The object of the present invention is solved by the subject-matter of the independent claims.

There is disclosed an apparatus for receiving an input video data stream is provided. The input video data stream has a video encoded thereinto. The apparatus is configured to generate an output video data stream from the input video data stream. Moreover, the apparatus is to determine whether a picture of the video preceding a dependent random access picture shall be output or not.

Moreover, a video data stream is provided. The video data stream has a video encoded thereinto. The video data stream comprises an indication that indicates whether a picture of the video preceding a dependent random access picture shall be output or not.

Furthermore, a video encoder is provided. The video encoder is configured to encode a video into a video data stream. Moreover, the video encoder is configured to generate the video data stream such that the video data stream comprises an indication that indicates whether a picture of the video preceding a dependent random access picture shall be output or not.

Moreover, a video decoder for receiving a video data stream having a video stored therein is provided. The video decoder is configured to decode the video from the video data stream. The video decoder is configured to decode the video depending on an indication indicating whether a picture of the video preceding a dependent random access picture shall be output or not.

Furthermore, a method for receiving an input video data stream is provided. The input video data stream has a video encoded thereinto. The method comprises generating an output video data stream from the input video data stream. Moreover, the method comprises determining whether a picture of the video preceding a dependent random access picture shall be output or not.

Moreover, a method for encoding a video into a video data stream is provided. The method comprises generating the video data stream such that the video data stream comprises an indication that indicates whether a picture of the video preceding a dependent random access picture shall be output or not.

Furthermore, a method for receiving a video data stream having a video stored therein is provided. The method comprises decoding the video from the video data stream. Decoding the video is conducted depending on an indication indicating whether a picture of the video preceding a dependent random access picture shall be output or not.

Moreover, computer programs for implementing one of the above-described methods when being executed on a computer or signal processor are provided.

In accordance with an aspect of the invention, an apparatus for receiving one or more input video data streams is provided. Each of the one or more input video data streams has an input video encoded thereinto. The apparatus is configured to generate an output video data stream from the one or more input video data streams, the output video data stream encoding an output video, wherein the apparatus is configured to generate the output video data stream such that the output video is the input video being encoded within one of the one or more input video data streams, or such that the output video depends on the input video of at least one of the one or more input video data streams. Moreover, the apparatus is configured to determine an access unit removal time of a current picture of a plurality of pictures of the output video from a coded picture buffer. The apparatus is configured to determine whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer depending at least on a concatenation flag.

Furthermore, a video data stream is provided. The video data stream has a video encoded thereinto. The video data stream comprises coded picture buffer delay offset information.

In accordance with another aspect of the invention, a non-transitory digital storage medium storing a video data stream is provided. The video data stream has a video encoded thereinto. The video data stream comprises coded picture buffer delay offset information and a concatenation flag. A determination of whether or not to use the coded picture buffer delay offset information is used for determining a removal time of a picture from a coded picture buffer depends at least on the concatenation flag.

In accordance with another aspect of the invention, a video encoder is provided. The video encoder is configured to encode a video into a video data stream. The video encoder is configured to generate the video data stream such that the video data stream comprises coded picture buffer delay offset information and a concatenation flag. The video encoder

is configured to determine whether or not to use the coded picture buffer delay offset information for determining a removal time of a picture from a coded picture buffer depends at least on the concatenation flag.

In accordance with an aspect of the invention, a video decoder for receiving a video data stream a video stored therein is provided. The video decoder is configured to decode the video from the video data stream. Moreover, the video decoder is configured to decode the video depending on an access unit removal time of a current picture of a plurality of pictures of the video from a coded picture buffer. The video decoder is configured to decode the video depending at least on a concatenation flag on an indication indicating whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer.

