

# iOS Media Devices Swift

## 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

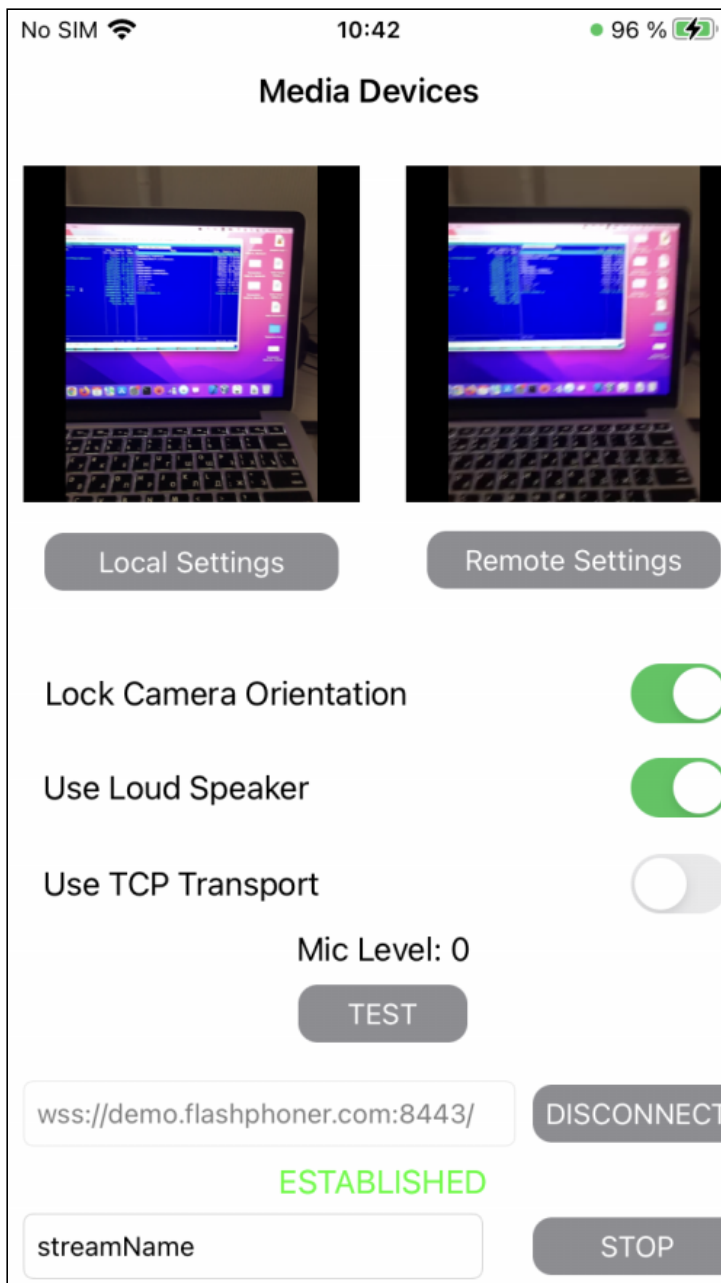
As well as publishing streams with audio and video, it allows to publish audio-only and video-only streams.

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.

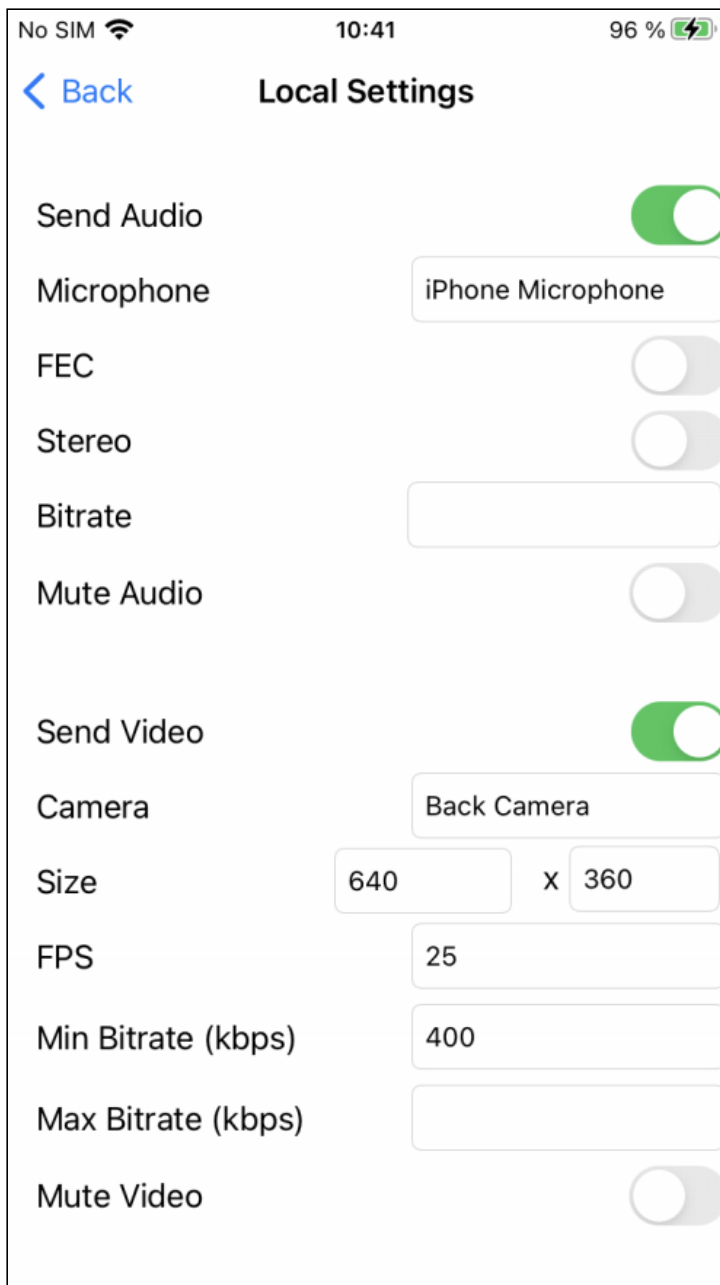
Video streams can be played with or without video.

