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| **Institute of Technology Blanchardstown** |
| StreaMe |
| Live Streaming Cross-Platform Broadcasting Client |
|  |
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Submitted in part fulfilment for the degree of

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School of Informatics and Engineering,

Institute of Technology Blanchardstown,

Dublin, Ireland

# Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Degree of **B.Sc. in Computer Science** in the Institute of Technology Blanchardstown, is entirely my own work except where otherwise stated, and has not been submitted for assessment for an academic purpose at this or any other academic institution other than in partial fulfilment of the requirements of that stated above.

Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Dated: \_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

# Abstract

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# Chapter 1: Introduction

## Introduction

Description of the project

## Project Design

Brief description of how the project is use

## Objectives

What the system should be able to do

## Motivation

## Technologies

Technologies use

# Chapter 2: Literature Review

# Chapter 3: System Analysis

## Overview

Main objectives and key functionalities

1. Create a project
2. Configure the streaming platform and parameters
3. Add media sources into the project
4. Send the stream to a server
5. Display stream in the software
6. Display feedback of the streaming

### Uses case

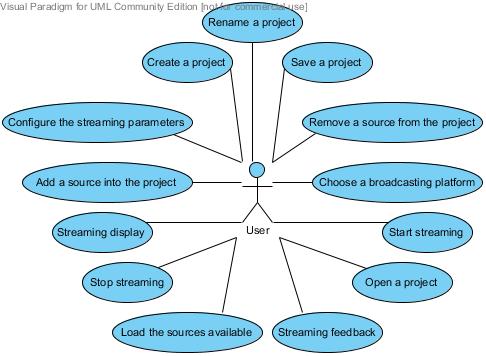


Figure III‑1 Use Case Diagram

## Functional requirements

One for each main functionalities of the project

### Create a project

### Configure the streaming platform and parameters

### Add media sources into the project

### Send the stream to a server

### Display stream in the software

### Display feedback of the streaming

## Use Cases

For each use case: description, diagrams (main use case first)

### Create a new project

The user wants to create a new project.  
The user clicks on the “File” menu and click on the “create new project “button in the interface.  
A new window appears and asks the user to give a name to the project.  
After clicking on the create button, the new project is created and the streaming configuration windows appears.

### Load the source available

When starting a new project the sources available are automatically load and appear in the sources list of the software

### Add a source into the project

When the user wants to add a source into his project he simply click on the source wanted in the source list and click on a button with an arrow to the right to add this source into the project, he can now see his selected source into the project source list call “Show”.

### Remove a source from the project

When the user wants to remove a source from the project he click on the source wanted into the source list of the project named “show” and click on the left arrow, he can see that the source is no more into the project list but in the source list.

### Choose a broadcasting platform

The user wants to choose a broadcasting platform. He clicks on the menu “Config”, then “Choose platform“, a window appear with the platforms he can choose, he can select a platform then enter a streaming key and click on the « ok » button. He can access to the streaming parameters too.

### Configure the streaming parameters

The user wants to configure the streaming parameters.  
The user clicks on the “Config” menu and click on the “Configure parameters” button in the interface.  
A new window appear witch allow the user to configure the broadcasting platform parameters (size, format, bitrate, speed). The user validate the changes by clicking on the ok button.

### Save the project

After configuring the project, the user can save it into a file, which can be reuse later. All parameters defined can be saved in the file like the sources selected, the configuration the platform chosen.  
To save the project, the user has to go on the “file” menu, he can save if a project file is already create, or save as if a file doesn’t exist.

### Open a project

The User want to open an existing project, he go on the “file” menu and select “open a project “, he has to select the file of the existing project and click on ok.

### Rename a project

The user can rename a project when he want to, he just has to go in the “edit” menu and click “rename” a new window appears where he can enter the new name of the project and click on “ok” to validate it.

### Start streaming

The user wants to start streaming. If he has selected some sources for his project and configure the streaming parameters he can click on the play button in the main window or in the “Show” menu, then the streaming start and after a few seconds the stream is displayed into the main window.

### Stop streaming

The user can at every-time stop the streaming, by clicking on the button stop in the main window or in the “show” menu. Clicking on stop will stop the display of the stream and the broadcast on the streaming platform. When the user stops the streaming, the project is still available. If he wants to stream again he just has to click on the play button again.

### Streaming display

When the user wants to stream the result of what he sent is displayed into the software with just a little delay, the user can control the sound of the output.

