Working with chat rooms

Overview

Web Call Server allows embedding of a video chat to your project, that will work on most of modern browsers without installing third-party software as well as on mobile devices.

Supported platforms and browsers

	Chrome	**Firefox**	**Safari**	**Edge**
Windows	✅	✅	❌	✅
Mac OS	✅	✅	✅	✅
Android	✅	✅	❌	✅
iOS	✅	✅	✅	✅

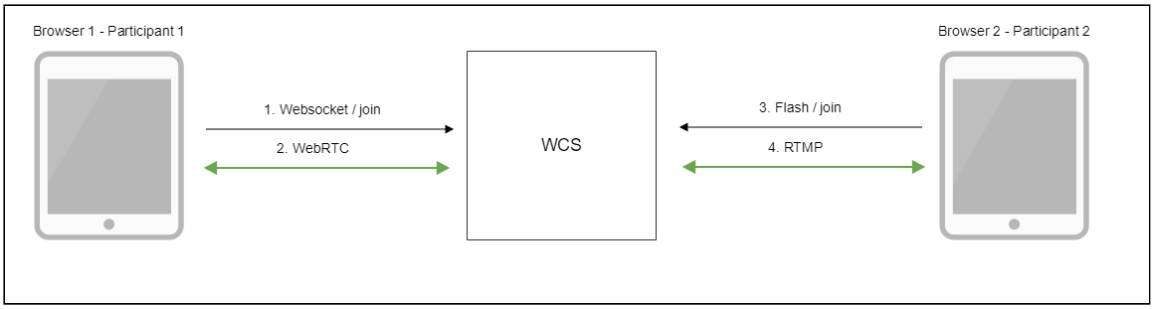
Supported codecs

- Video: H.264, VP8
- Audio: Opus, G.711

Functions

- Video chat
- Text chat
- Video conference
- Video conference with screen sharing

Operation flowchart

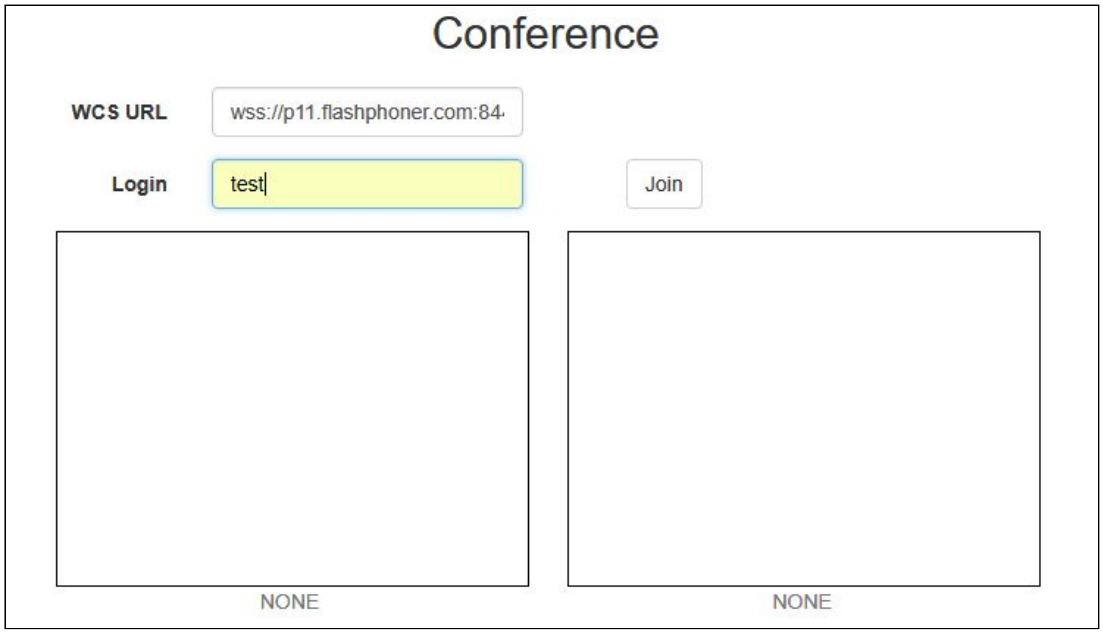


1. The browser of the participant 1 connects to the server via Websocket and sends the `join` command.
2. The browser of the participant 1 can send a stream via WebRTC to publish it in the chat room and receive streams published in the room.
3. The browser of the participant 2 connects to the server using Flash and sends the `join` command.
4. The browser of the participant 2 can send a stream via RTMP to publish it in the chat room and receive streams published in the room.

Quick testing

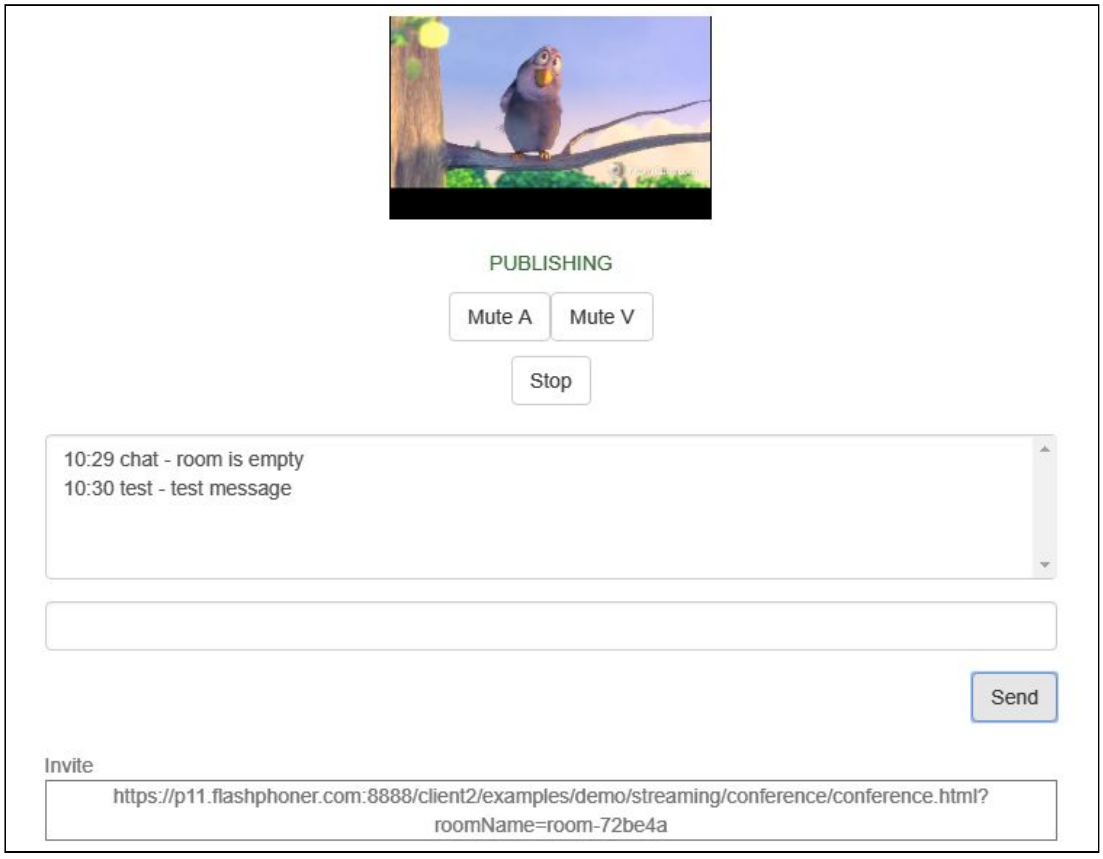
Video conference testing

1. For the test we use:
2. the demo server at `demo.flashphoner.com`
3. the Conference web application to arrange a video conference.
4. Open the Conference web application. In the `Login` field enter any arbitrary user name, for example `test`:



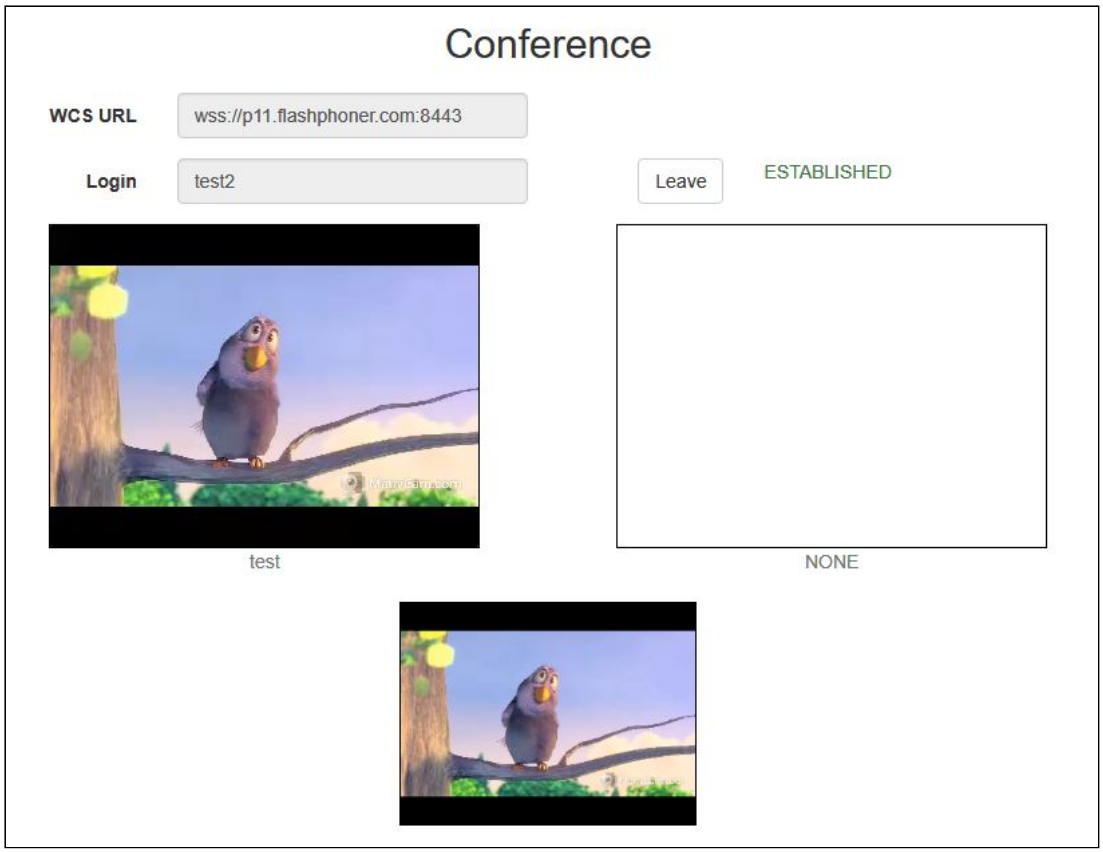
5. Click the `Join` button. A connection with the server is established, and you should see the corresponding `ESTABLISHED` label. The chat room is automatically created:

In the bottom of the screen, an image from the web camera, a text chat and a link to invite users to the room are shown:

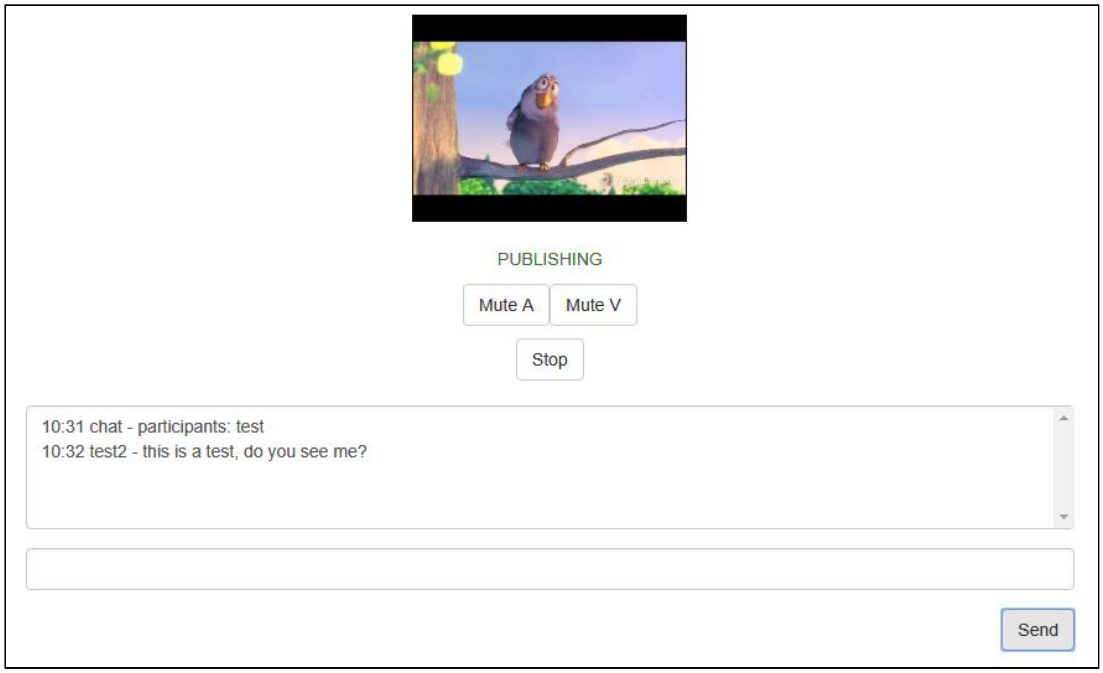


6. Copy the link to the chat room and open it in a new tab of the browser. Enter a user name other than the name of the chat room creator, for example, `test2`, and click the `Join` button. The page will display an image from the web camera of the `test` participant

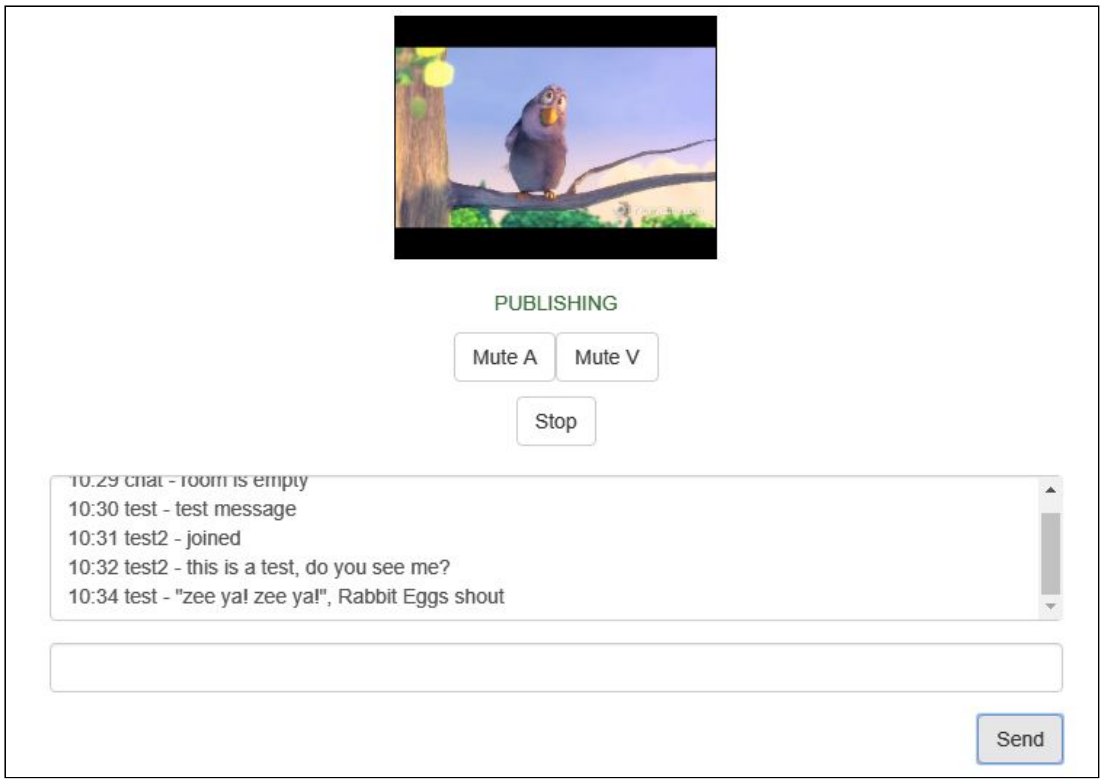
(left) and from the web camera of the `test2` participant (below):



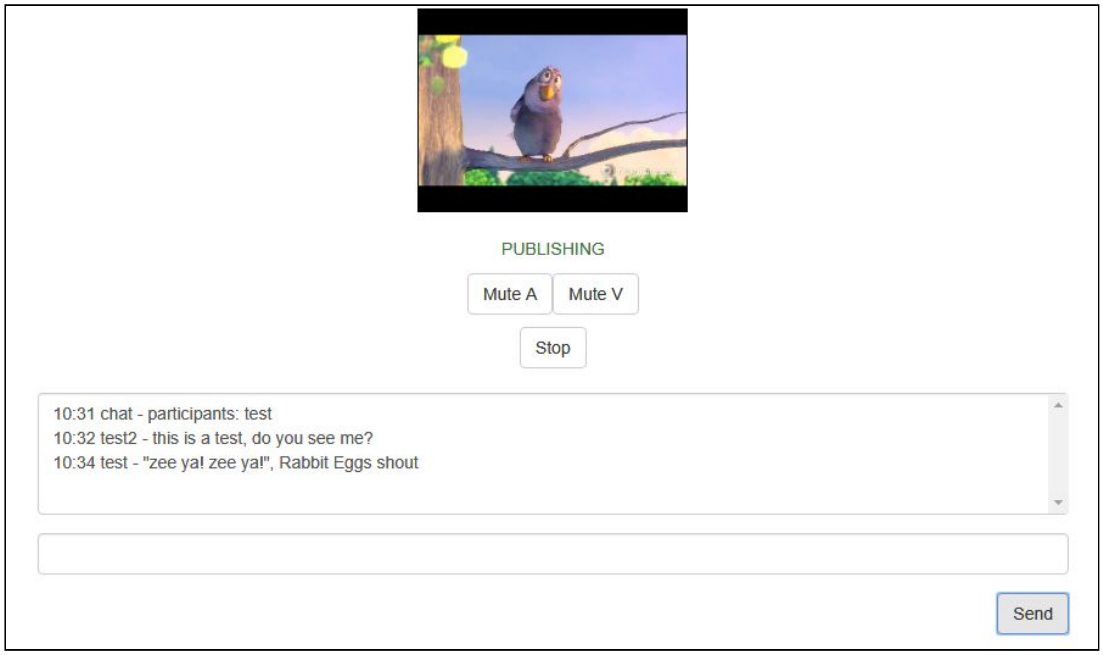
7. In the text chat window of the `test2` participant enter a message and click `Send`:



8. On the browser tab of the test participant enter an answer:



9. Make sure the answer is received:



10. To leave the chat room, click the `Leave` button

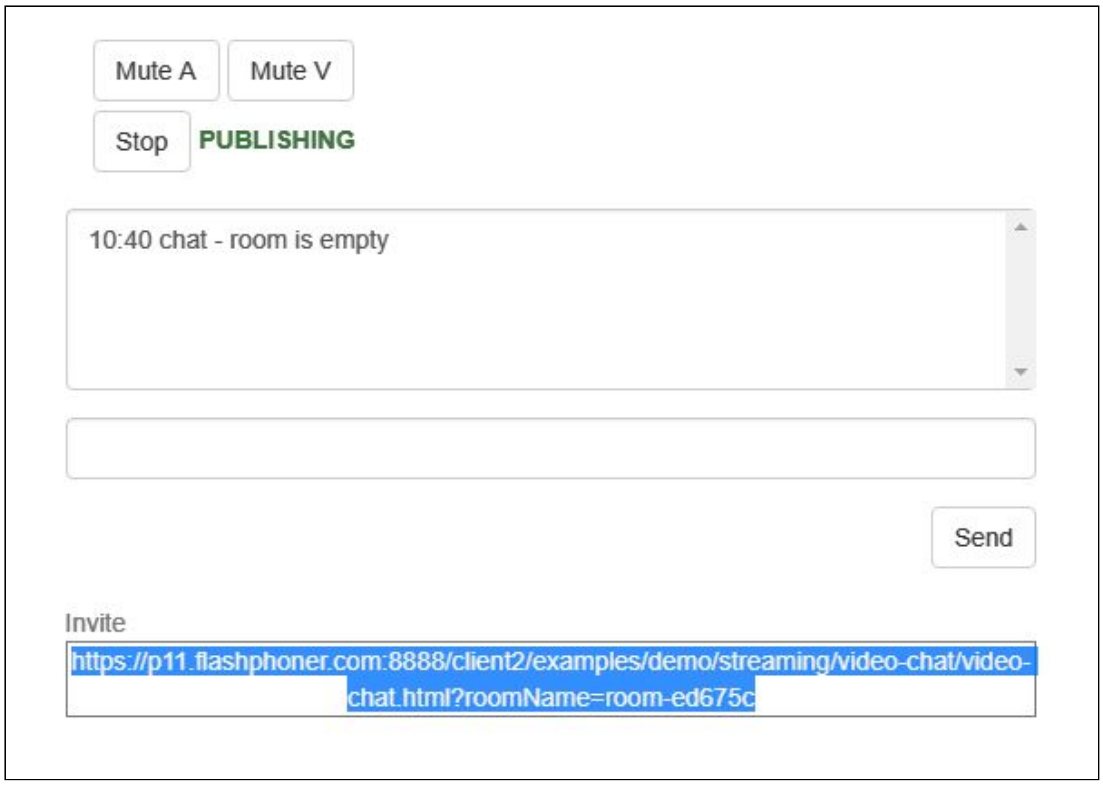
Video chat testing

1. For the test we use:
2. the demo server at `demo.flashphoner.com`

3. the Two Way Video Chat web application to arrange a video chat
4. Open the Two Way Video Chat web application. In the `Login` field enter any arbitrary user name, for example `test`:

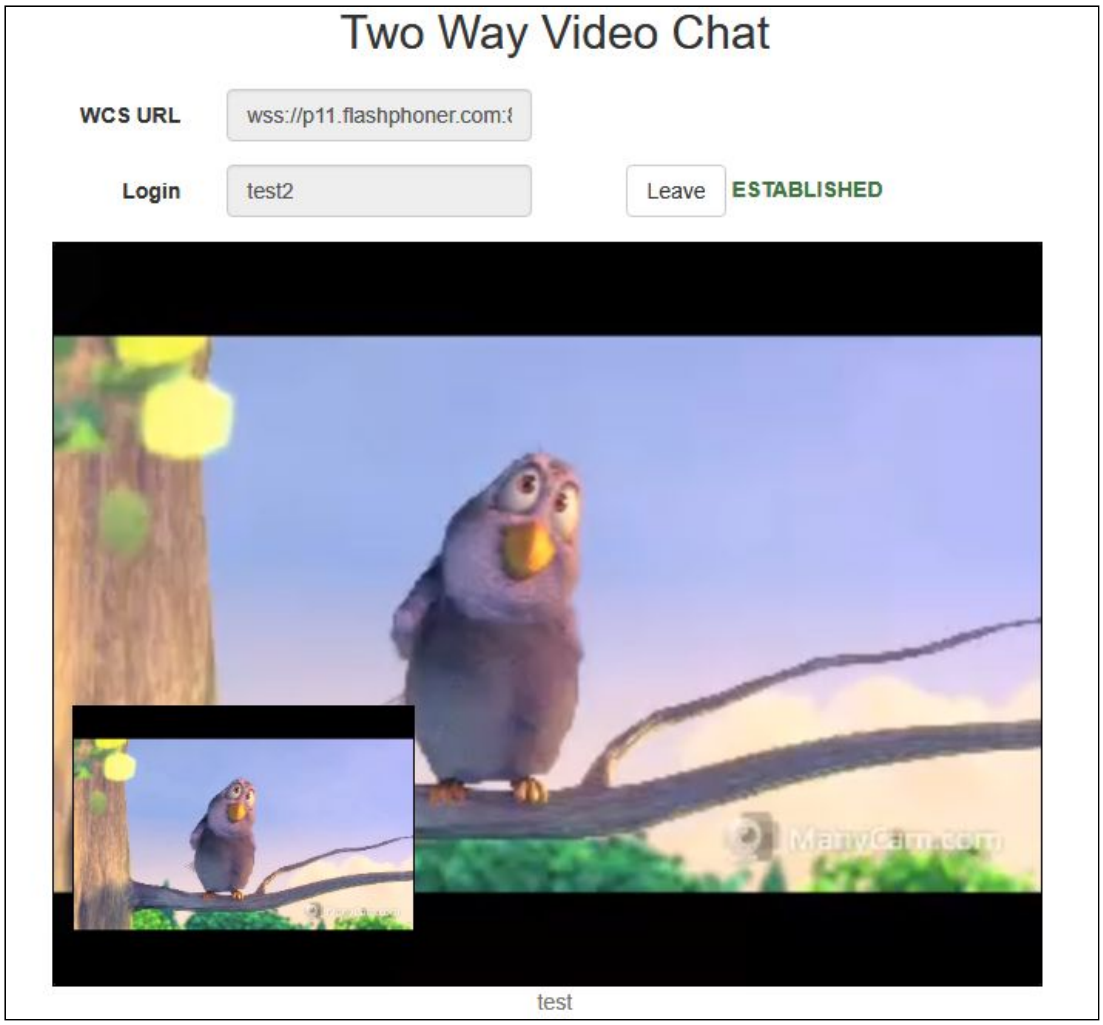
5. Click the `Join` button. A connection is established to the server, and the corresponding `ESTABLISHED` label is shown. The chat room is automatically created:

Below the screen, a text chat and a link to invite other users to the room are shown:

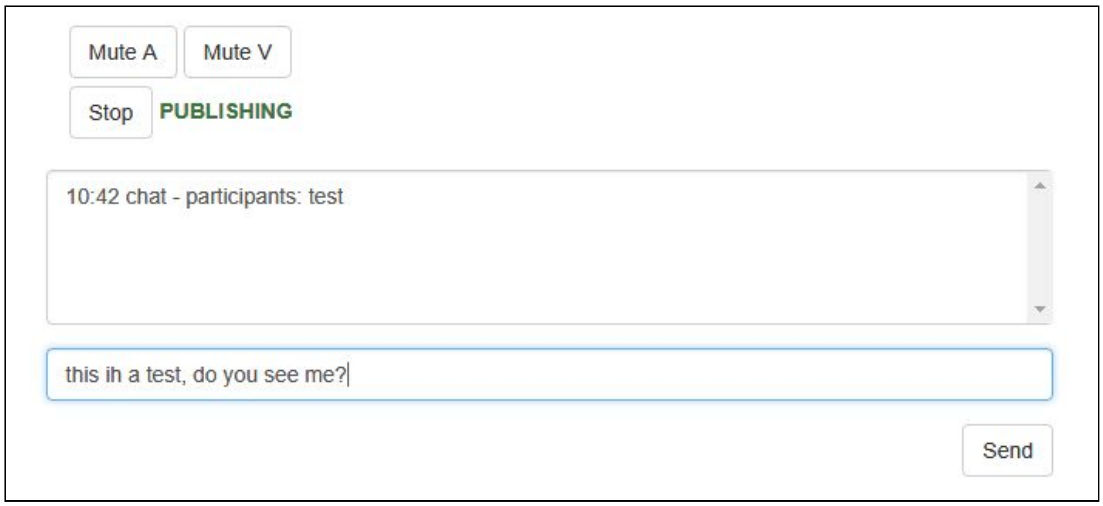


6. Copy the link to the chat room and open it in a new tab of the browser. Enter a user name other than that of the creator of the room, for example, `test2`, and click the `Join` button. The page will display a large image from the web camera of the `test` user and a