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

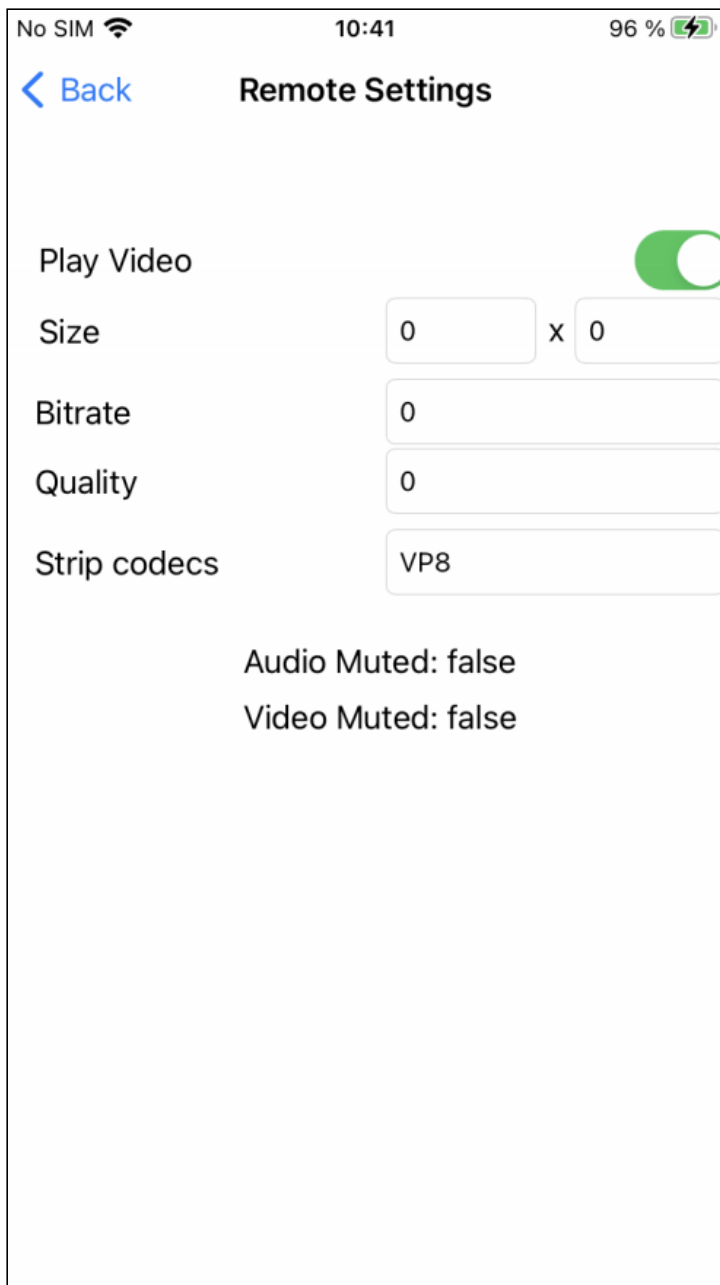
On the screenshot below the example is displayed when a stream is being published and played. Stream published is displaing in the left view, and stream played is displaing in the right view.



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



## Analyzing the example code

To analyze the code, let's take MediaDevices 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 FPWCSEApi2Swift
```

## 2. List available media devices

`WCSEApi2.getMediaDevices` code

```
localDevices = WCSEApi2.getMediaDevices()
```

## 3. Default microphone and camera selection

`FPWCSEApi2MediaDeviceList.audio` `FPWCSEApi2MediaDeviceList.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

`FPWCSEApi2AudioConstraints`, `FPWCSEApi2AudioConstraints` code

```
func toMediaConstraints() -> FPWCSEApi2MediaConstraints {
    let ret = FPWCSEApi2MediaConstraints()
    if (self.audioSend.isOn) {
        let audio = FPWCSEApi2AudioConstraints()
        audio.useFEC = audioFEC.isOn
        audio.useStereo = audioStereo.isOn
        audio.bitrate = Int(audioBitrate.text ?? "0") ?? 0
        ret.audio = audio
    }
    if (self.videoSend.isOn) {
        let video = FPWCSEApi2VideoConstraints()
        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
- name of internal server-side REST hook application (`defaultApp`)

```
@IBAction func connectPressed(_ sender: Any) {
    changeViewState(connectButton, false)
    if (connectButton.title(for: .normal) == "CONNECT") {
        if (session == nil) {
            let options = FPWCSEApi2SessionOptions()
            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`, `WCSSStream.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 = FPWCSEApi2StreamOptions()
        options.name = publishName.text
        options.display = localDisplay.videoView
        options.constraints = localMediaConstraints;
        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`, `WCSSStream.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 = FPWCSEApi2StreamOptions()
        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

WCSSStream.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

WCSSStream.stop [code](#)

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