The SDP (Session Description Protocol) Content Attribute
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Abstract

This document defines a new Session Description Protocol (SDP) media-level attribute, ‘content’. The ‘content’ attribute defines the content of the media stream in more detailed level than the media description line. The sender of an SDP session description can attach the ‘content’ attribute to one or more media streams. The receiving application can then treat each media stream differently (e.g., show it on a big screen or small screen) based on its content.
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1. Introduction

The Session Description Protocol (SDP) [1] is a protocol that is intended for describing multimedia sessions for the purposes of session announcement, session invitation, and other forms of multimedia session initiation. One of the most typical use cases of SDP is the one where it is used with the Session Initiation Protocol (SIP) [5].

There are situations where one application receives several similar media streams which are described in an SDP session description. The media streams can be similar in the sense that their content cannot be distinguished just by examining the media description lines (e.g., two video streams). The ‘content’ attribute is needed, so that the receiving application can treat each media stream appropriately based on its content.

This specification defines the SDP ‘content’ media-level attribute, which provides more information about the media stream than the ‘m’ line in an SDP session description.

2. Terminology

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in BCP 14, RFC 2119 [3] and indicate requirement levels for compliant implementations.

3. Related Techniques

The ‘label’ attribute [9] enables a sender to attach a pointer to a particular media stream. The name space of the ‘label’ attribute itself is unrestricted, so in principle it could also be used to convey information about the content of a media stream. However, in practice, this is not possible because of the need for backward compatibility. Existing implementations of the ‘label’ attribute already use values from that unrestricted namespace in an application specific way. So it is not possible to reserve portions of the ‘label’ attribute’s namespace without possible conflict with already used, application specific labels.

It is possible to assign semantics to a media stream with an external document that uses the ‘label’ attribute as a pointer. The downside of this approach is that it requires external document. Typically this kind of mechanism would be defined for some particular use case,
for example centralized conferencing.

Yet another way to attach semantics to a media stream is by using the 'i' SDP attribute, defined in [1]. However, values of the 'i' attribute are intended for human users and not for automata.

4. Motivation for the New Content Attribute

Currently, SDP does not provide any means to describe what is the content of a media stream (e.g., speaker’s image, slides, sign language) in a form that the application can understand. Of course the end user can see the content of the media stream and read its title, but the application cannot understand what the media stream contains.

The application that is receiving multiple similar (e.g., same type and format) media stream needs, in some cases, to know what is the content of those streams. This kind of situation occurs, for example, in cases where presentation slides, the speaker’s image and sign language are transported as separate media streams. It would be desirable that the receiving application could distinguish them in a way that it could handle them automatically in appropriate manner.

```
+--------------------------------------+
|+------------++----------------------+|
||            ||                      ||
|| speaker's ||                      ||
||   image   ||                      ||
||            ||                      ||
|+------------+|     presentation     ||
|+------------+|        slides        ||
||            ||                      ||
||    sign    ||                      ||
||  language  ||                      ||
||            ||                      ||
|+------------++----------------------+|
+--------------------------------------+
```

Figure 1: Application’s screen

The Figure 1 presents a screen of a typical communication application. The ‘content’ attribute enables the application to make the decision on where to show each media stream. From an end user’s perspective, it is desirable that the user does not need to arrange media stream every time the media session starts.

The ‘content’ attribute could also be used in more complex
situations. This kind of complex situation could be e.g., an application that is controlling the equipment in an auditorium. An auditorium can have many different output channels for the video (main screen and two smaller screens) and the audio (main speakers, headsets for the participants). In this kind of environment, a lot of interaction from the end user who is operating the application would be required in absence of cues from a controlling application. So, the possibility for such an application to handle the media stream without end users’ input is highly desirable.

5. The Content Attribute

This specification defines a new media-level value attribute, ‘content’. Its formatting in SDP is described by the following BNF:

\[
\text{content-attribute} = \text{a=content:} \text{ mediacnt-tag} \\
\text{mediacnt-tag} = \text{mediacnt} *(, \text{mediacnt)} \\
\text{mediacnt} = \text{"slides" / "speaker" / "sl" / "main" / "alt" / mediacnt-ext} \\
\text{mediacnt-ext} = \text{token}
\]

The ‘content’ attribute contains a token, which MAY be attached to a media stream by a sending application. It describes the content of the transmitted media stream to the receiving application. Multiple ‘content’ attribute values MAY be attached to a single media stream.

This document provides a set of pre-defined values for the ‘content’ attribute. Other values can be defined in the future. The pre-defined values are:

\begin{itemize}
\item \textbf{slides}: This is a media stream that includes presentation slides. The media type can be e.g., a video stream or a set of instant message with pictures. A typical use case for this is e.g., online seminars and courses. This is similar to the ‘presentation’ role in H.239 [11].
\item \textbf{speaker}: This is an image from the speaker. The media can be e.g., a video stream or a still image. Typical use case for this is e.g., online seminars and courses.
\item \textbf{sl}: This means that the media stream contains sign language. The media type is a video stream. A typical use case for this is one where the audio stream is translated into sign language.
\end{itemize}
main: This means that the media stream is taken from the main source. A typical use case for this is a concert, where the camera is shooting the performer.

alt: This means that the media stream is taken from the alternative source. A typical use case for this is an event, where there is a separate ambient sound and the main sound. The alternative audio stream could be e.g., the sound of a jungle. Another example is the video of the conference room while the main is the video of the speaker. This is similar to the ‘live’ role in H.239.

