

AVTCore  
Internet-Draft  
Obsoletes: [RFC5285](#) (if approved)  
Intended status: Standards Track  
Expires: November 12, 2016

R. Even, Ed.  
Huawei Technologies  
D. Singer  
Apple, Inc.  
H. Desineni  
May 11, 2016

**A General Mechanism for RTP Header Extensions**  
**draft-ietf-avtcare-rfc5285-bis-02.txt**

Abstract

This document provides a general mechanism to use the header extension feature of RTP (the Real-Time Transport Protocol). It provides the option to use a small number of small extensions in each RTP packet, where the universe of possible extensions is large and registration is de-centralized. The actual extensions in use in a session are signaled in the setup information for that session.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datacenter.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on November 12, 2016.

Copyright Notice

Copyright (c) 2016 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must

include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">2</a>
<a href="#">2.</a>	Requirements Notation . . . . .	<a href="#">3</a>
<a href="#">3.</a>	Design Goals . . . . .	<a href="#">3</a>
<a href="#">4.</a>	Packet Design . . . . .	<a href="#">3</a>
<a href="#">4.1.</a>	General . . . . .	<a href="#">3</a>
<a href="#">4.2.</a>	One-Byte Header . . . . .	<a href="#">5</a>
<a href="#">4.3.</a>	Two-Byte Header . . . . .	<a href="#">7</a>
<a href="#">5.</a>	SDP Signaling Design . . . . .	<a href="#">8</a>
<a href="#">6.</a>	SDP Signaling for support of mixed one byte and two bytes header extensions. . . . .	<a href="#">10</a>
<a href="#">7.</a>	Offer/Answer . . . . .	<a href="#">11</a>
<a href="#">8.</a>	BNF Syntax . . . . .	<a href="#">13</a>
<a href="#">9.</a>	Security Considerations . . . . .	<a href="#">14</a>
<a href="#">10.</a>	IANA Considerations . . . . .	<a href="#">14</a>
<a href="#">10.1.</a>	Identifier Space for IANA to Manage . . . . .	<a href="#">14</a>
<a href="#">10.2.</a>	Registration of the SDP extmap Attribute . . . . .	<a href="#">16</a>
<a href="#">10.3.</a>	Registration of the SDP Attribute . . . . .	<a href="#">16</a>
<a href="#">11.</a>	Acknowledgments . . . . .	<a href="#">17</a>
<a href="#">12.</a>	References . . . . .	<a href="#">17</a>
<a href="#">12.1.</a>	Normative References . . . . .	<a href="#">17</a>
<a href="#">12.2.</a>	Informative References . . . . .	<a href="#">18</a>
	Authors' Addresses . . . . .	<a href="#">18</a>

## [1.](#) Introduction

The RTP specification [[RFC3550](#)] provides a capability to extend the RTP header. It defines the header extension format and rules for its use in [Section 5.3.1](#). The existing header extension method permits at most one extension per RTP packet, identified by a 16-bit identifier and a 16-bit length field specifying the length of the header extension in 32-bit words.

This mechanism has two conspicuous drawbacks. First, it permits only one header extension in a single RTP packet. Second, the specification gives no guidance as to how the 16-bit header extension identifiers are allocated to avoid collisions.

This specification removes the first drawback by defining a backward-compatible and extensible means to carry multiple header extension elements in a single RTP packet. It removes the second drawback by defining that these extension elements are named by URIs, defining an IANA registry for extension elements defined in IETF specifications,



and a Session Description Protocol (SDP) method for mapping between the naming URIs and the identifier values carried in the RTP packets.

This header extension applies to RTP/AVP (the Audio/Visual Profile) and its extensions.

This document removes a limitation from [RFC5285](#) that did not allow sending both one byte and two bytes header extensions in the same RTP stream

## **2. Requirements Notation**

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

## **3. Design Goals**

The goal of this design is to provide a simple mechanism whereby multiple identified extensions can be used in RTP packets, without the need for formal registration of those extensions but nonetheless avoiding collision.

