iOS Media Devices Swift

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Example of iOS application managing media devices

This example allows to publish WebRTC stream on Web Call Server and demonstrates selection of source camera and specification of the following parameters for published and played video

- resolution (width, height)
- bitrate
- FPS (Frames Per Second) - for published video
- quality - for played video

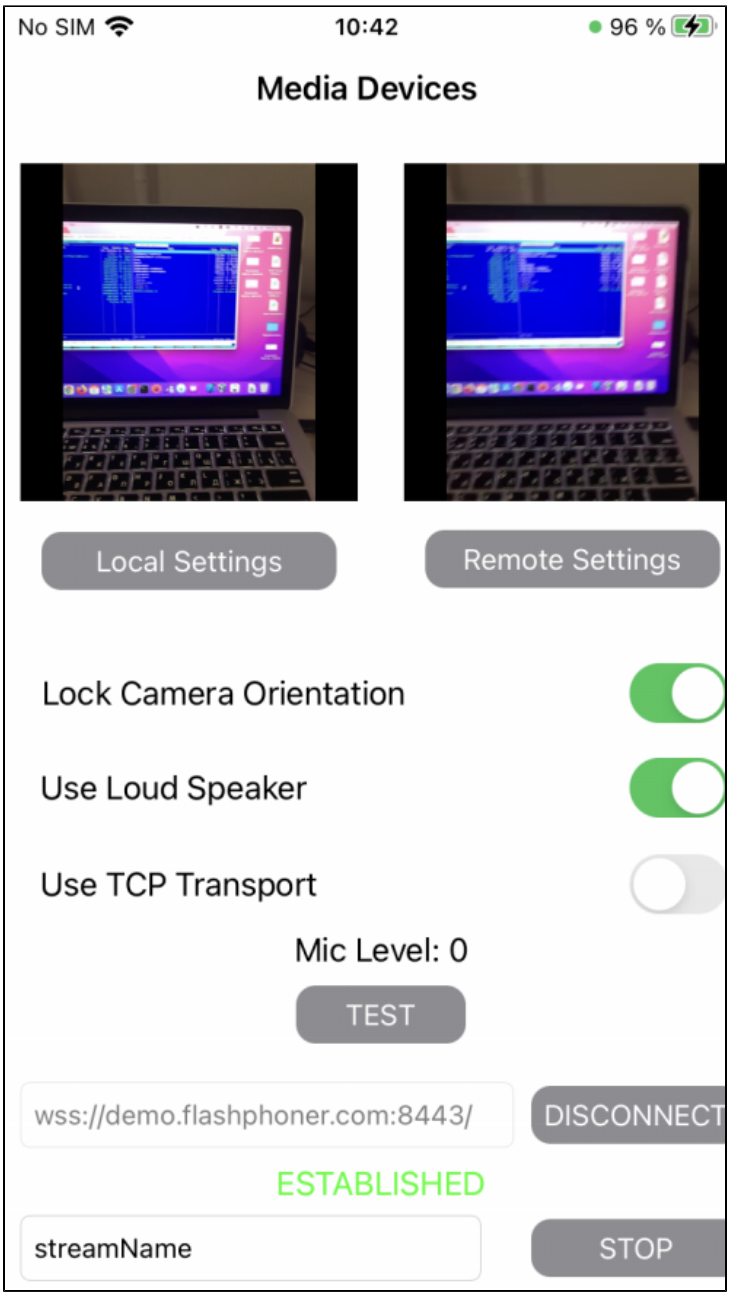
As well as publishing streams with audio and video, it allows to publish audio-only and video-only streams.

Audio and video can be muted when publishing is started (if corresponding controls has been set to ON before streaming was started), or while stream is being published.

