# Stream Filter


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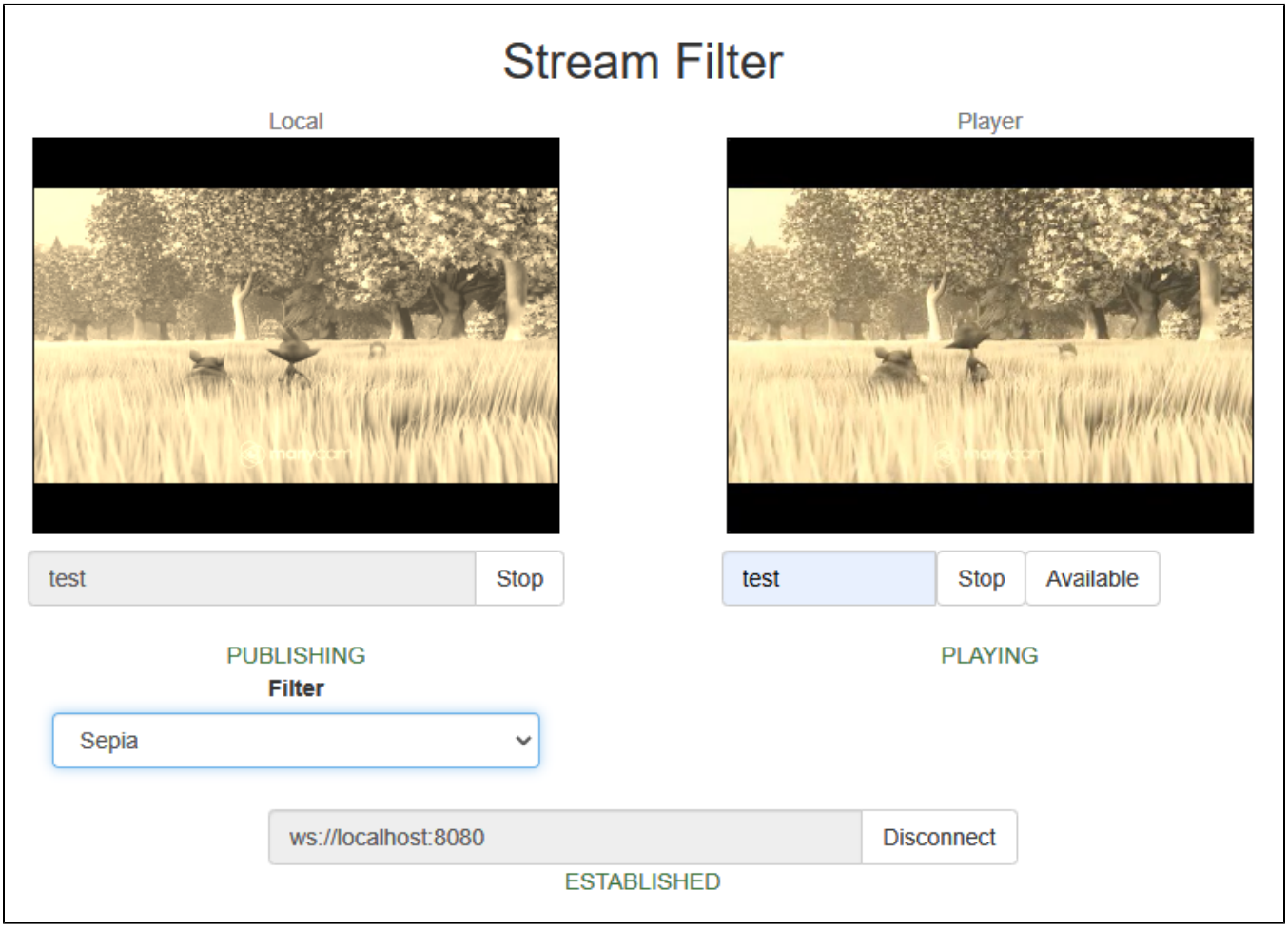
## Streamer example with picture filter application

This example shows how to apply a filter or another changes (beautification etc) to picture while publishing a stream using canvas element




This feature works in all the main browsers except iOS Safari 12

## Code of the example

The example code is available on WCS server by the following path:

/usr/local/FlashphonerWebCallServer/client2/examples/demo/streaming/stream_filter

stream_filter.css - styles file
stream_filter.html - client page
stream_filter.js - main script to work

The example can be tested by the following URL:

https://host:8888/client2/examples/demo/streaming/stream_filter/stream_filter.html

Where host - WCS server address.

## Analyzing the code

To analyze the code take the file stream_filter.js version with hash ecbadc3, which is available here and can be downloaded with SDK build 2.0.212.

