

Live TV for Mobile Applications	Version: 1.1
Requirements Definition	Date: 2009-12-15

# Live TV for Mobile Applications Requirements Definition

**Version 1.1**

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## Revision History

Date	Version	Description	Author
2009-10-01	1.0	Initial Draft	Željko Rumenjak
2009-12-15	1.1	Reorganized project requirements	Željko Rumenjak

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## 1. Introduction

### 1.1 Purpose of this document

This document contains the requirements for the Live TV for Mobile Applications project. Requirements are divided into groups and priorities are defined to differentiate the optional requirements from the mandatory ones. Requirements are described using UML Use Case diagrams so that it would be easier to understand them.

### 1.2 Intended Audience

Intended audience of this document is:

- Project team, to have some guidelines when implementing functionalities
- Project leader, to check if the project is progressing as planned
- Steering group, to see what functionalities the end product will have
- Customer, to verify if the team understood the requirements correctly

### 1.3 Scope

This document will list all requirements requested by different stakeholders, the document defines a priority for each of those requirements and also its source (the person that requested it). All changes to the requirements that will happen during the project will also be listed in this document.

### 1.4 Definitions and acronyms

#### 1.4.1 Definitions

Keyword	Definitions
3G	A family of standards for mobile telecommunications defined by the International Telecommunication Union

#### 1.4.2 Acronyms and abbreviations

Acronym or abbreviation	Definitions
UML	Unified Modeling Language
RTSP	Real Time Streaming Protocol
MDH	Mälardalen University, Vasteras, Sweden

### 1.5 References

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## 2. Requirements Description

### 2.1 Introduction

Live TV for Mobile Applications project is a project that will be done as part of the Distributed Software Development course. Project team will be distributed with 4 members working in Sweden and 3 members working in Croatia. Customers for this project are Damir Isovich (MDH) and Klas Eriksson (OndeDial AB).

Two alternatives are already partially implemented, but each has some problems. Those alternatives will be analyzed to avoid some of the problems that may occur in development process.

The system that is going to be developed has three main parts: the player, the recorder and the production studio. Because of that, the requirements have been divided into three groups, each of which contains the requirements for one of those parts. Fourth group of requirements consists of requirements that are relevant to the whole project.

### 2.2 General requirements

The goal of the project is to implement a system that can be used for live TV broadcasting using mobile phones. This system should allow users to record an event using their mobile phones and send it live to a server via mobile network. On the server an application will be running with which an operator can choose one of the streams that users are recording and this stream is then broadcasted to the viewers that want to watch it. The viewers watch the stream using their mobile phones and can send a feedback to this video that is broadcasted by the server to the users that are recording it.

### 2.3 Recording application requirements

The mobile phones that will be used to record an event can be of a certain brand (e.g., Nokia 5800). However it is desirable if the capturing can be done by variety of phone brands. The user of the recording application should be able to choose the quality of the video that is being recorded (e.g., resolution). It is desirable that the recording application has the ability to receive user feedback, but this is an optional requirement.

### 2.4 Production studio application requirements

Production studio application is used to select the stream that will be broadcasted to the viewers. This application should play all of the incoming streams and allow the operator to choose which of these streams will be broadcasted. The application must be able to receive and process at least six different streams simultaneously. The operator can insert a commercial anywhere in the currently broadcasted stream. The part of the live stream that happened during a commercial is lost, i.e., it is not replayed after the commercial. The application should be optimized to run efficiently on Microsoft Windows operating system.

### 2.5 Player application requirements

The service should be available on variety of mobile phone brands, i.e., the player application should be platform independent. It is desirable that the player application allows users to send feedback back to the production studio application, but this is an optional requirement. The ability to check mobile device support was added as a requirement by the project team to allow for easier testing of the player application on different mobile phones.

