

JCT3V-J0037: ARP, IC and DBBP Flags Signaling

Min Woo Park

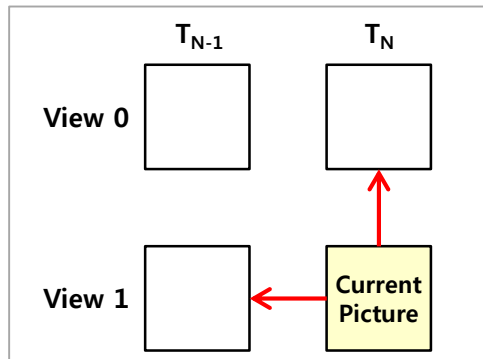
**DMC R&D Center
Samsung Electronics**

Contents

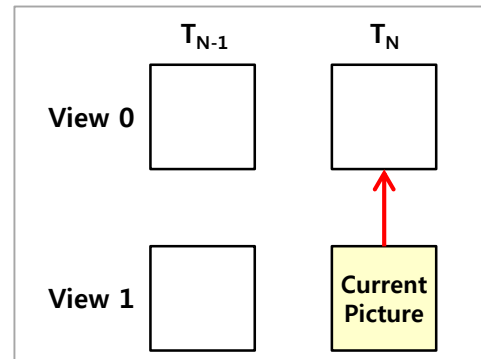
- ❖ Item 1: Signaling of Syntax Element for ARP (iv_res_pred_weight_idx)
- ❖ Item 2: Removal of Encoder Restriction of iv_res_pred_weight_idx
- ❖ Item 3: Setting Slice Level Enabling Flag for IC (slice_ic_enable_flag)
- ❖ Item 4: Signaling of Syntax Element for DBBP (dbbp_flag)

Item 1: Signaling of Syntax Element for ARP (iv_res_pred_weight_idx)

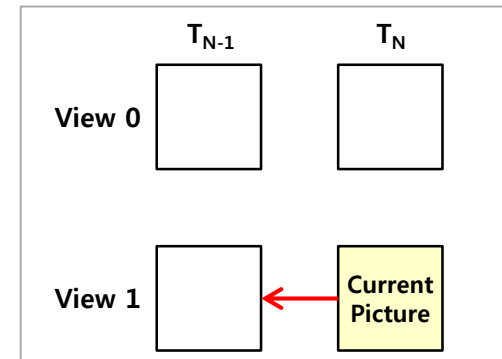
- ❖ Currently, **iv_res_pred_weight_idx** is signaled
 - “when the current slice has temporal reference picture”
- ❖ But, this condition is not sufficient
 - **iv_res_pred_weight_idx** is always signaled even when view reference picture is unavailable (i.e. ARP is never used)
- ❖ So, we propose to signal **iv_res_pred_weight_idx**
 - “when the current slice has **both** temporal **and** view reference picture”



Both temporal and view references are available



Only view reference is available



Only temporal reference is available

ARP		Used	Not Used	Not Used
CU level Signal	Current	O	X	O
	Proposed	O	X	X

Item 2: Removal of Encoder Restriction of iv_res_pred_weight_idx

- ❖ Currently, ARP has a encoder restriction, which checks whether NBDV is a default DV
 - When NBDV is the default DV, ARP is disabled (iv_res_pred_weight_idx is set to '0')
 - For this restriction, DV status needs to be stored in every CU
 - DISP_AVAILABLE: NBDV is available
 - DISP_DEFAULT: NBDV is a default DV
 - DISP_NONE: View reference is unavailable
- ❖ But, even if NBDV is a default DV, ARP can be enabled by just using the default DV
- ❖ So, we propose to remove this encoder restriction → No need to store DV status

I.7.4.9.5.2 Coding unit extension semantics

iv_res_pred_weight_idx specifies the index of the weighting factor used for residual prediction. iv_res_pred_weight_idx equal to 0 specifies that residual prediction is not used for the current coding unit. iv_res_pred_weight_idx not equal to 0 specifies that residual prediction is used for the current coding unit. When not present, the value of iv_res_pred_weight_idx is inferred to be equal to 0.

