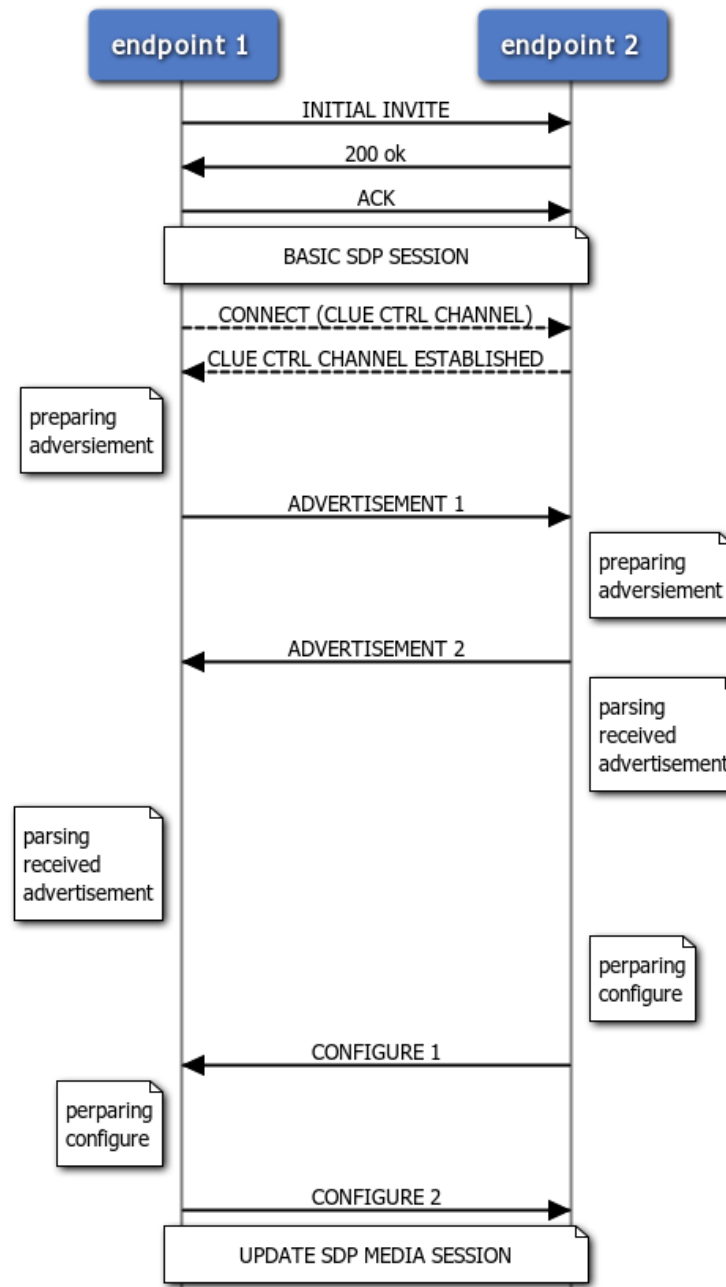


# Clue protocol over WebRTC data channel: 'running code' trials

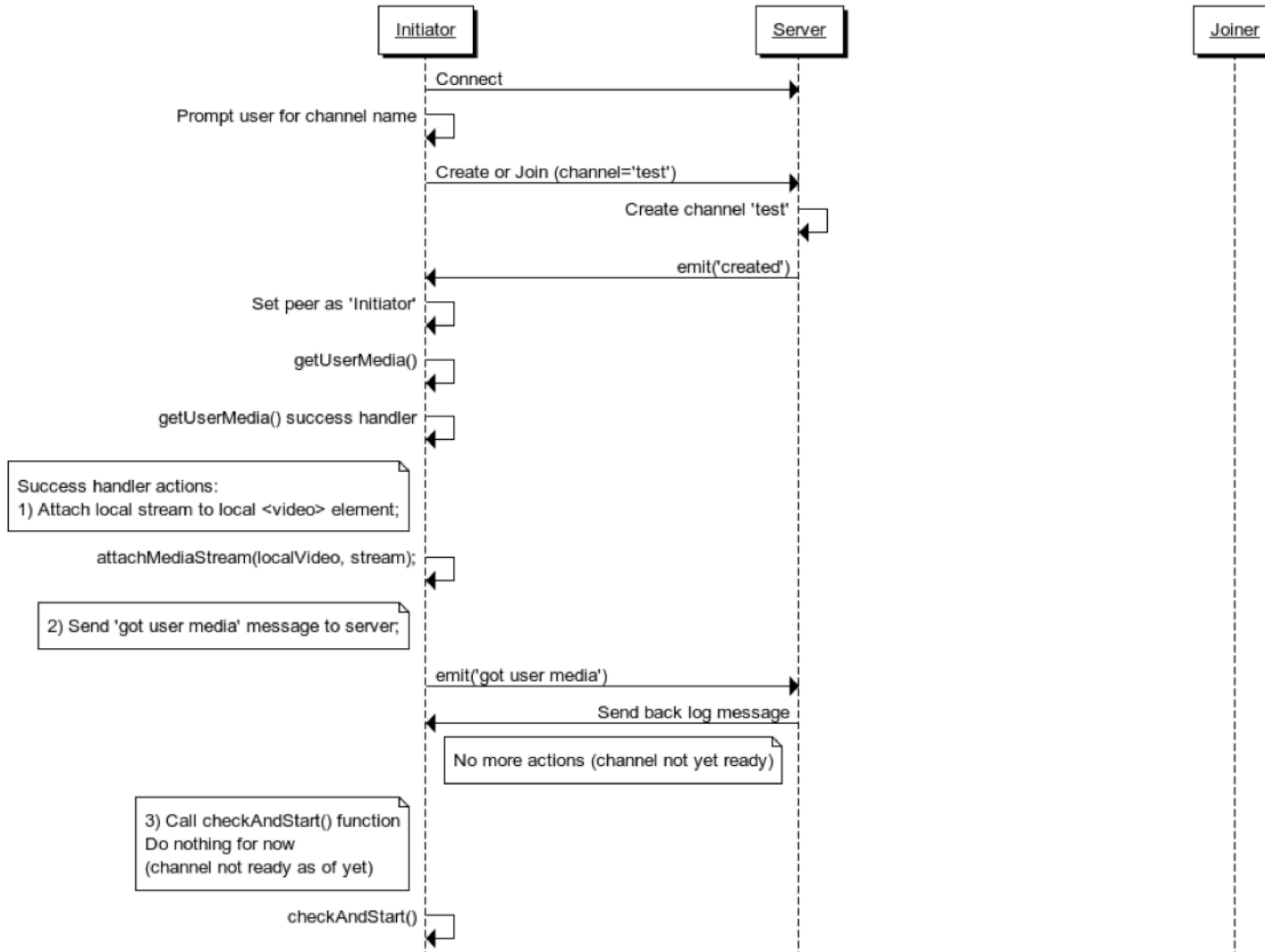
CLUE WG meeting  
London, March 7<sup>th</sup>, 2014

