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**Session Description Protocol (SDP) Format for Binary Floor Control  
Protocol (BFCP) Streams  
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**Abstract**

This document specifies how to describe Binary Floor Control Protocol (BFCP) streams in Session Description Protocol (SDP) descriptions. User agents using the offer/answer model to establish BFCP streams use this format in their offers and answers.

This document obsoletes [RFC 4583](#). Changes from [RFC 4583](#) are summarized in [Section 14](#).

**Status of This Memo**

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">2</a>
<a href="#">2.</a>	Terminology . . . . .	<a href="#">3</a>
<a href="#">3.</a>	Fields in the 'm' Line . . . . .	<a href="#">3</a>
<a href="#">4.</a>	Floor Control Server Determination . . . . .	<a href="#">4</a>
<a href="#">4.1.</a>	SDP 'floorctrl' Attribute . . . . .	<a href="#">4</a>
<a href="#">5.</a>	SDP 'confid' and 'userid' Attributes . . . . .	<a href="#">6</a>
<a href="#">6.</a>	SDP 'floorid' Attribute . . . . .	<a href="#">6</a>
<a href="#">7.</a>	SDP 'bfcprver' Attribute . . . . .	<a href="#">7</a>
<a href="#">8.</a>	BFCP Connection Management . . . . .	<a href="#">7</a>
<a href="#">8.1.</a>	TCP Connection Management . . . . .	<a href="#">8</a>
<a href="#">9.</a>	Authentication . . . . .	<a href="#">8</a>
<a href="#">10.</a>	SDP Offer/Answer Procedures . . . . .	<a href="#">9</a>
<a href="#">10.1.</a>	Generating the Initial SDP Offer . . . . .	<a href="#">10</a>
<a href="#">10.2.</a>	Generating the SDP Answer . . . . .	<a href="#">11</a>
<a href="#">10.3.</a>	Offerer Processing of the SDP Answer . . . . .	<a href="#">12</a>
<a href="#">10.4.</a>	Modifying the Session . . . . .	<a href="#">12</a>
<a href="#">10.5.</a>	DTLS Role Determination . . . . .	<a href="#">13</a>
<a href="#">11.</a>	Examples . . . . .	<a href="#">13</a>
<a href="#">12.</a>	Security Considerations . . . . .	<a href="#">15</a>
<a href="#">13.</a>	IANA Considerations . . . . .	<a href="#">15</a>
<a href="#">13.1.</a>	Registration of SDP 'proto' Values . . . . .	<a href="#">15</a>
<a href="#">13.2.</a>	Registration of the SDP 'floorctrl' Attribute . . . . .	<a href="#">16</a>
<a href="#">13.3.</a>	Registration of the SDP 'confid' Attribute . . . . .	<a href="#">16</a>
<a href="#">13.4.</a>	Registration of the SDP 'userid' Attribute . . . . .	<a href="#">17</a>
<a href="#">13.5.</a>	Registration of the SDP 'floorid' Attribute . . . . .	<a href="#">17</a>
<a href="#">13.6.</a>	Registration of the SDP 'bfcprver' Attribute . . . . .	<a href="#">17</a>
<a href="#">14.</a>	Changes from <a href="#">RFC 4583</a> . . . . .	<a href="#">18</a>
<a href="#">15.</a>	Acknowledgements . . . . .	<a href="#">19</a>
<a href="#">16.</a>	References . . . . .	<a href="#">19</a>
<a href="#">16.1.</a>	Normative References . . . . .	<a href="#">19</a>
<a href="#">16.2.</a>	Informational References . . . . .	<a href="#">21</a>
	Authors' Addresses . . . . .	<a href="#">21</a>

## [1.](#) Introduction

As discussed in the BFCP (Binary Floor Control Protocol) specification [[8](#)], a given BFCP client needs a set of data in order to establish a BFCP connection to a floor control server. This data includes the transport address of the server, the conference identifier, and the user identifier.