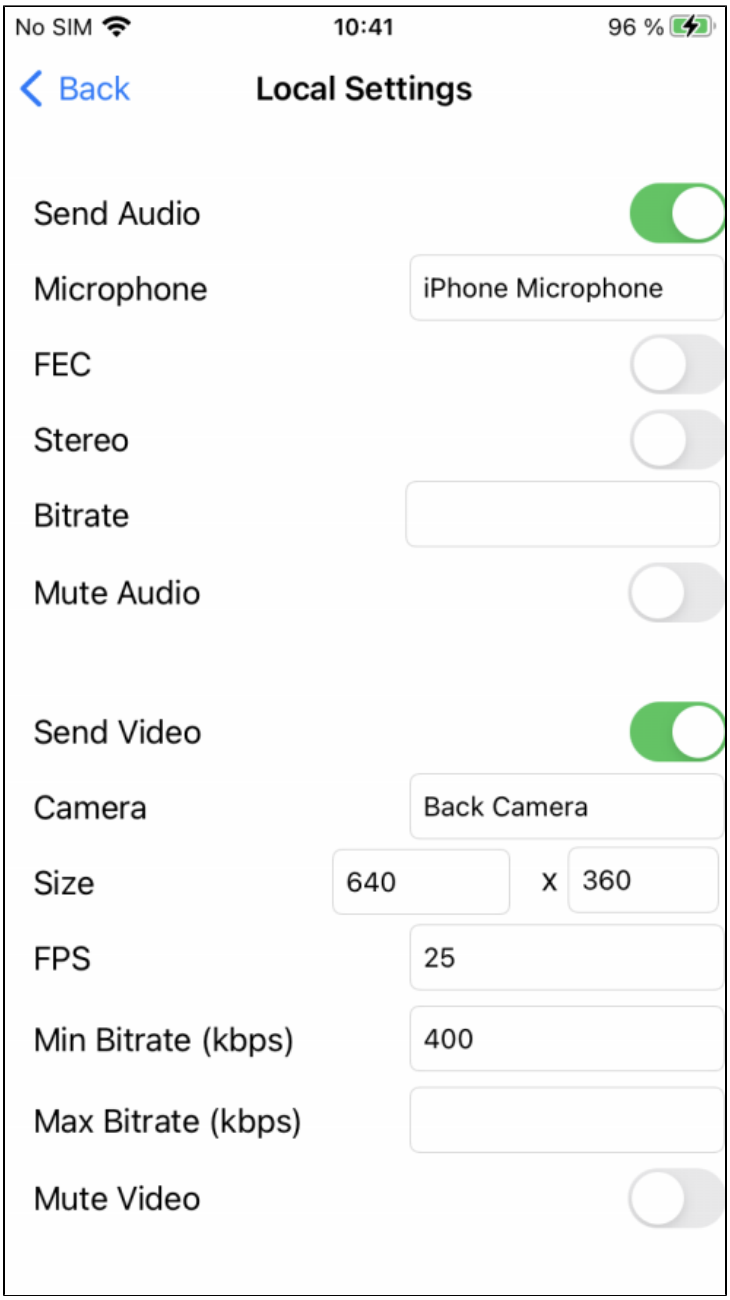
Video streams can be played with or without video.

Some codecs may be excluded while publishing/plauing if needed.

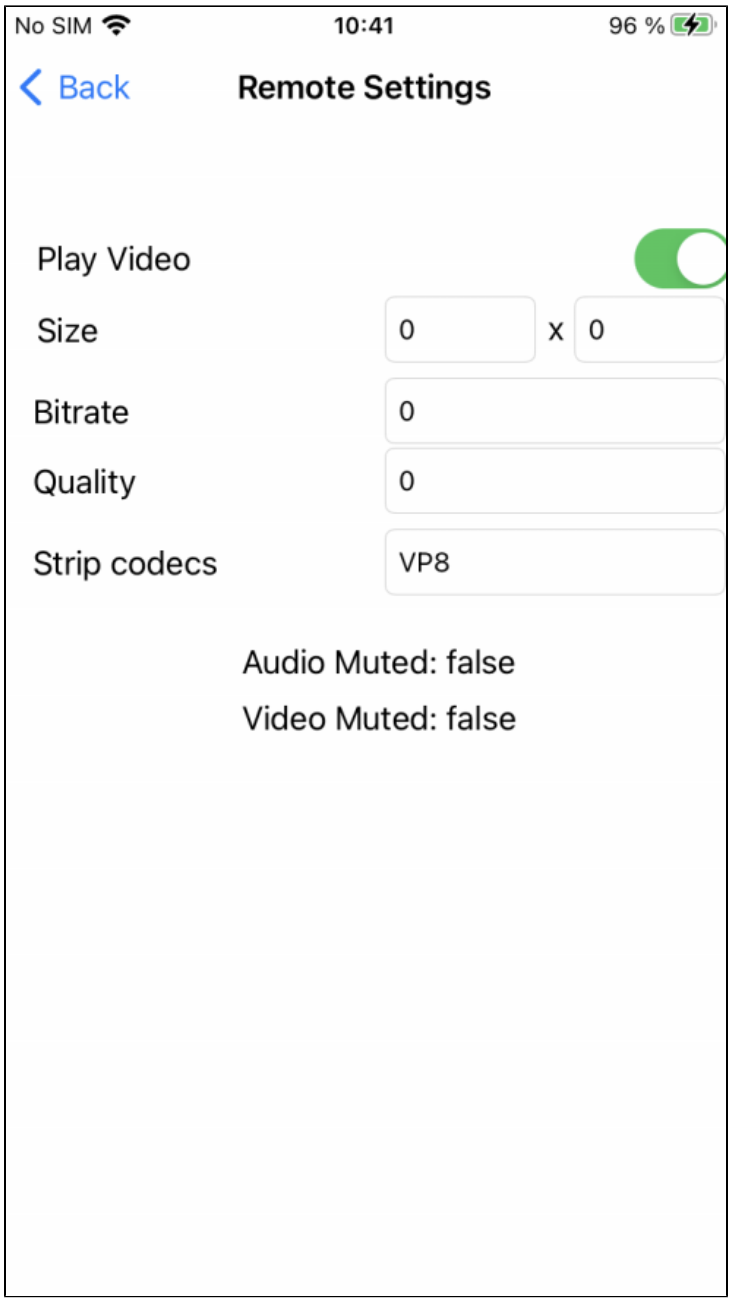
On the screenshot below the example is displayed when a stream is being published and played. Stream published is displaing in the left view, and stream played is displaing in the right view.



