

Публикация потока из приложения Android в фоновом режиме

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Описание

Чтобы приложение Android не выгружалось из памяти устройства, и публикация видео не останавливалась при сворачивании приложения, необходимо устанавливать соединение с WCS сервером и публиковать видео из сервиса, который должен быть запущен из Activity приложения. В свою очередь, чтобы и сервис не был выгружен из памяти, необходимо создать уведомление, которое должно находиться в панели уведомлений, пока сервис работает. Рассмотрим пример модификации исходного кода приложения [Android Two Way Streaming](#)

Пример модификации исходного кода приложения

1. Создание сервиса при нажатии кнопки Publish и успешном получении доступа к камере и микрофону

```
@Override
public void onRequestPermissionsResult(int requestCode,
                                     @NonNull String permissions[], @NonNull int[] grantResults) {
    switch (requestCode) {
        case PUBLISH_REQUEST_CODE: {
            if (grantResults.length == 0 ||
                grantResults[0] != PackageManager.PERMISSION_GRANTED ||
                grantResults[1] != PackageManager.PERMISSION_GRANTED) {
                Log.i(TAG, "Permission has been denied by user");
            } else {
                mPublishButton.setEnabled(false);
                ...
                Intent intent = new Intent(StreamingMinActivity.this, TestService.class);
                intent.putExtra("url", mWcsUrlView.getText().toString());
                intent.putExtra("streamName", mPublishStreamView.getText().toString());
                startService(intent);

                Log.i(TAG, "Permission has been granted by user");
            }
        }
    }
}
```

2. Создание сессии и публикация потока при старте сервиса

```
@Override
public int onStartCommand(Intent intent, int flags, int startId) {
    SessionOptions sessionOptions = new SessionOptions(intent.getStringExtra("url"));
    Session session = Flashphoner.createSession(sessionOptions);
    session.connect(new Connection());
    StreamOptions streamOptions = new StreamOptions(intent.getStringExtra("streamName"));
    Stream publishStream = session.createStream(streamOptions);
    publishStream.publish();
    Toast.makeText(this, "Start service", Toast.LENGTH_SHORT).show();
    return START_STICKY;
}
```

3. Создание уведомления

```

private void showNotification() {
    Intent notificationIntent = new Intent(this, StreamingMinActivity.class);
    notificationIntent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
    PendingIntent pendingIntent = PendingIntent.getActivity(this, 0, notificationIntent, 0);
    int iconId = R.mipmap.ic_launcher;
    int uniqueCode = new Random().nextInt(Integer.MAX_VALUE);
    Notification notification = new NotificationCompat.Builder(this)
        .setSmallIcon(iconId)
        .setContentText("Started stream")
        .setContentIntent(pendingIntent).build();
    startForeground(uniqueCode, notification);
}

```

4. Остановка сервиса при нажатии кнопки Unpublish

```

mPublishButton.setOnClickListener(new OnClickListener() {
    @Override
    public void onClick(View view) {
        if (mPublishButton.getTag() == null || Integer.valueOf(R.string.action_publish).equals
(mPublishButton.getTag())) {
            ...
        } else {
            mPublishButton.setEnabled(false);
            ...
            stopService(new Intent(StreamingMinActivity.this, TestService.class));
            publishStream = null;
        }
        ...
    }
});

```

5. Остановка публикации при остановке сервиса

```

@Override
public void onDestroy() {
    super.onDestroy();
    publishStream.stop();
    Toast.makeText(this, "Stop service",
        Toast.LENGTH_SHORT).show();
    stopForeground(true);
}

```

Полный код примера модификации файла StreamingMinActivity.java

Code

```

package com.flashphoner.wcsexample.streaming_min;

import android.Manifest;
import android.app.IntentService;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.content.pm.PackageManager;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.PixelFormat;
import android.graphics.PorterDuff;
import android.os.Bundle;
import android.support.annotation.NonNull;
import android.support.v4.app.ActivityCompat;
import android.support.v7.app.AppCompatActivity;
import android.util.Log;
import android.view.View;
import android.view.View.OnClickListener;