All of these values can be used with any media type. The application can make decisions on how to handle a single media stream based on both the media type and the value of the ‘content’ attribute. Therefore the situation where one value of ‘content’ attribute occurs more than once in a single session descriptor is not problematic.

6. The Content Attribute in the Offer/Answer Model

This specification does not define a means to discover whether or not the peer endpoint understands the ‘content’ attribute because ‘content’ values are informative only at the offer/answer model level. The fact that the peer endpoint does not understand the ‘content’ attribute does not keep the media session from being established. The only consequence is that end user interaction on the receiving side may be required to direct the individual media streams appropriately.

Since the ‘content’ attribute does not have to be understood, an SDP answer MAY contain ‘content’ attributes even if none were present in the offer. Similarly, the answer MAY contain no ‘content’ attributes even if they were present in the offer.

The ‘content’ attribute can also be used in scenarios where SDP is used in declarative style. For example, ‘content’ attributes can be used in SDP session descriptors that are distributed with Session Announcement Protocol (SAP) [8].

7. Examples

There are two examples in this section. The first example, shown below, uses only one ‘content’ attribute value per media stream:
The second example, below, shows a case where there is more than one ‘content’ attribute value per media stream. The difference to the previous example is that now the conferencing system automatically mixes the video streams from the presenter and slides:

```
v=0
o=Alice 292742730 29277831 IN IP4 131.163.72.4
s=Second lecture from information technology
c=IN IP4 131.164.74.2
t=0 0
m=video 52886 RTP/AVP 31
a=rtpmap:31 H261/9000
a=content:slides
m=video 53334 RTP/AVP 31
a=rtpmap:31 H261/9000
a=content:speaker
m=video 54132 RTP/AVP 31
a=rtpmap:31 H261/9000
a=content:slide
```

8. Operation with SMIL

The values of ‘content’ attribute, defined in Section 5, can also be used with SMIL [10]. SMIL contains a ‘param’ element, which is used for describing the content of a media flow. However, this ‘param’ element provides only application specific description of media content. By using the values of the ‘content’ attribute, this ‘param’ element can also be used to describe the media content in a globally interpretable way.

Details on how to use the values of the ‘content’ attribute with SMIL’s ‘param’ element are outside the scope of this specification.
9. Security Considerations

An attacker may attempt to add, modify, or remove 'content' attributes from a session description. This could result in an application behaving in an undesirable way. So, it is strongly RECOMMENDED that integrity protection be applied to the SDP session descriptions. For session descriptions carried in SIP [5], S/MIME [6] is the natural choice to provide such end-to-end integrity protection, as described in RFC 3261 [5]. Other applications MAY use a different form of integrity protection.

10. IANA Considerations

This document defines a new 'content' attribute for SDP. It also defines an initial set of values for it. Some general information regarding 'content' attribute is presented in the following:

Contact name: Jani Hautakorpi Jani.Hautakorpi@ericsson.com.
Attribute name: 'content'.
Type of attribute: Media level.
Subject to charset: No.
Purpose of attribute: The 'content' attribute gives information from the content of the media stream to the receiving application.
Allowed attribute values: "slides", "speaker", "sl", "main", "alt", and any other registered values.

The IANA is requested to create a subregistry for 'content' attribute values under the Session Description Protocol (SDP) Parameters registry. The initial values for the subregistry are presented in the following, and IANA is requested to add them into its database:

<table>
<thead>
<tr>
<th>Value of 'content' attribute</th>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>slides</td>
<td>RFC xxxx</td>
<td>Presentation slides</td>
</tr>
<tr>
<td>speaker</td>
<td>RFC xxxx</td>
<td>Image from the speaker</td>
</tr>
<tr>
<td>sl</td>
<td>RFC xxxx</td>
<td>Sign language</td>
</tr>
<tr>
<td>main</td>
<td>RFC xxxx</td>
<td>Main media stream</td>
</tr>
<tr>
<td>alt</td>
<td>RFC xxxx</td>
<td>Alternative media stream</td>
</tr>
</tbody>
</table>

Note for the RFC Editor: The 'RFC xxxx' in the above should be a
reference to the coming RFC number of this draft.

As per the terminology in RFC 2434 [4], the registration policy for new values for the 'content' parameter shall be 'Specification Required'.

If new values for the 'content' attribute are specified in the future, they should consist of a meta description of the contents of a media stream. New values for the 'content' attribute should not describe things like what to do in order to handle a stream.

11. Acknowledgements

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12. References

12.1. Normative References


12.2. Informational References


Authors’ Addresses

Jani Hautakorpi  
Ericsson  
Hirsalantie 11  
Jorvas 02420  
Finland  

Email: Jani.Hautakorpi@ericsson.com

Gonzalo Camarillo  
Ericsson  
Hirsalantie 11  
Jorvas 02420  
Finland  

Email: Gonzalo.Camarillo@ericsson.com
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