### 2.6 Project-wide requirements

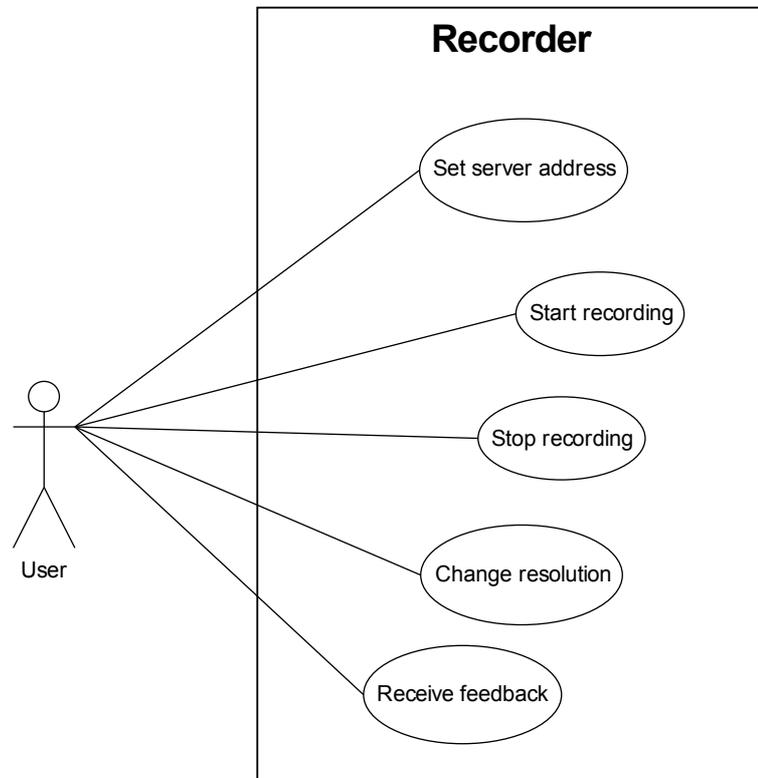
Project-wide requirements are the requirements that could not be placed in any of previously defined groups of requirements. These requirements are relevant to all parts of the project.

One of such requirements is the requirement that the video streaming must be done through some existing mobile network, e.g., 3G network. Another is that the delay introduced by the system, or the time that passes from the moment an event occurs to the moment a user sees it on his mobile phone, should be less than 5 seconds. Also, the quality of sound should not be compromised, the quality of video can be reduced if necessary, but the quality of sound must be preserved.

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### 3. Use Case Models

#### 3.1 Use case model for the recording application



##### 3.1.1 Set server address

**Initiator:**

*User of the recording application*

**Goal:**

*Set an address of the remote server where the stream is going to be sent*

**Main Scenario:**

1. *User selects the “Set server address” option*
2. *Application displays the form where the user can enter an address*
3. *User enters and confirms the address*
4. *Application saves the address*

**Extensions:**

*If user enters an invalid address or doesn't enter anything an error message is displayed.*

##### 3.1.2 Start recording

**Initiator:**

*User of the recording application*

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**Goal:**

*Start recording an event using mobile phone's camera.*

**Main Scenario:**

1. User selects the "Start recording" option
2. Application displays the camera viewfinder
3. Application connects to the remote server
4. Application starts recording and streaming recorded content to the server

**Extensions:**

*If the application cannot connect to the remote server an error message is displayed.*

**3.1.3 Stop recording**

**Initiator:**

*User of the recording application*

**Goal:**

*Stop recording an event using mobile phone's camera.*

**Main Scenario:**

1. User selects the "Stop recording" option
2. Application stops recording content
3. Application disconnects from the remote server

**3.1.4 Change resolution**

**Initiator:**

*User of the recording application*

**Goal:**

*Change the resolution of the recorded video.*

**Main Scenario:**

1. User selects the "Change resolution" option
2. Application displays the available resolutions
3. User chooses one of the displayed resolutions
4. Chosen resolution is saved

**Extensions:**

*User cannot change the recording options while the recording is in progress. The menu for changing options is not available while the recording is in progress.*

**3.1.5 Receive feedback**

**Initiator:**

*Production studio application*

**Goal:**

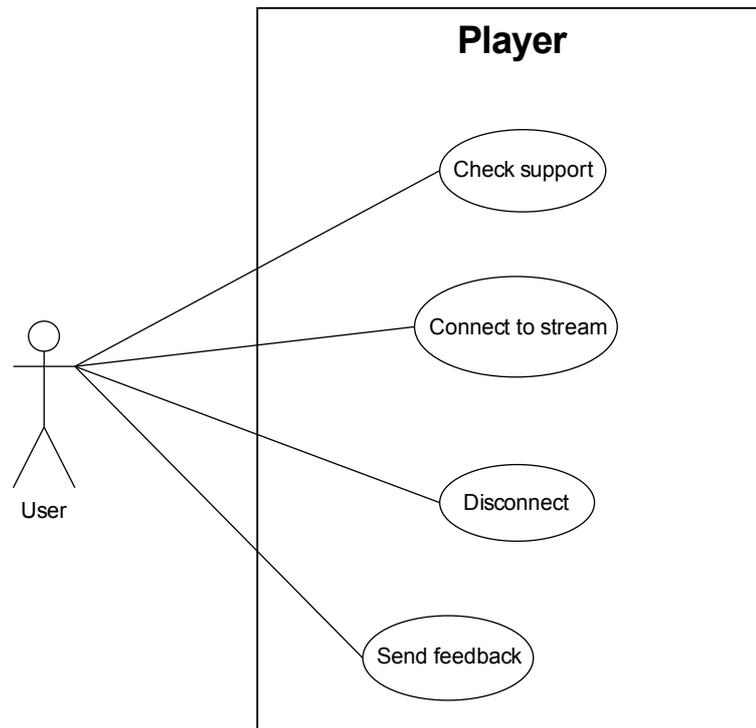
*Receives and displays the feedback from the viewers.*