```

```

import android.view.inputmethod.InputMethodManager;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import com.flashphoner.fpwcsapi.Flashphoner;
import com.flashphoner.fpwcsapi.bean.Connection;
import com.flashphoner.fpwcsapi.bean.Data;
import com.flashphoner.fpwcsapi.bean.StreamStatus;
import com.flashphoner.fpwcsapi.bean.StreamStatusInfo;
import com.flashphoner.fpwcsapi.layout.PercentFrameLayout;
import com.flashphoner.fpwcsapi.session.Session;
import com.flashphoner.fpwcsapi.session.SessionEvent;
import com.flashphoner.fpwcsapi.session.SessionOptions;
import com.flashphoner.fpwcsapi.session.Stream;
import com.flashphoner.fpwcsapi.session.StreamOptions;
import com.flashphoner.fpwcsapi.session.StreamStatusEvent;

import junit.framework.Test;

import org.webrtc.PeerConnection;
import org.webrtc.RendererCommon;
import org.webrtc.SurfaceViewRenderer;

import java.util.ArrayList;
import java.util.List;

/**
 * Example with streamer and player.
 * Demonstrates how to publish a video stream while playing another one.
 */
public class StreamingMinActivity extends AppCompatActivity {

    private static String TAG = StreamingMinActivity.class.getName();

    private static final int PUBLISH_REQUEST_CODE = 100;

    // UI references.
    private EditText mWcsUrlView;
    private TextView mConnectStatus;
    private Button mConnectButton;
    private EditText mPublishStreamView;
    private TextView mPublishStatus;
    private Button mPublishButton;
    private EditText mPlayStreamView;
    private TextView mPlayStatus;
    private Button mPlayButton;

    private Session session;

    private Stream publishStream;
    private Stream playStream;

    private SurfaceViewRenderer localRender;
    private SurfaceViewRenderer remoteRender;

    private PercentFrameLayout localRenderLayout;
    private PercentFrameLayout remoteRenderLayout;
    private SessionOptions sessionOptions;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_streaming_min);

        /**
         * Initialization of the API.
         */

```

```

Flashphoner.init(this);

mWcsUrlView = (EditText) findViewById(R.id.wcs_url);
SharedPreferences sharedPref = this.getSharedPreferences(Context.MODE_PRIVATE);
mWcsUrlView.setText(sharedPref.getString("wcs_url", getString(R.string.wcs_url)));
mConnectStatus = (TextView) findViewById(R.id.connect_status);
mConnectButton = (Button) findViewById(R.id.connect_button);

/**
 * Connection to server will be established when Connect button is clicked.
 */
mConnectButton.setOnClickListener(new OnClickListener() {
    @Override
    public void onClick(View view) {
        if (mConnectButton.getTag() == null || Integer.valueOf(R.string.action_connect).equals
(mConnectButton.getTag())) {
            /**
             * The options for connection session are set.
             * WCS server URL is passed when SessionOptions object is created.
             * SurfaceViewRenderer to be used to display video from the camera is set with method
SessionOptions.setLocalRenderer().
             * SurfaceViewRenderer to be used to display video of the played stream is set with method
SessionOptions.setRemoteRenderer().
             */
            sessionOptions = new SessionOptions(mWcsUrlView.getText().toString());
            sessionOptions.setLocalRenderer(localRender);
            sessionOptions.setRemoteRenderer(remoteRender);

            /**
             * Uncomment this code to use your own RTCCConfiguration. For example, you can use custom
TURN server
             */
            //List<PeerConnection.IceServer> iceServers = new ArrayList<>();
            //iceServers.add(new PeerConnection.IceServer("turn:your.turn-server.com:443?
transport=tcp","username","passw0rd"));
            //PeerConnection.RTCCConfiguration customConfig = new PeerConnection.RTCCConfiguration
(iceServers);
            //sessionOptions.setMediaOptions(customConfig);

            /**
             * Session for connection to WCS server is created with method createSession().
             */
            session = Flashphoner.createSession(sessionOptions);

            /**
             * Callback functions for session status events are added to make appropriate changes in
controls of the interface when connection is established and closed.
             */
            session.on(new SessionEvent() {
                @Override
                public void onAppData(Data data) {
                }

                @Override
                public void onConnected(final Connection connection) {
                    runOnUiThread(new Runnable() {
                        @Override
                        public void run() {
                            mConnectButton.setText(R.string.action_disconnect);
                            mConnectButton.setTag(R.string.action_disconnect);
                            mConnectButton.setEnabled(true);
                            mConnectStatus.setText(connection.getStatus());
                            mPublishButton.setEnabled(true);
                            mPlayButton.setEnabled(true);
                        }
                    });
                }

                @Override
                public void onRegistered(Connection connection) {

