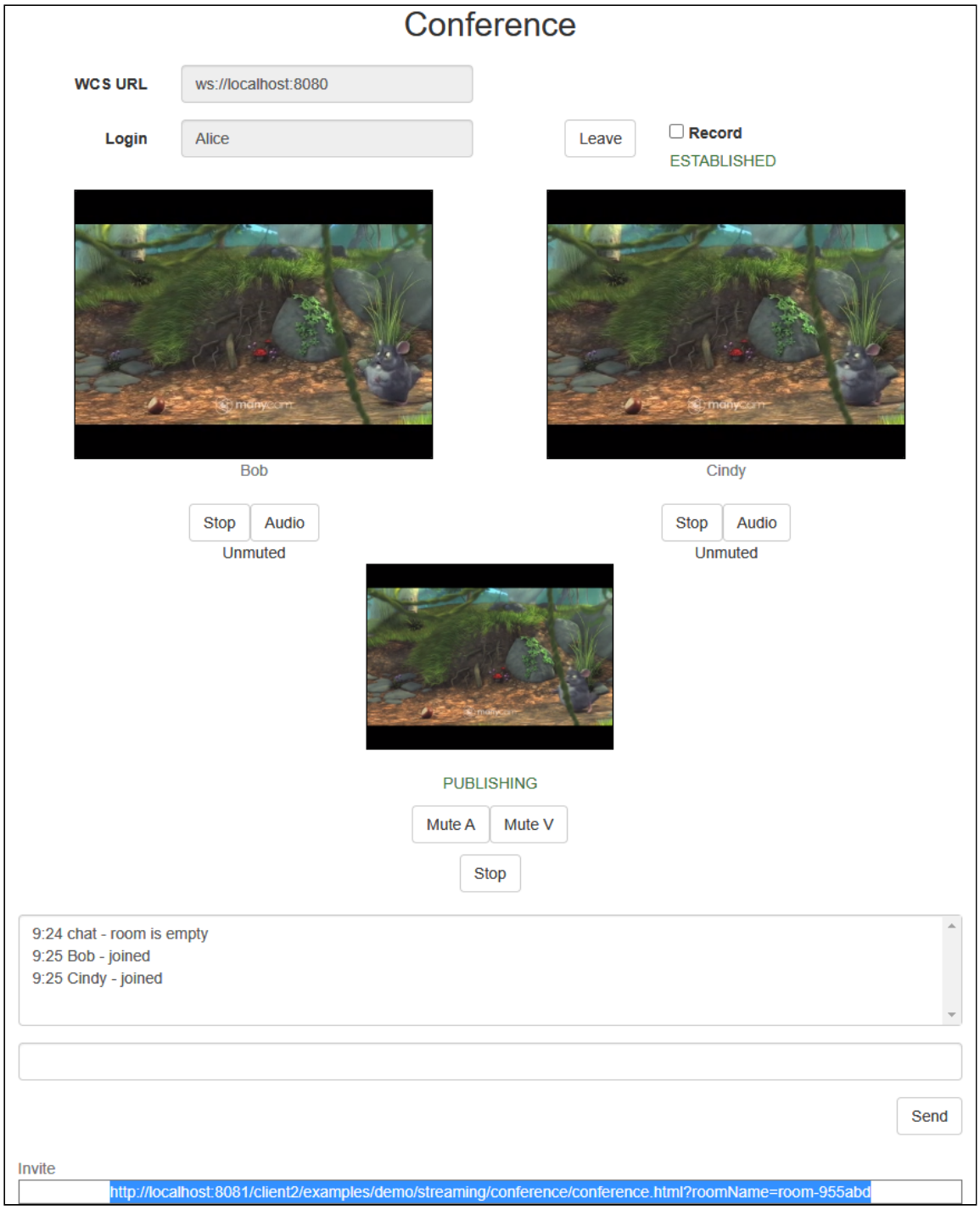
Video Conference

Example of video conference

This example can be used to organize video conference for three participants on Web Call Server. Each participant can publish a WebRTC stream

On the screenshot below the participant is connected, publishing a stream and playing streams from the other two participants.



Three videos are played on the page

- video from the camera of this participant (Alice) - the lower one
- videos from the other participants (Bob and Cindy)

Code of the example

The path to the source code of the example on WCS server is:

/usr/local/FlashphonerWebCallServer/client/examples/demo/streaming/conference

- conference.css - file with styles
- conference.html - page of video conference participant
- conference.js - script providing functionality for video conference

This example can be tested using the following address:

https://host:8888/client/examples/demo/streaming/conference/conference.html

Here host is the address of the WCS server.

Analyzing the code

To analyze the code, let's take the version of file `conference.js` with hash `90771d4`, which is available here and can be downloaded with corresponding build 2.0.218.

