



GadgEon

Engineering Smartness

IOT SURVEILLANCE SOLUTION

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Version 01



IoT Surveillance Solution



A start-up in security cameras needed an Android Application to view live camera feeds with ability to stream the content to web browser using WebRTC.

Solution Description

- Developed an Android application with following features
 - Discover the cameras on the WIFI by listening to UDP beacons
 - Playback live RTSP video stream from camera on the app UI
 - Configure the camera through WIFI (eg resolution)
 - Implement live streaming to WebRTC on user command while continues to play video on the APP UI
- Cloud based application with WebRTC signalling service for remote users
 - List all the active cameras
 - View the live stream from selected camera
 - Provision to record the live stream
 - Remote firmware upgrade and camera settings change through WebRTC data channel

Outcome and Benefits Delivered

- All development done on opensource software
- Highly efficient implementation of forwarding media from RTSP connection to WebRTC. Uses H.264 frame extraction and forwarding methodology resulting in very low processing overhead.



The Business Context and Challenges of the Customer

- Our customer was an Israel based start up company specializing in security cameras and associated solutions, primarily for law-enforcement and governmental agencies. They had developed a highly sophisticated camera for security applications. Camera supported WIFI and RTSP protocols.
- Customer wanted an android mobile application to configure the camera and view the live stream. Moreover, they wanted the live stream to be available to remote personnel over a very low latency, peer to peer WebRTC connection.
- In the next stage, customer wanted the settings of the camera, firmware upgrade etc available to the WebRTC remote user via WebRTC data channel. New features like text message controlled start/stop of the video stream was also required.



The Solution / System Description

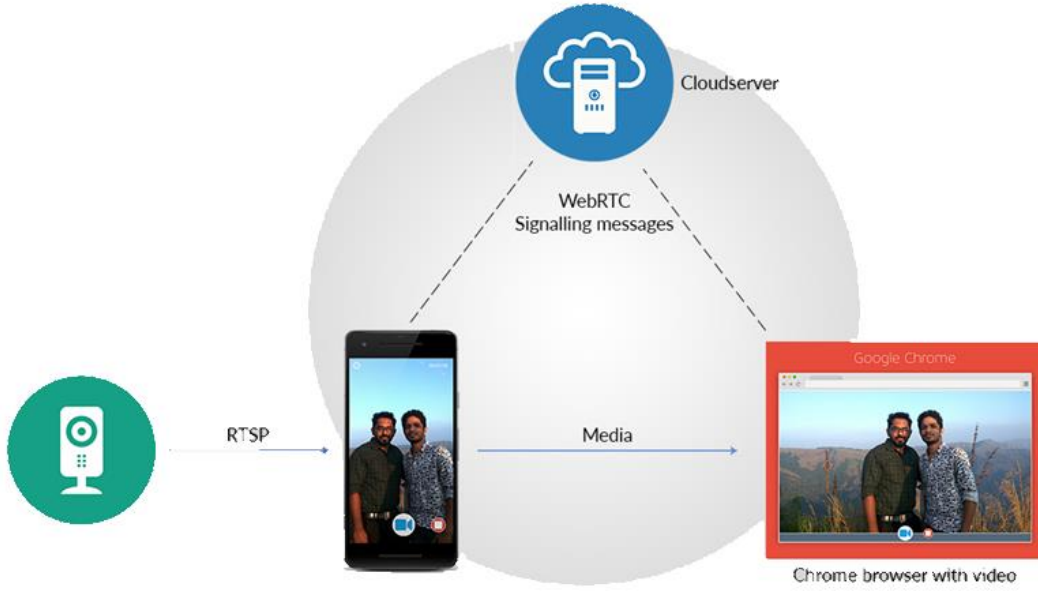
Android Application

Technologies Used: NDK, RTSP, WebRTC, H.264, AAC, Opus, transcoding, Socket programming

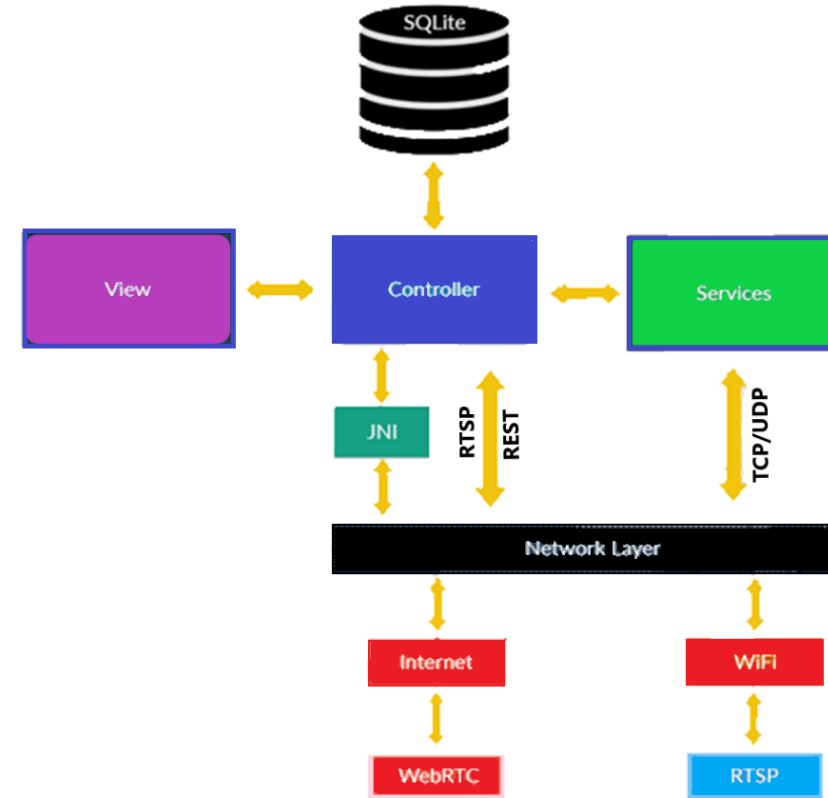
Android application supported the following features

- Discover camera by listening to UDP beacons and listing them. Connect to the user selected camera. Display the live video stream on the app UI.
- Configure the camera through WiFi APIs. Various options like Resolution, Video quality, Photo size, Photo quality etc can be configured. Option to download images and videos from Camera to the Android Gallery. Option to record the media locally from the incoming RTSP stream.
- Generate and display media thumbnail for videos and photos. Implement Audio only mode.
- Implement live streaming to WebRTC on user tap. Continues to play video on the screen. Streaming continues even when app is in background. App implements H.264 frame forwarding from RTSP to WebRTC. Audio is transcoded from AAC to Opus.
- Handling commands from remote user on WebRTC link over the WebRTC data channel and take appropriate action like settings changes on the camera, firmware upgrade etc.

System / Architecture Description



System Overview



Mobile App Architecture



The System Description

Cloud Application

Technologies Used: Node.js, bootstrap JS, WebRTC, STUN/TURN

Google Cloud platform is used for WebRTC Web server and for Signalling server. Implemented Web socket based signaling server. Used STUN/TURN servers for NAT/Firewall Traversal. Cloud application supported the following features

- List all the active live streams from different cameras
- View the live stream from selected camera
- Provision to record the live stream
- Control the settings of the camera via WebRTC data channels
- Firmware upgrade of the camera via the WebRTC data channel

THANK YOU



For More Details, Let's Connect



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