Expert Radio System for Zimbabwe Broadcasting Holdings

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Expert Radio System for Zimbabwe Broadcasting Holdings

by

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Submitted in partial fulfilment of the requirements for the degree of

BSc Honours Information Systems

Department of Computer Science and Information Systems in the

Faculty of Science and Technology at the

Midlands State University

Gweru

November 2018

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ABSTRACT

This study sought to craft an Expert Radios System for Zimbabwe Broadcasting Holdings. The researcher's problem statement indicated that Zimbabwe Broadcasting Holdings is engaged in two media services namely television and radio broadcasting services, and the processes involved in their radio broadcasting was mainly through analogy radio signals. As technology evolves, the equipment currently in use becomes obsolete and makes it hard to keep maintaining available infrastructure to serve the population. In the research carried out, the objectives of the Expert Radio System were to schedule music playlist according to preference, filter program content according to profile, to publish listener advertisements, to publish news online, to promote artist music and to award royalties to most streamed music and programs. In order to meet these stated objectives, the business value to accrue from the Expert Radio System was noted and a feasibility analysis was performed and yielded positive results. Several risks associated to the ERS's development were identified and counter measures were put in place. Stakeholder analysis identified system users, their expectations and interests in the new system and a work plan was drafted. Information gathering tools were used, namely, questionnaires, interviews and observations. Questionnaires were issued personally and interviews were conducted and results were documented for further assessment. Process and data analysis were performed on the previously implemented radio system and the system data flows were drawn. Weakness to the system were noted, alternatives for system development were evaluated and requirements analysis was done. In-house development was chosen as the development alternative for the new system. Designs for the Expert Radio System were drawn highlighting the data flows, architectural design, interface design, database table relationships and the system security designs. Implementation of the Expert Radio System was successfully done through performing code debugging, a series of test cases, and installation of the system. Recommendations to further develop the Expert Radio System was made for maintenance of network, security and system upgrades. A user manual and system installation instructions were provided.

DECLARATION

I, **Honest Kudakwashe Manjombo,** hereby declare that I am the sole author of this dissertation. I authorize the **Midlands State University** to lend this dissertation to other institutions or individuals for the purpose of scholarly research.

Signature: …………………………….   Date: ………………………………..

APPROVAL

This dissertation, entitled **"Expert Radio System for Zimbabwe Broadcasting Holdings"** by **Honest K. Manjombo** meets the regulations governing the award of the degree of **BSc Honours Information Systems** of the **Midlands State University,** and is approved for its contribution to knowledge and literary presentation.

Supervisor's Signature: …………………………………………….

Date: …………………………………………………………….

ACKNOWLEDGEMENTS

My sincere gratitude is extended to the Almighty God for being with me during the course of this research. I also want to thank my supervisor, family and friends for their support and time devoted to make this research a success.

This path would not have been easy without you. May the Lord bless you.

DEDICATION

This research is dedicated to my family.