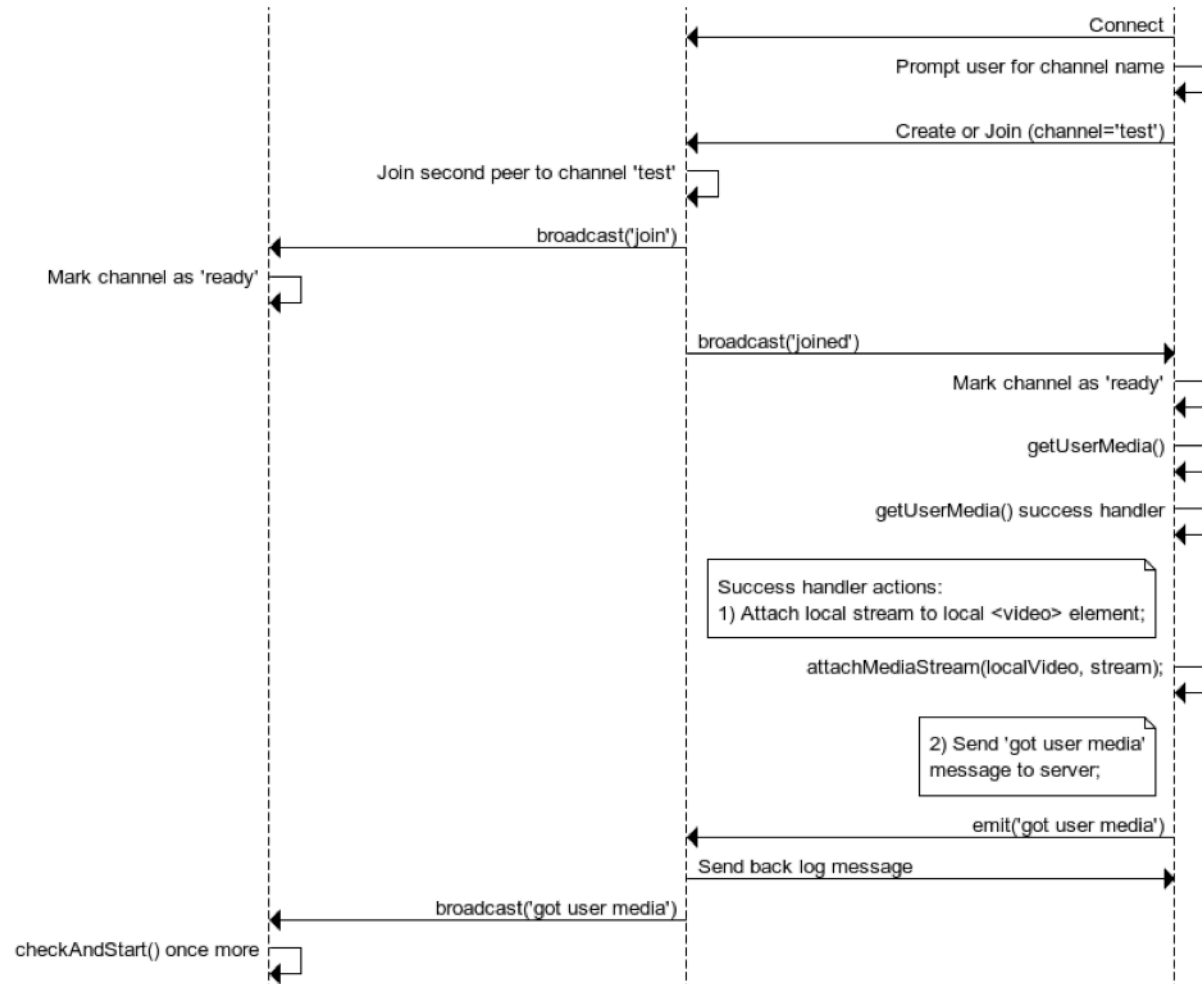
Roberta Presta & Simon Romano  
{roberta.presta,spromano}@unina.it