~~When DispAvailabilityIdx[x0][y0] is not equal to DISP_AVAILABLE, iv_res_pred_weight_idx shall be equal to 0.~~

❖ Simulation Results

- Based on CTC and HTM 12
- No coding loss
 - -0.01% for coded views
 - 0.00% for synthesized views

	video 0	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate	enc time	dec time	ren time
Balloons	0.00%	0.06%	-0.11%	-0.01%	-0.01%	0.05%	100.9%	104.6%	102.8%
Kendo	0.00%	-0.05%	-0.06%	0.00%	-0.01%	-0.05%	100.4%	93.8%	100.0%
Newspaper_CC	0.00%	-0.04%	-0.08%	-0.02%	-0.02%	-0.06%	99.7%	89.9%	99.6%
GT_Fly	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	99.8%	96.7%	98.0%
Poznan_Hall2	0.00%	-0.08%	0.08%	0.00%	-0.01%	0.06%	100.8%	96.3%	103.3%
Poznan_Street	0.00%	0.00%	-0.03%	-0.01%	-0.01%	-0.03%	100.5%	99.1%	101.0%
Undo_Dancer	0.00%	-0.01%	-0.01%	0.00%	0.00%	0.00%	100.0%	100.6%	100.7%
Shark	0.00%	0.00%	-0.01%	0.00%	0.00%	-0.01%	100.2%	102.4%	102.9%
1024x768	0.00%	-0.01%	-0.08%	-0.01%	-0.01%	-0.02%	100.3%	96.1%	100.8%
1920x1088	0.00%	-0.02%	0.00%	0.00%	0.00%	0.01%	100.3%	99.0%	101.2%
average	0.00%	-0.02%	-0.03%	-0.01%	-0.01%	0.00%	100.3%	97.9%	101.0%

Item 3: Setting Slice Level Enabling Flag for IC (slice_ic_enable_flag)

- ❖ When **slice_ic_enable_flag** is set to '1', CU level **ic_flag** should be signaled
- ❖ But, even when there is no view reference picture in the current slice,
 - **slice_ic_enable_flag** might be set to '1'
 - although IC is never used, **ic_flag** is signaled in CU level
- ❖ So, we propose to impose the following restriction to **slice_ic_enable_flag**

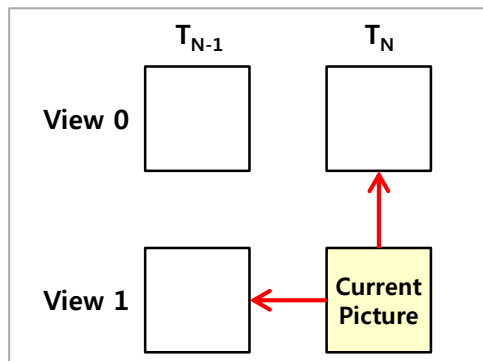
1.7.4.7.1 General slice segment header semantics

slice_ic_enable_flag equal to 1 specifies that illumination compensation is enabled for the current slice. **slice_ic_enable_flag** equal to 0 specifies that illumination compensation is disabled for the current slice. When not present, the value of **slice_ic_enable_flag** is inferred to be equal to 0.

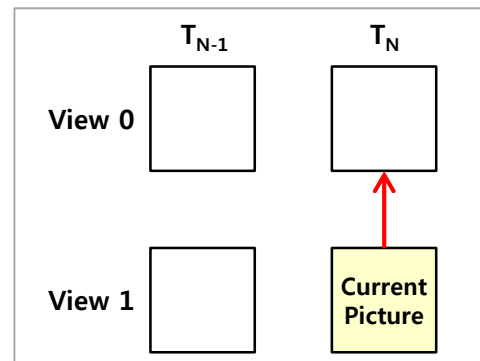
When **DefaultRefViewIdxAvailableFlag** is equal to 0, **slice_ic_enable_flag** shall be equal to 0.