```

```

    }

    @Override
    public void onDisconnection(final Connection connection) {
        runOnUiThread(new Runnable() {
            @Override
            public void run() {
                mConnectButton.setText(R.string.action_connect);
                mConnectButton.setTag(R.string.action_connect);
                mConnectButton.setEnabled(true);
                mPublishButton.setText(R.string.action_publish);
                mPublishButton.setTag(R.string.action_publish);
                mPublishButton.setEnabled(false);
                mPlayButton.setText(R.string.action_play);
                mPlayButton.setTag(R.string.action_play);
                mPlayButton.setEnabled(false);
                mConnectStatus.setText(connection.getStatus());
                mPublishStatus.setText("");
                mPlayStatus.setText("");
            }
        });
    }
    mConnectButton.setEnabled(false);

    /**
     * Connection to WCS server is established with method Session.connect().
     */
    session.connect(new Connection());

    SharedPreferences sharedPref = StreamingMinActivity.this.getPreferences(Context.
MODE_PRIVATE);

    SharedPreferences.Editor editor = sharedPref.edit();
    editor.putString("wcs_url", mWcsUrlView.getText().toString());
    editor.apply();
} else {
    mConnectButton.setEnabled(false);

    /**
     * Connection to WCS server is closed with method Session.disconnect().
     */
    session.disconnect();
}
View currentFocus = getCurrentFocus();
if (currentFocus != null) {
    InputMethodManager inputManager = (InputMethodManager) getSystemService(Context.
INPUT_METHOD_SERVICE);
    inputManager.hideSoftInputFromWindow(currentFocus.getWindowToken(), InputMethodManager.
HIDE_NOT_ALWAYS);
}
});

    mPublishStreamView = (EditText) findViewById(R.id.publish_stream);
    mPublishStreamView.setText(sharedPref.getString("publish_stream", getString(R.string.
default_publish_name)));
    mPublishStatus = (TextView) findViewById(R.id.publish_status);
    mPublishButton = (Button) findViewById(R.id.publish_button);

    /**
     * Stream will be published when Publish button is clicked.
     */
    mPublishButton.setOnClickListener(new OnClickListener() {
        @Override
        public void onClick(View view) {
            if (mPublishButton.getTag() == null || Integer.valueOf(R.string.action_publish).equals
(mPublishButton.getTag())) {
                ActivityCompat.requestPermissions(StreamingMinActivity.this,
                    new String[]{Manifest.permission.RECORD_AUDIO, Manifest.permission.CAMERA},
                    PUBLISH_REQUEST_CODE);
            }
        }
    });

```

```

        SharedPreferences sharedPref = StreamingMinActivity.this.getPreferences(Context.
MODE_PRIVATE);

        SharedPreferences.Editor editor = sharedPref.edit();
        editor.putString("publish_stream", mPublishStreamView.getText().toString());
        editor.apply();
    } else {
        mPublishButton.setEnabled(false);
        /**
         * Method Stream.stop() is called to unpublish the stream.
         */
        //publishStream.stop();
        stopService(new Intent(StreamingMinActivity.this, TestService.class));
        publishStream = null;
    }
    View currentFocus = getCurrentFocus();
    if (currentFocus != null) {
        InputMethodManager inputManager = (InputMethodManager) getSystemService(Context.
INPUT_METHOD_SERVICE);
        inputManager.hideSoftInputFromWindow(currentFocus.getWindowToken(), InputMethodManager.
HIDE_NOT_ALWAYS);
    }
}

mPlayStreamView = (EditText) findViewById(R.id.play_stream);
mPlayStreamView.setText(sharedPref.getString("play_stream", getString(R.string.default_play_name)));
mPlayStatus = (TextView) findViewById(R.id.play_status);
mPlayButton = (Button) findViewById(R.id.play_button);

/**
 * Stream playback will be started when Play button is clicked.
 */
mPlayButton.setOnClickListener(new OnClickListener() {
    @Override
    public void onClick(View view) {
        mPlayButton.setEnabled(false);
        if (mPlayButton.getTag() == null || Integer.valueOf(R.string.action_play).equals(mPlayButton.
getTag())) {
            /**
             * The options for the stream to play are set.
             * The stream name is passed when StreamOptions object is created.
             */
            StreamOptions streamOptions = new StreamOptions(mPlayStreamView.getText().toString());

            /**
             * Stream is created with method Session.createStream().
             */
            playStream = session.createStream(streamOptions);

            /**
             * Callback function for stream status change is added to make appropriate changes in
controls of the interface when playing.
             */
            playStream.on(new StreamStatusEvent() {
                @Override
                public void onStreamStatus(final Stream stream, final StreamStatus streamStatus) {
                    runOnUiThread(new Runnable() {
                        @Override
                        public void run() {

                            if (StreamStatus.PLAYING.equals(streamStatus)) {
                                mPlayButton.setText(R.string.action_stop);
                                mPlayButton.setTag(R.string.action_stop);
                            } else if (StreamStatus.NOT_ENOUGH_BANDWIDTH.equals(streamStatus)) {
                                Log.w(TAG, "Not enough bandwidth stream " + stream.getName() + ",
consider using lower video resolution or bitrate. " +
                                "Bandwidth " + (Math.round(stream.getNetworkBandwidth() /
1000)) + " " +
                                "bitrate " + (Math.round(stream.getRemoteBitrate() / 1000)));
                            } else {

