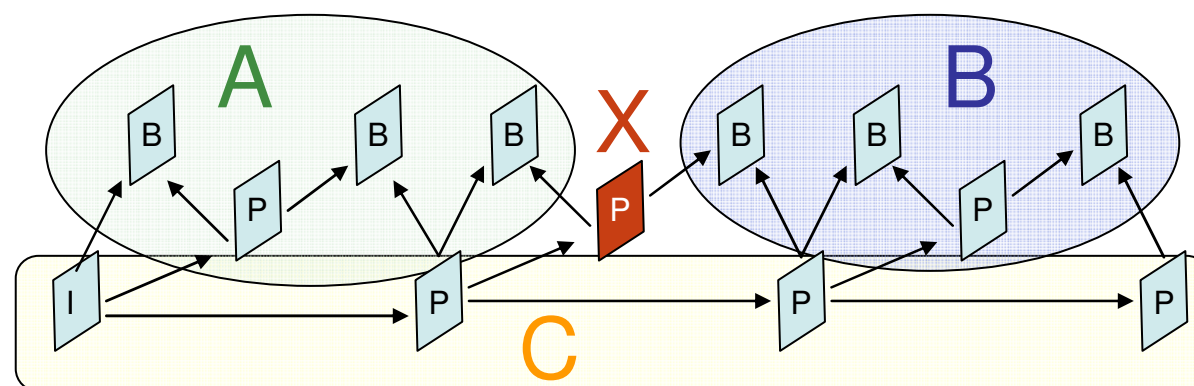
nal_unit_type	Content of NAL unit and RBSP syntax structure	NAL unit type class
0	Unspecified	non-VCL
1	Coded slice of a non-IDR, non-CRA and non-TLA picture slice_layer_rbsp( )	VCL
2-3	Reserved	n/a
4	Coded slice of a CRA picture if temporal_id is equal to 0 Coded slice of a TLA picture if temporal_id is greater than 0 slice_layer_rbsp( )	VCL
5	Coded slice of an IDR picture slice_layer_rbsp( )	VCL
6	Supplemental enhancement information (SEI) sei_rbsp( )	non-VCL
7	Sequence parameter set seq_parameter_set_rbsp( )	non-VCL
8	Picture parameter set pic_parameter_set_rbsp( )	non-VCL
9	Access unit delimiter access_unit_delimiter_rbsp( )	non-VCL
10-11	Reserved	n/a
12	Filler data filler_data_rbsp( )	non-VCL
13-23	Reserved	n/a
24..31	Unspecified	non-VCL

Coding structure supported by proposed scheme
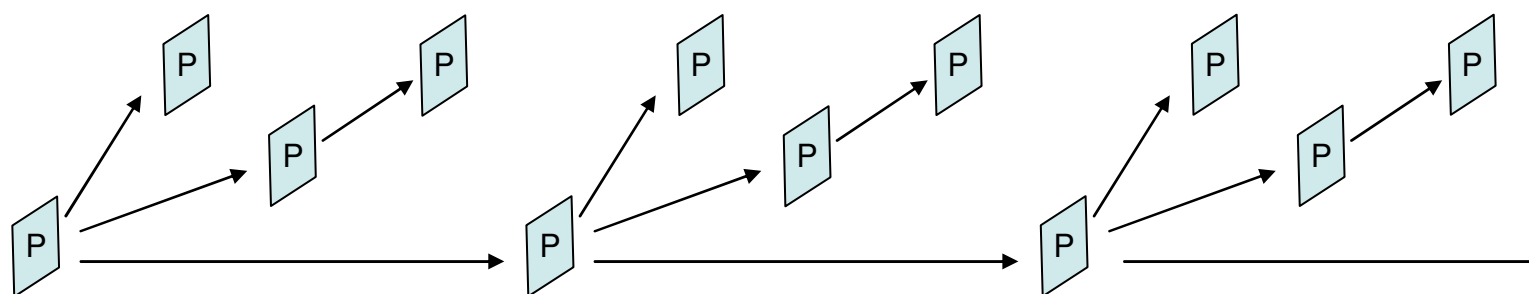but not by current scheme:

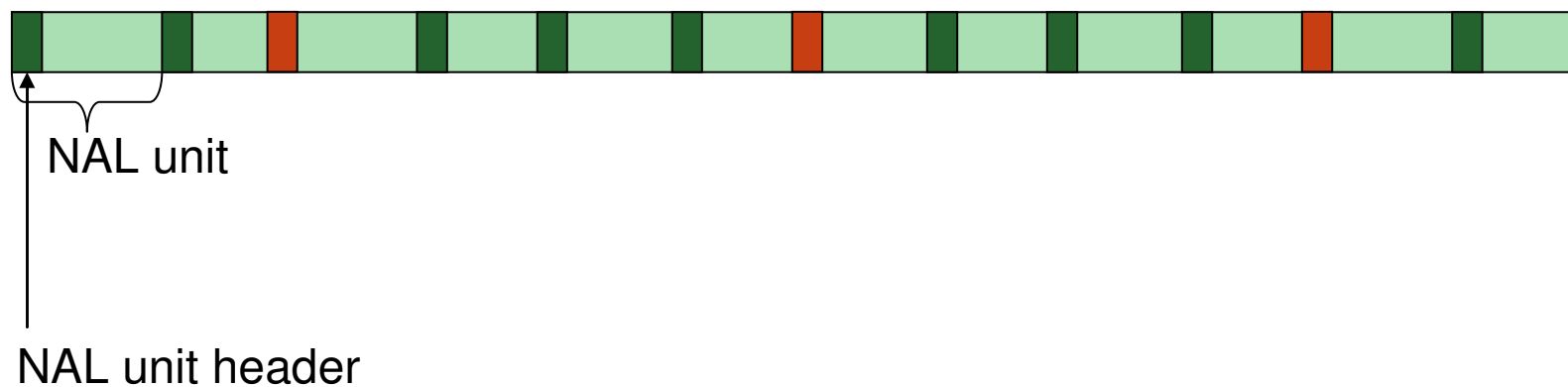Coding structure supported by current scheme
but not by proposed scheme:
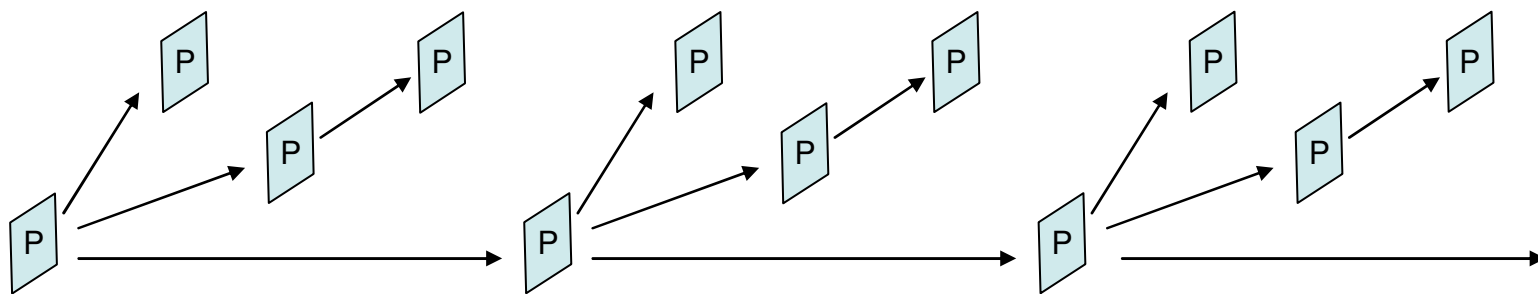
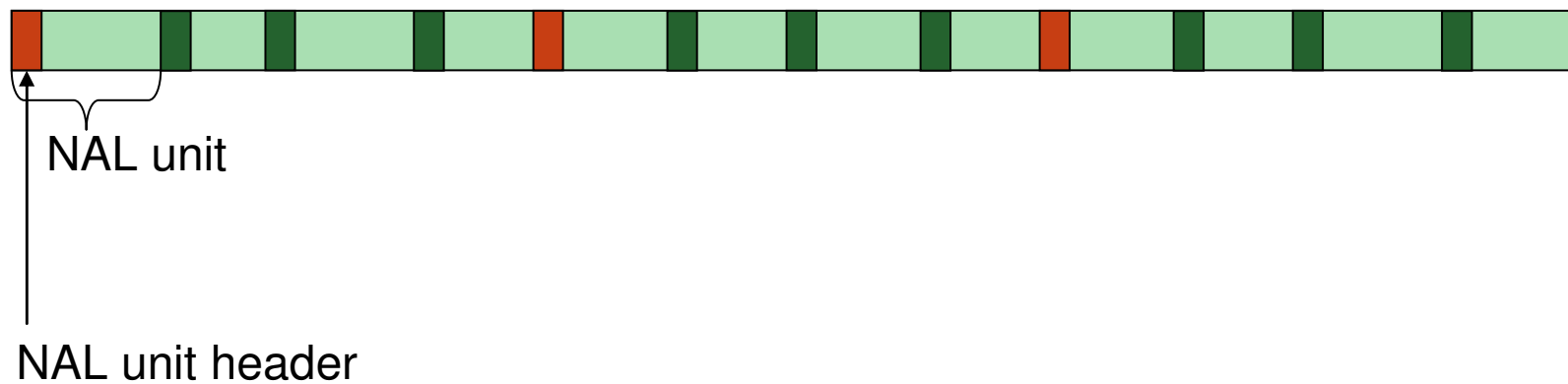# PROPOSED SCHEME FOR SWITCHING

Coding structure:

Bitstream:

NAL unit

NAL unit header

CURRENT SCHEME FOR SWITCHING

Coding structure:

Bitstream:

NAL unit

NAL unit header

SUMMARY

1. Restrict CRA pictures to have temporal_id equal to 0

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…	…	…	…