One way for clients to obtain this information is to use an SDP offer/answer [4] exchange. This document specifies how to encode this information in the SDP session descriptions that are part of such an offer/answer exchange.

User agents typically use the offer/answer model to establish a number of media streams of different types. Following this model, a BFCP connection is described as any other media stream by using an SDP 'm' line, possibly followed by a number of attributes encoded in 'a' lines.

## 2. Terminology

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](#), [RFC 2119](#) [1] and indicate requirement levels for compliant implementations.

## 3. Fields in the 'm' Line

This section describes how to generate an 'm' line for a BFCP stream.

According to the SDP specification [11], the 'm' line format is the following:

```
m=<media> <port> <proto> <fmt> ...
```

The media field MUST have a value of "application".

The port field is set depending on the value of the proto field, as explained below. A port field value of zero has the standard SDP meaning (i.e., rejection of the media stream) regardless of the proto field.

When TCP is used as the transport, the port field is set following the rules in [7]. Depending on the value of the 'setup' attribute (discussed in [Section 8.1](#)), the port field contains the port to which the remote endpoint will direct BFCP messages or is irrelevant (i.e., the endpoint will initiate the connection towards the remote endpoint) and should be set to a value of 9, which is the discard port.

When UDP is used as the transport, the port field contains the port to which the remote endpoint will direct BFCP messages regardless of the value of the 'setup' attribute.



This document defines four values for the proto field: TCP/BFCP, TCP/TLS/BFCP, UDP/BFCP, and UDP/TLS/BFCP. TCP/BFCP is used when BFCP runs directly on top of TCP, TCP/TLS/BFCP is used when BFCP runs on top of TLS, which in turn runs on top of TCP. Similarly, UDP/BFCP is used when BFCP runs directly on top of UDP, and UDP/TLS/BFCP is used when BFCP runs on top of DTLS [12], which in turn runs on top of UDP.

The fmt (format) list is not applicable to BFCP. The fmt list of 'm' lines in the case of any proto field value related to BFCP SHOULD contain a single "\*" character. If the the fmt list contains any other value it is ignored.

The following is an example of an 'm' line for a BFCP connection:

```
m=application 50000 TCP/TLS/BFCP *
```

#### **4. Floor Control Server Determination**

When two endpoints establish a BFCP stream, they need to determine which of them acts as a floor control server. In the most common scenario, a client establishes a BFCP stream with a conference server that acts as the floor control server. Floor control server determination is straight forward because one endpoint can only act as a client and the other can only act as a floor control server.

However, there are scenarios where both endpoints could act as a floor control server. For example, in a two-party session that involves an audio stream and a shared whiteboard, the endpoints need to decide which party will be acting as the floor control server.

Furthermore, there are situations where both the offerer and the answerer act as both clients and floor control servers in the same session. For example, in a two-party session that involves an audio stream and a shared whiteboard, one party acts as the floor control server for the audio stream and the other acts as the floor control server for the shared whiteboard.

##### **4.1. SDP 'floorctrl' Attribute**

This document defines the 'floorctrl' SDP media-level attribute to perform floor control server determination. Its Augmented BNF syntax [2] is:

```
floor-control-attribute = "a=floorctrl:" role *(SP role)
role                    = "c-only" / "s-only" / "c-s"
```

The offerer includes this attribute to state all the roles it would be willing to perform:



c-only: The offerer would be willing to act as a floor control client only.

s-only: The offerer would be willing to act as a floor control server only.

c-s: The offerer would be willing to act both as a floor control client and as a floor control server.

If an SDP media description in an offer contains a 'floorctrl' attribute, the answerer accepting that media MUST include a 'floorctrl' attribute in the corresponding media description of the answer. The answerer includes this attribute to state which role the answerer will perform. That is, the answerer chooses one of the roles the offerer is willing to perform and generates an answer with the corresponding role for the answerer. Table 1 shows the corresponding roles for an answerer, depending on the offerer's role.