**Main Scenario:**

1. Recording application listens for the incoming feedback transmissions
2. Production studio sends the feedback received from the user
3. Recording application receives the feedback and notifies the user

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### 3.2 Use case model for the player application



#### 3.2.1 Check support

**Initiator:**

*User of the player application.*

**Goal:**

*Check if the mobile phone supports the APIs required for receiving of the streaming video and audio content.*

**Main Scenario:**

1. User chooses the "Check support" option
2. Application checks if the required APIs are supported
3. Application displays which of the APIs are supported
4. User reviews the displayed information and returns to previous menu

#### 3.2.2 Connect to a stream

**Initiator:**

*User of the player application.*

**Goal:**

*Play streaming content from the remote server.*

**Main Scenario:**

1. User chooses the "Connect to a stream" option
2. Application shows a form where the user can enter the address of the stream
3. Application connects to the remote address
4. Application starts playing the content from this stream

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**Extensions:**

*If the application cannot connect to the remote server an error message is displayed to the user.*

**3.2.3 Disconnect from the remote server**

**Initiator:**

*User of the player application.*

**Goal:**

*Stops playing the stream and disconnects from the remote server.*

**Main Scenario:**

1. *While the stream is playing, user chooses the "Disconnect" option*
2. *Application stops playing the stream*
3. *Application disconnects from the remote server*

**Extensions:**

*If the stream isn't playing application does nothing.*

**3.2.4 Send feedback to the production studio application**

**Initiator:**

*User of the player application.*

**Goal:**

*Sends the feedback about the stream that is playing to the production studio application.*

**Main Scenario:**

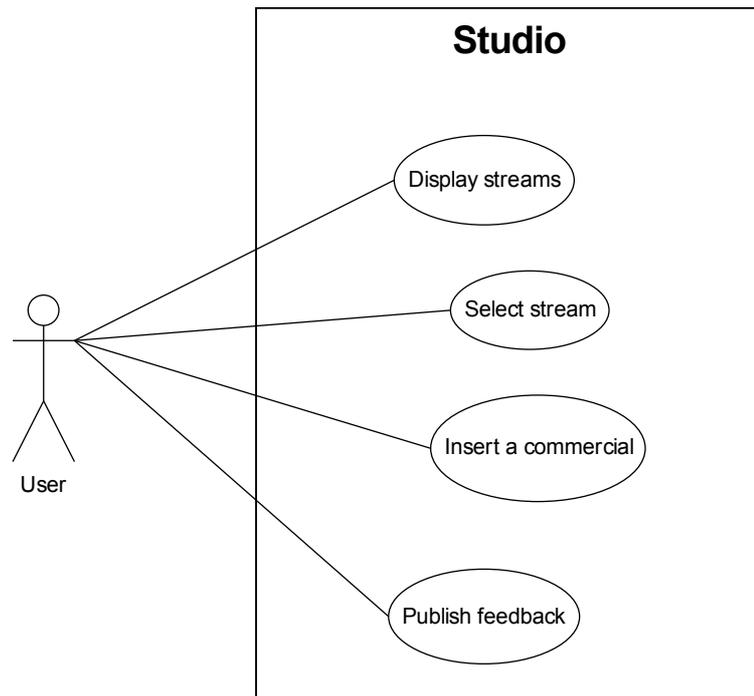
1. *While the stream is playing, user chooses the "Send feedback" option*
2. *Application shows the different types of feedback that the user can send*
3. *User chooses one of the displayed options*
4. *Application sends the feedback to the server*

**Extensions:**

*If the feedback cannot be sent an error message is displayed.*

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### 3.3 Use case model for the production studio application



#### 3.3.1 Display streams

**Initiator:**

*Production studio application*

**Goal:**

*Display all of the incoming streams to the application's user.*

**Main Scenario:**

1. *User opens the production studio application*
2. *Production studio listens for the incoming streams*
3. *Application displays all of the incoming streams simultaneously*