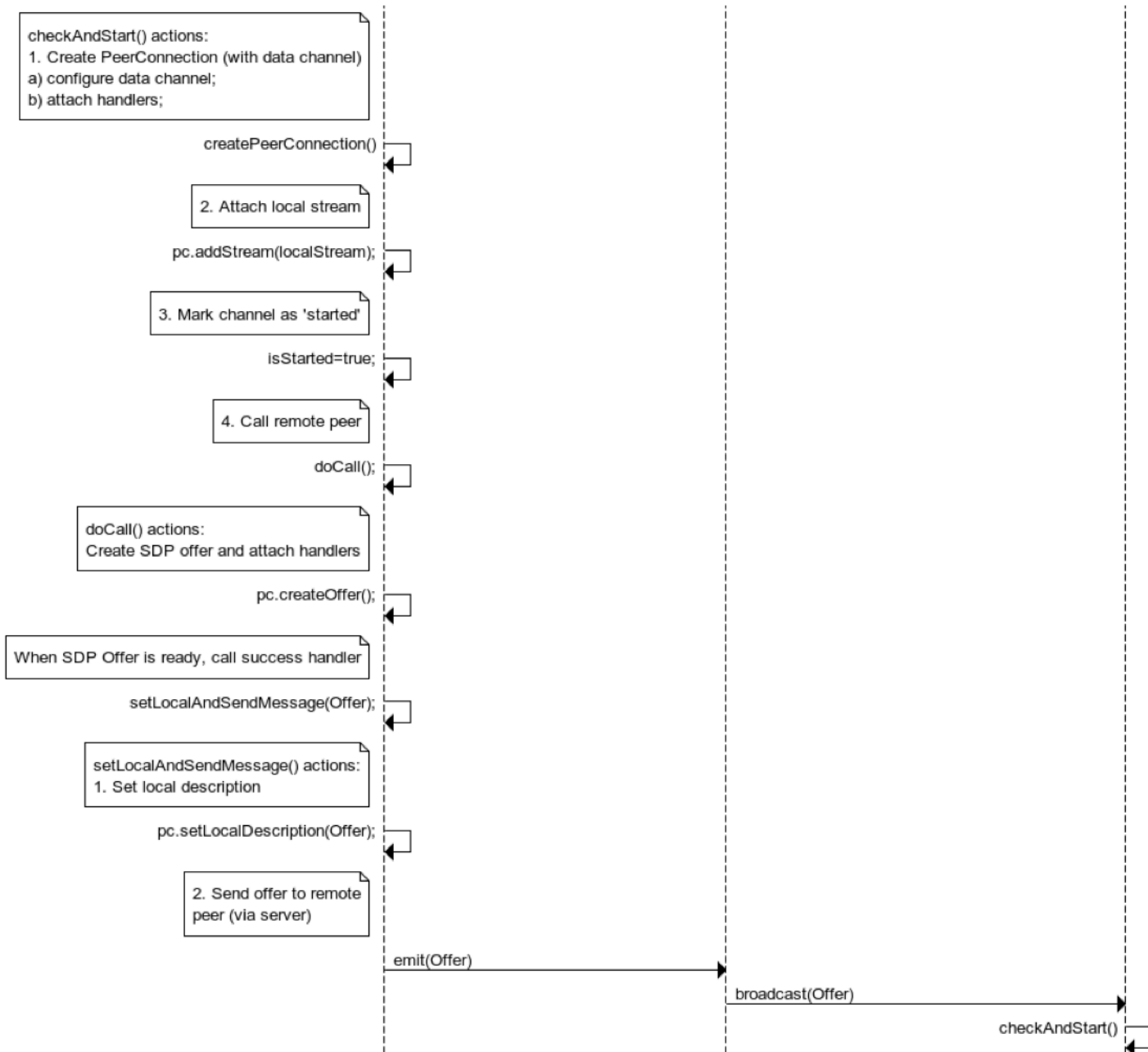
### BASIC CLUE MESSAGE FLOW



## Complete WebRTC call flow







loop

[ICE candidate negotiation]

Note well:  
When the channel is started  
every time a new ICE candidate  
is made available to the  
PeerConnection...

...it is sent to the other  
peer via the server.