+-----+-----+	
Offerer	Answerer
+-----+-----+	
c-only	s-only
s-only	c-only
c-s	c-s
+-----+-----+	

Table 1: Roles

The following are the descriptions of the roles when they are chosen by an answerer:

c-only: The answerer will act as a floor control client.  
Consequently, the offerer will act as a floor control server.

s-only: The answerer will act as a floor control server.  
Consequently, the offerer will act as a floor control client.

c-s: The answerer will act both as a floor control client and as a floor control server. Consequently, the offerer will also act both as a floor control client and as a floor control server.

Endpoints that use the offer/answer model to establish BFCP connections MUST support the 'floorctrl' attribute. A floor control server acting as an offerer or as an answerer SHOULD include this attribute in its session descriptions.



If the 'floorctrl' attribute is not used in an offer/answer exchange, by default the offerer and the answerer will act as a floor control client and as a floor control server, respectively.

The following is an example of a 'floorctrl' attribute in an offer. When this attribute appears in an answer, it only carries one role:

```
a=floorctrl:c-only s-only c-s
```

## 5. SDP 'confid' and 'userid' Attributes

This document defines the 'confid' and the 'userid' SDP media-level attributes. These attributes are used by a floor control server to provide a client with a conference ID and a user ID, respectively. Their Augmented BNF syntax [2] is:

```
confid-attribute      = "a=confid:" conference-id
conference-id         = token
userid-attribute      = "a=userid:" user-id
user-id              = token

token-char            = %x21 / %x23-27 / %x2A-2B / %x2D-2E / %x30-39
                      / %x41-5A / %x5E-7E
token                 = 1*(token-char)
```

The 'confid' and the 'userid' attributes carry the decimal integer representation of a conference ID and a user ID, respectively.

The token-char and token elements are defined in [11] but included here to provide support for the implementor of this SDP feature.

Endpoints that use the offer/answer model to establish BFCP connections MUST support the 'confid' and the 'userid' attributes. A floor control server acting as an offerer or as an answerer MUST include these attributes in its session descriptions.

## 6. SDP 'floorid' Attribute

This document defines the 'floorid' SDP media-level attribute. This attribute is used to provide an association between media streams and floors. Its Augmented BNF syntax [2] is:

```
floor-id-attribute = "a=floorid:" token [" mstrm:" token *(SP token)]
```

The 'floorid' attribute is used in the SDP media description for BFCP media. It defines a floor identifier and, possibly, associates it with one or more media streams. The token representing the floor ID is the integer representation of the Floor ID to be used in BFCP.



The token representing the media stream is a pointer to the media stream, which is identified by an SDP label attribute [9].

Endpoints that use the offer/answer model to establish BFCP connections MUST support the 'floorid' and the 'label' attributes. A floor control server acting as an offerer or as an answerer MUST include these attributes in its session descriptions.

Note: In [15] 'm-stream' was erroneously used in [Section 11](#). Although the example was non-normative, it is implemented by some vendors and occurs in cases where the endpoint is willing to act as an server. Therefore, it is RECOMMENDED to support parsing and interpreting 'm-stream' the same way as 'mstrm' when receiving.

## 7. SDP 'bfcvver' Attribute

This document defines the 'bfcvver' SDP media-level attribute. This attribute is used for BFCP version negotiation. Its Augmented BNF syntax [2] is:

```
bfcvver-attribute = "a=bfcvver:" bfcvver *(SP bfcvver)
bfcvver           = token
```

The 'bfcvver' attribute defines the list of the versions of BFCP supported by the endpoint. Tokens representing versions MUST be integers matching the "Version" field that would be presented in the BFCP COMMON-HEADER [8]. The version of BFCP to be used will then be confirmed with a BFCP-level Hello/HelloAck.