1. API initializing.

Flashphoner.init() code

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

2. Connecting to the server.

Flashphoner.createSession() code

```
Flashphoner.createSession({urlServer: url}).on(SESSION_STATUS.ESTABLISHED, function(session){
    ...
}).on(SESSION_STATUS.DISCONNECTED, function(){
    ...
}).on(SESSION_STATUS.FAILED, function(){
    ...
});
```

3.Receiving the event confirming successful connection.

ConnectionStatusEvent ESTABLISHED code

```
Flashphoner.createSession({urlServer: url}).on(SESSION_STATUS.ESTABLISHED, function(session){
    setStatus("#connectStatus", session.status());
    onConnected(session);
}).on(SESSION_STATUS.DISCONNECTED, function(){
    ...
}).on(SESSION_STATUS.FAILED, function(){
    ...
});
```

4.Video streaming.

session.createStream(), stream.publish() code

When stream is created, the following parameters are passed

- streamName - name of the stream
- localVideo -  element, in which video from camera will be displayed

To apply a filter, the video captured from web camera will be drawn on the canvas using the optionuseCanvasMediaStream: true

```
session.createStream({
    name: streamName,
    display: localVideo,
    cacheLocalResources: true
    receiveVideo: false,
    receiveAudio: false,
    useCanvasMediaStream: true
    ...
}).publish();
```

5.Receiving the event confirming successful streaming

StreamStatusEvent PUBLISHING code

Th picture drawing on the canvas with FPS 30 is started by this event

```
session.createStream({
    ...
}).on(STREAM_STATUS.PUBLISHING, function(stream){
    setStatus("#publishStatus", STREAM_STATUS.PUBLISHING);
    onPublishing(stream);
    intervalId = setInterval(draw, 1000.0 / 30);
}).on(STREAM_STATUS.UNPUBLISHED, function(){
    ...
}).on(STREAM_STATUS.FAILED, function(){
    ...
}).publish();
```

6.Stream playback

session.createStream(), stream.play() code

When stream is created, the following parameters are passed

- streamName - name of the stream (including the stream published on step above)
- remoteVideo -  element, in which video playback will be displayed

```
session.createStream({
    name: streamName,
    display: remoteVideo
    ...
}).play();
```

7.Receiving the event confirming successful stream playback

StreamStatusEvent PLAYING code

```
session.createStream({
    name: streamName,
    display: remoteVideo
    ...
}).on(STREAM_STATUS.PLAYING, function(stream) {
    setStatus("#playStatus", stream.status());
    onPlaying(stream);
}).on(STREAM_STATUS.STOPPED, function() {
    ...
}).on(STREAM_STATUS.FAILED, function() {
    ...
}).play();
```

8.Stream playback stop

stream.stop() code

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

9. Receiving the event confirming successful playback stop.

StreamStatusEvent STOPPED code

```
session.createStream({
    ...
}).on(STREAM_STATUS.PLAYING, function(stream) {
    ...
}).on(STREAM_STATUS.STOPPED, function() {
    setStatus("#playStatus", STREAM_STATUS.STOPPED);
    onStopped();
}).on(STREAM_STATUS.FAILED, function() {
    ...
}).play();
```

10.Streaming stop

stream.stop() code

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

11.Receiving the event confirming successful streaming stop

StreamStatusEvent UNPUBLISHED code

```
session.createStream({
    ...
}).on(STREAM_STATUS.PUBLISHING, function(stream){
    ...
}).on(STREAM_STATUS.UNPUBLISHED, function(){
    setStatus("#publishStatus", STREAM_STATUS.UNPUBLISHED);
    onUnpublished();
}).on(STREAM_STATUS.FAILED, function(){
    ...
}).publish();
```

12. The picture drawing on the canvas and applying the filter

draw code

```
function draw() {
    let localVideo = document.getElementById('localVideo');
    let canvas = localVideo.children[0];
    if (canvas) {
        let ctx = canvas.getContext('2d');
        // First need to draw video on the canvas
        ctx.drawImage(canvas.children[0], 0, 0);
        // next get image data
        let imageData = ctx.getImageData(0, 0, canvas.width, canvas.height);
        // next need to apply filter to the image
        let filtered = currentFilter(imageData);
        // and finally draw filtered image on the canvas
        ctx.putImageData(filtered, 0, 0);
    }
}
```

13. Filter list initializing and choosing the filter to apply

applyFilter code

```
var filters = [empty, sepia, threshold, invert];
var currentFilter = empty;
...
function applyFilter() {
    let filter = $('#filter').val();
    currentFilter = filters[filter];
}

function empty(imageData) {
    return imageData;
}
```