This mechanism provides an alternative to the practice of burying associated metadata into the media format bit stream. This has often been done in media data sent over fixed-bandwidth channels. Once this is done, a decoder for the specific media format needs to extract the metadata. Also, depending on the media format, the metadata can be added at the time of encoding the media so that the bit-rate used for the metadata is taken into account. But the metadata can be unknown at that time. Inserting metadata at a later time can cause a decode and re-encode to meet bit-rate requirements.

In some cases, a more appropriate, higher-level mechanism can be available, and if so, it can be used. For cases where a higher-level mechanism is not available, it is better to provide a mechanism at the RTP level than have the metadata be tied to a specific form of media data.

## **4. Packet Design**

### **4.1. General**

The following design is fit into the "header extension" of the RTP extension, as described above.

The presence and format of this header extension and its contents are negotiated or defined out-of-band, such as through signaling (see



below for SDP signaling). The value defined for an RTP extension (defined below for the one-byte and two-byte header forms) is only an architectural constant (e.g., for use by network analyzers); it is the negotiation/definition (e.g., in SDP) that is the definitive indication that this header extension is present.

This specification updates the requirement from the RTP specification that the header extension "is designed so that the header extension MAY be ignored". To be specific, header extensions using this specification SHOULD be used for data that can safely be ignored by the recipient without affecting interoperability, there can be essential header extensions for interoperability and intermediaries SHOULD NOT remove such header extensions. Note that the support of header extension as specified in this recommendation is negotiated. RTP Header extensions MUST NOT be used when the presence of the extension has changed the form or nature of the rest of the packet in a way that is not compatible with the way the stream is signaled (e.g., as defined by the payload type). Valid examples might include metadata that is additional to the usual RTP information, e.g. Audio level from Client to mixer [[RFC6464](#)].

The RTP header extension is formed as a sequence of extension elements, with possible padding. Each extension element has a local identifier and a length. The local identifiers MAY be mapped to a larger namespace in the negotiation (e.g., session signaling).

As is good network practice, data SHOULD only be transmitted when needed. The RTP header extension SHOULD only be present in a packet if that packet also contains one or more extension elements, as defined here. An extension element SHOULD only be present in a packet when needed; the signaling setup of extension elements indicates only that those elements can be present in some packets, not that they are in fact present in all (or indeed, any) packets.

Each extension element in a packet has a local identifier (ID) and a length. The local identifiers present in the stream MUST have been negotiated or defined out-of-band. There are no static allocations of local identifiers. Each distinct extension MUST have a unique ID. The value 0 is reserved for padding and MUST NOT be used as a local identifier.

There are two variants of the extension: one-byte and two-byte headers. Since it is expected that (a) the number of extensions in any given RTP session is small and (b) the extensions themselves are small, the one-byte header form is preferred and MUST be supported by all receivers. A stream MUST contain only one-byte or two-byte headers unless it is known that all recipients support mixing, either by offer/answer negotiation (see [section 6](#)) or by out-of-band



knowledge. One-byte and two-byte headers MUST NOT be mixed in a single RTP packet. Transmitters SHOULD NOT use the two-byte form when all extensions are small enough for the one-byte header form. A transmitter MAY be aware that an intermediary may add RTP header extensions in this case, the transmitter SHOULD use two-byte form.

A sequence of extension elements, possibly with padding, forms the header extension defined in the RTP specification. There are as many extension elements as fit into the length as indicated in the RTP header extension length. Since this length is signaled in full 32-bit words, padding bytes are used to pad to a 32-bit boundary. The entire extension is parsed byte-by-byte to find each extension element (no alignment is needed), and parsing stops at the earlier of the end of the entire header extension, or in one-byte headers only case, on encountering an identifier with the reserved value of 15.

In both forms, padding bytes have the value of 0 (zero). They MAY be placed between extension elements, if desired for alignment, or after the last extension element, if needed for padding. A padding byte does not supply the ID of an element, nor the length field. When a padding byte is found, it is ignored and the parser moves on to interpreting the next byte.

Note carefully that the one-byte header form allows for data lengths between 1 and 16 bytes, by adding 1 to the signaled length value (thus, 0 in the length field indicates 1 byte of data follows). This allows for the important case of 16-byte payloads. This addition is not performed for the two-byte headers, where the length field signals data lengths between 0 and 255 bytes.