Endpoints that use the offer/answer model to establish BFCP connections SHOULD support the 'bfcvver' attribute. A floor control server acting as an offerer or as an answerer SHOULD include this attribute in its session descriptions. However, endpoints that support RFC XXXX, and not only the [15] subset, are REQUIRED to support and, when acting as a floor control server, to use the 'bfcvver' attribute.

If a 'bfcvver' attribute is not present, default values are inferred from the transport specified in the 'm' line ([Section 3](#)). In accordance with definition of the Version field in [8], when used over a reliable transport the default value is "1", and when used over an unreliable transport the default value is "2".

## 8. BFCP Connection Management

BFCP connections can use TCP or UDP as the underlying transport. BFCP entities exchanging BFCP messages over UDP direct the BFCP messages to the peer side connection address and port provided in the



SDP 'm' line. TCP connection management is more complicated and is described below.

### **8.1. TCP Connection Management**

The management of the TCP connection used to transport BFCP is performed using the 'setup' and 'connection' attributes, as defined in [7].

The 'setup' attribute indicates which of the endpoints (client or floor control server) initiates the TCP connection. The 'connection' attribute handles TCP connection reestablishment.

The BFCP specification [8] describes a number of situations when the TCP connection between a client and the floor control server needs to be reestablished. However, that specification does not describe the reestablishment process because this process depends on how the connection was established in the first place. BFCP entities using the offer/answer model follow the following rules.

When the existing TCP connection is closed and reestablished following the rules in [8], the client MUST generate an offer towards the floor control server in order to reestablish the connection. If a TCP connection cannot deliver a BFCP message and times out, the entity that attempted to send the message (i.e., the one that detected the TCP timeout) MUST generate an offer in order to reestablish the TCP connection.

Endpoints that use the offer/answer model to establish TCP connections MUST support the 'setup' and 'connection' attributes.

## **9. Authentication**

When a BFCP connection is established using the offer/answer model, it is assumed that the offerer and the answerer authenticate each other using some mechanism. TLS/DTLS is the preferred mechanism, but other mechanisms are possible and outside the scope of this document. Once this mutual authentication takes place, all the offerer and the answerer need to ensure is that the entity they are receiving BFCP messages from is the same as the one that generated the previous offer or answer.

When SDP is used to perform an offer/answer exchange, the initial mutual authentication takes place at the SIP level. Additionally, SIP uses S/MIME [6] to provide an integrity-protected channel with optional confidentiality for the offer/answer exchange. BFCP takes advantage of this integrity-protected offer/answer exchange to perform authentication. Within the offer/answer exchange, the



offerer and answerer exchange the fingerprints of their self-signed certificates. These self-signed certificates are then used to establish the TLS/DTLS connection that will carry BFCP traffic between the offerer and the answerer.

BFCP clients and floor control servers follow the rules in [10] regarding certificate choice and presentation. This implies that unless a 'fingerprint' attribute is included in the session description, the certificate provided at the TLS-/DTLS-level MUST either be directly signed by one of the other party's trust anchors or be validated using a certification path that terminates at one of the other party's trust anchors [5]. Endpoints that use the offer/answer model to establish BFCP connections MUST support the 'fingerprint' attribute and MUST include it in their session descriptions.

When TLS is used with TCP, once the underlying connection is established, the answerer which may be the client or the floor control server acts as the TLS server regardless of its role (passive or active) in the TCP establishment procedure. If the TCP connection is lost, the active endpoint is responsible for re-establishing the TCP connection. Unless a new TLS session is negotiated, subsequent SDP offers and answers will not impact the previously negotiated TLS roles.

When DTLS is used with UDP, the requirements specified in Section 5 of [13] MUST be followed.

Informational note: How to determine which endpoint initiates the TLS/DTLS association depends on the selected underlying transport. It was decided to keep the original semantics in [15] for TCP to retain backwards compatibility. When using UDP, the procedure above was preferred since it adheres to [13] as used for DTLS-SRTP, it does not overload offer/answer semantics, and it works for offerless INVITE in scenarios with B2BUAs.