View with controls for publishing settings is displayed when 'Local settings' button is tapped



and view with controls for playback settings - when 'Remote settings' button is tapped.



Work with code of the example

To analyze the code, let's takeMediaDevices example,which can be downloaded from GitHub.

View classes

- class for the main view of the application: ViewController (implementation file ViewController.swift)
- class for view with publishing settings: LocalViewController (implementation file LocalViewController.swift)
- class for view with playback settings: RemoteViewController (implementation file RemoteViewController.swift)

1. Import of API.

code

```
import FPWCSApi2Swift
```

2.List available media devices.

WCSApi2.getMediaDevices code

```
localDevices = WCSApi2.getMediaDevices()
```

3.Default microphone and camera selection

FPWCSApi2MediaDeviceList.audioFPWCSApi2MediaDeviceList.video code

```
        if (localDevices?.audio?.count ?? 0 > 0) {
            microphone.text = (localDevices?.audio[0] as AnyObject).label
        }
        if (localDevices?.video?.count ?? 0 > 0) {
            camera.text = (localDevices?.video[0] as AnyObject).label
        }
```

4.Constraints for stream publishing.

FPWCSApi2AudioConstraints, FPWCSApi2AudioConstraints code

```
    func toMediaConstraints() -> FPWCSApi2MediaConstraints {
        let ret = FPWCSApi2MediaConstraints()
        if (self.audioSend.isOn) {
            let audio = FPWCSApi2AudioConstraints()
            audio.useFEC = audioFEC.isOn
            audio.useStereo = audioStereo.isOn
            audio.bitrate = Int(audioBitrate.text ?? "0") ?? 0
            ret.audio = audio
        }
        if (self.videoSend.isOn) {
            let video = FPWCSApi2VideoConstraints()
            for device in localDevices!.video {
                if ((device as AnyObject).label == camera.text) {
                    video.deviceID = (device as AnyObject).deviceID;
                }
            }
            video.minWidth = Int(videoWidth.text ?? "0") ?? 0
            video.maxWidth = video.minWidth
            video.minHeight = Int(videoHeight.text ?? "0") ?? 0
            video.maxHeight = video.minHeight
            video.minFrameRate = Int(videoFPS.text ?? "0") ?? 0
            video.maxFrameRate = video.minFrameRate
            video.minBitrate = Int(videoMinBitrate.text ?? "0") ?? 0
            video.maxBitrate = Int(videoMaxBitrate.text ?? "0") ?? 0
            ret.video = video;
        }
        return ret;
    }
```

5.Constraints for stream playback.