Use of RTP header extensions will reduce the efficiency of RTP header compression, since the header extension will be sent uncompressed unless the RTP header compression module is updated to recognize the extension header. If header extensions are present in some packets, but not in others, this can also reduce compression efficiency by requiring an update to the fixed header to be conveyed when header extensions start or stop being sent. The interactions of the RTP header extension and header compression is explored further in [\[RFC2508\]](#) and [\[RFC3095\]](#).

#### **4.2. One-Byte Header**

In the one-byte header form of extensions, the 16-bit value REQUIRED by the RTP specification for a header extension, labeled in the RTP specification as "defined by profile", MUST have the fixed bit pattern 0xBEDE (the first version of this specification was written on the feast day of the Venerable Bede).





Each extension element MUST start with a byte containing an ID and a length:

```

0
0 1 2 3 4 5 6 7
+---+---+---+---+
| ID | len |
+---+---+---+---+

```

The 4-bit ID is the local identifier of this element in the range 1-14 inclusive. In the signaling section, this is referred to as the valid range.

The local identifier value 15 is reserved for future extension and MUST NOT be used as an identifier. If the ID value 15 is encountered, its length field MUST be ignored, processing of the entire extension MUST terminate at that point, and only the extension elements present prior to the element with ID 15 SHOULD be considered.

The 4-bit length is the number minus one of data bytes of this header extension element following the one-byte header. Therefore, the value zero in this field indicates that one byte of data follows, and a value of 15 (the maximum) indicates element data of 16 bytes. (This permits carriage of 16-byte values, which is a common length of labels and identifiers, while losing the possibility of zero-length values -- which would often be padded anyway.)

An example header extension, with three extension elements, and some padding follows:

```

0                               1                               2                               3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           0xBE          |           0xDE          |           length=3          |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| ID | L=0 |           data           | ID | L=1 |           data...           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           ...data       |           0 (pad)       |           0 (pad)       | ID | L=3 |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           data          |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```



### 4.3. Two-Byte Header

In the two-byte header form, the 16-bit value defined by the RTP specification for a header extension, labeled in the RTP specification as "defined by profile", is defined as shown below.

```

      0                               1
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+---+---+---+---+---+---+---+---+
|           0x100           |appbits|
+---+---+---+---+---+---+---+---+

```

The appbits field is 4 bits that are application-dependent and MAY be defined to be any value or meaning, and are outside the scope of this specification. For the purposes of signaling, this field is treated as a special extension value assigned to the local identifier 256. If no extension has been specified through configuration or signaling for this local identifier value 256, the appbits field SHOULD be set to all 0s by the sender and MUST be ignored by the receiver.

Each extension element starts with a byte containing an ID and a byte containing a length:

```

      0                               1
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+---+---+---+---+---+---+---+---+
|           ID           | length |
+---+---+---+---+---+---+---+---+

```

The 8-bit ID is the local identifier of this element in the range 1-255 inclusive. In the signaling section, the range 1-256 is referred to as the valid range, with the values 1-255 referring to extension elements, and the value 256 referring to the 4-bit field 'appbits' (above).

The 8-bit length field is the length of extension data in bytes not including the ID and length fields. The value zero indicates there is no data following.



An example header extension, with three extension elements, and some padding follows:

```

      0               1               2               3
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           0x10          |          0x00          |          length=3          |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           ID           |          L=0           |          ID           |          L=1           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|          data          |          0 (pad)         |          ID           |          L=4           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|                                     data                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

## 5. SDP Signaling Design

The indication of the presence of this extension, and the mapping of local identifiers used in the header extension to a larger namespace, **MUST** be performed out-of-band, for example, as part of a SIP offer/answer exchange using SDP. This section defines such signaling in SDP.

A usable mapping **MUST** use IDs in the valid range, and each ID in this range **MUST** be used only once for each media (or only once if the mappings are session level). Mappings that do not conform to these rules **MAY** be presented, for instance, during offer/answer negotiation as described in the next section, but remapping to conformant values is necessary before they can be applied.