Upon reception of such a candidate,  
the remote peer adds it  
to the local Peer Connection

pc.addIceCandidate(candidate);

onIceCandidate

emit(candidate)

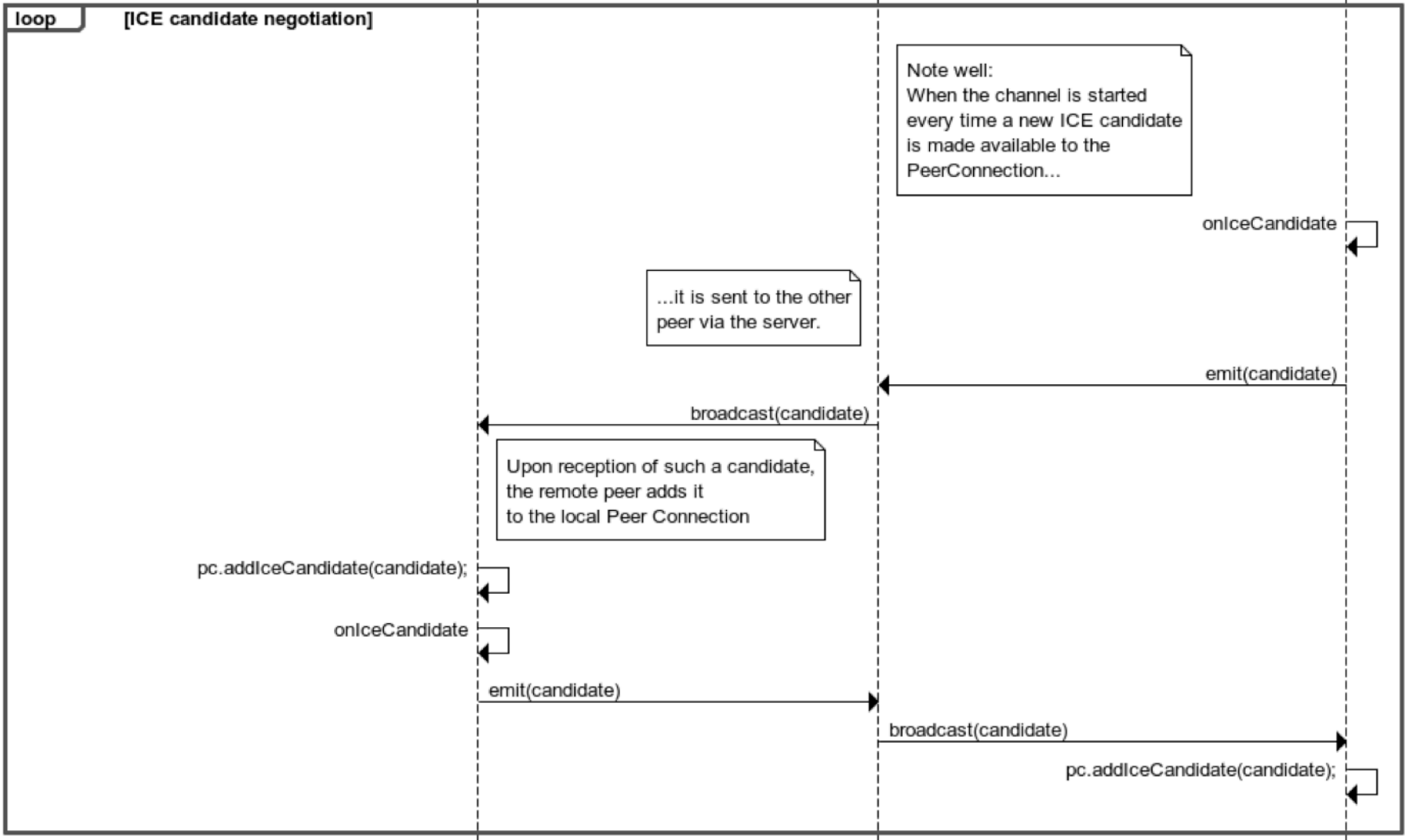
broadcast(candidate)

