##### Derivation process for temporal luma motion vector prediction

Inputs to this process are

* a luma location ( xP, yP ) specifying the top-left luma sample of the current prediction unit relative to the top-left sample of the current picture,
* variables specifying the width and the height of the prediction unit for luma, nPSW and nPSH,
* the reference index of the current prediction unit partition refIdxLX (with X being 0 or 1).

Outputs of this process are

* the motion vector prediction mvLXCol,
* the availability flag availableFlagLXCol.

The function RefPicOrderCnt( picX, refIdx, LX ) returns the picture order count PicOrderCntVal of the reference picture with index refIdx from reference picture list LX of the picture picX and is specified as follows.

RefPicOrderCnt( picX, refIdx, LX ) = PicOrderCnt(RefPicListLX( refIdx ) of the picture picX) (8 141)

Depending on the values of slice\_type and collocated\_from\_l0\_flag, the variable colPic, specifying the picture that contains the co-located partition, is derived as follows.

* If slice\_type is equal to B and collocated\_from\_l0\_flag is equal to 0, the variable colPic specifies the picture that contains the co-located partition as specified by RefPicList1[ 0 ].
* Otherwise (slice\_type is equal to B and collocated\_from\_l0\_flag is equal to 1 or slice\_type is equal to P) , the variable colPic specifies the picture that contains the co-located partition as specified by RefPicList0[ 0 ].

Variable colPu and its position ( xPCol, yPCol ) are derived in the following ordered steps:

1. The variable colPu is derived as follows

yPRb = yP + nPSH (8‑141)

* + If ( yP >> Log2MaxCuSize ) is equal to ( yPRb >> Log2MaxCuSize ), the horizontal component of the right-bottom luma position of the current prediction unit is defined by

xPRb = xP + nPSW (8‑140)

and the variable colPu is set as the prediction unit covering the modified position given by ( ( xPRb >> 4 ) << 4, ( yPRb >> 4 ) << 4 ) inside the colPic.

* + Otherwise ( ( yP >> Log2MaxCuSize ) is not equal to ( yPRb >> Log2MaxCuSize ) ), colPu is marked as unavailable.

1. When colPu is coded in an intra prediction mode or colPu is unavailable, the following applies.
   * Central luma position of the current prediction unit is defined by

xPCtr = ( xP + ( nPSW >> 1 ) (8‑142)

yPCtr = ( yP + ( nPSH >> 1 ) (8‑143)

* + The variable colPu is set as the prediction unit covering the modified position given by ( ( xPCtr >> 4 ) << 4, ( yPCtr >> 4 ) << 4 ) inside the colPic.

1. ( xPCol, yPCol ) is set equal to the top-left luma sample of the colPu relative to the top-left luma sample of the colPic.

The variables mvLXCol and availableFlagLXCol are derived as follows.

* If colPu is coded in an intra prediction mode or colPu is unavailable, both components of mvLXCol are set equal to 0 and availableFlagLXCol is set equal to 0.
* Otherwise (colPu is not coded in an intra prediction mode and colPu is available), the motion vector mvCol, the reference index refIdxCol, and the reference list identifier listCol are derived as follows.
  + If PredFlagL0[ xPCol ][ yPCol ] is equal to 0, mvCol, refIdxCol, and listCol are set equal to MvL1[ xPCol ][ yPCol ], RefIdxL1[ xPCol ][ yPCol ], and L1, respectively.
  + Otherwise (PredFlagL0[ xPCol ][ yPCol ] is equal to 1), the following applies.
  + If PredFlagL1[ xPCol ][ yPCol ] is equal to 0, mvCol, refIdxCol, and listCol are set equal to MvL0[ xPCol ][ yPCol ], RefIdxL0[ xPCol ][ yPCol ], and L0, respectively.
  + Otherwise (PredFlagL1[ xPCol ][ yPCol ] is equal to 1), the following assignments are made.
    - * If PicOrderCnt of every picture in every reference picture lists is less than or equal to PicOrderCnt( currPic ), mvCol, refIdxCol, and listCol are set equal to MvLX[ xPCol ][ yPCol ], RefIdxLX[ xPCol ][ yPCol ] and LX, respectively with X being the value of X this process is invoked for.
      * Otherwise (PicOrderCnt of at least one picture in at least one reference picture list is greater than PicOrderCnt( currPic )), mvCol, refIdxCol and listCol are set equal to MvLN[ xPCol ][ yPCol ], RefIdxLN[ xPCol ][ yPCol ] and LN, respectively with N being the value of collocated\_from\_l0\_flag.

and the variable availableFlagLXCol is set equal to 1 and the following applies.

* + If PicOrderCnt( colPic ) – RefPicOrderCnt( colPic, refIdxCol, listCol ) is equal to PicOrderCnt( currPic ) - RefPicOrderCnt( currPic, refIdxLX, LX ),

mvLXCol = mvCol (8‑144)

* + Otherwise, mvLXCol is derived as scaled version of the motion vector mvCol as specified below

tx = ( 16384 + ( Abs( td ) >>1 ) ) / td (8‑145)

DistScaleFactor = Clip3( −4096, 4095, ( tb \* tx + 32 ) >> 6 ) (8‑146)

mvLXCol =  Sign( DistScaleFactor \* mvCol ) \*    
 ( (Abs( DistScaleFactor \* mvCol ) + 127 ) >> 8 ) (8‑147)

where td and tb are derived as

td = Clip3( -128, 127, PicOrderCnt( colPic ) – RefPicOrderCnt( colPic, refIdxCol, listCol ) ) (8‑148)

tb = Clip3( -128, 127, PicOrderCnt( currPic ) – RefPicOrderCnt( currPic, refIdxLX, LX ) ) (8‑149)