Each extension is named by a URI. That URI **MUST** be absolute, and precisely identifies the format and meaning of the extension. URIs that contain a domain name **SHOULD** also contain a month-date in the form mmyyyy. The definition of the element and assignment of the URI **MUST** have been authorized by the owner of the domain name on or very close to that date. (This avoids problems when domain names change ownership.) If the resource or document defines several extensions, then the URI **MUST** identify the actual extension in use, e.g., using a fragment or query identifier (characters after a '#' or '?' in the URI).

Rationale: the use of URIs provides for a large, unallocated space, and gives documentation on the extension. The URIs do not have to be de-referencable, in order to permit confidential or experimental use, and to cover the case when extensions continue to be used after the organization that defined them ceases to exist.



An extension URI with the same attributes MUST NOT appear more than once applying to the same stream, i.e., at session level or in the declarations for a single stream at media level. (The same extension can, of course, be used for several streams, and can appear differently parameterized for the same stream.)

For extensions defined in RFCs, the URI used SHOULD be a URN starting "urn:ietf:params:rtp-hdext:" and followed by a registered, descriptive name.

The registration requirements are detailed in the IANA Considerations section, below.

An example (this is only an example), where 'avt-example-metadata' is the hypothetical name of a header extension, might be:

```
urn:ietf:params:rtp-hdext:avt-example-metadata
```

An example name not from the IETF (this is only an example) might be:

```
http://example.com/082005/ext.htm#example-metadata
```

The mapping MAY be provided per media stream (in the media-level section(s) of SDP, i.e., after an "m=" line) or globally for all streams (i.e., before the first "m=" line, at session level). The definitions MUST be either all session level or all media level; it is not permitted to mix the two styles. In addition, as noted above, the IDs used MUST be unique for each stream type for a given media, or for the session for session-level declarations.

Each local identifier potentially used in the stream is mapped to a string using an attribute of the form:

```
a=extmap:<value>["<direction>"] <URI> <extensionattributes>
```

where <URI> is a URI, as above, <value> is the local identifier (ID) of this extension and is an integer in the valid range inclusive (0 is reserved for padding in both forms, and 15 is reserved in the one-byte header form, as noted above), and <direction> is one of "sendonly", "recvonly", "sendrecv", or "inactive" (without the quotes).

The formal BNF syntax is presented in a later section of this specification.

Example:

```
a=extmap:1 http://example.com/082005/ext.htm#ttime
```





```
a=extmap:2/sendrecv http://example.com/082005/ext.htm#xmeta short
```

When SDP signaling is used for the RTP session, it is the presence of the 'extmap' attribute(s) that is diagnostic that this style of header extensions is used, not the magic number indicated above.

## **6. SDP Signaling for support of mixed one byte and two bytes header extensions.**

In order to allow for backward interoperability with systems that do not support mixing of one byte and two bytes header extensions this document defines the "a=extmap-allow-mixed" Session Description Protocol (SDP) [[RFC4566](#)] attribute to indicate if the participant is capable of supporting this new mode. The attribute takes no value. This attribute can be used at the session or media levels. A participant that proposes the use of this mode SHALL itself support the reception of mixed one byte and two bytes header extensions.

The negotiation for mixed one byte and two bytes extension MUST be negotiated in offer/answer [[RFC3264](#)]. In the absence of negotiation using offer/answer, mixed headers MUST NOT occur unless the transmitter has some (out of band) knowledge that all potential recipients support this mode.

The formal definition of this attribute is:

Name: extmap-allow-mixed

Value:

Usage Level: session, media

Charset Dependent: no

Example:

```
a=extmap-allow-mixed
```

When doing SDP Offer/Answer [[RFC3264](#)] an offering client that wishes to use both one and two bytes extensions MUST include the attribute "a= extmap-allow-mixed " in the SDP offer. If "a= extmap-allow-mixed " is present in the offer SDP, the answerer that supports this mode and wishes to use it SHALL include the "a=extmap-allow-mixed " attribute in the answer. In cases the answer has been excluded, neither clients SHALL use mixed one bytes and two bytes extensions in the same RTP stream.