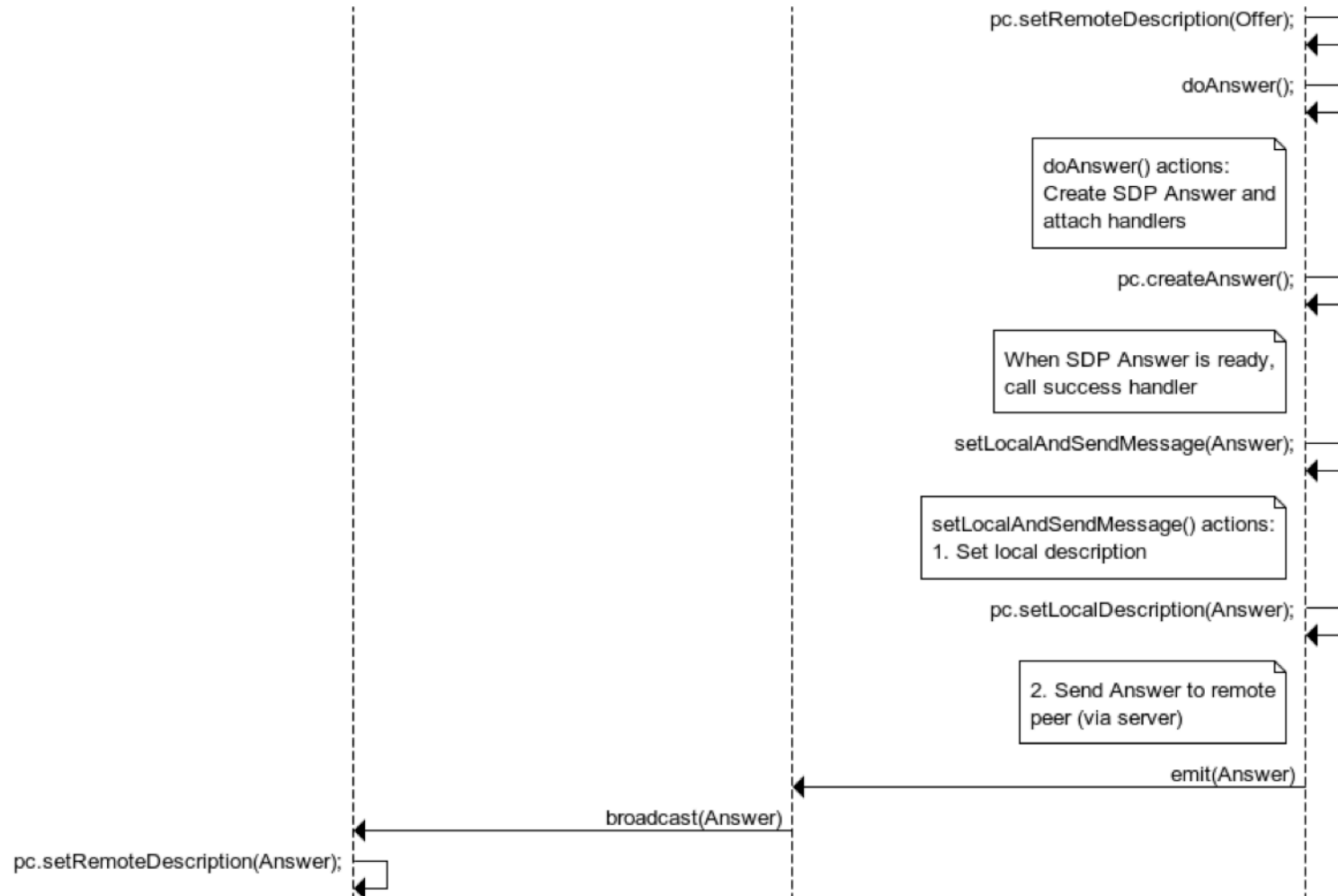
pc.addIceCandidate(candidate);

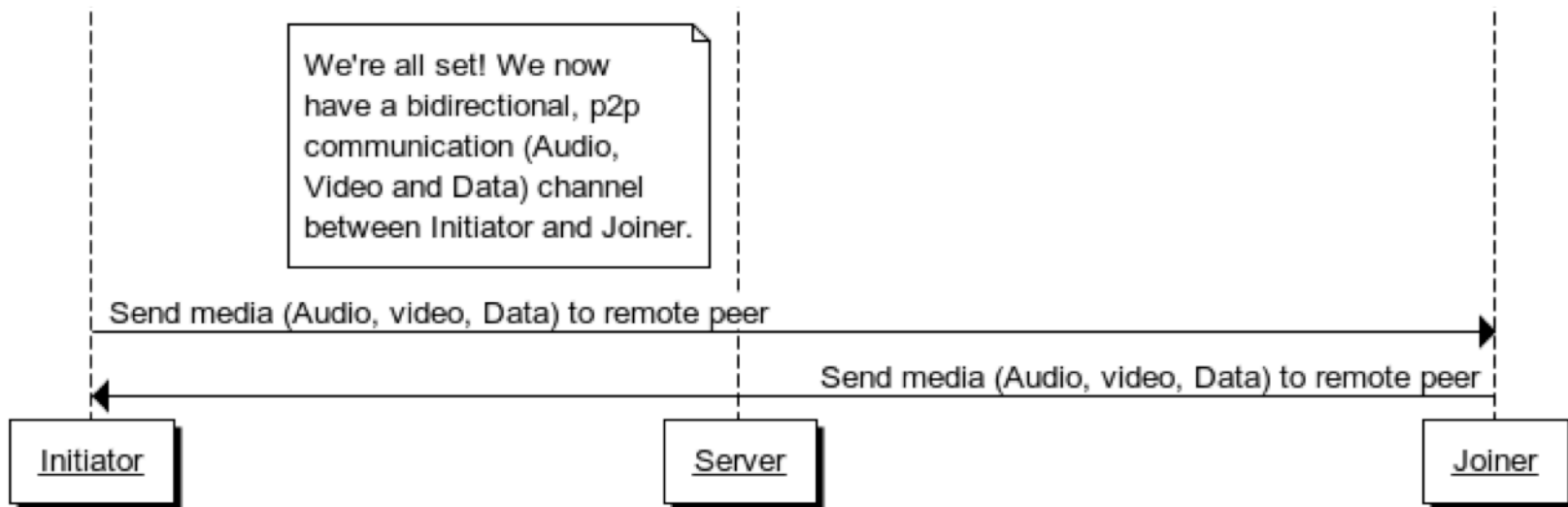
onIceCandidate

emit(candidate)

broadcast(candidate)