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LIST OF ACRONYMS

CAT   - Category

CCTV   - Closed-circuit Television

CD   - Compact Disk

DBMS   - Database Management System

DC   - Direct Current

DFD   - Data Flow Diagram

DJ   - Disk Jockey

DVD   - Digital Video Disk

DVR   - Digital Video Recorder

EER   - Enhanced Entity Relationship

ER   - Entity Relationship

ERS   - Expert Radio System

FM   - Frequency Modulation

GB   - Gigabyte

GUI   - Graphic User Interface

HP   - Hewlett Packard

ID   - Identity

IP   - Internet Protocol

ISP   - Internet Service Provider

LAN   - Local Area Network

LCD   - Liquid Crystal Display

NPV   - Net Present Value

PC   - Personal Computer

PERT   - Program Evaluation and Review Technique

PHP   - Hypertext Pre-processor

PIN   - Personal Identification Number

PK   - Primary Key

RAM   - Random Access Memory

ROI   - Return on Investment

ROM   - Read Only Memory

RW   - Rewriteable

SSD   - Solid State Drive

TB   - Terabyte

UTP   - Unshielded Twisted Pair

Wi-Fi   - Wireless Fidelity

ZBH   - Zimbabwe Broadcasting Holdings

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The Expert Radio System (ERS) for Zimbabwe Broadcasting Holdings is an online system that will allow listeners to schedule music and programs according their taste and preference. It offers a wide range of music moods to select from, to recommend and also schedule music that is locally available in the database. The ERS allows a user to listen to music in real-time, register user profiles, filter program content according to preference, publish listener advertisements, promote artist music, award royalties to most streamed music and programmes and recommend radio stations based on location. The concept of an expert radio is simple, the listener launches a web-based player or an android application which presents the user with a list of potential stations to listen to. This chapter outlines the background of study, problem definition and the aim. Objectives of the project are defined, instruments and methods to be used will be stated as well as the justification and rationale of the project.

1.2 BACKGROUND OF STUDY

Radio broadcasting in Southern Rhodesia commenced in the year 1933, up until 1941 when the earliest professional broadcasting centre was setup. Lusaka came to be the main location point for broadcasting radio signal to African listeners in Southern and Northern Rhodesia and Nyasaland, while Salisbury became the heart for transmitting radio signals to European listeners in the region. In 1950 and the years following, African programme content were gathered and directed to Lusaka for broadcast. 1951 saw the Southern Rhodesian government set up a commission headed by Hugh Green to give advice on how radio broadcasting was to be managed.

The main transmitters of ZBH are located in Harare, with others strategically distributed at locations in towns and cities all over the country. The principal director in the Ministry Of Media, Information and Publicity says coverage of television signal falls between 20 and 25 percent and 30 to 35 percent for radio signal. More so, the director of engineering and technical services at TransMedia, specifies that radio signal is still transmitted through telephone lines from source to receiver. This means that the use of optic fibre technology to transmit radio signal is in its early stages. This results in poor radio and television signal transmission.

Failure of ZBH to repair and restore broken down equipment especially in bad weather conditions has resulted in the reduction of radio coverage in some areas. This has seen the range covered by some stations go as little as 10 km, although the technology had been primarily designed to reach over 100 km. Hence the continued shift to internet-based stations where information can quickly and easily flow in both directions, the degree of potential listener interaction has not generally been fully utilized. The development of an ERS is capable of addressing issues to do with coverage and an increased listener population and interaction. Every listener to an ERS will possess certain qualities and characteristics. These qualities and characteristics will include choices such as favourite stations and programs, genres of music, artists and the era which they prefer.

1.2.1 Background of the Organisation

The Zimbabwe Broadcasting Holdings (ZBH) formerly known as Rhodesian Broadcasting Corporation came to being in the year 1980 at Independence. The 1957 Broadcasting Act saw ZBH gaining monopoly of broadcasting since the state has more control over its broadcasting. ZBH is wholly owned by the state and operates six radio stations namely, Power FM, Radio Zimbabwe, Khulumani FM, 95.8 Central Radio, Classics 263 and National FM all transmitting on short and medium wave.

Audio-visual data coming from remote broadcasting stations is sent to Harare studios through microwave links with injection points designated centres. Other cities and towns have microwave capabilities which are not utilised at the moment. Audio data is collected and sent through telephone lines to Harare headquarters studios for final broadcast.

1.2.2 Organisational Structure

An organisational structure shows how roles, responsibilities and power is assigned and coordinated in an organisation. It also defines how task allocation, direction of supervision and how information flows towards goal achievement in an organisation. In the figure below, the organisational structure of Zimbabwe Broadcasting Holdings is outlined.

Figure 1.1 Organogram of ZBH

1.2.3 Vision

- A leading Zimbabwean voice promoting Pan-African values locally and globally.

1.2.4 Mission Statement

- Produce high quality content that is innovative and commercially viable and projects the national voice in a Pan African perspective.

1.3 PROBLEM DEFINITION

i. Silence in presenting

An unexpected and sudden pause during presentation that is broadcast to listeners. This may be due to technical faults whereby voice signal is lost on air.

ii. Playing music of wildly varying characteristics.

Lack of uniformity in programmatic output of music selection. The listener has no control over choice of music and the listener may be pushed between different emotional positions, for example, calm song to energetic song.

iii. Song fading during playback.

The gradual reduction of volume and premature ending of a song before it has reached a natural end.

iv. Too many commercial advertisements interfering music playlists and programs.