### Streaming feedback

When the user is sending a stream he also has a text feedback into the software that will tell the state of the streaming and of the source capture.

# Chapter 4: System Design

This chapter will outline how the software works in term of display and implementation; first we will take a look to the interface design.

## User Interface Design

The user interface must allow the user to create a project, select some sources, configure the streaming and start it.

To do that we have a few different window. Each window has its own functionality, but all the software is depending on one window, the main one, which we will describe first.

### Main Window

This window is the main window of the software, this is the most important window of the project, all the functionalities are depending on this window.

We have a menu where we can access to the project functionalities, the streaming parameters, the sources selection and where we can start and stop the streaming.

A list of the sources available is displayed in this window and we can add or delete a source to the show by clicking on the arrows between the two lists.

A player is also available where we have the streaming display, we can click on play and stop to play and stop the streaming, we also have a volume slider to control the sound in output.

The stream time is also displayed, this is the time since the stream is started.

And finally we have two tabs, one for the software feedback and one for the ffmpeg feedback (the streaming feedback), and we also have a status bar that display the streaming status (started, stopped).

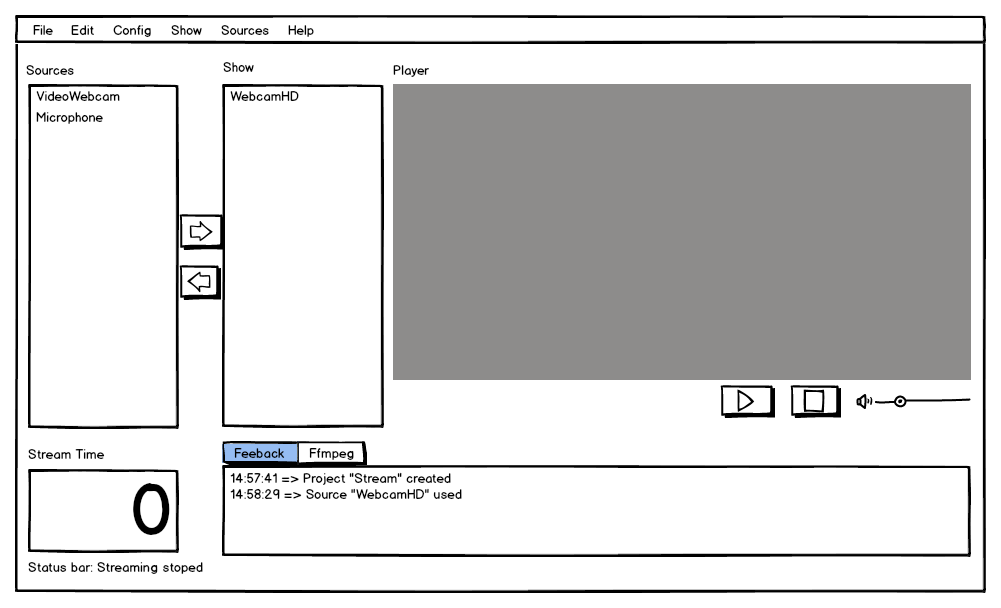


Figure Main widow draft

### Starting Assistant

The starting assistant window is a window that is automatically displayed when we start the project.

It simply propose to the user to create a project or to open one, the user can skip this window but everything in the main window is disable until a project is created or opened.

If create project is selected the new project window is displayed, if open project is selected the open project window is displayed.

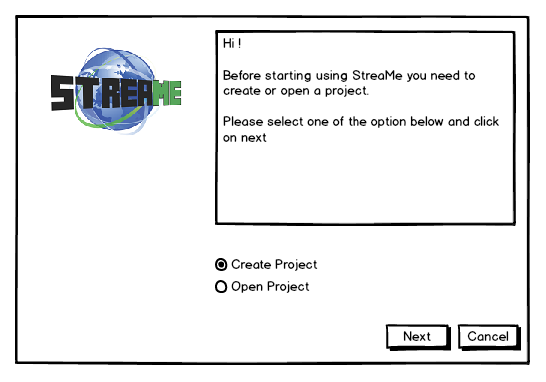


Figure 3 Starting assistant window draft

### New Project

The new project window is the window displayed when the user choose to create a project in the menu or with the starting assistant.

The user just has to enter a project name and click to next, that will display the streaming parameters window.