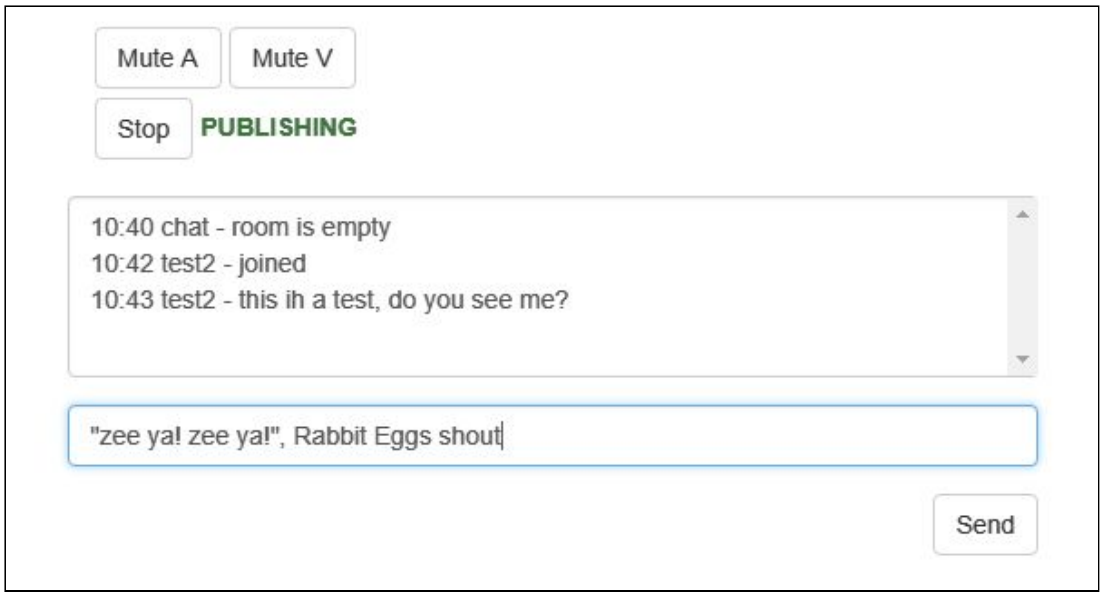
smaller image from the web camera of the `test2` user (in the lower left corner):



7. In the text chat box, enter a message and click the `Send` button:



8. On the tab of the test user enter an answer:



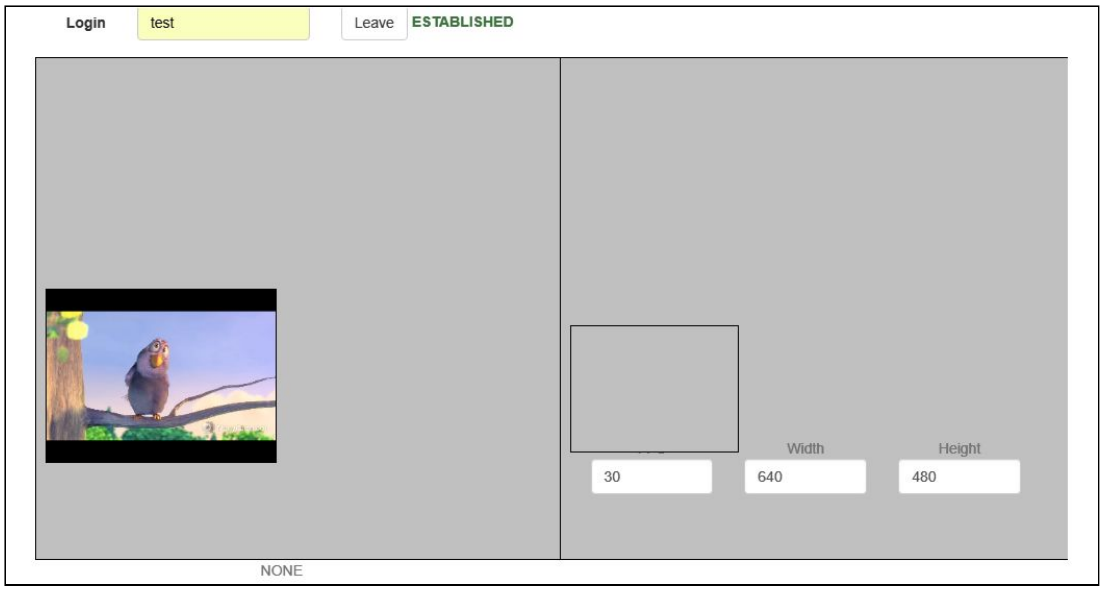
9. Make sure the answer is received:

10. To leave the chat room, click the `Leave` button

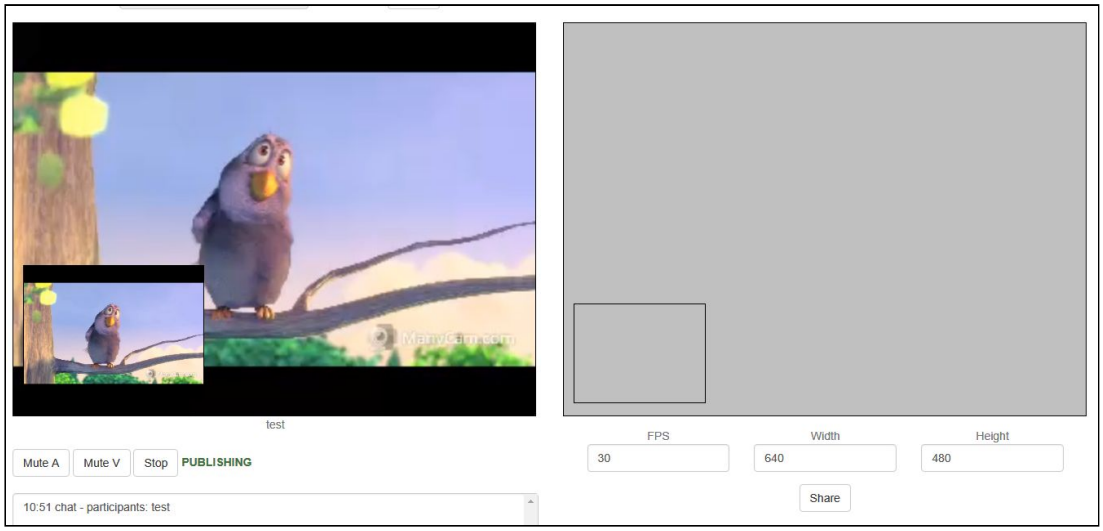
Video conference with screen sharing testing

1. For the test we use:
2. the demo server at `demo.flashphoner.com`
3. the Two Way Video Chat and Screen Sharing web application to organize a video conference
4. the Chrome browser
5. Open the Two Way Video Chat and Screen Sharing web application. In the `Login` field enter any arbitrary user name, for example `test`. Click the `Join` button. A connection is established to the server, and the corresponding `ESTABLISHED` label is displayed. The

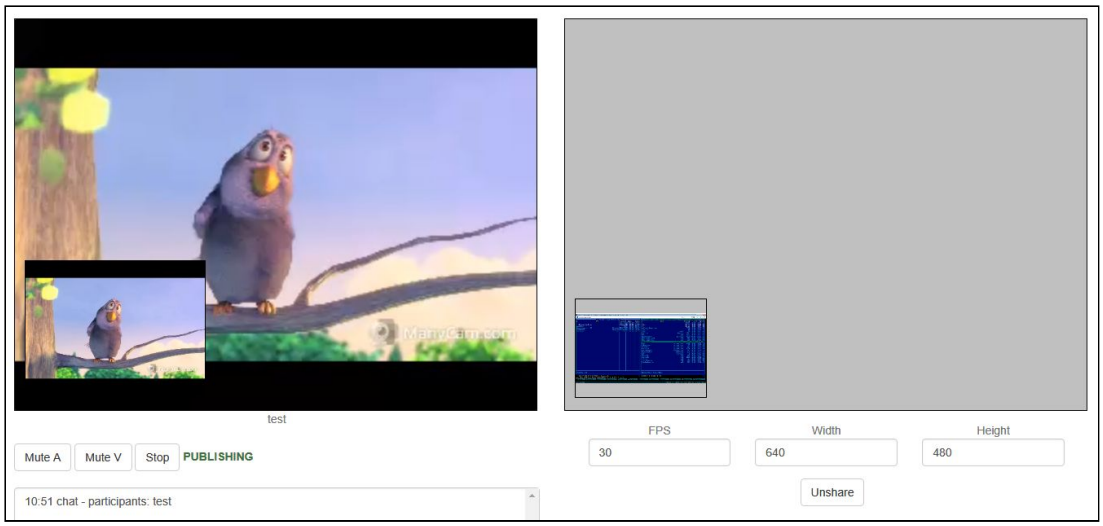
chat room is created automatically, and an image from the web camera is shown:



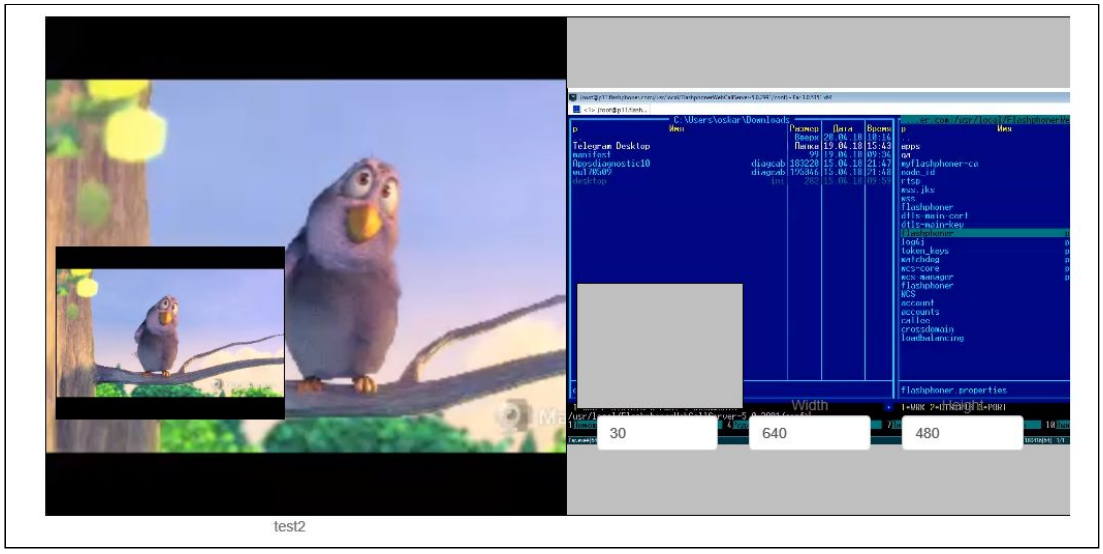
6. Copy the link to the chat room and open it in a new tab of the browser. Enter a user name different from the name of the chat room's creator, for example `test2`, and click the `Join` button. The page displays an image from the web camera:



7. Click the `Share` button and allow the browser to gain access to your screen or to the application window:



8. On the tab of the `test` user you should see the screen or the app window you allowed the browser to access:



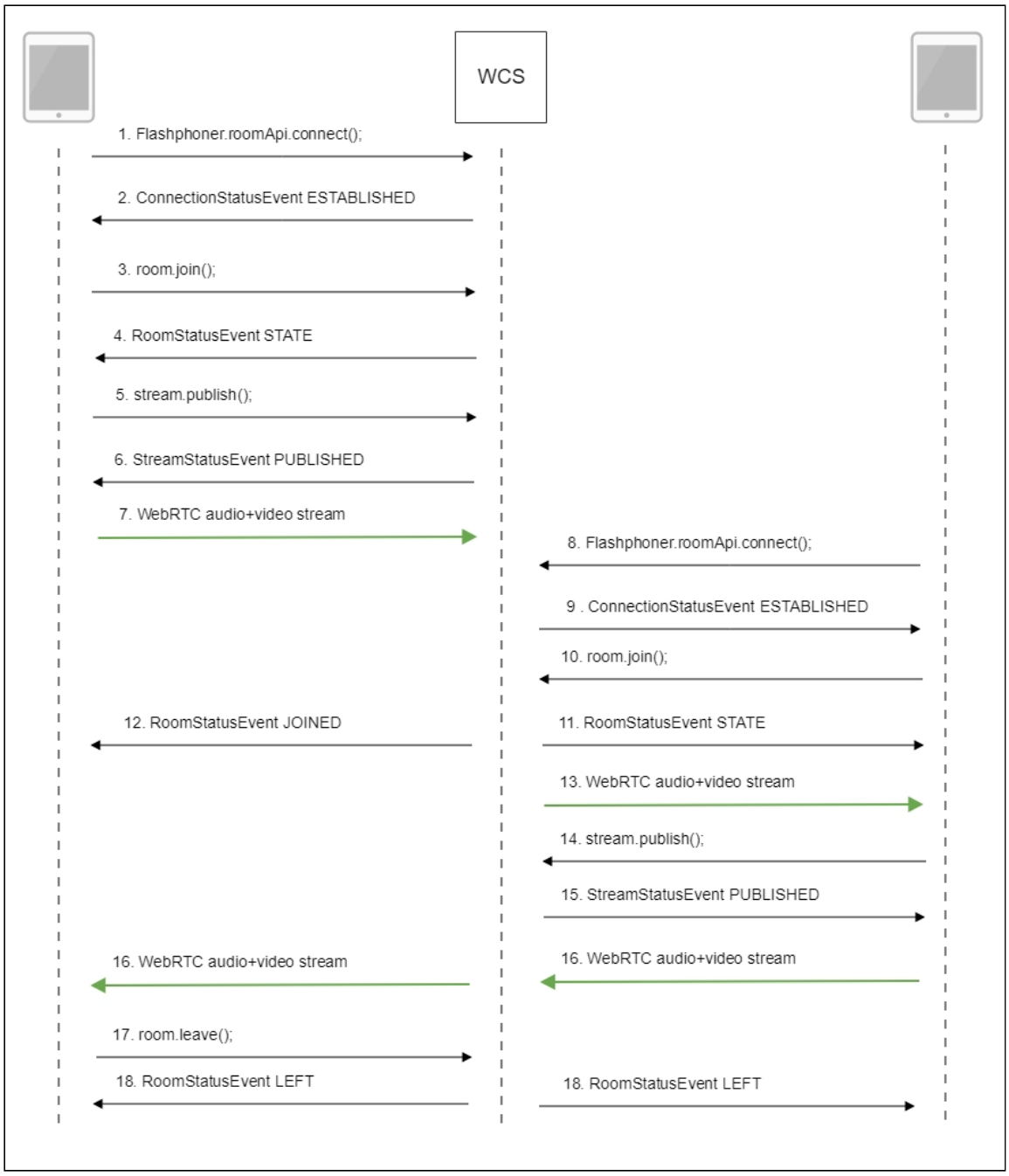
9. To leave the chat room, click the `Leave` button

Call Flow

Below is the call flow when using the Conference example.

conference.html

conference.js



1. Participant 1 establishes a connection to the server

   `RoomApi.connect()` code

```
connection = RoomApi.connect({urlServer: url, username:
username}).on(SESSION_STATUS.FAILED, function(session){
  setStatus('#status', session.status());
  onLeft();
}).on(SESSION_STATUS.DISCONNECTED, function(session) {
  setStatus('#status', session.status());
  onLeft();
}).on(SESSION_STATUS.ESTABLISHED, function(session) {
  setStatus('#status', session.status());
  joinRoom();
});
```

2. Participant 1 receives from the server an event confirming successful connection `SESSION_STATUS.ESTABLISHED` code

```
connection = RoomApi.connect({urlServer: url, username:
username}).on(SESSION_STATUS.FAILED, function(session){
  ...
}).on(SESSION_STATUS.DISCONNECTED, function(session) {
  ...
}).on(SESSION_STATUS.ESTABLISHED, function(session) {
  setStatus('#status', session.status());
  joinRoom();
});
```

3. Participant 1 joins the chat room `Session.join()` code

```
connection.join({name: getRoomName()}).on(ROOM_EVENT.STATE, function(room)
{
  ...
});
```

4. Participant 1 receives from the server an event describing the state of the room `ROOM_EVENT.STATE` code

```
connection.join({name: getRoomName()}).on(ROOM_EVENT.STATE, function(room)
{
  var participants = room.getParticipants();
  console.log("Current number of participants in the room: " +
participants.length);
  if (participants.length >= _participants) {
      console.warn("Current room is full");
      $("#failedInfo").text("Current room is full.");
      room.leave().then(onLeft, onLeft);
      return false;
  }
  setInviteAddress(room.name());
  if (participants.length > 0) {
      var chatState = "participants: ";
      for (var i = 0; i < participants.length; i++) {
          installParticipant(participants[i]);
          chatState += participants[i].name();
          if (i != participants.length - 1) {
              chatState += ",";
          }
      }
      addMessage("chat", chatState);
  } else {
      addMessage("chat", " room is empty");
  }
  publishLocalMedia(room);
  onJoined(room);
  ...
});
```

5. Participant 1 publishes the media stream
`Room.publish()` code

```
room.publish({
  display: display,
  constraints: constraints,
  record: false,
  receiveVideo: false,
  receiveAudio: false
  ...
});
```

6. Participant 1 receives from the server an event confirming successful publishing of the stream
`STREAM_STATUS.PUBLISHING` code

```
room.publish({
  ...
}).on(STREAM_STATUS.FAILED, function (stream) {
  ...
}).on(STREAM_STATUS.PUBLISHING, function (stream) {
  setStatus("#localStatus", stream.status());
  onMediaPublished(stream);
}).on(STREAM_STATUS.UNPUBLISHED, function(stream) {
  ...
});
```

7. Participant 1 sends the stream via WebRTC
8. Participant 2 establishes a connection to the server
9. Participant 2 receives from the server an event confirming successful connection
10. Participant 2 enters the chat room
11. Participant 2 receives from the server an event describing the state of the room
12. Participant 1 receives from the server an event informing that participant 2 has joined
`ROOM_EVENT.JOINED` code

```
connection.join({name: getRoomName()}).on(ROOM_EVENT.STATE, function(room)
{
    ...
}).on(ROOM_EVENT.JOINED, function(participant){
    installParticipant(participant);
    addMessage(participant.name(), "joined");
}).on(ROOM_EVENT.LEFT, function(participant){
    ...
}).on(ROOM_EVENT.PUBLISHED, function(participant){
    ...
}).on(ROOM_EVENT.FAILED, function(room, info){
    ...
}).on(ROOM_EVENT.MESSAGE, function(message){
```

```
    ...
});
```

