~~An object of the present technology is to~~ Embodiments of the present invention allow for reliable transport of time information for obtaining decoding time and/or presentation time to a receiver in a transport structure for next-generation broadcasting.

Solution to Problem

[0006]

~~A concept of the present technology is a transmission apparatus including: a transport stream generation unit configured to generate a transport stream in which a first transport packet containing transport media in a payload and a second transport packet containing information about the transport media in a payload, are time-division multiplexed; a transport stream transmission unit configured to transmit the transport stream to a receiver through a predetermined transmission channel; and a time information insertion unit configured to insert time information for allowing the receiver to obtain decoding time and/or presentation time into the first transport packet or the second transport packet.~~

According to a first aspect, there is provided a transmission apparatus comprising: a transport stream generation unit configured to generate a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed; a transport stream transmission unit configured to transmit the transport stream to a receiver through a predetermined transmission path; and a time information insertion unit configured to insert a value of a display time of the transport medium included in the first transport packet to the second transport packet.

[0007]

In ~~the present technology~~ an embodiment, the transport stream generation unit generates a transport stream. In the transport stream, a first transport packet containing transport media in a payload and a second transport packet containing information about the transport media in a payload, are time-division multiplexed. For example, the first transport packet and the second transport packet may be MMT packets. The transport stream transmission unit transmits the transport stream to a receiver through a predetermined transmission channel. For example, the predetermined transmission channel may be an RF transmission channel or a communication network transmission channel.

[0008]

The time information insertion unit inserts time information for allowing a receiver to obtain decoding time and/or presentation time into the first transport packet or the second transport packet. For example, the transport media contained in the first transport packet may include one or more access units, and the time information inserted

by the time information insertion unit may be information for obtaining decoding time and/or presentation time corresponding to each of the one or more access units.

[0009]

In this case, the time information inserted by the time information insertion unit may have a value of decoding time or presentation time corresponding to the initial access unit of the one or more access units, and an offset value from decoding time to presentation time each corresponding to each access unit. This use of the offset value allows for efficient delivery of the time information. Further, in this case, the time information inserted by the time information insertion unit may be presentation time, or presentation time and decoding time, corresponding to each of the one or more access units. This delivery of the presentation time itself, or the presentation time and the decoding time themselves, can reduce a process load on a receiver.

[0010]

In this case, the offset value may be a relative offset value corresponding to an absolute offset value, and conversion information for converting the relative offset value into the absolute offset value may be added to the time information inserted by the time information insertion unit. This use of the relative offset value allows for efficient delivery of the offset value to a receiver. For example, the time information insertion unit may insert the relative offset value after variable length coding. This use of variable length coding can reduce time information transmission capacity.

[0011]

For example, the payload of the first transport packet may include a payload header portion and a payload body portion, and the time information insertion unit may insert the time information into the payload header portion. For example, the payload of the first transport packet may include a payload header portion and a payload body portion, in the payload body portion, fragment payloads each containing one or more access units obtained by fragmenting the transport media, may be provided together with fragment headers, and the time information insertion unit may insert, into the fragment header or the fragment payload, time information of the corresponding access unit. For example, the payload of the second transport packet may include a payload header portion and a payload body portion, and the time information insertion unit may insert the time information into the payload body portion.

[0012]

Thus, in ~~the present technology~~ an embodiment, time information for allowing a receiver to obtain decoding time and presentation time is inserted in the first transport packet or the second transport packet, and in a transport structure for next-generation broadcasting, the time information for obtaining decoding time and/or presentation time can be reliably delivered to a receiver.

[0013]

~~Another concept of the present technology is a reception apparatus including: a transport stream reception unit configured to receive a transport stream in which a first transport packet containing transport media in a payload and a second transport packet containing information about the transport media in a payload, are time-division multiplexed, from a transmitter through a predetermined transmission channel. Time information for obtaining decoding time and/or presentation time is inserted in the first transport packet or the second transport packet.~~

According to a second aspect, there is provided a transmission method comprising the steps of: generating a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed; transmitting the transport stream to a receiver through a predetermined transmission path; and inserting a value of a display time of the transport medium included in the first transport packet to the second transport packet.

The reception apparatus further includes a transport media processing unit configured to process the transport media extracted from the transport stream using the decoding time and/or presentation time obtained based on the time information.

[0014]

In ~~the present technology~~ an embodiment, the transport stream reception unit receives a transport stream from a transmitter through a predetermined transmission channel. In the transport stream, a first transport packet containing transport media in a payload and a second transport packet containing information about the transport media in a payload, are time-division multiplexed. Time information for obtaining decoding time and/or presentation time is inserted in the first transport packet or the second transport packet. The transport media processing unit processes transport media extracted from the transport stream using the decoding time and/or presentation time obtained based on the time information.

[0015]

For example, the transport media contained in the first transport packet may include one or more access units, the time information may be a value of decoding time or presentation time corresponding to an initial access unit of the one or more access units, and a relative offset value corresponding to an absolute offset value from decoding time to presentation time each corresponding to each access unit, and the reception apparatus may further include an offset value conversion unit configured to convert the relative offset value into the absolute offset value.