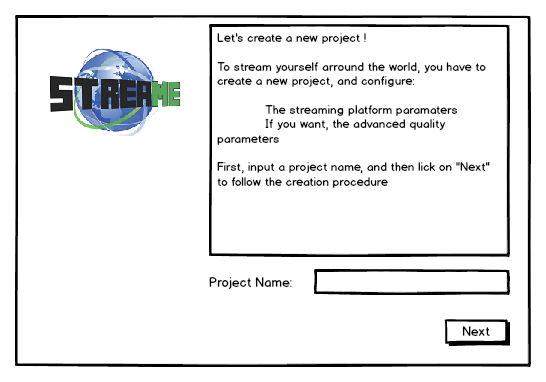


Figure 4 New project assistant window draft

### Streaming Parameters

The streaming parameters window make the user choose a streaming platform and enter the streaming key to send a stream on this platform, the streaming key is something a platform gave to a user when he create an account on it, it is obligatory to send a stream on a platform.

After selected a platform and enter the streaming key the user can validate by clicking on ok or configure the advanced parameters by clicking on advanced

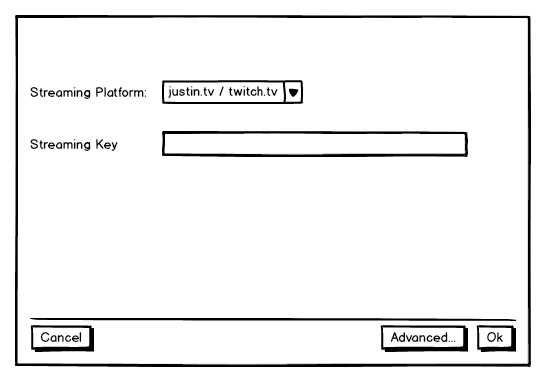


Figure 5 Streaming parameters window draft

### Advanced Parameters

The advanced parameters window allows the user to configure the parameters he want for his streaming.

He can select the size and the format of the video.

He can enable or not the auto configuration, if it is enable he just can change the upload speed, if the auto configuration is disable he can change more parameters like the video bitrate, the audio bitrate and format (mono, stereo).

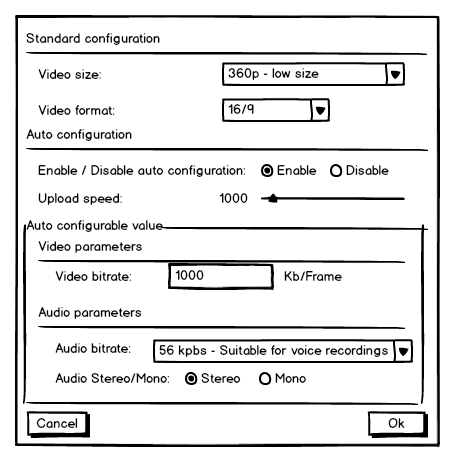


Figure 6 Advanced parameters window draft

### Rename

The rename window simply allows the user to change the name of the project, he can enter the new name and click on ok to validate, or click on cancel to cancel.

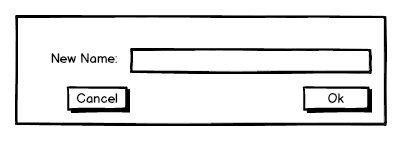


Figure Rename window draft

## Functional Design

Most of the interactions are done within the main window in this software, except a few that will call the other windows described above. We will take a look to how the interaction with these windows are done in the software.

### Starting assistant

When we start the software the first interaction is the starting assistant, we select a starting option, open or create a new project.

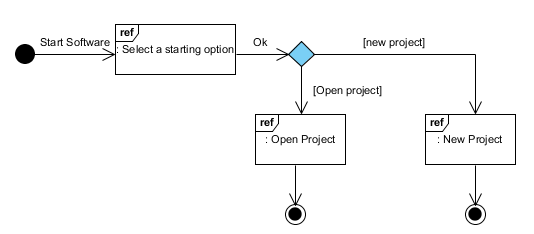


Figure 8 Interaction Diagram Starting Assistant

Then depending on the option selected another window is opened, a simple file browser to open a project or the new project assistant to create a new project.

### New Project Assistant

The new project assistant proposes to enter a project name, and then it brings the user to the streaming parameters window.

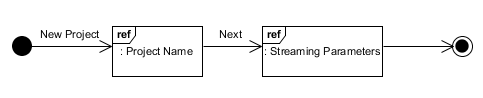


Figure 9 Interaction Diagram New Project Assistant

### Streaming Parameters

The streaming parameters window propose to the user to select a streaming platform in a list, the user has to enter his streaming key for this platform, then he can choose to end the configuration or to change the advanced parameters.