A situation whereby too many adverts are broadcast in turn distracting listeners from enjoying music and programs.

v. Lack of program content filtering.

Listeners do not have the freedom to choose programs that they wish to listen to. They cannot eliminate, skip or schedule programs.

vi. Poor signal coverage.

A situation where some areas within the country do not receive radio signal due to lack of infrastructure.

1.4 AIM

To develop an Expert Radio System.

1.5 OBJECTIVES

The objectives of the Expert Radio System are:

- To filter program content according to profile.

- To award royalties to most streamed music and programs.

- To publish listener advertisements.

- To publish news online.

- To schedule music playlists according to listener's preference.

1.6 INSTRUMENTS AND METHODS

System implementation will span two different languages, Android and PHP. All components of the expert radio system are to be designed and tested on the instruments listed in the table below.

Table 1.1 Instruments

Instrument	Description
HP Elitebook 1040 G3, Intel Core i5-6300U CPU @ 2.40 GHz, 8GB RAM	A notebook with a 64-bit dual core 2.4GHz processor that is able to execute system development processes.
Android Studio	An IDE for developing Google's Android operating system and applications.
PHP	An easy to use, strong programming language with the ability to interact with databases on several platforms thereby providing for web-based administration.
MySQLite database.	A relational DBMS contained in a C programming library.
Microsoft Office 2016	An office suite of productivity applications that will be used during documentation of project progress.

The reasons for the choice of languages is discussed in the sections for each component, but it should be noted that the use of more than one language demonstrates flexibility in the project's design, allowing developers of any language to build a component for the system.

1.7 JUSTIFICATION AND RATIONALE

The Expert Radio System offers many advantages over other current conventional radio channels in Zimbabwe which are:

- A wide collection of radio stations to pick from.

- Expert radio compromises a variety of music categories, in turn providing a bit of options for every generation and allowing a listener to match music playlist with mood.

- Low cost of running an internet radio as compared to a conventional radio. This means that the ERS makes use of available infrastructure unlike setting up infrastructure only for radio.

- Commercials that frequently interrupt music playlists on live radio airings have a tendency to bore listeners. The use of digital advertisements in an ERS allows the listener to listen to music and read advertisements without audio interruption.

- Listeners' access to the web will not be limited if they have the corrected gadgets to use since the web is all over and access to internet radio is not limited.

- Internet radio broadcasting is not vulnerable to signal noise and distortion therefore delivering flawless audio compared to FM radio signals

- Online radio stations allows the broadcaster to track the number of listeners streaming their station at some precise moment. Statistics gathered can be used to adjust and improve the radio station service.

- Expert radio relies on self-censorship, meaning it only broadcasts what you want to hear whereas traditional radio relies on the presenter's choice.

- Listener subscriptions and advertising revenue will add to the income received by ZBH.

1.8 CONCLUSION

This chapter has shed light to what the researcher seeks to achieve through the background of study where all reasons to development were outlined. An introduction to the aim of the project was highlighted where objectives of the project were set. The rationale and importance and justification of the project was stressed. The next phase is planning and it covers the business value that will accrue from the ERS, feasibility study, risk analysis, stakeholder's analysis and a clear project work plan.

CHAPTER 2: PLANNING PHASE

2.1 INTRODUCTION

Project planning narrates to the use of schedules to plan and later give reports on progress within the ERS development environment, Kerzner (2003). The business value that will accrue from the use of the ERS are going to be outlined. A feasibility study is going to be undertaken to determine whether the system can be successfully implemented. Risk analysis will be done to uncover all potential risks and outline their counter measures. Stakeholder analysis will be done to measure the level of interest and expertise of internal and external stakeholders. A work plan will be drafted to show the duration of the project with the use of the Gantt chart, PERT and Critical Path Method.

2.2 BUSINESS VALUE

Business value are all the forms of value that determine the direction of an organisation in the long run. It grows the idea of worth of an organisation further than monetary value to embrace other forms of value Sward, David (2006). Business value can also be qualitative goals that an organisation seeks to achieve which are generated by a commitment to high corporate values. ZBH's business values are listed below:

- Ubuntu

Sharing of content that confer humanness, good relations in which society share an approach to life exhibiting harmony to others and care about each other's quality of life.