Moreover, a method for receiving one or more input video data streams is provided. Each of the one or more input video data streams has an input video encoded thereinto. The method comprises generating an output video data stream from the one or more input video

data streams, the output video data stream encoding an output video, wherein generating the output video data stream is conducted such that the output video is the input video being encoded within one of the one or more input video data streams, or such that the output video depends on the input video of at least one of the one or more input video data streams. Moreover, the method comprises determining an access unit removal time of a current picture of a plurality of pictures of the output video from a coded picture buffer. Furthermore, the method comprises determining whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer.

Furthermore, a method for encoding a video into a video data stream according to an embodiment is provided. The method comprises generating the video data stream such that the video data stream comprises coded picture buffer delay offset information.

Moreover, a method for receiving a video data stream a video stored therein is provided. The method comprises decoding the video from the video data stream. Decoding the video is conducted depending on an access unit removal time of a current picture of a plurality of pictures of the video from a coded picture buffer. Moreover, decoding the video is conducted depending on an indication indicating whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer.

Furthermore, computer programs for implementing one of the above-described methods when being executed on a computer or signal processor are provided.

There is disclosed a video data stream is provided. The video data stream has a video encoded thereinto. Moreover, the video data stream comprises an initial coded picture buffer removal delay. Furthermore, the video data stream comprises an initial coded picture buffer removal offset. Moreover, the video data stream comprises information that indicates whether or not a sum of the initial coded picture buffer removal delay and the initial coded picture buffer removal offset is defined to be constant across two or more buffering periods.

Furthermore, a video encoder is provided. The video encoder is configured to encode a video into a video data stream. Moreover, the video encoder is configured to generate the video data stream such that the video data stream comprises an initial coded picture buffer

There is disclosed a video data stream is provided. The video data stream has a video encoded thereinto. Moreover, the video data stream comprises an indication indicating whether or not a non-scalable nested picture timing supplemental enhancement information message of a network abstraction layer unit of an access unit of the plurality of access units of a coded video sequence of a one or more coded video sequences of the video data stream is defined to apply to all output layer sets of a plurality of output layer sets of said access unit. If the indication has a first value, then the non-scalable nested picture timing supplemental enhancement information message of said network abstraction layer unit of said access unit is defined to apply to all output layer sets of the plurality of output layer sets of said access unit. If the indication has a value being different from the first value, then the indication does not define whether or not the non-scalable nested picture timing supplemental enhancement information message of said network abstraction layer unit of said access unit applies to all output layer sets of the plurality of output layer sets of said access unit.

Moreover, a video encoder is provided. The video encoder is configured to encode a video into a video data stream. Moreover, the video encoder is configured to generate the video data stream such that the video data stream comprises an indication indicating whether or not a non-scalable nested picture timing supplemental enhancement information message of a network abstraction layer unit of an access unit of the plurality of access units of a coded video sequence of a one or more coded video sequences of the video data stream is defined to apply to all output layer sets of a plurality of output layer sets of said access unit. If the indication has a first value, then the non-scalable nested picture timing supplemental enhancement information message of said network abstraction layer unit of said access unit is defined to apply to all output layer sets of the plurality of output layer sets of said access unit. If the indication has a value being different from the first value, then the indication does not define whether or not the non-scalable nested picture timing supplemental enhancement information message of said network abstraction layer unit of said access unit applies to all output layer sets of the plurality of output layer sets of said access unit.

Furthermore, an apparatus for receiving an input video data stream is provided., The input video data stream has a video encoded thereinto. The apparatus is configured to generate an processed video data stream from the input video data stream. Moreover, the apparatus is configured to generate the processed video data stream such that the processed video data stream comprises an indication indicating whether or not a non-scalable nested picture

network abstraction layer unit of said access unit applies to all output layer sets of the plurality of output layer sets of said access unit.

Moreover, computer programs for implementing one of the above-described methods when being executed on a computer or signal processor are provided.

There is disclosed a video data stream is provided. The video data stream has a video encoded thereinto. Moreover, the video data stream comprises one or more scalable nested supplemental enhancement information messages. The one or more scalable nested supplemental enhancement information messages comprise a plurality of syntax elements. Each syntax element of one or more syntax elements of the plurality of syntax elements is defined to have a same size in every one of the scalable nested supplemental enhancement information messages of the video data stream or of a portion of the video data stream.

