Description

Method for generating and/or processing a data stream description

The invention relates to a method and device for generating and/or processing a data stream description, in particular an XML-based data stream description.

XML (= Extensible Markup Language) is a language, which allows a structured description of the content of a document using XML schema language definitions. A more precise description of the XML schema language definition and the definition of XML structures, data types and content models this allows can be found in the references [1], [2] and [3].

The use of XML-based descriptions of data streams, in which the individual components of the data stream are described or identified according to their syntactic significance using BSD (Bitstream Syntax Description; see reference [4]), freely addressable gBSD (generic Bitstream Description; see reference [5]) units or in respect of adaptation possibilities, is known from the prior art (see reference [6]). These descriptions of the data stream are used to adapt the data stream by means of a generic processor with no knowledge of the data stream format. To this end the description of the data stream can first be transformed in an appropriate manner, with the data stream then being adapted based on the transformed description.

In the case of the descriptions of data streams known from the prior art, the generic processor must read the complete description for a transformation of the data stream

description or an adaptation of the data stream, in order to determine the necessary adaptations in the data stream description or in the data stream. This is disadvantageous, as enough memory has to be made available for this in the generic processor and at the start of the adaptation it is necessary to wait until the processor has received the complete description of the data stream. This is a fundamental problem in the case of broadcast services, for example digital television, in particular.

The object of the present invention is therefore to create a method for the generation and successive processing of a data stream description, with which the data stream description generated with the method allows a simple and efficient adaptation of the data stream, on which the data stream description is based, by means of a generic processor.

This object is achieved by means of the independent claims. Developments of the invention are defined in the dependent claims.

A data stream description is generated and/or processed with the claimed method, said data stream description being used to describe and/or reference and/or classify sections of a data stream and being able to be transformed by means of a processor using a transformation, with the transformed data stream description allowing an adaptation of the data stream. It should be noted here that, for the purpose of adapting the data stream, the transformation of the data stream description does not have to be executed in a separate method step but can be an implicit part of the adaptation of the data stream. The method is characterized in that one or more sections of the data stream description are identified as process units, a

process unit containing all the information from the data stream description that is required for the transformation of the process unit by means of the processor to a transformed process unit, without sections of the data stream description outside the process unit having to be accessed during the transformation of the process unit. The data stream description is preferably an XML-based data stream description, which in particular contains gBSD and/or BSD units.

The claimed method has the advantage that individual process units and the corresponding sections of the data stream can be read and processed separately in a processor for the purpose of transforming data stream descriptions and adapting data streams. As a result the processor requires less memory capacity for the transformation or adaptation and can process the data stream descriptions more quickly, as it has to search through less memory to access information. Also the successive adaptation of a data stream in small process units in a small memory only requires a short delay. This is particularly important for broadcast and streaming applications.

In a preferred embodiment of the invention at least one process unit comprises two or more parts, which are not successive in a data stream description. Non-successive sections of a data stream can also be described by a process unit.

In a further embodiment at least one sub-area of at least one process unit is identified as a persistent sub-area, containing information, which can be used during the transformation of process units following the at least one process unit. A sub-area of at least one process unit can also

be identified as a persistent sub-area, if it describes information from the data stream, which can be used during the adaptation of sections of the data stream, which are described by process units following the at least one process unit. A sub-area of a data stream description or a section of a data stream is thus defined, which is required permanently by the processor during the transformation of the data stream description or adaptation of the data stream. It can also be signaled in the claimed method how long the persistent sub-areas thus described of the process unit and/or the sections of the data stream, which are described by the sub-areas, are to be stored in a storage unit of the processor for the transformation of the data stream description and/or adaptation of the data stream. It can also be signaled that a persistent sub-area of a process unit stored in a memory of a processor should be deleted.

In a further embodiment the maximum memory capacity of the process units and/or the sections of the data stream described by the process units is signaled. As a result the processor can optionally verify whether there is sufficient memory, before processing the data stream description and/or the described data stream. If not, another processor can carry out the processing operation.

The identifications and signalings carried out in the claimed method are preferably stored in a separate data stream and/or in the data stream description.

In addition to the described method, the invention also comprises a device, which is configured such that it can be used to implement the claimed method. The device is hereby in

particular part of a device for transforming a data stream description and/or adapting a data stream.

Exemplary embodiments of the invention are described below with reference to the accompanying drawing, in which:

Figure 1 shows a schematic diagram of a claimed method for the generation and successive processing of a data stream description.