## **10. SDP Offer/Answer Procedures**

This section defines the SDP offer/answer [4] procedures for negotiating and establishing a BFCP connection. The generic procedures for DTLS are defined in [13], the specific BFCP parts are specified here.

If the 'm' line 'proto' value is 'TCP/TLS/BFCP' or 'UDP/TLS/BFCP', each endpoint MUST provide a certificate fingerprint, using the SDP 'fingerprint' attribute [7], if the endpoint supports, and is willing to use, a cipher suite with an associated certificate.



The authentication certificates are interpreted and validated as defined in [10]. Self-signed certificates can be used securely, provided that the integrity of the SDP description is assured as defined in [10].

Note: The procedures apply to a specific 'm' line describing a BFCP connection. If an offer or answer contains multiple 'm' lines describing BFCP connections, the procedures are applied separately to each 'm' line.

Informational note: The use of source-specific parameters in SDP, as defined in [16], is not applicable to BFCP.

Multiplexing of BFCP 'm' lines, as defined in BUNDLE [17], is not defined by this specification and MUST NOT be included in a BUNDLE group. An analysis of the SDP attributes defined in [15], with regards to multiplexing of 'm' lines, is presented in Section 5.27 of [18]. The analysis for the 'bfcprver' SDP attribute, defined in this document is provided in Table 2.

+-----+-----+-----+-----+			
Name	Notes	Level	Mux Category
+-----+-----+-----+-----+			
bfcprver	Needs further analysis	M	TBD
+-----+-----+-----+-----+			

Table 2: Multiplexing Attribute Analysis

### 10.1. Generating the Initial SDP Offer

When the offerer creates an initial offer, the offerer:

- o MUST, if the 'm' line proto value is 'TCP/BFCP', 'TCP/TLS/BFCP' or 'UDP/TLS/BFCP', associate an SDP setup attribute, with an 'actpass' value, with the 'm' line;
- o MUST, if the 'm' line proto value is 'TCP/BFCP' or 'TCP/TLS/BFCP', associate an SDP 'connection' attribute, with a 'new' value, with the 'm' line; and

In addition, if the offerer acts as the floor control server, the offerer:

- o SHOULD associate an SDP 'floorctrl' attribute defined in [Section 4.1](#), with the 'm' line;
- o MUST associate an SDP 'confid' attribute defined in [Section 5](#), with the 'm' line;



- o MUST associate an SDP 'userid' attribute defined in [Section 5](#), with the 'm' line;
- o MUST associate an SDP 'floorid' attribute defined in [Section 6](#), with the 'm' line;
- o MUST associate an SDP 'label' attribute as described in [Section 6](#), with the 'm' line; and
- o SHOULD, if it supports only the [RFC 4583](#) subset and MUST, if it supports RFC XXXX associate an SDP 'bfcpxver' attribute defined in [Section 7](#), with the 'm' line.

## **10.2. Generating the SDP Answer**

When the answerer receives an offer, which contains an 'm' line describing a BFCP connection, if the answerer accepts the 'm' line it:

- o MUST insert a corresponding 'm' line in the answer, with an identical 'm' line proto value [\[4\]](#); and
- o MUST, if the 'm' line proto value is 'TCP/BFCP', 'TCP/TLS/BFCP' or 'UDP/TLS/BFCP', associate an SDP setup attribute, with an 'active' or 'passive' value, with the 'm' line;

In addition, if the answerer acts as the floor control server, the answerer:

- o MUST, if the offer contains a 'floorctrl' attribute or else it SHOULD associate an SDP 'floorctrl' attribute defined in [Section 4.1](#), with the 'm' line;
- o MUST associate an SDP 'confid' attribute defined in [Section 5](#), with the 'm' line;
- o MUST associate an SDP 'userid' attribute defined in [Section 5](#), with the 'm' line;
- o MUST associate an SDP 'floorid' attribute defined in [Section 6](#), with the 'm' line; and
- o MUST associate an SDP 'label' attribute as described in [Section 6](#), with the 'm' line.
- o SHOULD, if it supports only the [RFC 4583](#) subset and MUST, if it supports RFC XXXX associate an SDP 'bfcpxver' attribute defined in [Section 7](#), with the 'm' line.



