

SOURCE: Japan
TITLE: Usage of program and program element descriptors
PURPOSE: Proposal

1. Introduction

In both the Transport Stream (TS) and the Program Stream (PS) defined in ITU-T Rec. H.222.0 | IS ISO/IEC 13818-1, two fields are provided to contain program and program element descriptors. These fields are `program_info` and `ES_info` for TS, and `program_stream_info` and `elementary_stream_info` for PS. However, ITU-T Rec. H.222.0 | IS ISO/IEC 13818-1 does not explicitly specify for each descriptor which of the two fields the descriptor should be written in. Since this ambiguity may cause problems in terms of interoperability, we propose that the descriptor usage should be explicitly specified in ITU-T Rec. H.222.1 as given in this document.

2. Specification of descriptor usage

To guarantee interoperability of a wide range, it is required that:

- the receiver can decode bitstreams produced by other applications; and that
- the transmitter transmits bitstreams that can be used in other applications.

Following this idea, we propose that H.222.1 should be able to interpret descriptors that conforms to the mandatory descriptor syntax defined in section 2.1. It is also mandatory for H.222.1 to output bitstreams that conforms to this descriptor syntax.

Although not mandatory, it is advisable for H.222.1 to output bitstreams that conforms to the syntax defined in section 2.2 to achieve interoperability of a wide range. This advisable descriptor syntax is a special case of the mandatory descriptor syntax.

2.1 Mandatory descriptor syntax

Four rules of priority between `program_info` (`program_stream_info`) and `ES_info` (`elementary_stream_info`) are defined, and for each descriptor one of these priority rules is applied as shown in Table 1. Programs and elementary streams (ESs) ignore descriptors that are not relevant (e.g. An ES with a `stream_type` value of a video ES ignores `audio_stream_descriptors` in `program_info` and/or `ES_info`).

The four rules are as follows:

- A. The descriptor in `ES_info` overrides the same type of descriptor in `program_info`. However, the descriptor in `program_info` applies to all of the ESs of the program (descriptors that are not relevant are ignored).
- B. The descriptor in `program_info` is applied only to the associated program. Also the descriptor in `ES_info` is applied only to the associated ES.
- C. The descriptor is ignored when it is present in `program_info`. It is applied to the associated ES only when it is present in `ES_info`.
- D. The descriptor is ignored when it is present in `ES_info`. It is applied to the associated program only when it is present in `program_info`.

Table 1. Priority rules in the mandatory descriptor syntax

tag no.	descriptor	priority rule
2	video_stream_descriptor	A
3	audio_stream_descriptor	A
4	hierarchy_descriptor	C
5	registration_descriptor	NS
6	data_stream_alignment_descriptor	A
7	target_background_grid_descriptor	A
8	video_window_descriptor	A
9	CA_descriptor	NS
10	ISO_639_language_descriptor	A
11	system_clock_descriptor	D
12	multiplex_buffer_utilization_descriptor	A
13	copyright_descriptor	B
14	maximum_bitrate_descriptor	B*
15	private_data_indicator_descriptor	NS
16	smoothing_buffer_descriptor	B*
17	STD_descriptor	A
18	IBP_descriptor	A

NS = not specified in this recommendation

*When the descriptor in program_info conflicts with the same type of descriptor in ES_info, the descriptor in program_info takes precedence.

2.2 Descriptor syntax for the transmitter (not mandatory)

Except for the CA_descriptor and private_data_indicator_descriptor whose usage is not specified in this document, the descriptors in program_info are applied only to the associated program, and descriptors in ES_info are applied only to the associated ES. The descriptors are permitted to be present only in the fields indicated by the 'X's in Table 2. To achieve interoperability, bitstreams including invalid or inconsistent descriptors are inhibited (e.g. The presence of an audio_stream_descriptor in ES_info of a video ES is inhibited.)

Table 2. Permission of descriptor presence (not mandatory)

tag no.	descriptor	program_info (program_stream_info)	ES_info (elementary_stream_info)
2	video_stream_descriptor	.	X
3	audio_stream_descriptor	.	X
4	hierarchy_descriptor	.	X
5	registration_descriptor	NS	NS
6	data_stream_alignment_descriptor	.	X
7	target_background_grid_descriptor	.	X
8	video_window_descriptor	.	X
9	CA_descriptor	NS	NS
10	ISO_639_language_descriptor	.	X
11	system_clock_descriptor	X	.
12	multiplex_buffer_utilization_descriptor	.	X
13	copyright_descriptor	X	X
14	maximum_bitrate_descriptor	X	X
15	private_data_indicator_descriptor	NS	NS
16	smoothing_buffer_descriptor	X	X
17	STD_descriptor	.	X
18	IBP_descriptor	.	X

NS = not specified in this recommendation

X = presence of the descriptor is permitted . = presence of the descriptor is inhibited

3. Conclusion

It was pointed out in this document that Rec. ITU-T H.222.0 | IS ISO/IEC 13818-1 involves ambiguity concerning the usage of program and program element descriptors. To guarantee interoperability, an additional descriptor syntax that removes this ambiguity was proposed. We also proposed that this additional syntax should be included in ITU-T Rec. H.222.1.

END