CLAIMS

1. A method for delivering a live video content using adaptive streaming from a cache server (130) to a client device (140) during a live video content delivery session, the live video content being divided into segments, the segments being further divided into chunks, the method being implemented by the cache server (130), wherein the method comprises:

- receiving (S200) from the client device (140) a manifest request that requests a manifest of the live video content, referred to as original manifest, and obtaining (S202) said original manifest;

- determining (S204) whether or not said manifest request is the very first manifest request in said live video content delivery session;

wherein, in the case where said manifest request is the very first one in said live video content delivery session, the method comprises:

- rewriting (S206) said original manifest by modifying a descriptor of at least one chunk so as to insert at least one additional start of independent group of pictures;

- transmitting (S208) the rewritten manifest to the client device in response to the received manifest request;

wherein, in the case where said manifest request is not the very first one in said live video content delivery session, the method comprises:

- determining (S210) whether or not at least one previously modified descriptor needs to be present in the requested manifest, according to whether or not the original manifest lists at least one chunk that needs transcoding, in view of the rewritten manifest transmitted in response to the very first manifest request of the live video content delivery session;

- in the case where at least one previously modified descriptor needs to be described, altering (S212) the original manifest with said at least one previously modified descriptor by replacing the description of said at least one chunk that needs transcoding in the original manifest by the description of said at least one chunk that needs transcoding which was put in the rewritten manifest transmitted in response to the very first manifest request of the live video content delivery session, and transmitting (S214) said altered original manifest in response to the received manifest request; and

- otherwise, transmitting (S216) the original manifest in response to the received manifest request.

2. The method according to claim 1, wherein modifying the descriptor of at least one chunk when rewriting (S206) said original manifest comprises:
- identifying (S304) a join point expected to be used later by the client device (140) to start playing the live video content;
- rewriting (S310) said original manifest so as to insert one said additional start of independent group of pictures at said identified join point.

3. The method according to claim 2, wherein the join point expected to be used later on by the client device (140) to start playing the live video content is defined as a predefined offset backward from the end of the list of chunks in the original manifest.

4. The method according to claim 2 or 3, comprising:
- checking whether or not a start of independent group of pictures is present at the identified join point;
- in the case where a start of independent group of pictures is present at the identified join point, transmitting (S308) the original manifest in response to the received manifest request;
- in the case where a start of independent group of pictures is not present at the identified join point, rewriting (S310) said original manifest so as to insert at least one additional start of independent group of pictures at said join point; and
- transmitting (S312) the rewritten manifest to the client device in response to the received manifest request.

5. The method according to any one of claims 1 to 4, wherein the method further comprises, when receiving (S402) a chunk request that requests a chunk described in said rewritten manifest or altered original manifest:
- instructing (S410) a transcoder (160) to perform transcoding so as to obtain said requested chunk by decoding chunks in original form, reencoding the decoded chunks by inserting the at least one additional start of independent group of pictures and extracting the requested chunk described in the received chunk request;
- receiving (S412) the requested chunk from the transcoder (160); and
- transmitting (S414) said requested chunk to the client device (140).

6. The method according to claim 5, wherein chunks being indexed by byte range in the rewritten manifest, the method further comprises zero-padding the requested chunk received from the transcoder to keep the byte range unchanged before and after transcoding and compressing the zero-padded chunk using entropy coding.

7. The method according to any one of claims 1 to 6, wherein said adaptive streaming is compliant with LL- DASH or LL-HLS protocol.

8. A computer program product comprising instructions causing implementation of the method according to any one of claims 1 to 7, when the instructions are executed by a processor.

9. A storage medium storing instructions causing implementation of the method according to any one of claims 1 to 7, when the instructions are read from the storage medium and executed by a processor.

10. A cache server configured to deliver a live video content using adaptive streaming to a client device during a live video content delivery session, the live video content being segmented into segments, the segments being further divided into chunks, the cache server comprising electronic circuitry configured to implement:

- receiving (S200) from the client device (140) a manifest request that requests a manifest of the live video content, referred to as original manifest, and obtaining (S202) said original manifest;
- determining (S204) whether or not said manifest request is the very first manifest request in said live video content delivery session;

wherein, in the case where said manifest request is the very first one in said live video content delivery session, the method comprises:

- rewriting (S206) said original manifest by modifying a descriptor of at least one chunk so as to insert at least one additional start of independent group of pictures;
- transmitting (S208) the rewritten manifest to the client device in response to the received manifest request;

wherein, in the case where said manifest request is not the very first one in said live video content delivery session, the method comprises:

- determining (S210) whether or not at least one previously modified descriptor needs to be present in the requested manifest, according to whether or not the original manifest lists at least one chunk that needs transcoding, in view of the rewritten manifest transmitted in response to the very first manifest request of the live video content delivery session;
- in the case where at least one previously modified descriptor needs to be described, altering (S212) the original manifest with said at least one previously modified descriptor by replacing the description of said at least one chunk that needs transcoding in the original manifest by the description of said at least one chunk that needs transcoding which was put in the rewritten manifest transmitted in response to the very first manifest request of the live video content delivery session, and transmitting (S214) said altered original manifest in response to the received manifest request; and
- otherwise, transmitting (S216) the original manifest in response to the received manifest request.

11. A Content Delivery Network CDN comprising a cache server according to claim 10.