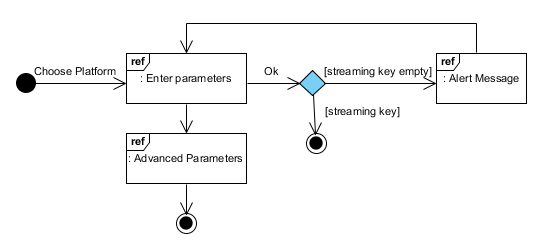


Figure 10 Interaction Diagram Streaming Parameters

### Advanced Parameters

The advanced parameters window propose to the user to change a lot of streaming parameters as we can see in the user interface part. The user can change these parameters and then save or cancel. The parameters in the auto configuration part can be changed only if the user select “disable” in the Enable/Disable auto configuration option.

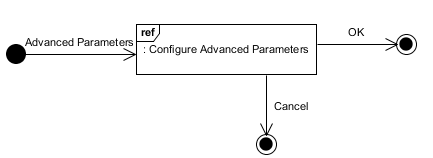


Figure 11 Interaction Diagram Advanced Parameters

### Rename

The user can choose to rename his project after creating it, a simple window to enter the new name is displayed, the user can save the new name or cancel the change.

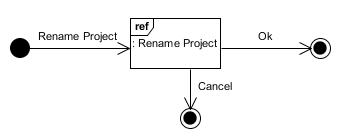


Figure Interaction Diagram Rename

## Classes Design

This software require an important number of classes to work, due to its complexity. To handle that correctly we implemented a design pattern, the model view controller pattern (MVC).

### Design Pattern MVC

The MVC pattern is very useful to structure the architecture of the software. Indeed this pattern separates the classes into three parts.

**The Model:** It contains the data classes of the software, example in our software the *camera* class.

**The View:** It contains the visual part of the software, the user interface, example in our software the *mainwindow* class.

**The controller:** This is what control everything, when an action is asked by a user, the view send the information to the controller who will apply it by using the model if necessary. In our software this is the *controller* class.

**Example of the use of the MVC in our software:**

when the user want to rename a project. The user enter the new project name in the view and tell the view “I want to save this new name”, the view call the controller and tell him “the user want to change the name of the project with this one”, the controller will change the name by calling the project model and tell him “your name is now this one”.

The point for this software to use this pattern was to structure the classes and make it easier to implement.

### Overall Class Diagram

|  |  |  |
| --- | --- | --- |
| Class | MVC | Description |
| Camera | Model |  |
| Microphone | Model |  |
| Project | Model |  |
| Source | Model |  |
| Controller | Controller |  |
| StreamThread | Controller |  |
| StreamTools | Controller |  |
| WinavTools | Controller |  |
| *ChooseCreateOpenProject* | View | View of the starting assistant |
| *MainWindow* | View | View of the main window |
| *NewProjectAssistant* | View | View of the new project assistant |
| *PlatformSelectionWindow* | View | View of the streaming parameters |
| *RenameProjectWindow* | View | View of the rename window |
| *StreamingParametersConfigurationWindow* | View | View of the advanced parameters |

### Class Diagram

Class diagram

# Chapter 5: Implementation

## Prototype Implementation

One subpart for each main functionalities, explain of each is implemented

### Project File

For the storage of the project data we decided to use the XML file format to define our own file storage format policy. The goal of using this format is to make it readable also for humans using a simple text editor to simplify the debugging. Indeed, using this standard an experimented user can easily understand what configuration was selected by reading the project file. Also, the C++ framework we use (QT) include methods to create and read XML formatted files. These included methods accentuated our decision to use it because it also simplified the algorithm we had to perform to open a project from an existing project file.

Conform to the standard way of saving files into software, we decided to allow the user to save a project using two different way (save and save as). Also, to simplify the finding of the StreaMe project file, a StreaMe file type was defined (.sm). This file type helps the user when this one wants to open a project file because it allows filtering the files by this extension easily.

### Video Capture

### Video Broadcast

### Video Display

## Linux Implementation

Description how the software is implemented on linux

## Installer on Linux and Windows

## Others ???

# Chapter 6: Testing and Evaluation

# Chapter 7: Conclusion and Further Work

## Further Work

## Conclusion