#### 3.3.2 Select a stream for broadcast

**Initiator:**

*User of the production studio application.*

**Goal:**

*Select the stream that will be broadcasted to the viewers.*

**Main Scenario:**

1. *User sees all of the incoming streams*
2. *User selects one of those streams*
3. *Application marks the selected stream as the stream that is being broadcasted*
4. *Application starts broadcasting the selected stream*

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### 3.3.3 *Insert a commercial*

**Initiator:**

*User of the production studio application.*

**Goal:**

*Insert a commercial in the stream that is being broadcasted to the viewers.*

**Main Scenario:**

1. *User sees the available commercials*
2. *User selects one of those commercials*
3. *Application stops broadcasting the stream and broadcasts the selected commercial*
4. *After the commercial has ended, the application continues broadcasting the stream*

### 3.3.4 *Publish the feedback received from players to the recorders*

**Initiator:**

*Player application.*

**Goal:**

*Send the feedback received from the player to the recording applications.*

**Main Scenario:**

1. *Production studio application listens for the incoming feedback*
2. *Player application sends the feedback to the production studio application*
3. *Production studio application sends the feedback to the recording applications*

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## 4. Requirements Definition

### 4.1 Requirement Group Definitions

Identification	Requirement Group	Rem.
REC	Recorder application requirements	
PLY	Player application requirements	
STU	Production studio application requirements	
PWR	Project-wide requirements	

### 4.2 Requirement Sources

Source	Description	Rem.
DI	Damir Isovich (MDH)	
KE	Klas Eriksson (OneDial AB)	
Sys	Required as a consequence of system design (contractor's requirement)	

### 4.3 Requirements definitions

Identity	Status	Priority	Description	Source
Recorder application				
REC-1	I	1	Record video using phone's camera	DI, KE
REC-2	I	1	Stream video to a remote server	DI, KE
REC-3	I	2	Change the recording resolution	DI, KE
REC-4	I	3	Receive feedback from server	DI, KE
Player application				
PLY-1	I	1	Play video stream from remote server	DI, KE
PLY-2	I	3	Check streaming support on the mobile device	Sys
PLY-3	I	3	Send feedback to the server	DI, KE
PLY-4	I	2	Platform independent	DI, KE
Production studio application				
STU-1	I	1	Receive at least 6 different streams at a time	DI, KE
STU-2	I	1	Show all incoming streams	DI, KE
STU-3	I	1	User can choose which stream to broadcast	DI, KE
STU-4	I	2	Insert a commercial at any point in a stream	DI, KE
STU-5	I	3	Send feedback from players to recorders	DI, KE
Project-wide requirements				
PWR-1	I	1	The delay introduced by the system should be less than 5 seconds	DI, KE
PWR-2	I	1	The video streaming must be done through some existing mobile network, e.g., 3G	DI, KE
PWR-3	I	1	The quality of the sound should not be compromised, the quality of the video can be lowered to match available system resources	DI, KE

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Requirement status:

- I = initial* (this requirement has been identified at the beginning of the project),
- D = dropped* (this requirement has been deleted from the requirement definitions),
- H = on hold* (decision to be implemented or dropped will be made later),
- A = additional* (this requirement was introduced during the project course).

#### 4.3.1 Change Log

Identity	Action	Date	Comments

Requirement status:

- D = dropped* (this requirement has been deleted from the requirement definitions),
- H = on hold* (decision to be implemented or dropped will be made later),
- A = added* (this requirement was introduced during the project course).
- R = resurrected* (dropped or on hold requirement was reactivated)

## 5. Future Development

### 5.1 General Overview

This project could be expanded and turned into a commercial product in the future. First priority would be to secure the communication between different parts of the systems so that only registered users could use it. Another way of further developing the results of this product would be to extend the support to the platforms that won't be supported by the end of this project, mainly Android, iPhone and Windows Mobile platforms.

### 5.2 Securing the system

To secure the communication between different parts of the system users should be able to register and create accounts on the system. Before the user is allowed to watch a stream, the system would check to see if the user is authorized to see the requested stream. To achieve this, a number of different security protocols could be used.

### 5.3 Extending the support on other platforms

To enable users to watch the streams on other platforms a player application should be implemented for those platforms. If the final product wouldn't use any security protocols (i.e., if it would be free to watch the streams), then people using other platforms could use any player that supports rtsp streaming protocol. If such protocols would be used, then the application that supports used security protocols should be implemented for each platform.