## 7. Offer/Answer

The simple signaling described above MAY be enhanced in an offer/answer context, to permit:

- o asymmetric behavior (extensions sent in only one direction),
- o the offer of mutually exclusive alternatives, or
- o the offer of more extensions than can be sent in a single session.

A direction attribute MAY be included in an extmap; without it, the direction implicitly inherits, of course, from the stream direction, or is "sendrecv" for session-level attributes or extensions of "inactive" streams. The direction MUST be one of "sendonly", "recvonly", "sendrecv", or "inactive". A "sendonly" direction indicates an ability to send; a "recvonly" direction indicates a desire to receive; a "sendrecv" direction indicates both. An "inactive" direction indicates neither, but later re-negotiation MAY make an extension active.

Extensions, with their directions, MAY be signaled for an "inactive" stream. It is an error to use an extension direction incompatible with the stream direction (e.g., a "sendonly" attribute for a "recvonly" stream).

If an offer or answer contains session-level mappings (and hence no media-level mappings), and different behavior is desired for each stream, then the entire set of extension map declarations MAY be moved into the media-level section(s) of the SDP. (Note that this specification does not permit mixing global and local declarations, to make identifier management easier.)

If an extension map is offered as "sendrecv", explicitly or implicitly, and asymmetric behavior is desired, the SDP MAY be modified to modify or add direction qualifiers for that extension.

If an extension is marked as "sendonly" and the answerer desires to receive it, the extension MUST be marked as "recvonly" in the SDP answer. An answerer that has no desire to receive the extension or does not understand the extension SHOULD remove it from the SDP answer.

If an extension is marked as "recvonly" and the answerer desires to send it, the extension MUST be marked as "sendonly" in the SDP answer. An answerer that has no desire to, or is unable to, send the extension SHOULD remove it from the SDP answer.



Local identifiers in the valid range inclusive in an offer or answer MUST NOT be used more than once per media section (including the session-level section). A session update MAY change the direction qualifiers of extensions under use. A session update MAY add or remove extension(s). Identifiers values in the valid range MUST NOT be altered (remapped).

Note that, under this rule, the same local identifier cannot be used for two extensions for the same media, even when one is "sendonly" and the other "recvonly", as it would then be impossible to make either of them sendrecv (since re-numbering is not permitted either).

If a party wishes to offer mutually exclusive alternatives, then multiple extensions with the same identifier in the (unusable) range 4096-4351 MAY be offered; the answerer SHOULD select at most one of the offered extensions with the same identifier, and remap it to a free identifier in the valid range, for that extension to be usable.

Similarly, if more extensions are offered than can be fit in the valid range, identifiers in the range 4096-4351 MAY be offered; the answerer SHOULD choose those that are desired, and remap them to a free identifier in the valid range.

It is always allowed to place the offered identifier value "as is" in the SDP answer (for example, due to lack of a free identifier value in the valid range). Extensions with an identifier outside the valid range MUST NOT, of course, be used. If needed, the offerer or answerer can update the session to make space for such an extension.

Rationale: the range 4096-4351 for these negotiation identifiers is deliberately restricted to allow expansion of the range of valid identifiers in future.

Either party MAY include extensions in the stream other than those negotiated, or those negotiated as "inactive", for example, for the benefit of intermediate nodes. Only extensions that appeared with an identifier in the valid range in SDP originated by the sender can be sent.

Example (port numbers, RTP profiles, payload IDs and rtpmaps, etc. all omitted for brevity):

The offer:



```
a=extmap:1 URI-toffset
a=extmap:14 URI-obscure
a=extmap:4096 URI-gps-string
a=extmap:4096 URI-gps-binary
a=extmap:4097 URI-frametype
m=video
a=sendrecv
m=audio
a=sendrecv
```

The answerer is interested in receiving GPS in string format only on video, but cannot send GPS at all. It is not interested in transmission offsets on audio, and does not understand the URI-obscure extension. It therefore moves the extensions from session level to media level, and adjusts the declarations:

```
m=video
a=sendrecv
a=extmap:1 URI-toffset
a=extmap:2/recvonly URI-gps-string
a=extmap:3 URI-frametype
m=audio
a=sendrecv
a=extmap:1/sendonly URI-toffset
```

