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***JCTVC-AA0029***

***MCTS EXTRACTION WITH SLICE REORDERING***

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# Problem Description

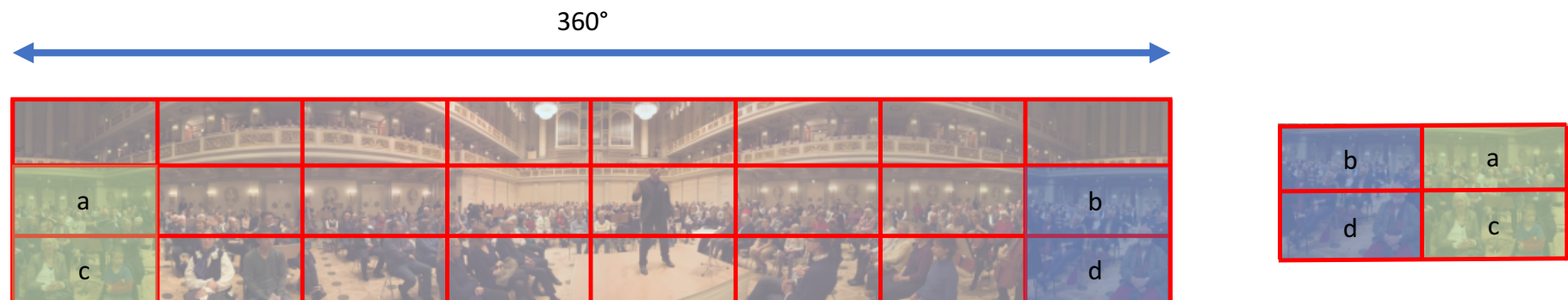
- Video subsets to be extracted potentially
  - span over picture boundaries
  - are scattered over the picture plane
- Legacy/Low tier devices may lack rendering capabilities
- Rendering module may expect certain subset arrangements
- Current MCTS extraction process maintains slice order
- Controlling tile arrangement in extracted bitstream is desirable



Cylindrical Projection

# Proposal

- Control tile arrangement per replacement slice segment addresses
1. Signalling of slice segment addresses in the MCTS EIS SEI message
  2. Incorporate a reordering step into the MCTS extraction process



# Proposal - Syntax & semantics

## 1. Signalling of slice segment addresses in the MCTS EIS SEI message.

	Descriptor
mcts_extraction_info_set( ) {	
<b>num_extraction_info_sets_minus1</b>	ue(v)
for( i = 0; i <= num_extraction_information_sets_minus1; i++ ) {	
<b>num_associated_tile_set_identifiers_minus1[ i ]</b>	ue(v)
for( j = 0; j <= num_associated_tile_set_identifiers_minus1[ i ]; j++ )	
<b>mcts_identifier[ i ][ j ]</b>	ue(v)
<b>num_slice_segments_minus1[ i ]</b>	ue(v)
for( k = 0; k <= num_slice_segments_minus1[ i ]; k++ )	
<b>output_slice_segment_address[ i ][ k ]</b>	u(v)
[ ... ]	
}	
}	

**num\_slice\_segments\_minus1[ i ]** plus 1 indicates the number of slice segments belonging to an MCTS with mcts identifier equal to any value of the list mcts\_identifier[ i ][ j ]. The value of num\_slice\_segments\_minus1[ i ] shall be in the range of 0 to 4096, inclusive.

**output\_slice\_segment\_address[ i ][ k ]** identifies the slice segment address of the k-th slice segment in bitstream order belonging to an MCTS with mcts identifier equal to any value within the list mcts\_identifier[ i ][ j ]. The length of the output\_slice\_segment\_address syntax element is  $\text{Ceil}(\text{Log2}(\text{PicSizeInCtbsY}))$  bits. The value of output\_slice\_segment\_address shall be in the range of 0 to  $\text{PicSizeInCtbsY} - 1$ , inclusive and no value of output\_slice\_segment\_address shall be in output\_slice\_segment\_address[ i ][ k ] more than once for one extraction information set.

# Proposal - Process change

## 2. Incorporate a reordering step into the MCTS extraction process.

- For the ~~k-th~~ ~~each remaining~~ VCL NAL units of each access unit in outBitstream, ~~adjust the slice segment header as follows:~~
  - ~~For the first VCL NAL unit within each access unit, set the value of first\_slice\_segment\_in\_pic\_flag equal to 1, otherwise 0.~~
  - ~~Set the value of first\_slice\_segment\_in\_pic\_flag equal to 0 and slice\_segment\_address equal to output\_slice\_segement\_address[ mctsEISIdTarget ][ k ]. according to the tile setup defined in the PPS with pps\_pic\_parameter\_set\_id equal to slice\_pic\_parameter\_set\_id.~~
- Reorder the VCL NAL units in each access unit for ascending values of slice\_segment\_address.
- For the first VCL NAL unit within each access unit, set the value of first\_slice\_segment\_in\_pic\_flag equal to 1, otherwise 0.