```

```

        mPlayButton.setText(R.string.action_play);
        mPlayButton.setTag(R.string.action_play);
    }
    mPlayButton.setEnabled(true);
    if (StreamStatus.FAILED.equals(streamStatus)){
        switch (stream.getInfo()){
            case StreamStatusInfo.SESSION_DOES_NOT_EXIST:
                mPlayStatus.setText(streamStatus+": Actual session does not
exist");

                break;
            case StreamStatusInfo.STOPPED_BY_PUBLISHER_STOP:
                mPlayStatus.setText(streamStatus+": Related publisher stopped
its stream or lost connection");

                break;
            case StreamStatusInfo.SESSION_NOT_READY:
                mPlayStatus.setText(streamStatus+": Session is not initialized
or terminated on play ordinary stream");

                break;
            case StreamStatusInfo.RTSP_STREAM_NOT_FOUND:
                mPlayStatus.setText(streamStatus+": Rtsp stream not found where
agent received '404-Not Found'");

                break;
            case StreamStatusInfo.FAILED_TO_CONNECT_TO_RTSP_STREAM:
                mPlayStatus.setText(streamStatus+": Failed to connect to rtsp
stream");

                break;
            case StreamStatusInfo.FILE_NOT_FOUND:
                mPlayStatus.setText(streamStatus+": File does not exist, check
filename");

                break;
            case StreamStatusInfo.FILE_HAS_WRONG_FORMAT:
                mPlayStatus.setText(streamStatus+": File has wrong format on
play vod, this format is not supported");

                break;
            default:{
                mPlayStatus.setText(stream.getInfo());
            }
        }
    } else {
        mPlayStatus.setText(streamStatus.toString());
    }
}
});
}
});

/**
 * Method Stream.play() is called to start playback of the stream.
 */
playStream.play();

SharedPreferences sharedPref = StreamingMinActivity.this.getPreferences(Context.
MODE_PRIVATE);

SharedPreferences.Editor editor = sharedPref.edit();
editor.putString("play_stream", mPlayStreamView.getText().toString());
editor.apply();
} else {
/**
 * Method Stream.stop() is called to stop playback of the stream.
 */
playStream.stop();
playStream = null;
}
View currentFocus = getCurrentFocus();
if (currentFocus != null) {
    InputMethodManager inputManager = (InputMethodManager) getSystemService(Context.
INPUT_METHOD_SERVICE);
    inputManager.hideSoftInputFromWindow(currentFocus.getWindowToken(), InputMethodManager.
HIDE_NOT_ALWAYS);
}
}
}

```

```

});

localRender = (SurfaceViewRenderer) findViewById(R.id.local_video_view);
remoteRender = (SurfaceViewRenderer) findViewById(R.id.remote_video_view);

localRenderLayout = (PercentFrameLayout) findViewById(R.id.local_video_layout);
remoteRenderLayout = (PercentFrameLayout) findViewById(R.id.remote_video_layout);

localRender.setZOrderMediaOverlay(true);

remoteRenderLayout.setPosition(0, 0, 100, 100);
remoteRender.setScalingType(RendererCommon.ScalingType.SCALE_ASPECT_FIT);
remoteRender.setMirror(false);
remoteRender.requestLayout();

localRenderLayout.setPosition(0, 0, 100, 100);
localRender.setScalingType(RendererCommon.ScalingType.SCALE_ASPECT_FIT);
localRender.setMirror(true);
localRender.requestLayout();
}

@Override
protected void onResume() {
    super.onResume();
    try {
        localRender.init(Flashphoner.context, null);
    } catch (IllegalStateException e) {
        //ignore
    }
    try {
        remoteRender.init(Flashphoner.context, null);
    } catch (IllegalStateException e) {
        //ignore
    }
}

@Override
protected void onPause() {
    super.onPause();
    localRender.release();
    remoteRender.release();
}

@Override
protected void onDestroy() {
    super.onDestroy();
    if (session != null) {
        session.disconnect();
    }
}

@Override
public void onRequestPermissionsResult(int requestCode,
                                       @NonNull String permissions[], @NonNull int[] grantResults) {
    switch (requestCode) {
        case PUBLISH_REQUEST_CODE: {
            if (grantResults.length == 0 ||
                grantResults[0] != PackageManager.PERMISSION_GRANTED ||
                grantResults[1] != PackageManager.PERMISSION_GRANTED) {
                Log.i(TAG, "Permission has been denied by user");
            } else {
                mPublishButton.setEnabled(false);
                /**
                 * The options for the stream to publish are set.
                 * The stream name is passed when StreamOptions object is created.
                 */
                StreamOptions streamOptions = new StreamOptions(mPublishStreamView.getText().toString());
                /**
                 * Uncomment this code to use case WebRTC-as-RTMP. Stream will be republished to your

