CLAIMS:

1. A method for signaling chained auxiliary media content over Dynamic Adaptive Streaming over Hypertext Transfer Protocol (DASH) media stream, the method being performed by at least one processor, the method comprising:

receiving one or more auxiliary descriptors associated with a main DASH media stream, wherein a respective auxiliary descriptor among the one or more auxiliary descriptors includes a Uniform Resource Locator (URL) referencing one or more auxiliary media presentation descriptions (MPDs) and a stack mode value indicating a stack operation supported by the main DASH media stream,

wherein a first value of the stack mode value indicates that all auxiliary media segments of the one or more auxiliary MPDs in a stack are played only once in an order,

wherein a second value of the stack mode value indicates that the all auxiliary media segments in the stack are played in the order cyclically such that a first auxiliary media segment of the one or more auxiliary MPDs in the stack is replayed after a last auxiliary media segment of the one or more auxiliary MPDs in the stack, and

wherein a third value of the stack mode value indicates that at least one auxiliary media segment in the stack is replayed a plurality of times and out of the order based on a stack level;

retrieving one or more auxiliary media segments based on the URL referenced in the respective auxiliary descriptors among the one or more auxiliary descriptors, wherein the one or more auxiliary media segments is independent of one or more main DASH media segments; and

playing the one or more auxiliary media segments and the one or more main DASH media segments from a media source extension (MSE) source buffer at least once based on the one or more auxiliary MPDs and the stack mode value.

2. The method of claim 1, wherein the one or more auxiliary descriptors further include:

a departing information, wherein the departing information comprises a first information for playing the one or more auxiliary media segments, wherein the first value is relative to MPD availability start time (AST) of a main MPD; and

a rejoining information, wherein the rejoining information comprises a second information for rejoining the main MPD.

3. The method of claim 2, wherein the departing information comprises one of:

a first departing value indicating that the one or more auxiliary media segments be played immediately upon retrieval;

a second departing value indicating that the one or more auxiliary media segments be played at an end of a current MPD, wherein the current MPD is one of the main MPD and an auxiliary MPD among the one or more auxiliary MPDs; and

a third departing value indicating that the one or more auxiliary media segments be played at a specific offset from the MPD availability start time.

4. The method of claim 2, wherein the rejoining information comprises one of:

a first rejoining value indicating a return to the main MPD at a departure time from the main MPD to the one or more auxiliary MPDs;

a second rejoining value indicating a return to the main MPD at an end of the one or more auxiliary MPDs;

a third rejoining value indicating a return to a live edge of the main MPD; and

a fourth rejoining value indicating a return to the main MPD at an offset of the departure time from the main MPD to the one or more auxiliary MPDs.

5. The method of claim 1, wherein the one or more auxiliary descriptors is signaled in an essential descriptor at an MPD level or a supplemental descriptor at the MPD level.

6. The method of claim 1, wherein the one or more auxiliary descriptors is signaled as an MPD event.

7. The method of claim 6, wherein the MPD event has an event scheme with an on_receive dispatch mode.

8. The method of claim 6, wherein the MPD event has an equivalency rule that applies to all instances of the MPD event.

9. The method of claim 6, wherein the MPD event has an equivalency rule that applies to particular instances of the MPD event.

10. The method of claim 6, wherein the MPD event comprises departing information, rejoining information, and the stack mode value.

11. An apparatus for signaling chained auxiliary media content over Dynamic Adaptive Streaming over Hypertext Transfer Protocol (DASH) media stream, the apparatus comprising:

at least one memory configured to store computer program code;

at least one processor configured to access the computer program code and operate as instructed by the computer program code, the computer program code including:

receiving code configured to cause the at least one processor to receive one or more auxiliary descriptors associated with a main DASH media stream, wherein a respective auxiliary descriptor among the one or more auxiliary descriptors includes a Uniform Resource Locator (URL) referencing one or more auxiliary media presentation descriptions (MPDs) and a stack mode value indicating a stack operation supported by the main DASH media stream,

wherein a first value of the stack mode value indicates that all auxiliary media segments of the one or more auxiliary MPDs in a stack are played only once in an order,

wherein a second value of the stack mode value indicates that the all auxiliary media segments in the stack are played in the order cyclically such that a first auxiliary media segment of the one or more auxiliary MPDs in the stack is replayed after a last auxiliary media segment of the one or more auxiliary MPDs in the stack, and

wherein a third value of the stack mode value indicates that at least one auxiliary media segment in the stack is replayed a plurality of times and out of the order based on a stack level;

retrieving code configured to cause the at least one processor to retrieve one or more auxiliary media segments based on the URL referenced in the respective auxiliary descriptors among the one or more auxiliary descriptors, wherein the one or more auxiliary media segments is independent of one or more main DASH media segments; and playing code configured to cause the at least one processor to play the one or more auxiliary media segments and the one or more main DASH media segments from a media source extension (MSE) source buffer at least once based on the one or more auxiliary MPDs and the stack mode value.

12. The apparatus of claim 11, wherein the one or more auxiliary descriptors further include:

a departing information, wherein the departing information comprises a first information for playing the one or more auxiliary media segments, wherein the first value is relative to MPD availability start time (AST) of a main MPD; and

a rejoining information, wherein the rejoining information comprises a second information for rejoining the main MPD.

13. The apparatus of claim 11, wherein the one or more auxiliary descriptors is signaled in an essential descriptor at an MPD level or a supplemental descriptor at the MPD level.

14. The apparatus of claim 11, wherein the one or more auxiliary descriptors is signaled as an MPD event.

15. The apparatus of claim 14, wherein the MPD event has an equivalency rule that applies to all instances of the MPD event.

16. A non-transitory computer-readable medium storing instructions, the instructions comprising: one or more instructions that, when executed by one or more processors of a device for signaling chained auxiliary media content including pre-roll media content, mid-roll media content, and end-roll media content in a main dynamic adaptive streaming over HTTP (DASH) media stream, cause the one or more processors to:

receiving one or more auxiliary descriptors associated with a main DASH media stream, wherein a respective auxiliary descriptor among the one or more auxiliary descriptors includes a Uniform Resource Locator (URL) referencing one or more auxiliary media presentation descriptions (MPDs) and a stack mode value indicating a stack operation supported by the main DASH media stream,

wherein a first value of the stack mode value indicates that all auxiliary media segments of the one or more auxiliary MPDs in a stack are played only once in an order,

wherein a second value of the stack mode value indicates that the all auxiliary media segments in the stack are played in the order cyclically such that a first auxiliary media segment of

the one or more auxiliary MPDs in the stack is replayed after a last auxiliary media segment of the one or more auxiliary MPDs in the stack, and

wherein a third value of the stack mode value indicates that at least one auxiliary media segment in the stack is replayed a plurality of times and out of the order based on a stack level;

retrieving one or more auxiliary media segments based on the URL referenced in the respective auxiliary descriptors among the one or more auxiliary descriptors, wherein the one or more auxiliary media segments is independent of one or more main DASH media segments; and

playing the one or more auxiliary media segments and the one or more main DASH media segments from a media source extension (MSE) source buffer at least once based on the one or more auxiliary MPDs and the stack mode value.

17. The non-transitory computer-readable medium of claim 16, wherein the one or more auxiliary descriptors further include:

a departing information, wherein the departing information comprises a first information for playing the one or more auxiliary media segments, wherein the first value is relative to MPD availability start time (AST) of a main MPD; and

a rejoining information, wherein the rejoining information comprises a second information for rejoining the main MPD.