- Competitiveness

The broadcasting of content and offer of services that meet or exceed the quality standards of other competing broadcasting organisations.

- Innovation

The production and broadcasting of new and improved content through the adoption of new processes and technologies.

- Creativity

The ability to go beyond traditional ideas and methods in turn creating new meaningful ideas that reflect originality.

- Stakeholder satisfaction

ZBH seeks to offer content that meets stakeholder perceptions and the results are gathered by taking polls that rate broadcast content on a numeric scale.

- Quality

The provision of products and services that are non-inferior and suitable for its intended audience and also satisfying expectations.

- Professionalism

The conduct, aims and qualities upheld by ZBH in broadcasting and engaging stakeholders.

- Accountability

Corporate accountability relates to being answerable to all stakeholders for actions and results that deviate from stated goals and values.

2.3 FEASIBILITY ANALYSIS

Feasibility analysis aims to disclose strong point and weaknesses in the current system, breaks, and pressures present in the surroundings and it outlines the assets vital to carry the project through, Georgakellos et. al (2009). This analysis helps management in deciding on whether the proposed project should continue or not. Technical, economic, social and operational feasibility will be measured.

2.3.1 Technical Feasibility

Technical feasibility focuses on measuring the likelihood of successfully completing the project basing on the human knowledge, software requirements, hardware requirements and availability.

2.3.1.1 Human Requirements

The developer is evaluated based on knowledge of the development language and users of the system are evaluated based on knowledge of how the system will operate.

Table 2.1 Technical Expertise of Developer and Users

Description	Knowledge	Comment
Developer	Yes	The developer has enough knowledge in software development. Thus, he will design and write code for the system. A few references will be made and it will be highlighted in the text.
Users	No	The users of the system do not have knowledge on how to operate the system to be developed. Therefore, the users of the system will be trained.

The developer has enough knowledge in system development and there is no need to outsource the project. Users of the system will be trained once necessary equipment and software has been secured.

2.3.1.2 Software Requirements

Software to be used during development is evaluated based on availability and compatibility.

Table 2.2 Software Requirements

Description	Availability	Comment
Avast Antivirus	Yes	The organisation will use the antivirus for computer security against virus and malware attacks.
B4 Android	Yes	A development environment for the system android application.
Xinox Software's JCreator Pro 3.50	Yes	The developer will use this software package to design the system graphics.
Java 1.42	Yes	The developer will use the software for system development
Microsoft Office 2016	No	This software package will be purchased before commencement of system development.
MySQLite Database	Yes	The developer will use the software package to develop database for the system.
ShoutCast Server	No	Server subscriptions will be paid in advance prior to system development and launch.

Unavailable software will be purchased before commencing with system development.

2.3.1.3 Hardware Requirements

Hardware to be used during development is evaluated based on availability and compatibility.

Table 2.3 Hardware requirements

Description	Availability	Comment
HP Server	No	The server will be used to run and host the ERS.
10 TB SSD	No	Storage drives will be acquired to enable storage of media files.
Intel™ Core® i5-6300U CPU @ 2.40 GHz Processor	Yes	The organisation will use available processor on the current computer for development.
DVD-RW ROM	No	The best DVD ROM for use during development will be purchased.
Local Area Network	Yes	This network infrastructure will be used for connectivity between devices.
External Hard Drive 500GB	Yes	The drive will be used for backup during system development.
Internet Router	Yes	The router will be used during development for internet connectivity.
UTP CAT 5.e Cables	Yes	The cables will be used for networking.
Printer	Yes	The organisation will use the available printer.

Unavailable hardware will be purchased before commencing with system development.

2.3.2 Economic Feasibility

Economic feasibility focuses on measuring the likelihood of successfully completing the project basing on the estimation of the Cost Benefit Analysis, Return on Investment, project Payback period and the Net Present Value.

2.3.2.1 Cost Benefit Analysis

It is an evaluation of the overheads of development and maintenance of the system with the estimated benefits from the use of the system over a given period. Cost of development and operation, tangible and intangible benefits are going to be quantified in monetary value.

2.3.2.2 Development Costs

These costs will be incurred during development of the ERS.