## **8. BNF Syntax**

The syntax definition below uses ABNF according to [\[RFC5234\]](#). The syntax element 'URI' is defined in [\[RFC3986\]](#) (only absolute URIs are permitted here). The syntax element 'extmap' is an attribute as defined in [\[RFC4566\]](#), i.e., "a=" precedes the extmap definition. Specific extensionattributes are defined by the specification that defines a specific extension name; there can be several.





```
extmap = mapentry SP extensionname [SP extensionattributes]

extensionname = URI

direction = "sendonly" / "recvonly" / "sendrecv" / "inactive"

mapentry = "extmap:" 1*5DIGIT ["/" direction]

extensionattributes = byte-string

URI = <Defined in RFC 3986>

byte-string = <Defined in RFC 4566>

SP = <Defined in RFC 5234>

DIGIT = <Defined in RFC 5234>
```

## **9. Security Considerations**

This document defines only a place to transmit information; the security implications of each of the extensions MUST be discussed with those extensions.

Header extensions have the same security coverage as the RTP header itself. When Secure Real-time Transport Protocol (SRTP) [[RFC3711](#)] is used to protect RTP sessions, the RTP payload can be both encrypted and integrity protected, while the RTP header is either unprotected or integrity protected. RTP header extensions can carry sensitive information for which participants in multimedia sessions want confidentiality. [RFC6904](#) [[RFC6904](#)] provides a mechanism, extending the mechanisms of SRTP, to selectively encrypt RTP header extensions in SRTP.

## **10. IANA Considerations**

This document updates the IANA consideration to reference this document and adds a new SDP attribute in [section 10.3](#)

Note to IANA : change RFCxxxx to this RFC number and remove the note.

### **10.1. Identifier Space for IANA to Manage**

The mapping from the naming URI form to a reference to a specification is managed by IANA. Insertion into this registry is under the requirements of "Expert Review" as defined in [[RFC5226](#)].



The IANA will also maintain a server that contains all of the registered elements in a publicly accessible space.

Here is the formal declaration to comply with the IETF URN Sub-namespace specification [[RFC3553](#)].

- o Registry name: RTP Compact Header Extensions
- o Specification: [RFC 5285](#) and RFCs updating [RFC 5285](#).
- o Information required:
  - A. The desired extension naming URI
  - B. A formal reference to the publicly available specification
  - C. A short phrase describing the function of the extension
  - D. Contact information for the organization or person making the registration

For extensions defined in RFCs, the URI SHOULD be of the form urn:ietf:params:rtp-hdext:, and the formal reference is the RFC number of the RFC documenting the extension.

- o Review process: Expert review is REQUIRED. The expert review SHOULD check the following requirements:
  1. that the specification is publicly available;
  2. that the extension complies with the requirements of RTP and this specification, for extensions (notably, that the stream is still decodable if the extension is ignored or not recognized);
  3. that the extension specification is technically consistent (in itself and with RTP), complete, and comprehensible;
  4. that the extension does not duplicate functionality in existing IETF specifications (including RTP itself), or other extensions already registered;
  5. that the specification contains a security analysis regarding the content of the header extension;
  6. that the extension is generally applicable, for example point-to-multipoint safe, and the specification correctly describes limitations if they exist; and



7. that the suggested naming URI form is appropriately chosen and unique.
- o Size and format of entries: a mapping from a naming URI string to a formal reference to a publicly available specification, with a descriptive phrase and contact information.
  - o Initial assignments: none.

### **10.2. Registration of the SDP extmap Attribute**

This section contains the information requested by [[RFC4566](#)] for an SDP attribute.

- o contact name, email address, and telephone number:  

D. Singer  
singer@apple.com  
+1 408-974-3162
- o attribute name (as it will appear in SDP): extmap
- o long-form attribute name in English: generic header extension map definition
- o type of attribute (session level, media level, or both): both
- o whether the attribute value is subject to the charset attribute:  
not subject to the charset attribute
- o a one-paragraph explanation of the purpose of the attribute: This attribute defines the mapping from the extension numbers used in packet headers into extension names as documented in specifications and appropriately registered.
- o a specification of appropriate attribute values for this attribute: see [RFC 5285](#).

