### Residual coding semantics

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**significant\_coeff\_group\_flag**[ xCG ][ yCG ] specifies for the coefficient group position ( xCG, yCG ) within the current transform block whether the corresponding coefficient group at location ( xCG, yCG ) has non-zero transform coefficient level. A coefficient group at location ( xCG, yCG ) is an array of 16 transform coefficient levels at locations ( xC, yC ), where the first coefficient level is at location ( xCG’, yCG’ ). The coefficient group at location ( xCGLastSig, yCGLastSig ) contains the last significant position ( LastSignificantCoeffX, LastSignificantCoeffY ).

* If scanIdx is equal to 1 and log2TrafoWidth is equal to 3 and log2TrafoHeight is equal to 3,
  + Coefficient groups are 8x2
  + ( xCG’, yCG’ ) is equal to ( 0, yCG << 1 )
  + ( xCGLastSig, yCGLastSig ) is equal to ( 0, LastSignificantCoeffY >> 1 )
* Otherwise, if scanIdx is equal to 2 and log2TrafoWidth is equal to 3 and log2TrafoHeight is equal to 3,
  + Coefficient groups are 2x8
  + ( xCG’, yCG’ ) is equal to ( xCG << 1, 0 )
  + ( xCGLastSig, yCGLastSig ) is equal to ( LastSignificantCoeffX >> 1, 0 )
* Otherwise,
  + Coefficient groups are 4x4 (width x height)
  + ( xCG’, yCG’ ) is equal to ( xCG << 2, yCG << 2 )
  + ( xCGLastSig, yCGLastSig ) is equal to (LastSignificantCoeffX >> 2, LastSignificantCoeffY >> 2 )
* If significant\_coeff\_group\_flag[ xCG ][ yCG ] is equal to 0, the 16 transform coefficient levels of the coefficient group at location ( xCG, yCG ) are inferred to be equal to 0;
* Otherwise (significant\_coeff\_group\_flag[ xCG ][ yCG ] is equal to 1), the following applies.
* If significant\_coeff\_group\_flag[ xCG ][ yCG ] is present or ( xCG’, yCG’ ) is the last significant position ( LastSignificantCoeffX, LastSignificantCoeffY ), at least one of the 16 transform coefficient levels of the coefficient group at location ( xCG, yCG ) has a non zero value.
* Otherwise, at least one of the 16 significant\_coeff\_flag syntax elements is present for the coefficient group at location ( xCG, yCG )

When significant\_coeff\_group\_flag[ xCG ][ yCG ] is not present, it is inferred as follows.

* If one or more of the following conditions are true, significant\_coeff\_group\_flag[ xCG ][ yCG ] is inferred to be equal to 1.
* ( xCG, yCG ) is equal to ( xCGLastSig, yCGLastSig )
* ( xCG, yCG ) is equal to ( 0, 0 )
* Otherwise, significant\_coeff\_group\_flag[ xCG ][ yCG ] is inferred to be equal to 0.