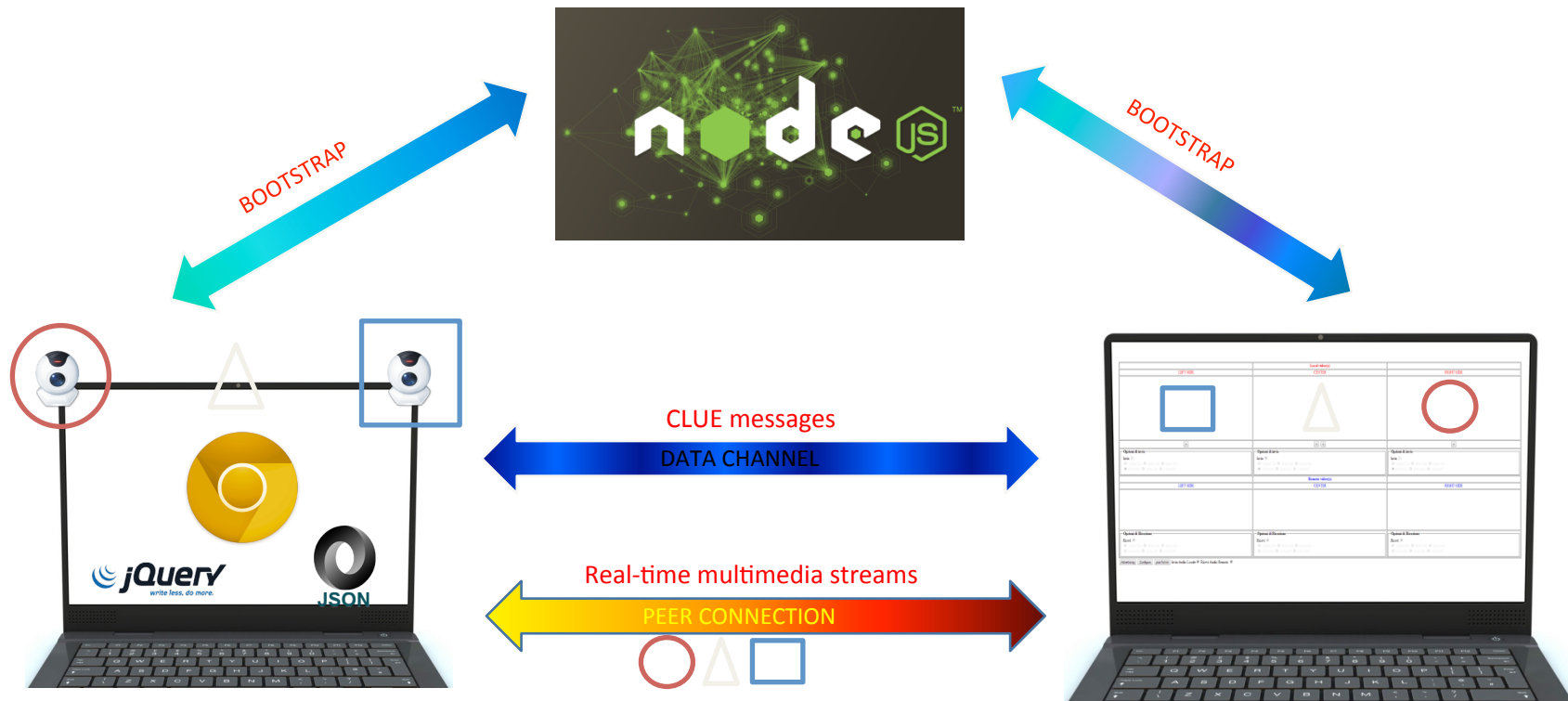









# Clue over WebRTC demo





	Local video(s)	
LEFT SIDE	CENTER	RIGHT SIDE
>	< >	<
<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
	Remote video(s)	
LEFT SIDE	CENTER	RIGHT SIDE
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180

http://localhost:2013/ wants to use your camera. [Learn more](#)

Deny Allow ×

Local video(s)		
LEFT SIDE	CENTER	RIGHT SIDE
		
>	< >	<
<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
Remote video(s)		
LEFT SIDE	CENTER	RIGHT SIDE
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180


ADVERTISE CONFIGURE



	Local video(s)	
LEFT SIDE	CENTER	RIGHT SIDE
		
➤	⏪ ➤	⏪
<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
	Remote video(s)	
LEFT SIDE	CENTER	RIGHT SIDE
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180

## CLUE over WebRTC log page



Clean logs

>	< >	<
<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
<b>LEFT SIDE</b>	<b>Remote video(s)</b> <b>CENTER</b>	<b>RIGHT SIDE</b>
		
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180

	<b>Local video(s)</b>	
<b>LEFT SIDE</b>	<b>CENTER</b>	<b>RIGHT SIDE</b>
		
>	< >	<
<b>Send Options</b> Send <input checked="" type="checkbox"/> <input checked="" type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
	<b>Remote video(s)</b>	
<b>LEFT SIDE</b>	<b>CENTER</b>	<b>RIGHT SIDE</b>
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180