According to a third aspect, there is provided a reception apparatus comprising: a transport stream reception unit configured to receive a transport stream in which a first

transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed from a transmitter through a predetermined transmission path, wherein a value of a display time of the transport medium included in the first transport packet is inserted to the second transport packet, and the reception device further comprising: a transport medium processing unit configured to process the transport medium taken out of the transport stream based on the value of a display time.

According to a fourth aspect, there is provided a reception method comprising the step of: receiving a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed from a transmitter through a predetermined transmission path, wherein a value of a display time of the transport medium included in the first transport packet is inserted to the second transport packet, and the reception method further comprising the step of: processing the transport medium taken out of the transport stream based on the value of a display time.

[0016]

Thus, in ~~the present technology~~ an embodiment, time information for obtaining decoding time and/or presentation time is inserted in the first transport packet or the second transport. Decoding time and/or presentation time can be obtained based on the time information, and transport media extracted from a transport stream can be reliably processed.

Advantageous Effects of Invention

[0017]

According to ~~the present technology~~ embodiments of the present invention, in a transport structure for next-generation broadcasting, time information for obtaining decoding time and/or presentation time can be reliably delivered to a receiver. Note that the advantages described herein are for illustrative purposes only and are not intended to be limited, and there may be additional advantages.

Brief Description of Drawings

[0018]

[FIG. 1] FIG. 1 is a block diagram showing an example configuration of a transmission/reception system according to an embodiment.

[FIG. 2] FIG. 2 is a diagram schematically showing a configuration of an MMT payload.

[FIG. 3] FIG. 3 is a diagram showing an example correspondence relationship between an MMT file and MMT packets actually delivered.

CLAIMS

~~[Claim 1] (Amended)~~

1. A transmission apparatus comprising:

a transport stream generation unit configured to generate a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed;

a transport stream transmission unit configured to transmit the transport stream to a receiver through a predetermined transmission path; and

a time information insertion unit configured to insert a value of a display time of the transport medium included in the first transport packet to the second transport packet.

~~[Claim 2] (Amended)~~

2. The transmission apparatus according to claim 1, wherein

the transport medium included in the first transport packet is configured from one or more access units, and

the time information insertion unit inserts the value of a display time corresponding to a first access unit of the one or more access units.

~~[Claim 3] (Amended)~~

3. The transmission apparatus according to claim 2, wherein

the time information insertion unit inserts an offset value from a decoding time to the display time corresponding to each of the access units.

~~[Claim 4] (Amended)~~

4. The transmission apparatus according to claim 3, wherein

the offset value is a relative offset value corresponding to an absolute offset value, and

the time information insertion unit inserts conversion information for converting the relative offset value into the absolute offset value.

~~[Claim 5]~~

5. The transmission apparatus according to claim 4, wherein

the time information insertion unit inserts the relative offset value after performing variable-length encoding of the relative offset value.

~~[Claim 6] (Deleted)~~

~~[Claim 7] (Deleted)~~

~~[Claim 8] (Deleted)~~

~~[Claim 9] (Deleted)~~

~~[Claim 10] (Amended)~~

6. The transmission apparatus according to claim 1, wherein

a payload portion of the second transport packet includes a payload header portion and a payloadbody portion, and

the time information insertion unit inserts the value of a display time to the

payload body portion.

~~[Claim 11]~~

7. The transmission apparatus according to claim 1, wherein

the predetermined transmission path is an RF transmission path or a communication network transmission path.

~~[Claim 12]~~

8. The transmission apparatus according to claim 1, wherein

the first transport packet and the second transport packet are MMT packets.

~~[Claim 13] (Amended)~~

9. A transmission method comprising the steps of:

generating a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information related to the transport medium in a payload are time-division multiplexed;

transmitting the transport stream to a receiver through a predetermined transmission path; and

inserting a value of a display time of the transport medium included in the first transport packet to the second transport packet.

~~[Claim 14] (Amended)~~

10. A reception apparatus comprising:

a transport stream reception unit configured to receive a transport stream in which a first transport packet including a transport medium in a payload and a second

transport packet including information related to the transport medium in a payload are time-division multiplexed from a transmitter through a predetermined transmission path, wherein

a value of a display time of the transport medium included in the first transport packet is inserted to the second transport packet, and

the reception device further comprising:

a transport medium processing unit configured to process the transport medium taken out of the transport stream based on the value of a display time.

~~[Claim 15] (Amended)~~

11. The reception apparatus according to claim ~~14~~10, wherein

the transport medium included in the first transport packet is configured from one or more access units, and

the value of a display time is a value of a display time corresponding to a first access unit of the one or more access units, and a relative offset value corresponding to an absolute offset value from a decoding time to the display time corresponding to each of the access units is inserted to the second transport packet, and

the reception device further comprising:

an offset value conversion unit configured to convert the relative offset value into the absolute offset value.

~~[Claim 16] (Amended)~~

12. A reception method comprising the step of:

receiving a transport stream in which a first transport packet including a transport medium in a payload and a second transport packet including information

related to the transport medium in a payload are time-division multiplexed from a transmitter through a predetermined transmission path, wherein

a value of a display time of the transport medium included in the first transport packet is inserted to the second transport packet, and

the reception method further comprising the step of:

processing the transport medium taken out of the transport stream based on the value of a display time.

~~[Claim 17] (Added)~~

13. The transmission device according to claim 1, wherein

the information related to a transport medium included in the second transport packet is control information related to the transport medium.