Once the answerer has sent the answer, the answerer:

- o MUST, if the answerer is the 'active' endpoint, and if a TCP connection associated with the 'm' line is to be established (or re-established), initiate the establishing of the TCP connection; and
- o MUST, if the answerer is the 'active' endpoint, and if an TLS/DTLS connection associated with the 'm' line is to be established (or re-established), initiate the establishing of the TLS/DTLS connection (by sending a ClientHello message).

If the answerer does not accept the 'm' line in the offer, it MUST assign a zero port value to the corresponding 'm' line in the answer. In addition, the answerer MUST NOT establish a TCP connection or a TLS/DTLS connection associated with the 'm' line.

### **10.3. Offerer Processing of the SDP Answer**

When the offerer receives an answer, which contains an 'm' line with a non-zero port value, describing a BFCP connection, the offerer:

- o MUST, if the offerer is the 'active' endpoint, and if a TCP connection associated with the 'm' line is to be established (or re-established), initiate the establishing of the TCP connection; and
- o MUST, if the offerer is the 'active' endpoint, and if an TLS/DTLS connection associated with the 'm' line is to be established (or re-established), initiate the establishing of the TLS/DTLS connection (by sending a ClientHello message).

If the 'm' line in the answer contains a zero port value, the offerer MUST NOT establish a TCP connection or a TLS/DTLS connection associated with the 'm' line.

### **10.4. Modifying the Session**

When an offerer sends an updated offer, in order to modify a previously established BFCP connection, it follows the procedures in [Section 10.1](#), with the following exceptions:

- o If the BFCP connection is carried on top of TCP, and unless the offerer wants to re-establish an existing TCP connection, the offerer MUST associate an SDP connection attribute, with an 'existing' value, with the 'm' line; and



- o If the offerer wants to disable a previously established BFCP connection, it MUST assign a zero port value to the 'm' line associated with the BFCP connection, following the procedures in [4].

### 10.5. DTLS Role Determination

If the 'm' line proto value is 'UDP/TLS/BFCP', the 'active/passive' status is used to determine the TLS roles. Following the procedures in [10], the 'active' endpoint will take the TLS client role.

Once a DTLS connection has been established, if the 'active/passive' status of the endpoints change during a session, a new DTLS connection MUST be established. Therefore, endpoints SHOULD NOT change the 'active/passive' status in subsequent offers and answers, unless they want to establish a new DTLS connection.

The conditions above, and additional conditions under which endpoints MUST establish a new DTLS connection, are the same as defined for DTLS-SRTP in [13].

## 11. Examples

For the purpose of brevity, the main portion of the session description is omitted in the examples, which only show 'm' lines and their attributes.

The following is an example of an offer sent by a conference server to a client.

```
m=application 50000 TCP/TLS/BFCP *
a=setup:passive
a=connection:new
a=fingerprint:SHA-1 \
    4A:AD:B9:B1:3F:82:18:3B:54:02:12:DF:3E:5D:49:6B:19:E5:7C:AB
a=floorctrl:s-only
a=confid:4321
a=userid:1234
a=floorid:1 mstrm:10
a=floorid:2 mstrm:11
a=bfcper:1
m=audio 50002 RTP/AVP 0
a=label:10
m=video 50004 RTP/AVP 31
a=label:11
```

Note that due to RFC formatting conventions, this document splits SDP across lines whose content would exceed 72 characters. A backslash



character marks where this line folding has taken place. This backslash and its trailing CRLF and whitespace would not appear in actual SDP content.