```



```

import android.app.PendingIntent;
import android.app.Service;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.IBinder;
import android.support.v4.app.NotificationCompat;
import android.widget.EditText;
import android.widget.Toast;

import com.flashphoner.fpwcsapi.Flashphoner;
import com.flashphoner.fpwcsapi.bean.Connection;
import com.flashphoner.fpwcsapi.session.Session;
import com.flashphoner.fpwcsapi.session.SessionOptions;
import com.flashphoner.fpwcsapi.session.Stream;
import com.flashphoner.fpwcsapi.session.StreamOptions;

import junit.framework.Test;

import java.util.ArrayList;
import java.util.Random;

public class TestService extends Service {

    private static Stream publishStream;
    private static Session session;

    @Override
    public IBinder onBind(Intent intent) {
        // TODO: Return the communication channel to the service.
        //throw new UnsupportedOperationException("Not yet implemented");
        return null;
    }

    @Override
    public void onCreate() {
        super.onCreate();
        showNotification();
        Toast.makeText(this, "Create service",
            Toast.LENGTH_SHORT).show();
    }

    @Override
    public int onStartCommand(Intent intent, int flags, int startId) {
        SessionOptions sessionOptions = new SessionOptions(intent.getStringExtra("url"));
        Session session = Flashphoner.createSession(sessionOptions);
        session.connect(new Connection());
        StreamOptions streamOptions = new StreamOptions(intent.getStringExtra("streamName"));
        Stream publishStream = session.createStream(streamOptions);
        publishStream.publish();
        Toast.makeText(this, "Start service", Toast.LENGTH_SHORT).show();
        return START_STICKY;
    }

    @Override
    public void onDestroy() {
        super.onDestroy();
        publishStream.stop();
        Toast.makeText(this, "Stop service",
            Toast.LENGTH_SHORT).show();
        stopForeground(true);
    }

    private void showNotification() {
        Intent notificationIntent = new Intent(this, StreamingMinActivity.class);
        notificationIntent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
        PendingIntent pendingIntent = PendingIntent.getActivity(this, 0, notificationIntent, 0);
        int iconId = R.mipmap.ic_launcher;
        int uniqueCode = new Random().nextInt(Integer.MAX_VALUE);
        Notification notification = new NotificationCompat.Builder(this)
            .setSmallIcon(iconId)
            .setContentText("Started stream")
    }

```

```

        .setContentIntent(pendingIntent).build();
        startForeground(uniqueCode, notification);
    }

    public static void setSession(Session session) {
        TestService.session = session;
    }

    public static void setPublishStream(Stream publishStream) {
        TestService.publishStream = publishStream;
    }
}

```

Полный код примера модификации манифеста приложения

Code

```

<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.flashphoner.wcsexample.streaming_min">

    <uses-feature android:name="android.hardware.camera" />
    <uses-feature android:name="android.hardware.camera.autofocus" />
    <uses-feature
        android:glEsVersion="0x00020000"
        android:required="true" />

    <uses-permission android:name="android.permission.CAMERA" />
    <uses-permission android:name="android.permission.CHANGE_NETWORK_STATE" />
    <uses-permission android:name="android.permission.MODIFY_AUDIO_SETTINGS" />
    <uses-permission android:name="android.permission.RECORD_AUDIO" />
    <uses-permission android:name="android.permission.INTERNET" />
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />
    <uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity
            android:name=".StreamingMinActivity"
            android:configChanges="orientation|screenSize"
            android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <service
            android:name=".TestService"
            android:enabled="true"
            android:exported="true">
        </service>
    </application>

</manifest>

```

Известные ограничения

1. При публикации потока из сервиса невозможно отображение локального видео в приложении
2. В приведенном примере, при закрытии приложения из списка запущенных приложений, сервис также остановится.