Moreover, a video encoder is provided. The video encoder is configured to encode a video into a video data stream. Moreover, the video encoder is configured to generate the video data stream such that the video data stream comprises one or more scalable nested supplemental enhancement information messages. Furthermore, the video encoder is configured to generate the video data stream such that the one or more scalable nested supplemental enhancement information messages comprise a plurality of syntax elements. Moreover, the video encoder is configured to generate the video data stream such that each syntax element of one or more syntax elements of the plurality of syntax elements is defined to have a same size in every one of the scalable nested supplemental enhancement information messages of the video data stream or of a portion of the video data stream.

Furthermore, an apparatus for receiving an input video data stream is provided. The input video data stream has a video encoded thereinto. The apparatus is configured to generate an output video data stream from the input video data stream. The video data stream comprises one or more scalable nested supplemental enhancement information messages. The one or more scalable nested supplemental enhancement information messages comprise a plurality of syntax elements. Each syntax element of one or more syntax elements of the plurality of syntax elements is defined to have a same size in every one of the scalable nested supplemental enhancement information messages of the video data stream or of a portion of the video data stream. The apparatus is configured to process the one or more scalable nested supplemental enhancement information messages.

Claims

1. An apparatus for receiving one or more input video data streams, wherein each of the one or more input video data streams has an input video encoded thereinto,

wherein the apparatus is configured to generate an output video data stream from the one or more input video data streams, the output video data stream encoding an output video, wherein the apparatus is configured to generate the output video data stream such that the output video is the input video being encoded within one of the one or more input video data streams, or such that the output video depends on the input video of at least one of the one or more input video data streams,

wherein the apparatus is configured to determine an access unit removal time of a current picture of a plurality of pictures of the output video from a coded picture buffer,

wherein the apparatus is configured to determine whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer depending at least on a concatenation flag.

2. The apparatus according to claim 1,

wherein the apparatus is configured to drop a group of one or more pictures of the input video of a first video data stream of the one or more input video data streams to generate the output video data stream,

wherein the apparatus is configured to determine an access unit removal time for at least one of the plurality of pictures of the output video from the coded picture buffer depending on the coded picture buffer delay offset information.

3. The apparatus according to claim 1,

wherein a first video received by the apparatus is a preprocessed video which results from an original video from which a group of one or more pictures has been dropped to generate the preprocessed video,

wherein the apparatus is configured to determine an access unit removal time for at least one of the plurality of pictures of the output video from the coded picture buffer depending on the coded picture buffer delay offset information.

4. The apparatus according to claim 2, wherein the buffer delay offset information depends on a number of pictures of the input video that have been dropped.

5. The apparatus according to claim 2,

wherein the one or more input video data streams are two or more input video data streams, and

wherein the apparatus is configured to splice the processed video and the input video of a second video data stream of the two or more input video data streams to obtain the output video, and is configured to encode the output video into the output video data stream.

6. The apparatus according to claim 5,

wherein the apparatus is configured to determine whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture, depending on a location of the current picture within the output video, or

wherein the apparatus is configured to determine whether or not to set a coded picture buffer delay offset value of the coded picture buffer delay offset information to 0 for determining the access unit removal time of the current picture depending on the location of the current picture within the output video.

7. The apparatus according to claim 1, wherein the apparatus is configured to determine the access unit removal time of the current picture depending on a removal time of a preceding picture.

8. The apparatus according to claim 1, wherein the apparatus is configured to determine the access unit removal time of the current picture depending on initial coded picture buffer removal delay information.

9. The apparatus according to claim 8, wherein the apparatus is configured to update the initial coded picture buffer removal delay information depending on a clock tick to obtain temporary coded picture buffer removal delay information to determine the access unit removal time of the current picture.