The following is the answer returned by the client.

```
m=application 9 TCP/TLS/BFCP *
a=setup:active
a=connection:new
a=fingerprint:SHA-1 \
    3D:B4:7B:E3:CC:FC:0D:1B:5D:31:33:9E:48:9B:67:FE:68:40:E8:21
a=floorctrl:c-only
a=bfcpxver:1
m=audio 55000 RTP/AVP 0
m=video 55002 RTP/AVP 31
```

A similar example using unreliable transport and DTLS is shown below, where the offer is sent from a client.

```
m=application 50000 UDP/TLS/BFCP *
a=setup:actpass
a=dtls-id:abc3dl
a=fingerprint:SHA-1 \
    4A:AD:B9:B1:3F:82:18:3B:54:02:12:DF:3E:5D:49:6B:19:E5:7C:AB
a=floorctrl:c-only s-only
a=confid:4321
a=userid:1234
a=floorid:1 mstrm:10
a=floorid:2 mstrm:11
a=bfcpxver:2
m=audio 50002 RTP/AVP 0
a=label:10
m=video 50004 RTP/AVP 31
a=label:11
```

The following is the answer returned by the server.



```
m=application 55000 UDP/TLS/BFCP *
a=setup:active
a=dtls-id:abc3dl
a=fingerprint:SHA-1 \
    3D:B4:7B:E3:CC:FC:0D:1B:5D:31:33:9E:48:9B:67:FE:68:40:E8:21
a=floorctrl:s-only
a=confid:4321
a=userid:1234
a=floorid:1 mstrm:10
a=floorid:2 mstrm:11
a=bfcvver:2
m=audio 55002 RTP/AVP 0
m=video 55004 RTP/AVP 31
```

## **12. Security Considerations**

The BFCP [8], SDP [11], and offer/answer [4] specifications discuss security issues related to BFCP, SDP, and offer/answer, respectively. In addition, [7] and [10] discuss security issues related to the establishment of TCP and TLS connections using an offer/answer model. Furthermore, when using DTLS over UDP, considerations for its use with RTP and RTCP are presented in [13]. The requirements for the offer/answer exchange, as listed in Section 5 of [13], MUST be followed.

An initial integrity-protected channel is REQUIRED for BFCP to exchange self-signed certificates between a client and the floor control server. For session descriptions carried in SIP [3], S/MIME [6] is the natural choice to provide such a channel.

## **13. IANA Considerations**

[Editorial note: The changes in [Section 13.1](#) instruct the IANA to register the two new values UDP/BFCP and UDP/TLS/BFCP for the SDP 'proto' field. The new section [Section 13.6](#) registers a new SDP "bfcvver" attribute. The rest is unchanged from [14].]

### **13.1. Registration of SDP 'proto' Values**

The IANA has registered the following values for the SDP 'proto' field under the Session Description Protocol (SDP) Parameters registry:



Value	Reference
TCP/BFCP	[RFC XXXX]
TCP/TLS/BFCP	[RFC XXXX]
UDP/BFCP	[RFC XXXX]
UDP/TLS/BFCP	[RFC XXXX]

Table 3: Values for the SDP 'proto' field

### 13.2. Registration of the SDP 'floorctrl' Attribute

The IANA has registered the following SDP att-field under the Session Description Protocol (SDP) Parameters registry:

Contact name: Gonzalo.Camarillo@ericsson.com

Attribute name: floorctrl

Long-form attribute name: Floor Control

Type of attribute: Media level

Subject to charset: No

Purpose of attribute: The 'floorctrl' attribute is used to perform floor control server determination.