13. Participant 2 receives the stream published by participant 1
14. Participant 2 publishes the media stream
15. Participant 2 receives from the server an event confirming successful publishing of the stream
16. Participant 2 sends the stream via WebRTC, participant 1 receives this stream
17. Participant 1 leaves the chat room
    `Room.leave()` code

```
function onJoined(room) {
    $("#joinBtn").text("Leave").off('click').click(function(){
        $(this).prop('disabled', true);
        room.leave().then(onLeft, onLeft);
    }).prop('disabled', false);
    ...
}
```

18. Participants of the room receive from the server an event informing that participant 1 has left the room
    `ROOM_EVENT.LEFT` code

```
connection.join({name: getRoomName()}).on(ROOM_EVENT.STATE, function(room)
{
    ...
}).on(ROOM_EVENT.JOINED, function(participant){
    ...
}).on(ROOM_EVENT.LEFT, function(participant){
    //remove participant
    removeParticipant(participant);
    addMessage(participant.name(), "left");
}).on(ROOM_EVENT.PUBLISHED, function(participant){
    ...
}).on(ROOM_EVENT.FAILED, function(room, info){
    ...
}).on(ROOM_EVENT.MESSAGE, function(message){
    ...
});
```

How to record streams published by room participants

Video streams published by room participants may be recorded. To do this, `record` parameter must be set to `true` while publishing a stream:

```
room.publish({
    display: display,
```

```
    constraints: constraints,
    record: true,
    ...
});
```

A stream from any participant is recorded to a separate file. The issue of record files futher processing is that they starts not at the same time.

Stream records synchronization

> **Warning**
>
> The feature is not supported sinsce build 5.2.142. Use stream mixer or multirecording instead.

To allow streams merging, room streams may be synchronized by the first stream published. To enable this feature set the following parameter in flashphoner.properties file

```
enable_empty_shift_writer=true
```

For example, if `User1` participant started publishing stream at 00:00:10, and `User2` participant did it at 00:00:55, then second participant will get 45 seconds of empty video (black screen and silence) at record beginning. So, stream record files `User1.mp4` and `User2.mp4` will be same in duration, and they can be merged.

Merging synchronized stream records using ffmpeg

Synchronized stream record files can be merged in chronological order using ffmpeg. To allow this, when stream is created, stream timeshift relative to room creation time is specified on server side. Stream record files written by this way are merged with command (two participants example)

```
ffmpeg -i stream1.mp4 -i stream2.mp4 -filter_complex "[0:v]pad=iw*2:ih[int];
[int][1:v]overlay=W/2:0[vid];[0:a][1:a]amerge[a]" -map [vid] -map "[a]" -ac 2
-strict -2 -c:v libx264 -crf 23 -preset veryfast output.mp4
```

Where

- `stream1` - first participant stream
- `stream2` - second participant stream

Room multiple streams recording to one file with subsequent mixing

Since WCS build 5.2.1012 and WebSDK build 2.0.190 it is possible to record all the room streams to one file, with automatic mixing after finishing a conference. To do this, a first participant should set room `record` option while creating a room:

```
connection.join({
    name: getRoomName(),
    record: true
}).on(ROOM_EVENT.STATE, function(room){
    ...
});
```

In this case, all the room streams will be recorded to one file.When the room is finalized, the recording will also be stopped, and the script set in the following parameter will be automatically launched

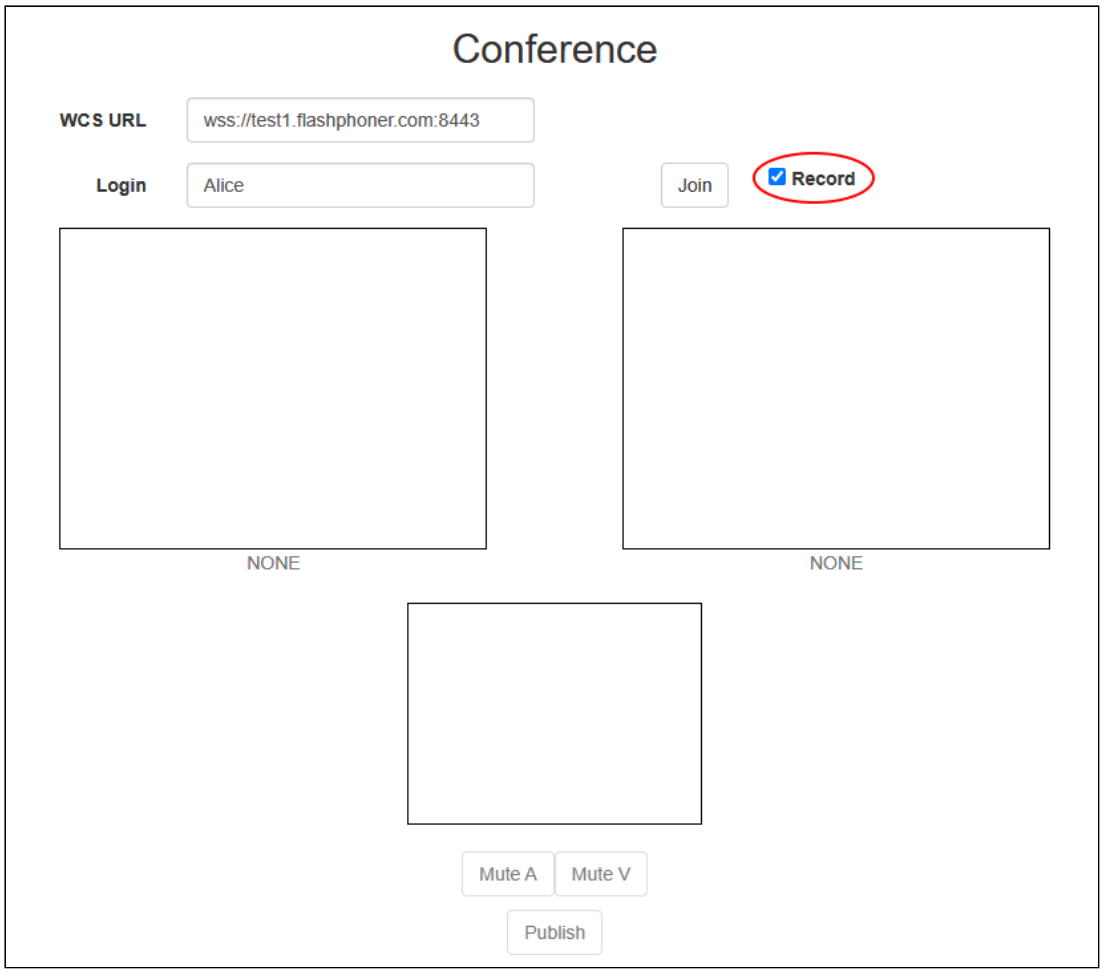
```
on_multiple_record_hook_script=on_multiple_record_hook.sh
```

The script will mix multiple streams recorded acoording to mixer settings defined in `/usr/local/FlashphonerWebCallServer/conf/offline_mixer.json` file, by default

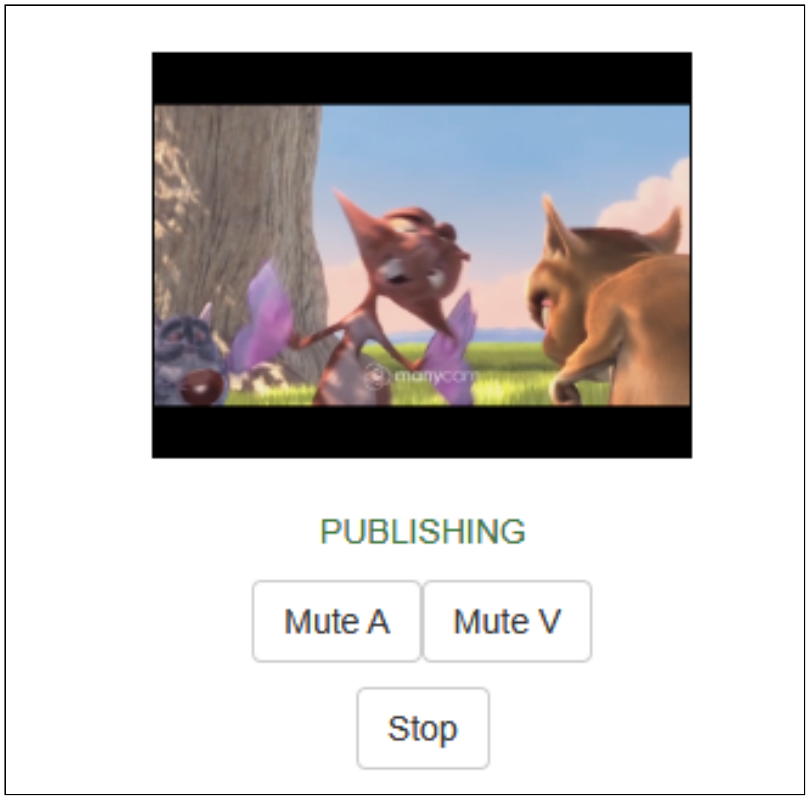
```
{
    "hasVideo": "true",
    "hasAudio": "true",
    "mixerDisplayStreamName": true
}
```