10. The apparatus according to claim 1,

wherein if the concatenation flag is set to a first value, then the apparatus is configured to use the coded picture buffer delay offset information to determine one or more removal times, and

wherein if the concatenation flag is set to a second value being different from the first value then the apparatus is configured to not use the coded picture buffer delay offset information to determine the one or more removal times.

11. The apparatus according to claim 1, wherein the apparatus is configured to signal to a video decoder, whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer.

12. The apparatus according to claim 11, wherein the current picture is located at a splicing point of the output video, where two input videos have been spliced.

13. A non-transitory digital storage medium storing a video data stream,

wherein the video data stream has a video encoded thereinto,

wherein the video data stream comprises coded picture buffer delay offset information and a concatenation flag,

wherein a determination of whether or not to use the coded picture buffer delay offset information is used for determining a removal time of a picture from a coded picture buffer depends at least on the concatenation flag.

14. The non-transitory digital storage medium storing a video data stream according to claim 13, wherein the video data stream comprises initial coded picture buffer removal delay information.

15. The non-transitory digital storage medium storing a video data stream according to claim 13,

wherein if the concatenation flag is set to a first value then the concatenation flag indicates that the coded picture buffer delay offset information needs to be used to determine one or more removal times, and

wherein if the concatenation flag is set to a second value being different from the first value then the concatenation flag indicates that the indicated offset is not used to determine the one or more removal times.

16. A video encoder,

wherein the video encoder is configured to encode a video into a video data stream,

wherein the video encoder is configured to generate the video data stream such that the video data stream comprises coded picture buffer delay offset information and a concatenation flag,

wherein the video encoder is configured to determine whether or not to use the coded picture buffer delay offset information for determining a removal time of a picture from a coded picture buffer depends at least on the concatenation flag.

17. The video encoder according to claim 16, wherein the video encoder is configured to generate the video data stream such that the video data stream comprises initial coded picture buffer delay offset information.

18. The video encoder according to claim 16,

wherein if the concatenation flag is set to a first value then the concatenation flag indicates that the coded picture buffer delay offset information needs to be used to determine one or more removal times, and

wherein if the concatenation flag is set to a second value being different from the first value then the concatenation flag indicates that the indicated offset is not used to determine the one or more removal times.

19. A video decoder for receiving a video data stream a video stored therein,

wherein the video decoder is configured to decode the video from the video data stream,

wherein the video decoder is configured to decode the video depending on an access unit removal time of a current picture of a plurality of pictures of the video from a coded picture buffer,

wherein the video decoder is configured to decode the video depending at least on a concatenation flag on an indication indicating whether or not to use coded picture buffer delay offset information for determining the access unit removal time of the current picture from the coded picture buffer.

20. The video decoder according to claim 19, wherein the access unit removal time for at least one of the plurality of pictures of the video from the coded picture buffer depends on the coded picture buffer delay offset information.

21. The video decoder according to claim 19, wherein the video decoder is configured to decode the video depending on whether or not a coded picture buffer delay offset value of the coded picture buffer delay offset information is set to 0.

22. The video decoder according to claim 19,

wherein the video decoder is configured to determine the access unit removal time of the current picture depending on a removal time of a preceding picture.

23. The video decoder according to claim 19, wherein the video decoder is configured to determine the access unit removal time of the current picture depending on initial coded picture buffer removal delay information.

24. The video decoder according to claim 23, wherein the video decoder is configured to update the initial coded picture buffer removal delay information depending on a clock tick to obtain temporary coded picture buffer removal delay information to determine the access unit removal time of the current picture.

25. The video decoder according to claim 19,

wherein if the concatenation flag is set to a first value then the video decoder is configured to use the coded picture buffer delay offset information to determine one or more removal times, and

wherein if the concatenation flag is set to a second value being different from the first value then the video decoder is configured to not use the coded picture buffer delay offset information to determine the one or more removal times.