Allowed attribute values: 1\*("c-only" / "s-only" / "c-s")

### 13.3. Registration of the SDP 'confid' Attribute

The IANA has registered the following SDP att-field under the Session Description Protocol (SDP) Parameters registry:

Contact name: Gonzalo.Camarillo@ericsson.com

Attribute name: confid

Long-form attribute name: Conference Identifier

Type of attribute: Media level

Subject to charset: No

Purpose of attribute: The 'confid' attribute carries the integer representation of a Conference ID.



Allowed attribute values: A token

#### **13.4. Registration of the SDP 'userid' Attribute**

The IANA has registered the following SDP att-field under the Session Description Protocol (SDP) Parameters registry:

Contact name: Gonzalo.Camarillo@ericsson.com

Attribute name: userid

Long-form attribute name: User Identifier

Type of attribute: Media level

Subject to charset: No

Purpose of attribute: The 'userid' attribute carries the integer representation of a User ID.

Allowed attribute values: A token

#### **13.5. Registration of the SDP 'floorid' Attribute**

The IANA has registered the following SDP att-field under the Session Description Protocol (SDP) Parameters registry:

Contact name: Gonzalo.Camarillo@ericsson.com

Attribute name: floorid

Long-form attribute name: Floor Identifier

Type of attribute: Media level

Subject to charset: No

Purpose of attribute: The 'floorid' attribute associates a floor with one or more media streams.

Allowed attribute values: Tokens

#### **13.6. Registration of the SDP 'bfcprver' Attribute**

The IANA has registered the following SDP att-field under the Session Description Protocol (SDP) Parameters registry:

Contact name: Gonzalo.Camarillo@ericsson.com



Attribute name: bfcpver

Long-form attribute name: BFCP Version

Type of attribute: Media level

Subject to charset: No

Purpose of attribute: The 'bfcpver' attribute lists supported BFCP versions.

Allowed attribute values: Tokens

#### **14. Changes from [RFC 4583](#)**

Following is the list of technical changes and other fixes from [\[15\]](#).

Main purpose of this work was to add signaling support necessary to support BFCP over unreliable transport, as described in [\[8\]](#), resulting in the following changes:

1. Fields in the 'm' line ([Section 3](#)):  
The section is re-written to remove reference to the exclusivity of TCP as a transport for BFCP streams. The proto field values UDP/BFCP and UDP/TLS/BFCP added.
2. Authentication ([Section 9](#)):  
In last paragraph, made clear that a TCP connection was described.
3. Security Considerations ([Section 12](#)):  
For the DTLS over UDP case, mention existing considerations and requirements for the offer/answer exchange in [\[13\]](#).
4. Registration of SDP 'proto' Values ([Section 13.1](#)):  
Register the two new values UDP/BFCP and UDP/TLS/BFCP in the SDP parameters registry.
5. BFCP Version Negotiation ([Section 7](#)):  
A new 'bfcpver' SDP media-level attribute is added in order to signal supported version number.

Clarification and bug fixes:

1. Errata ID: 712 ([Section 4](#) and [Section 6](#)):  
Language clarification. Don't use terms like an SDP attribute is "used in an 'm' line", instead make clear that the attribute is a media-level attribute.



2. Fix typo in example ([Section 11](#)):  
Do not use 'm-stream' in the SDP example, use the correct 'mstrm' as specified in [Section 11](#). Recommend interpreting 'm-stream' if it is received, since it is present in some implementations.
3. Assorted clarifications (Across the document):  
Language clarifications as a result of reviews. Also, the normative language where tightened where appropriate, i.e. changed from SHOULD strength to MUST in a number of places.

## **[15.](#) Acknowledgements**

Joerg Ott, Keith Drage, Alan Johnston, Eric Rescorla, Roni Even, and Oscar Novo provided useful ideas for the original [\[15\]](#). The authors also acknowledge contributions to the revision of BFCP for use over an unreliable transport from Geir Arne Sandbakken, Charles Eckel, Alan Ford, Eoin McLeod and Mark Thompson. Useful and important final reviews were done by Ali C. Begen, Mary Barnes and Charles Eckel.

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