Using SSRC with WebRTC Simulcast
draft-alvestrand-mmusic-simulcast-ssrc-01

Abstract

This document describes a convention for sending "a=ssrc" attributes in SDP together with "a=simulcast" attributes. This allows SFUs that need SSRC information to have this info easily accessible.

Given that it is intended as an interim measure, it does not aim for being published as an RFC.

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1. Introduction

In developing the WebRTC specification, the IETF decided on a form of simulcast that doesn’t require fixed SSRC allocation, but rather used a combination of SDP tags (a=rid) [I-D.ietf-mmusic-rid] and RTP header extensions (RTPStreamId) [I-D.ietf-avtext-rid] to describe the mapping between simulcast layers and RTP streams.

The SDP format is described in [I-D.ietf-mmusic-sdp-simulcast].

This posed a problem for some SFUs, which required information on what SSRCs the incoming streams were going to appear on in order to be configured correctly.

This document gives a convention for adding information about SSRCs to the SDP produced by conformant WebRTC implementations in order to make this information available.

This document does not specify an Internet standard. It is an interim measure, intended to be useful in the time between the introduction of RID-based simulcast in browsers and the full support of RID-based simulcast by SFUs.
2. Conventions and Definitions

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. How to represent SSRC information

   The syntax for representing SSRC information is taken from [RFC5576].

   Each media section in the SDP contains one a=ssrc attribute per simulcast stream, formatted as "a=ssrc:<ssrc> cname:<cname>". The cname is the sender’s single cname as defined in [I-D.ietf-rtcweb-rtp-usage]; carrying some attribute is required by the "a=ssrc" syntax, and sending the cname is compatible with what has been done in other instances.

   The list of SSRCs used is declared in an attribute with the SIM (Simulcast) semantic, which is registered by this memo.

   The order of SSRCs in the a=ssrc-group attribute MUST match the order of the rid attributes in the corresponding streams in the "send" part of the a=simulcast: attribute.

   It is RECOMMENDED that both the a=rid: attributes and the a=ssrc: attributes appear in the same order as the order in the a=simulcast and a=ssrc-group attributes.

   It is RECOMMENDED not to use RTX with this configuration, since the inclusion of the required declarations for associating RTX SSRCs with their main SSRCs would make the SDP unwieldy and hard to interpret correctly.

4. How to request that SSRC information be included

   If an SFU wishes to request that a browser send SSRC information, it should send an offer containing the line "a=x-please-send-ssrcs", together with a line requesting simulcast:

   m=video
   a=simulcast:recv a,b,c
   a=please-send-ssrcs

   The SFU can detect whether the request has been honored by looking for a=ssrc attributes in the responding answer.
If a Javascript application wishes to request that the browser generate offers containing SSRC, it can include the non-standard attribute "showSsrcInSimulcastOffer" in the RTCPeerConnection constructor:

```javascript
pc = new RTCPeerConnection({showSsrcInSimulcastOffer: true})
```

It is possible to verify that the request is understood by checking for the presence of this attribute in the RTCPeerConnection parameters:

```javascript
if ('showSsrcInSimulcastOffer' in pc.getConfiguration()) {
    // the request has been understood correctly
}
```

Formally, this amounts to changing the API of a W3C specification, but adding nonstandard attributes to an initialization dictionary has been done before in other contexts; it seems like a relatively harmless thing to do, but should be reviewed in the W3C WEBRTC WG anyway. Publishing a separate extension document in the W3C seems like bureaucratic overkill.

5. Example

```plaintext
m=video
a=simulcast:send hi,mid,low
a=rid:hi send
a=rid:mid send
a=rid:low send
a=ssrc-group:SIM 123 456 789
a=ssrc:123 cname:foo
a=ssrc:456 cname:foo
a=ssrc:789 cname:foo
```

6. Sunsetting the interim measure

This specification is intended to give SFU authors time to convert to the new mechanism. Since the invocation of this mechanism is explicit, it is easy to check on what the usage is, and emit deprecation warnings; those should probably be emitted from day 1.

Once enough time has passed, this mechanism can be removed.

7. Open questions

NOTE IN DRAFT: The goal is to make this section empty.
It’s been suggested that it’s better to replace the a=ssrc-group: line with new tag fields either on the a=src: lines or the a=rid: lines, thus giving explicit correlation. This, however, breaks the standard format of those lines. Inventing new syntax for an interim solution seems like a Bad Thing.

People have asked whether and how this document should be published. If it makes sense to publish it as a historical record, it might make sense to publish as an RFC; it does not make sense to the author to ask for standards track publication. At the moment, it claims that publication is not sought.

8. Security Considerations

This document describes two existing mechanisms: a=simulcast and a=ssrc-group. Each of these is defined in an RFC with security considerations.

The only added attack surface here is the ability to create mismatches between the two lists of simulcast RTP streams, causing different implementations to choose different streams to display. This is a special instance of the general rule that "people who can modify your SDP can mess things up"; normal precautions when passing SDP around should be adequate.

9. IANA Considerations

This document registers the "SIM" value of "ssrc-group" in the registry titled "Semantics for the "ssrc-group" SDP Attribute", according to the procedures of [RFC5576] section 12.3. That document specifies that registration requires a standards-track document.

- Semantics: Simulcast group
- Token: SIM
- Reference: RFC XXXX

This document registers the "please-send-ssrc" attribute in the registry titled "att-field (media level only)" according to the procedures of [RFC4566] section 8.2.4. That document specifies that the registry is of type "specification required".

- Contact: Harald Alvestrand, harald@alvestrand.no, +47 73 53 43 26
- Attribute name: please-send-ssrc
- Long-form attribute name: Please send SSRC
- Type of attribute: Media level
- Subject to the charset attribute: No
- Purpose: Indicates that the sender wishes to receive SSRC information in the form specified in RFC XXXX
- Appropriate values: Not relevant

RFC Editor: Please replace "RFC XXXX" with the RFC number of this document, if published, and delete this paragraph.

If the document succeeds in being transitory in nature, registration may not be needed.

10. References

10.1. Normative References


10.2. Informative References

[I-D.ietf-rtcweb-rtp-usage]

Change log

A.1. Changes from version -00 to -01

- Corrected example JS code
- Changed group semantic name from FID to SIM
- Added IANA registration information for SIM and please-send-ssrc

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