Script for video conference uses RoomApi designed for video chats, video conferences, webinars and other applications that involve presence of users in one virtual "room". To use RoomApi, the script `flashphoner-room-api.js` should be included

```
<script type="text/javascript" src="../../../../flashphoner-room-api.js">
</script>
```

In this case, `RoomApi.sdk` object should be used to access Flashphoner methods

```
var Flashphoner = RoomApi.sdk;
...
Flashphoner.init();
```

Unlike direct connection to server with method `createSession()`, method `RoomApi.connect()` is used when a user connects to a conference.

Method `Session.join()` is used to join to a new "room". When joining, object `Room` is created for work with the "room", and object `Participant` - for work with the participant.

All events occurring in the "room" (a user joined/left, or sent a message), are sent to all users connected to the "room". For example, in the following code, a user joins to a "room" and gets the list of already connected users.

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

Here user receives data of another participant which have just joined:

```
.on(ROOM_EVENT.JOINED, function(participant){
    installParticipant(participant);
    addMessage(participant.name(), "joined");
    ...
}};
```

1. Initialization of the API

`Flashphoner.init()` code

```
Flashphoner.init();
```

2. Camera and microphone access request

`Flashphoner.getMediaAccess()` code

```
Flashphoner.getMediaAccess(null, localDisplay).then(function() {
    createConnection(url, username);
}).catch(function(error) {
    console.error("User not allowed media access: "+error);
    $("#failedInfo").text("User not allowed media access. Refresh the page");
    onLeft();
});
```

3. Connection to server

`RoomApi.connect()` code

```
function createConnection(url, username) {
    connection = RoomApi.connect({urlServer: url, username:
username}).on(SESSION_STATUS.FAILED, function(session){
        ...
    });
}
```

4. Receiving the event confirming successful connection

`ConnectionStatusEvent 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();
});
```

5. Joining a conference

`Session.join()` code

To join, name of the conference room is passed to the method. (The name can be specified as parameter in the URL of the client page; otherwise, random name will be generated.)

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

6. Receiving the event describing chat room state

`RoomStatusEvent STATE` code

On this event:

- the length of the array of `Participant` objects returned by method `Room.getParticipants()` is determined to get the number of already connected participants
- if the maximum allowed number of participants had already been reached, the user leaves the "room" using `Room.leave()`
- otherwise, the user starts publishing video stream

```
connection.join({name: getRoomName(), record:
isRecord()}).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);
}).on(ROOM_EVENT.JOINED, function(participant){
    ...
}).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){
    ...
});
```

7. Low Power Mode checking before publishing on mobile device

`Flashphoner.playFirstVideo()` code

```
if (Browser.isSafariWebRTC()) {
    var display = document.getElementById("localDisplay");
    Flashphoner.playFirstVideo(display, true, PRELOADER_URL).then(function()
{
        publishLocalMedia(room);
    }).catch(function (error) {
        console.log("Can't atomatically publish local stream, use Publish
button");
        for (var i = 0; i < display.children.length; i++) {
            if (display.children[i]) {
                console.log("remove cached instance id " +
display.children[i].id);
                display.removeChild(display.children[i]);
            }
        }
        onMediaStopped(room);
    });
}
```

8. Video streaming

`Room.publish()` code

`div` element to display video from camera is passed to the `Room.publish()` method

```
room.publish({
    display: display,
    constraints: constraints,
    record: false,
    receiveVideo: false,
    receiveAudio: false
}).on(STREAM_STATUS.FAILED, function (stream) {
    console.warn("Local stream failed!");
    setStatus("#localStatus", stream.status());
```

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

9. Receiving the event notifying that other participant joined to the room

`RoomStatusEvent JOINED` code

```
connection.join({name: getRoomName(), record:
isRecord()}).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){
     ...
});
```

10. Receiving the event notifying that other participant published video stream

`RoomStatusEvent PUBLISHED` code

```
connection.join({name: getRoomName(), record:
isRecord()}).on(ROOM_EVENT.STATE, function(room){
     ...
}).on(ROOM_EVENT.JOINED, function(participant){
     ...
}).on(ROOM_EVENT.LEFT, function(participant){
     ...
}).on(ROOM_EVENT.PUBLISHED, function(participant){
     playParticipantsStream(participant);
}).on(ROOM_EVENT.FAILED, function(room, info){
     ...
}).on(ROOM_EVENT.MESSAGE, function(message){
     ...
});
```

11. Low Power Mode checking before playback on mobile device

`Flashphoner.playFirstVideo()` code