Room recording testing

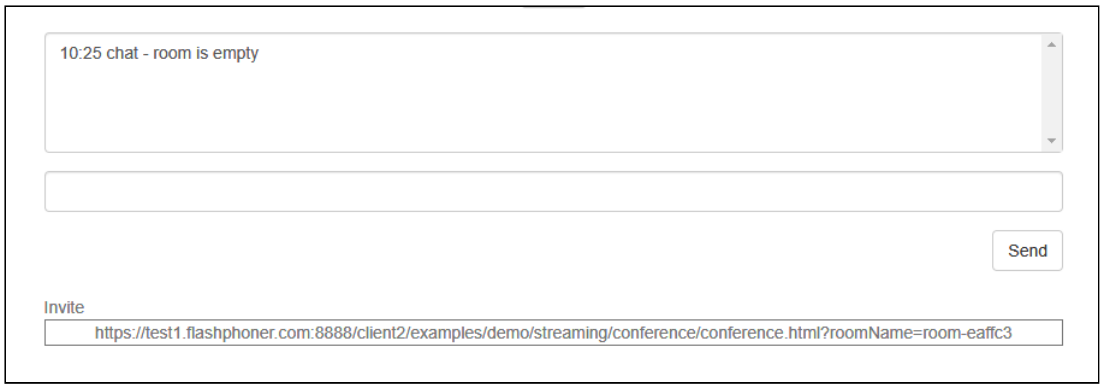
1. For test we use:
2. WCS server, for example `test1.flashphoner.com`
3. Conference web application example
4. Open Conference example in browser, enter participant name `Alice` and set `Record` checkbox



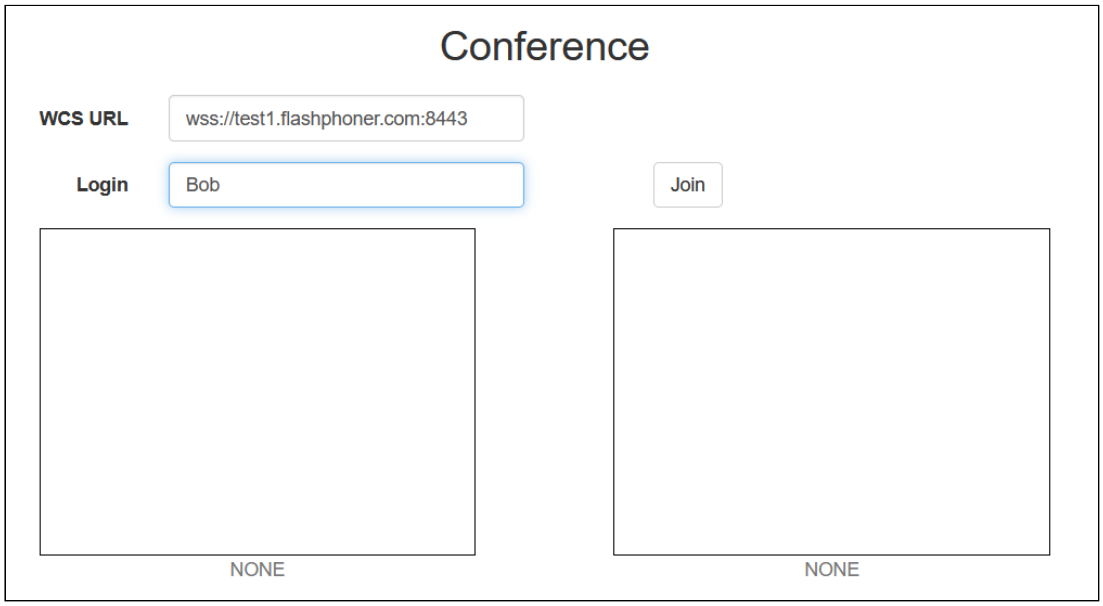
5. Click `Join`. Stream publishing will start



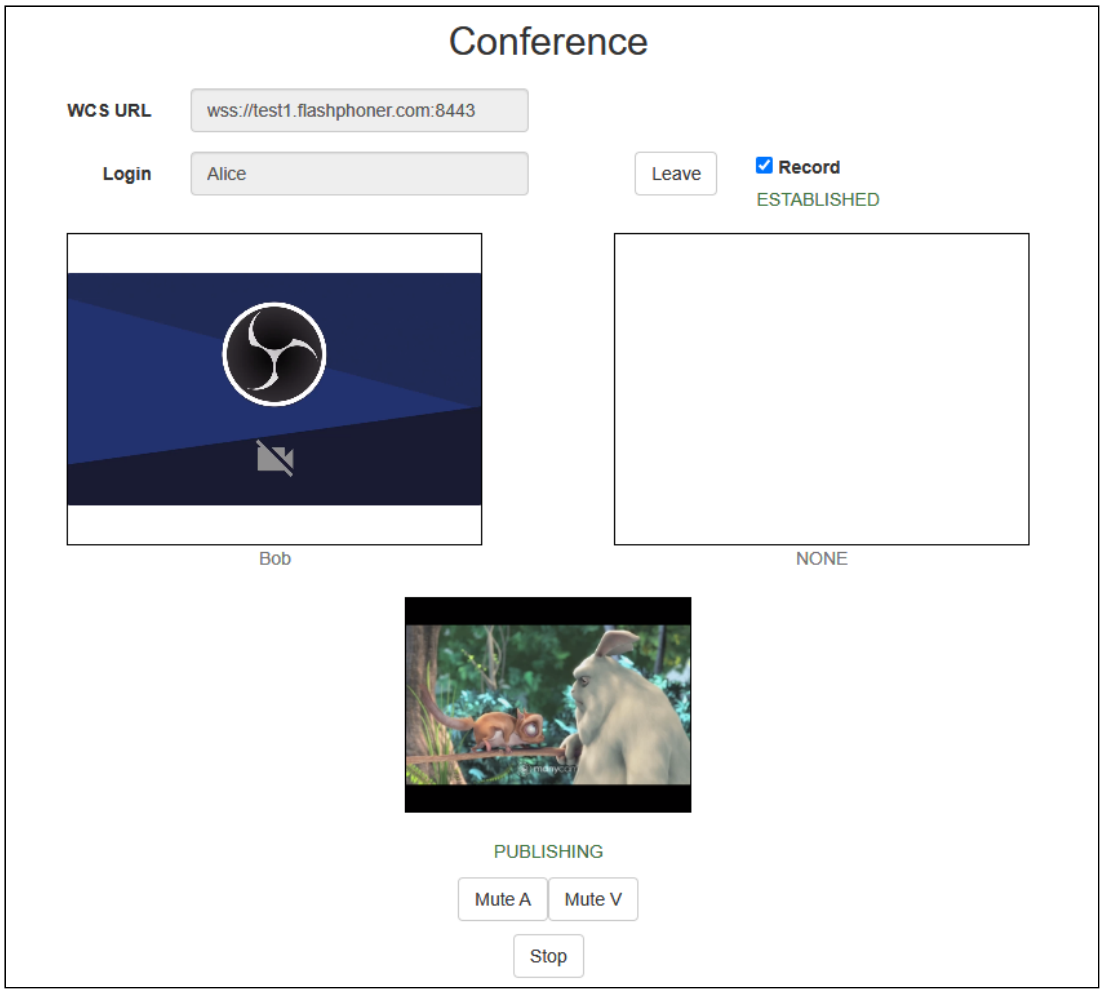
6. Open `Invite` link in another browser window