FPWCSApi2AudioConstraints, FPWCSApi2AudioConstraints code

```
func toMediaConstraints() -> FPWCSApi2MediaConstraints {
    let ret = FPWCSApi2MediaConstraints();
    ret.audio = FPWCSApi2AudioConstraints();
    if (playVideo.isOn) {
        let video = FPWCSApi2VideoConstraints();
        video.minWidth = Int(videoWidth.text ?? "0") ?? 0
        video.maxWidth = video.minWidth
        video.minHeight = Int(videoHeight.text ?? "0") ?? 0
        video.maxHeight = video.minWidth
        video.bitrate = Int(videoBitrate.text ?? "0") ?? 0
        video.quality = Int(videoQuality.text ?? "0") ?? 0
        ret.video = video;
    }
    return ret;
}
```

6.Local camera and microphone testing

WCSApi2.getMediaAccess code

```
@IBAction func testPressed(_ sender: Any) {
    if (testButton.title(for: .normal) == "TEST") {
        let constraints = FPWCSApi2MediaConstraints(audio: true, video: true)!
        do {
            try WCSApi2.getMediaAccess(constraints, localDisplay.videoView)
        } catch {
            print(error)
        }
        testButton.setTitle("RELEASE", for: .normal)
    } else {
        WCSApi2.releaseLocalMedia(display: localDisplay.videoView);
        testButton.setTitle("TEST", for: .normal)
    }
}
```

7.Session creation and connection to the server.

WCSSession,WCSSession.connect code

The options include:

- URL of WCS server
- appKey of internal server-side application (defaultApp)

```
@IBAction func connectPressed(_ sender: Any) {
    changeViewState(connectButton, false)
    if (connectButton.title(for: .normal) == "CONNECT") {
        if (session == nil) {
            let options = FPWCSApi2SessionOptions()
            options.urlServer = urlField.text
            options.appKey = "defaultApp"
            do {
            session = try WCSSession(options)
            } catch {
                print(error);
            }
        }
        ...
        changeViewState(urlField, false)
        session?.connect()
    }
}
```

8.Stream publishing.

WCSSession.createStream, WCSStream.publish code

Object with the following stream options is passed to createStream method:

- options.name - stream name
- options.display - view to display video
- options.constraints - audio and video constraints
- options.stripCodecs - codecs array to exclude from local SDP while publishing
- options.transport - WebRTC transport to use

```
    @IBAction func publishPressed(_ sender: Any) {
        changeViewState(publishButton,false)
        if (publishButton.title(for: .normal) == "PUBLISH") {
            let options = FPWCSApi2StreamOptions()
            options.name = publishName.text
            options.display = localDisplay.videoView
            options.constraints = localMediaConstrains;
            options.stripCodecs = localStripCodecs?.split(separator: ",")
            options.transport = tcpTransport.isOn ? kFPWCSTransport.fpwcsTransportTCP : kFPWCSTransport.
fpwcsTransportUDP;
            do {
                try publishStream = session!.createStream(options)
            } catch {
                print(error);
            }
            ...
            do {
                try publishStream?.publish()
            } catch {
                print(error);
            }
        }
    }
```

9.Stream playback

WCSSession.createStream, WCSStream.play code

Object with the following stream options is passed to createStream method:

- options.name - stream name
- options.display - view to display video
- options.constraints - audio and video constraints
- options.stripCodecs - codecs array to exclude from local SDP while playing
- options.transport - WebRTC transport to use

```
    @IBAction func playPressed(_ sender: Any) {
        changeViewState(playButton,false)
        if (playButton.title(for: .normal) == "PLAY") {
            let options = FPWCSApi2StreamOptions()
            options.name = playName.text;
            options.display = remoteDisplay.videoView;
            options.constraints = remoteMediaConstrains;
            options.stripCodecs = remoteStripCodecs?.split(separator: ",")
            options.transport = tcpTransport.isOn ? kFPWCSTransport.fpwcsTransportTCP : kFPWCSTransport.
fpwcsTransportUDP;
            do {
            playStream = try session!.createStream(options)
            } catch {
                print(error);
            }
            ...
            do {
                try playStream?.play()
            } catch {
                print(error);
            }
        }
    }
```

10.Stream playback stop.

WCSStream.stop code

```
    @IBAction func playPressed(_ sender: Any) {
        changeViewState(playButton,false)
        if (playButton.title(for: .normal) == "PLAY") {
            ...
        } else{
            do {
                try playStream?.stop();
            } catch {
                print(error);
            }
        }
    }
```

11.Stream publishing stop.

WCSStream.stop code

```
    @IBAction func publishPressed(_ sender: Any) {
        changeViewState(publishButton,false)
        if (publishButton.title(for: .normal) == "PUBLISH") {
            ...
        } else {
            do {
                try publishStream?.stop();
            } catch {
                print(error);
            }
        }

    }
```