### **10.3. Registration of the SDP Attribute**

The IANA is requested to register one new SDP attribute:



## SDP Attribute ("att-field"):

Attribute name: extmap-allow-mixed  
Long form: One and Two bytes mixed mode  
Type of name: att-field  
Type of attribute: Media or session level  
Subject to charset: No  
Purpose: Negotiate the use of One and Two bytes  
in the same RTP stream.  
Reference: [RFCXXXX]  
Values: None

## **11. Acknowledgments**

Both Brian Link and John Lazzaro provided helpful comments on an initial draft of this document. Colin Perkins was helpful in reviewing and dealing with the details. The use of URNs for IETF-defined extensions was suggested by Jonathan Lennox, and Pete Cordell was instrumental in improving the padding wording. Dave Oran provided feedback and text in the review. Mike Dolan contributed the two-byte header form. Magnus Westerlund and Tom Taylor were instrumental in managing the registration text.

## **12. References**

### **12.1. Normative References**

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC2508] Casner, S. and V. Jacobson, "Compressing IP/UDP/RTP Headers for Low-Speed Serial Links", [RFC 2508](#), February 1999.
- [RFC3095] Bormann, C., Burmeister, C., Degermark, M., Fukushima, H., Hannu, H., Jonsson, L-E., Hakenberg, R., Koren, T., Le, K., Liu, Z., Martensson, A., Miyazaki, A., Svanbro, K., Wiebke, T., Yoshimura, T., and H. Zheng, "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP, and uncompressed", [RFC 3095](#), July 2001.
- [RFC3550] Schulzrinne, H., Casner, S., Frederick, R., and V. Jacobson, "RTP: A Transport Protocol for Real-Time Applications", STD 64, [RFC 3550](#), July 2003.





- [RFC3553] Mealling, M., Masinter, L., Hardie, T., and G. Klyne, "An IETF URN Sub-namespace for Registered Protocol Parameters", [BCP 73](#), [RFC 3553](#), June 2003.
- [RFC3711] Baugher, M., McGrew, D., Naslund, M., Carrara, E., and K. Norrman, "The Secure Real-time Transport Protocol (SRTP)", [RFC 3711](#), March 2004.
- [RFC3986] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, [RFC 3986](#), January 2005.
- [RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", [RFC 4566](#), July 2006.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 5226](#), May 2008.
- [RFC5234] Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, [RFC 5234](#), January 2008.
- [RFC6904] Lennox, J., "Encryption of Header Extensions in the Secure Real-time Transport Protocol (SRTP)", [RFC 6904](#), DOI 10.17487/RFC6904, April 2013, <<http://www.rfc-editor.org/info/rfc6904>>.

## **12.2. Informative References**

- [RFC3264] Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model with Session Description Protocol (SDP)", [RFC 3264](#), June 2002.
- [RFC6464] Lennox, J., Ed., Ivov, E., and E. Marocco, "A Real-time Transport Protocol (RTP) Header Extension for Client-to-Mixer Audio Level Indication", [RFC 6464](#), DOI 10.17487/RFC6464, December 2011, <<http://www.rfc-editor.org/info/rfc6464>>.

## **Authors' Addresses**

Roni Even (editor)  
Huawei Technologies  
Shabazi 12A  
Tel Aviv  
Israel

Email: [Roni.even@mail01.huawei.com](mailto:Roni.even@mail01.huawei.com)



David Singer  
Apple, Inc.  
1 Infinite Loop  
Cupertino, CA 95014  
USA

Phone: +1 408 996 1010  
Email: [singer@apple.com](mailto:singer@apple.com)  
URI: <http://www.apple.com/quicktime>

Harikishan Desineni  
10001 Pacific Heights Blvd  
San Diego, CA 92121  
USA

Phone: +1 858 845 8996  
Email: [hdesinen@quicinc.com](mailto:hdesinen@quicinc.com)