## CLUE over WebRTC log page

### CLUE over WebRTC log page

Clue message SENT by Initiator:

```
<advertisement
  xmlns='urn:ietf:params:xml:ns:clue-message'
  xmlns:ns2='urn:ietf:params:xml:ns:clue-info' protocol='CLUE' version='0.1'>
  <sequenceNr>0</sequenceNr>
  <senderId>Prova</senderId>
  <advNr>1</advNr>
  <mediaCaptures>
    <ns2:mediaCapture
      xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance' xsi:type='ns2:audioCaptureType' captureID='randomAudioID'>
      <ns2:capturedMedia>audio</ns2:capturedMedia>
      <ns2:captureSceneIDREF>ScEn1</ns2:captureSceneIDREF>
      <ns2:encGroupIDREF>AuEncGroup0</ns2:encGroupIDREF>
      <ns2:spatialInformation>
        <ns2:capturePoint>
          <ns2:x>0</ns2:x>
          <ns2:y>0</ns2:y>
          <ns2:z>0</ns2:z>
          <ns2:lineOfCapturePoint>
            <ns2:x>0</ns2:x>
            <ns2:y>0</ns2:y>
            <ns2:z>10</ns2:z>
          </ns2:lineOfCapturePoint>
        </ns2:capturePoint>
      </ns2:spatialInformation>
      <ns2:description lang='en'>media Capture</ns2:description>
      <ns2:audioChannelFormat>mono</ns2:audioChannelFormat>
    </ns2:mediaCapture>
  </ns2:mediaCaptures>
</advertisement>
```

Clean logs




## CLUE over WebRTC log page

Message RECEIVED by Consumer:

```
<advertisement
  xmlns='urn:ietf:params:xml:ns:clue-message'
  xmlns:ns2='urn:ietf:params:xml:ns:clue-info' protocol='CLUE' version='0.1'>
  <sequenceNr>0</sequenceNr>
  <senderId>Prova</senderId>
  <advNr>1</advNr>
  <mediaCaptures>
    <ns2:mediaCapture
      xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance' xsi:type='ns2:audioCaptureType' captureID='randomAudioID'>
      <ns2:capturedMedia>audio</ns2:capturedMedia>
      <ns2:captureSceneIDREF>ScEn1</ns2:captureSceneIDREF>
      <ns2:encGroupIDREF>AuEncGroup0</ns2:encGroupIDREF>
      <ns2:spatialInformation>
        <ns2:capturePoint>
          <ns2:x>0</ns2:x>
          <ns2:y>0</ns2:y>
          <ns2:z>0</ns2:z>
          <ns2:lineOfCapturePoint>
            <ns2:x>0</ns2:x>
            <ns2:y>0</ns2:y>
            <ns2:z>10</ns2:z>
          </ns2:lineOfCapturePoint>
        </ns2:capturePoint>
      </ns2:spatialInformation>
      <ns2:description lang='en'>media Capture</ns2:description>
      <ns2:audioChannelFormat>mono</ns2:audioChannelFormat>
    </ns2:mediaCapture>
    <ns2:mediaCapture
      xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance' xsi:type='ns2:videoCaptureType'
      captureID='db6f9228a8d4e65f8589391a339c0bf82b4dd41d48b9ec3df6dd5a04adedfefd'>
```

Clean logs

>	< >	<
<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
<b>LEFT SIDE</b>	<b>Remote video(s)</b> <b>CENTER</b>	<b>RIGHT SIDE</b>
		
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input checked="" type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180

## CLUE over WebRTC log page

Clue message SENT by Consumer:

```
<configure
  xmlns='urn:ietf:params:xml:ns:clue-message'
  xmlns:ns2='urn:ietf:params:xml:ns:clue-info' protocol='CLUE' version='0.1'>
  <sequenceNr>1</sequenceNr>
  <senderId>consumer</senderId>
  <advNumber>1</advNumber>
  <captureEncodings>
    <ns2:captureEncoding ID='AuCE'>
      <ns2:mediaCaptureID>randomAudioID</ns2:mediaCaptureID>
      <ns2:encodingID>AuEn0</ns2:encodingID>
    </ns2:captureEncoding>
    <ns2:captureEncoding ID='CodecEnc0'>
      <ns2:mediaCaptureID>db6f9228a8d4e65f8589391a339c0bf82b4dd41d48b9ec3df6dd5a04adedfefed</ns2:mediaCaptureID>
      <ns2:encodingID>VidEnc0</ns2:encodingID>
      <ns2:encodingParameters>
        <ns2:width>1280</ns2:width>
        <ns2:height>720</ns2:height>
      </ns2:encodingParameters>
    </ns2:captureEncoding>
    <ns2:captureEncoding ID='CodecEnc1'>
      <ns2:mediaCaptureID>d723b28c62d705c3b437bfa0f9c46ea3d6f66323500a54dc70422c783e0e766e</ns2:mediaCaptureID>
      <ns2:encodingID>VidEnc1</ns2:encodingID>
      <ns2:encodingParameters>
        <ns2:width>640</ns2:width>
        <ns2:height>480</ns2:height>
      </ns2:encodingParameters>
    </ns2:captureEncoding>
  </captureEncodings>
</configure>
```