Table 2.4 Development Costs

Description	COST ($)
10 TB SSD	13000.00
HP Server DL380 Gen 9	2700.00
ShoutCast Server Subscription per Month	7.00
Development Team	10000.00
Microsoft Office 2016	150.00
Windows 10 Pro Operating System	250.00
DVD-RW ROM	50.00
Transport and Accommodation	900.00
Stationery	50.00
TOTAL COSTS	**27107.00**

2.3.2.3 Operation Costs

These are projected costs to be sustained once the ERS has been fully implemented.

Table 2.5 Operation Costs

DESCRIPTION	COST ($)
User training	5000.00
Security	1000.00
Maintenance costs	5000.00
Internet	24000.00
Analyst allowance	4000.00
TOTAL COSTS	**39000.00**

2.3.2.4 Tangible Benefits

These are benefits that will realised after the system has been implemented and they can be measured in monetary value.

Table 2.6 Tangible Benefits

DESCRIPTION	COST ($)
Advertisements income	10500.00
Reduced wages	18000.00
Wide coverage	500.00
Reduced office space	3000.00
Listener satisfaction	600.00
TOTAL COSTS	**32600.00**

2.3.2.5 Intangible Benefits

These are paybacks that cannot be expressed in monetary terms but improves productivity of processes and personnel.

- Listeners get to listen to their music through playlists.

- Integration of business processes improving efficiency.

Table 2.7 Cost Benefit Analysis

YEAR	0	1	2	3
Benefits	($)	($)	($)	($)
Tangible benefits	32600.00	39120.00	34000.00	36000.00
Listener subscription	2000.00	54412.00	66494.00	79793.00
Advertising income		13603.00	16623.00	19950.00
Total Benefits	**34600.00**	**107135.00**	**117117.00**	**135743.00**
Development Costs				
Additional hardware	16157.00	10000.00	10000.00	10000.00
Technical Labour	10000.00	0	0	0
Transport and Accommodation	900.00	0	0	0
Stationery	50.00	0	0	0
Operation Costs				
User training	5000.00	7000.00	7000.00	7000.00
Security	1000.00	1500.00	1500.00	1500.00
Analyst allowance	4000.00	5000.00	5000.00	5000.00
Internet	24000.00	24000.00	24000.00	24000.00
ShoutCast Subscription	100.00	200.00	200.00	200.00
Maintenance costs	5000.00	7000.00	10000.00	10000.00
Total Costs	**66307.00**	**54700.00**	**57700.00**	**57700.00**
Net Benefit	**(31507.00)**	**49435.00**	**59417.00**	**78043.00**

In Table 2.7 the ERS is projected to retain a positive Net Benefit of **$78043.00**. This means that development can commence basing on the cost benefit analysis.

Table 2.8 Net Benefit for ZBH

Year	Benefits ($)
0	(31507.00)
1	49435.00
2	59417.00
3	78043.00
Total Benefits	**155388.00**

2.3.2.6 Net Profit

The net profit of a project is the difference between total income and total costs incurred during implementation and over the life of a project.

Net Profit $=$ Total Benefit – Total Cost

$=$ $155388.00 - $66307.00

$=$ **$89081.00**

A negative benefit of **$31507.00** is realised in the year of implementation and a rise in benefits in the years that follow leading to a total benefit of **$155388.00** and a net profit of **$89081.00**.

2.3.2.7 Return on Investment

ROI provides a comparison of the net profitability of the ERS in light to the investment required.

Return on Investment $=$ $\dfrac{\text{Average Net Profit} \times 100}{\text{Total Investment}}$

Total average annual profit $=$ $\dfrac{89081.00}{3}$

$=$ **$29693.67**

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Therefore, ROI   = $\dfrac{29693.67}{66307.00}$ x 100

          =   **44.78%**

The project shows a **44.78%** return on investment. This means that the initial investment gains are more favourable compared to the costs and this also means that the investment is also efficient in providing returns.

2.3.2.8 Payback Period

Payback period is the turnaround period of paying back the initial investment of a project.

Payback   =   Year 0 + Year 1 + Year 2 * (10/12)

          =   -$31507.00 + $49435.00 + ($59417.00 * 10/12)

          =   **$67438.00**

The investment put into the system development will be paid back within a period of **1 year 10 months**. This means that system revenue will break-even with cost of development at **$67438.00**.