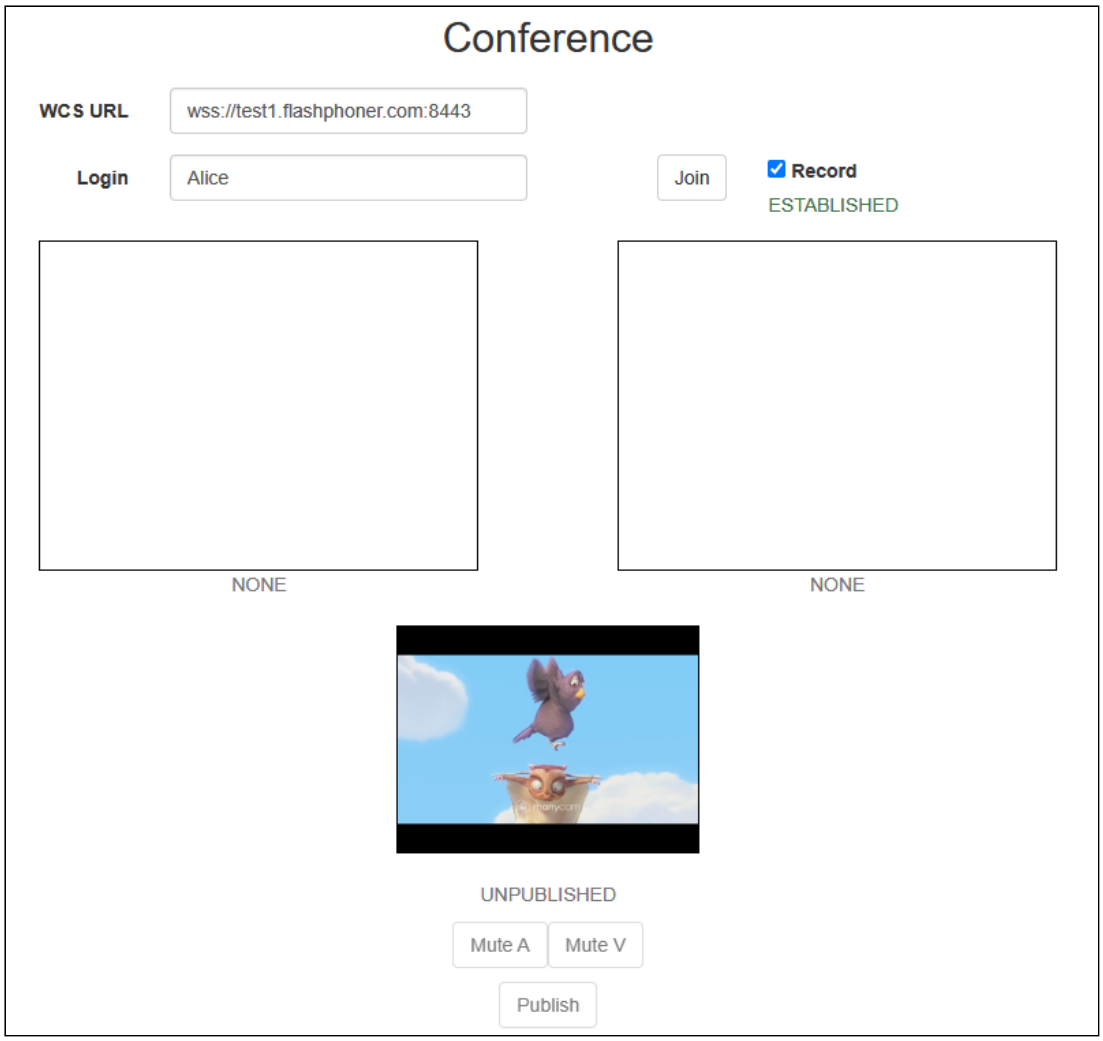
7. Enter participant name `Bob` and click `Join`



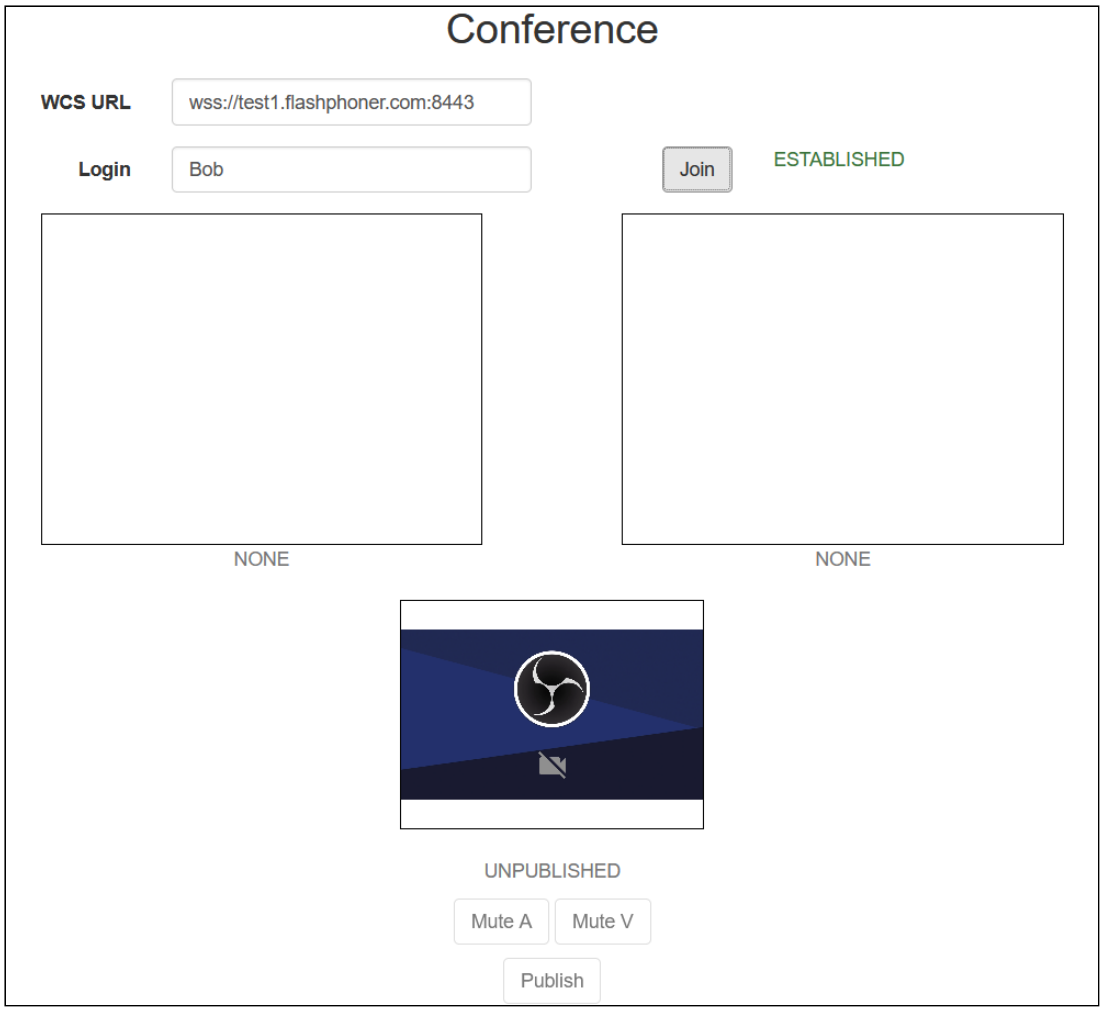
8. Bob joined to the room



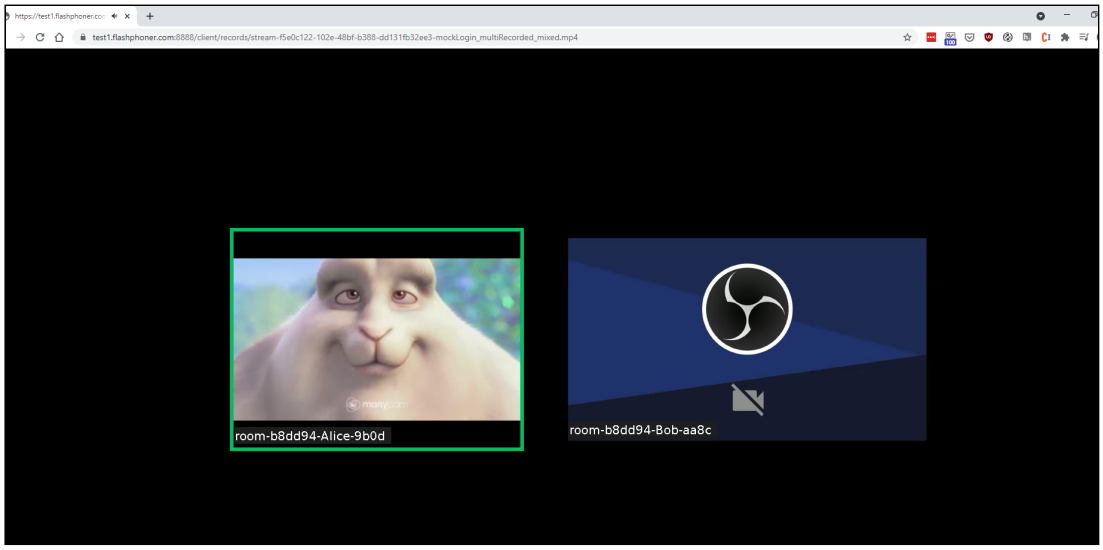
9. Click `Leave` in `Alice` participant window



and in `Bob` participant window



10. Recording file mixing may take a long time depending on recording length, CPU and dick I/O performance. When mixing is done, download the file from `/usr/local/FlashphonerWebCallServer/records` folder or open in browser by `/client/records` link



Room finalizing

Room exists until at least one participant is connected. When the lastparticipant calls `Room.leave()` function, the room is finalized.

If the last participant refreshes web page or loses server connection without calling `Room.leave()`, the room will be active during the time interval set by the following parameter in milliseconds

```
room_idle_timeout=60000
```

By default, the interval is 60 seconds. When time is expired, the room is finalized.

Known issues

1. Non-latin characters should be encoded while messaging

Symptoms

When message sent contains non-latin characters, they are replaced with questionmarks on receiving end

Solution

Use JavaScript functions `encodeURIComponent()` while sending a message

```
var participants = room.getParticipants();
for (var i = 0; i < participants.length; i++) {
   participants[i].sendMessage(encodeURIComponent(message));
}
```

and `decodeURIComponent()` while receiving message

```
connection.join({name: getRoomName(), record:
isRecord()}).on(ROOM_EVENT.STATE, function(room) {
...
}).on(ROOM_EVENT.MESSAGE, function(message){
    addMessage(message.from.name(), decodeURIComponent(message.text));
});
```

2. A race condition may occur when `Room.leave()` and then `Session.join()` are subsequently called too fast

When `Session.join()` and then `Room.leave()` are called too fast, it is possible to send join command to the server while it still handles previous leave command for this user

Symptoms

When `Session.join()` is called right after `Room.leave()`, client may receive a message

```
Room already has user with such login
```

Solution

Use at least 1 second interval between `Room.leave()` and `Session.join()` subsequent calls