Figure 1 shows a data stream DS in the form of a bitstream, comprising a plurality of smaller sections DS-F. Figure 1 also shows a corresponding data stream description gBSD, which describes the structure of the data stream DS and is based on the generic Bitstream Description (see reference [5]) already mentioned at the start of the description. The gBSD data stream description is also a bitstream, comprising a plurality of gBSD units (see reference [5]). According to the embodiment of the claimed method shown here, individual process units PU of the data stream description gBSD are identified, with the process units in turn comprising a number of gBSD units gBSDU. The individual process units PU comprise selected descriptions of parts of the data stream DS, with the selected descriptions being combined to form process units PU such that the process units can be processed separately for a subsequent transformation T of the data stream description, without sections of the data stream description outside the process unit having to be accessed during the transformation.

In Figure 1 a processor carrying out a transformation T of the data stream description is marked gBSD-P. As a result the processor gBSD-P supplies a transformed data stream description, which comprises individual transformed process

units T-gBSD-PU. As mentioned above, the processor can hereby process the process units individually for the purpose of transformation, whereas according to the prior art the complete data stream description has to be read. The processor gBSD-P therefore requires a smaller memory and does not have to have received the complete stream for processing purposes. The individual transformed process units T-gBSD-PU then serve to carry out an adaptation of the data stream based on the transformed process units in a processor DS-P. As a result of the adaptation, the processor DS-P finally supplies individual adapted sections A-DS-F of the data stream.

Bibliography:

[1] http://www.w3.org/TR/2001/REC-xmlschema-0-20010502/

[2] http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/

[3] http://www.w3.org/TR/2001/REC-xmlschema-2-20010502/

[4] "7.4.3 BS Description generation: BSDL-2", p. 125, ISO/IEC JTC 1/SC 29/WG 11/N5933, "Study on ISO/IEC 21000-7: Digital Item Adaptation", Brisbane, October 2003

[5] "7.4.4 generic Bitstream Syntax Schema (gBS Schema)", p. 133, ISO/IEC JTC 1/SC 29/WG 11/N5933, "Study on ISO/IEC 21000-7: Digital Item Adaptation", Brisbane, October 2003

[6] "7.7 Bitstream Syntax Description Transformation Instructions", p. 151, ISO/IEC JTC 1/SC 29/WG 11/N5933, "Study on ISO/IEC 21000-7: Digital Item Adaptation", Brisbane, October 2003

Claims

1. Method for generating or processing a data stream description, with the data stream description being used to describe and/or reference sections of a data stream and with the data stream description being able to be transformed by means of a processor using a transformation, with the transformed data stream description allowing an adaptation of the data stream,
characterized in that
one or more sections of the data stream description are identified as process units, with a process unit containing all the information from the data stream description that is required for the transformation of the process unit by means of the processor to a transformed process unit, without sections of the data stream description outside the process unit having to be accessed during the transformation.

2. Method according to claim 1, with which the data stream description is used to classify sections of a data stream.

3. Method according to claim 1 or 2, with which the data stream description is an XML-based data stream description.

4. Method according to claim 3, with which the data stream description contains BSD or gBSD units.

5. Method according to one of the preceding claims, with which at least one process unit comprises two or more parts, which are not successive in the data stream description.

6. Method according to one of the preceding claims, with which non-successive sections of the data stream are described

by a process unit.

7. Method according to one of the preceding claims, with which at least one sub-area of at least one process unit is identified as a persistent sub-area, containing information that can be used during the transformation of process units following the at least one process unit.

8. Method according to one of the preceding claims, with which at least one sub-area of at least one process unit is identified as a persistent sub-area, describing information from the data stream, which can be used during the adaptation of sections of the data stream, which are described by process units following the at least one process unit.

9. Method according to claim 7 or 8, with which it is signaled how long a persistent sub-area of a process unit and/or the section of the data stream, which is described by the persistent sub-area, is to be stored in a memory of the processor for the transformation of the data stream description and/or adaptation of the data stream.

10. Method according to one of claims 7 to 9, with which it is signaled that a persistent sub-area of a process unit stored in a memory of the processor is to be deleted.

11. Method according to one of the preceding claims, with which the maximum memory capacity of the process units or the sections of the data stream described by the process units is signaled.

12. Method according to one of the preceding claims, with which the identifications and signalings carried out are

stored in a separate data stream or in the data stream description.

13. Device for generating or processing a data stream description, which is configured such that a method according to one of the preceding claims can be implemented.

14. Device according to claim 13, the device being part of a device for transforming a data stream description or adapting a data stream.