Clean logs

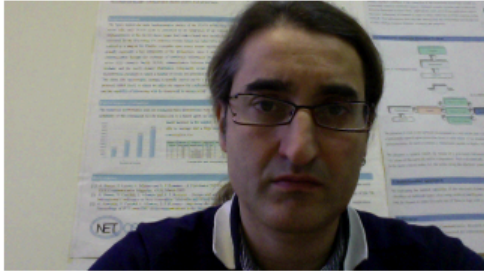

## CLUE over WebRTC log page

Message RECEIVED by Initiator:

```
<configure
  xmlns='urn:ietf:params:xml:ns:clue-message'
  xmlns:ns2='urn:ietf:params:xml:ns:clue-info' protocol='CLUE' version='0.1'>
  <sequenceNr>1</sequenceNr>
  <senderId>consumer</senderId>
  <advNumber>1</advNumber>
  <captureEncodings>
    <ns2:captureEncoding ID='AuCE'>
      <ns2:mediaCaptureID>randomAudioID</ns2:mediaCaptureID>
      <ns2:encodingID>AuEn0</ns2:encodingID>
    </ns2:captureEncoding>
    <ns2:captureEncoding ID='CodecEnc0'>
      <ns2:mediaCaptureID>db6f9228a8d4e65f8589391a339c0bf82b4dd41d48b9ec3df6dd5a04adedfefd</ns2:mediaCaptureID>
      <ns2:encodingID>VidEnc0</ns2:encodingID>
      <ns2:encodingParameters>
        <ns2:width>1280</ns2:width>
        <ns2:height>720</ns2:height>
      </ns2:encodingParameters>
    </ns2:captureEncoding>
    <ns2:captureEncoding ID='CodecEnc1'>
      <ns2:mediaCaptureID>d723b28c62d705c3b437bfa0f9c46ea3d6f66323500a54dc70422c783e0e766e</ns2:mediaCaptureID>
      <ns2:encodingID>VidEnc1</ns2:encodingID>
      <ns2:encodingParameters>
        <ns2:width>640</ns2:width>
        <ns2:height>480</ns2:height>
      </ns2:encodingParameters>
    </ns2:captureEncoding>
  </captureEncodings>
</configure>
```

-----  
Message RECEIVED by Initiator:

Clean logs

	<b>Local video(s)</b>	
<b>LEFT SIDE</b>	<b>CENTER</b>	<b>RIGHT SIDE</b>
		
>	< >	<
<b>Send Options</b> Send <input checked="" type="checkbox"/> <input checked="" type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Send Options</b> Send <input type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input checked="" type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180
	<b>Remote video(s)</b>	
<b>LEFT SIDE</b>	<b>CENTER</b>	<b>RIGHT SIDE</b>
<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180	<b>Receive Options</b> Receive <input checked="" type="checkbox"/> <input type="radio"/> 1280x720 <input type="radio"/> 960x720 <input type="radio"/> 640x360 <input type="radio"/> 640x480 <input type="radio"/> 320x240 <input type="radio"/> 320x180



**Send Options**

Send

- 1280x720  960x720  640x360
- 640x480  320x240  320x180

**Send Options**

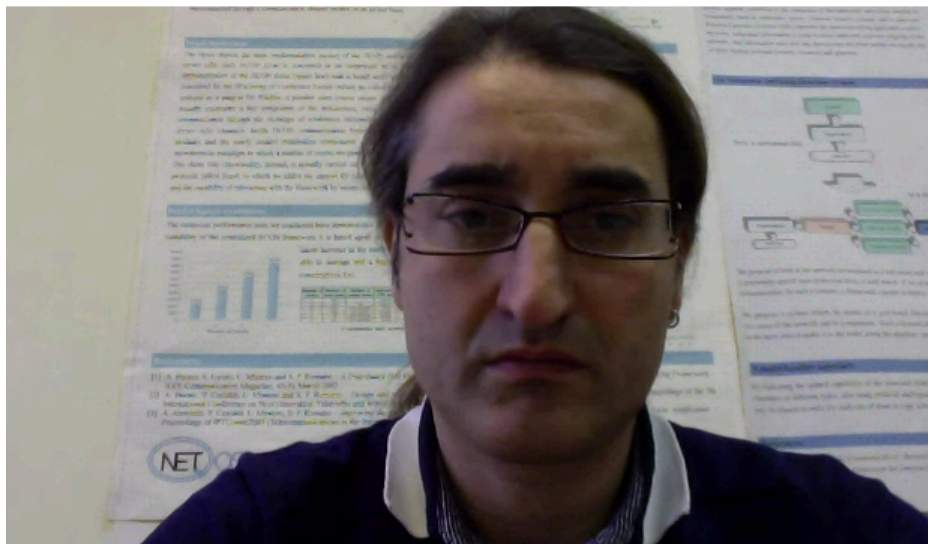
Send

- 1280x720  960x720  640x360
- 640x480  320x240  320x180

LEFT SIDE

Remote video(s)

CENTER



**Receive Options**

Receive

- 1280x720  960x720  640x360
- 640x480  320x240  320x180

**Receive Options**

Receive

- 1280x720  960x720  640x360
- 640x480  320x240  320x180