```
if (Browser.isSafariWebRTC()) {
    Flashphoner.playFirstVideo(pDisplay, false,
PRELOADER_URL).then(function() {
        playStream(participant, pDisplay);
    }).catch(function (error) {
        // Low Power Mode detected, user action is needed to start playback
in this mode #WCS-2639
        console.log("Can't atomatically play participant" +
participant.name() + " stream, use Play button");
        for (var i = 0; i < pDisplay.children.length; i++) {
            if (pDisplay.children[i]) {
                console.log("remove cached instance id " +
pDisplay.children[i].id);
                pDisplay.removeChild(pDisplay.children[i]);
            }
        }
        onParticipantStopped(participant);
    });
}
```

12. Playback of video stream

`Participant.play()` code

The following parameters are passed to the method:

- `display` - `div` element to display remote video;
- `options.unmutePlayOnStart` - enables (by default) or disables (for example, in Android Edge) automatic audio unmuting while starting playback;
- `options.constraints.audio.deviceId` - audio output device Id (the example uses default audio device)

A user must click a button if automatic audio playback is disabled

```
var options = {
    unmutePlayOnStart: true,
    constraints: {
        audio: {
            deviceId: 'default'
        }
    }
};
// Leave participant stream muted in Android Edge browser #WCS-3445
if (Browser.isChromiumEdge() && Browser.isAndroid()) {
    options.unmutePlayOnStart = false;
}
participant.getStreams()[0].play(display, options).on(STREAM_STATUS.PLAYING,
function (playingStream) {
    var video = document.getElementById(playingStream.id())
    video.addEventListener('resize', function (event) {
```

```
            resizeVideo(event.target);
        });
        // Set up participant Stop/Play button
        if (playBtn) {
            $(playBtn).text("Stop").off('click').click(function() {
                $(this).prop('disabled', true);
                playingStream.stop();
            }).prop('disabled', false);
        }
        // Set up participant audio toggle button #WCS-3445
        if (audioBtn) {
            $(audioBtn).text("Audio").off('click').click(function() {
                if (playingStream.isRemoteAudioMuted()) {
                    playingStream.unmuteRemoteAudio();
                } else {
                    playingStream.muteRemoteAudio();
                }
            }).prop('disabled', false);
        }
        // Start participant audio state checking timer #WCS-3445
        participantState.startMutedCheck(playingStream);
    }).on(STREAM_STATUS.STOPPED, function () {
        onParticipantStopped(participant);
    }).on(STREAM_STATUS.FAILED, function () {
        onParticipantStopped(participant);
    });
```

13. Stop of streaming.

`Stream.stop()` code

```
function onMediaPublished(stream) {
    $("#localStopBtn").text("Stop").off('click').click(function(){
        $(this).prop('disabled', true);
        stream.stop();
    }).prop('disabled', false);
    ...
}
```

14. Receiving the event confirming successful streaming stop

`StreamStatusEvent UNPUBLISHED` code

```
room.publish({
    display: display,
    constraints: constraints,
    record: false,
    receiveVideo: false,
    receiveAudio: false
}).on(STREAM_STATUS.FAILED, function (stream) {
    ...
}).on(STREAM_STATUS.PUBLISHING, function (stream) {
    ...
```

```
}).on(STREAM_STATUS.UNPUBLISHED, function(stream) {
    setStatus("#localStatus", stream.status());
    onMediaStopped(room);
});
```

15. Leaving conference 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);
    ...
}
```

16. Mute/unmute audio and video of the published stream

`Stream.isAudioMuted()`, `Stream.isVideoMuted()`, `Stream.muteAudio()`, `Stream.unmuteAudio()`, `Stream.muteVideo()`, `Stream.unmuteVideo()` code

```
function onMediaPublished(stream) {
    ...
    $("#localAudioToggle").text("Mute A").off('click').click(function(){
        if (stream.isAudioMuted()) {
            $(this).text("Mute A");
            stream.unmuteAudio();
        } else {
            $(this).text("Unmute A");
            stream.muteAudio();
        }
    }).prop('disabled', false);
    $("#localVideoToggle").text("Mute V").off('click').click(function() {
        if (stream.isVideoMuted()) {
            $(this).text("Mute V");
            stream.unmuteVideo();
        } else {
            $(this).text("Unmute V");
            stream.muteVideo();
        }
    }).prop('disabled',false);
}
```

17. Sending text message.

`Participant.sendMessage()` code

When `Send` button is clicked,

- method room.getParticipants() is used to get the array of connected participants
- the message is sent to each participant

```
function onJoined(room) {
    ...
    $('#sendMessageBtn').off('click').click(function(){
        var message = field('message');
        addMessage(connection.username(), message);
        $('#message').val("");
        //broadcast message
        var participants = room.getParticipants();
        for (var i = 0; i < participants.length; i++) {
            participants[i].sendMessage(message);
        }
    }).prop('disabled',false);
    $('#failedInfo').text("");
}
```