DefaultRefViewIdxAvailableFlag

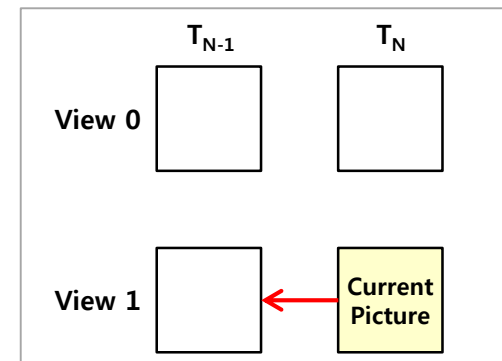
- 1: the current slice has at least one view reference
- 0: there's no view reference
- already derived in slice-level
- used for disabling VSP, IVMC, etc.



Both temporal and view references are available



Only view reference is available



Only temporal reference is available

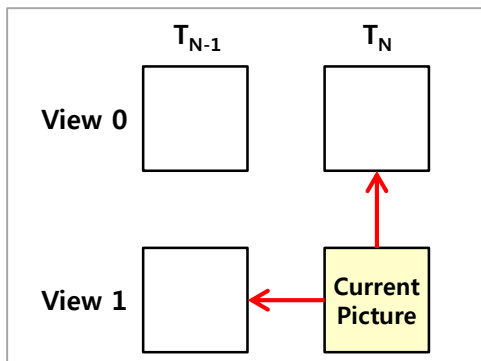
IC		Used	Used	Not Used
CU level Signal	Current	0	0	0
	Proposed	0	0	X

Item 4: Signaling of Syntax Element for DBBP (dbbp_flag)

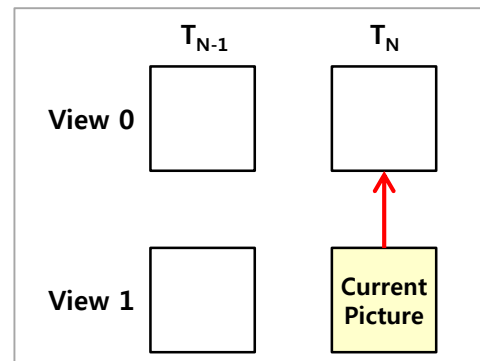
- ❖ **dbbp_flag** is signaled even when view reference picture is unavailable in the current slice
- ❖ In order to avoid the unnecessary signaling,
 - We propose that **dbbp_flag** is signaled only when the current slice has at least one view reference picture

I.7.3.8.5 Coding unit syntax

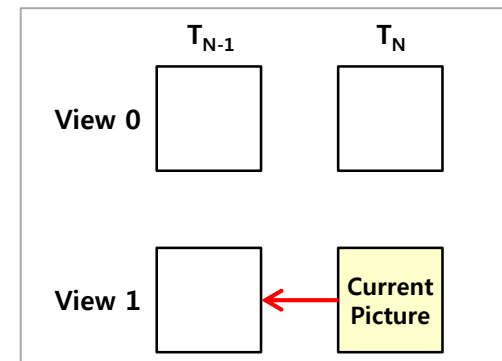
coding_unit(x0, y0, log2CbSize , ctDepth) {	Descriptor
...	ae(v)
if(depth_based_blk_part_flag[nuh_layer_id] && (log2CbSize > 3) && (PartMode == PART_2NxN PartMode == PART_Nx2N) && DefaultRefViewIdxAvailableFlag)	
dbbp_flag[x0][y0]	ae(v)
...	



Both temporal and
view references are available



Only view reference is available



Only temporal reference is available

DBBP		Used	Used	Not Used
CU level Signal	Current	O	O	O
	Proposed	O	O	X

Conclusion

- ❖ We proposed methods for signaling of the syntax elements for ARP, IC, and DBBP
 - When there is no view reference picture in the current slice, it is proposed not to signal the CU level syntax elements for ARP, IC and DBBP
 - Unnecessary signaling can be avoided
 - And it is also proposed to remove unnecessary encoder restriction of ARP
 - The storage for DV status of the current CU can be also removed.
 - No coding loss for all proposed methods
- ❖ We recommend to adopt the proposed methods into next 3D-HEVC Working Draft

Thanks Sharp for the cross check (JCT3V-J0077).