2.3.2.9 Net Present Value

NPV is an estimation method that takes into account viability of the project and timing of the cash flows that are produced. Net Present Value will be calculated using a discount factor of 15% per annum.

Discount Factor   = $\dfrac{1}{(1 + r) \wedge t}$

Where **r** = discount rate and **t** = time;

Present Value = Value in Year x Discount Factor;

Net Present Value = Total of Present Value.

Table 2.9 Net Present Value

Year	Value in Year	Discount Factor	Present Value($)
0	(31507.00)	1	(31507.00)
1	49435.00	0.87	43008.45
2	59417.00	0.76	45156.92
3	78043.00	0.66	51508.38
Net Present Value			**108166.75**

The project indicates a positive net present value of **$108166.75** that exceeds the estimated costs of **$66307.00** to be incurred during development and implementation.

2.3.3 Social Feasibility

Social feasibility focuses on the impacts of the ERS on the ZBH's employees and users. After full implementation of the system, there will be:

➢ A boost in employee morale due to an ease of doing work.

➢ Lower listener to DJ interaction affording DJs extra time to attend to other programs and duties that need attention.

➢ Listener will be highly responsible for the content they listen to through the use of profiles.

➢ Some employees who feel that they may lose their jobs since most system functions will become automated will be trained with new skills.

Upon realising the social impacts of the system, management will engage all parties involved so that they appreciate what the system has to offer.

2.3.4 Operational Feasibility

A comparison of the current system and the expected operation of the proposed system is made in light of the scope definition, requirements and objectives stated in the previous phase.

Table 2.10 Current vs. Proposed System

Description	Current System	Proposed System
Throughput	Slow throughput dependant on a DJ's speed of searching music and the amount of music requests in queue.	Quick throughput due to listener based music selection and playback.
Request turnaround speed	Slow as it depends on DJ's dexterity.	Quick since playlist selection depends on listener and music is stored on the server.
Signal Coverage	Poor coverage dependant on radio transmitters located at fixed points.	Excellent coverage dependent on ISP signal availability. i.e. Mobile Operators, Wi-Fi.
Integration of radio functions	Integrates a few radio functions	All radio functions will be integrated.
Achievement of objectives	Objectives are realised but not effectively	Objectives are realised effectively.

The proposed system shows an improvement in delivery and listener satisfaction as compared to the current system.

The economic feasibility has analysed the project financially and all results show a positive outcome, social feasibility has uncovered system threats to the organisation's employees and operational feasibility has given a comparison into what the new system has to offer if successfully implemented. All feasibility studies that have been carried out show that the system can be developed.

2.4 RISK ANALYSIS

Potential risks that may affect the successful development and implementation of this project will be analysed and counter measures will be put in place as shown in the table below.

Table 2.11 Potential Risks

Potential Risk	Solution
Inadequate specifications	Specifications should be well understood by the development team before the project can commence to avoid infinite development time.
Time frame constraints	Resources for this project must be set aside and be readily available. Clear attainable targets should be set.
Budget constraints	A comprehensive estimation of all vital resources for this project will be done before system development begins.
Staff turnover before end of project	Clearly defined roles and new processes to be adopted should be communicated to all employees, and for those affected notice should be given in time.
Lack of developer technical expertise	The organisation will contract developers with demonstrated technical expertise during the course of system development. Training ought to be done to equip them with adequate knowledge if they are not well experienced.
Employee sabotage	Personnel will be educated about the benefits accompanying implementation of the new system and adequate training has to be conducted to empower them.

2.5 STAKEHOLDER ANALYSIS

Listeners, employees, management and the development team form a part of the stakeholders. Their expectations on how the system should work will be pointed out.

Table 2.12 Stakeholder Expectations

Stakeholder	Expectations/Interests
Listeners	They are curious on the delivery of a new technology that allows them to personalize their radio experience. Some of them wish for the system to be available on mobile devices as an application.
Employees	Show interest and expect the system to work with minimum error as it will ease part of their job.
Management	They are interested in the adoption of new technology and for what it is worth, they are expecting to implement the system before the deadline.
Development Team	It is a new experience for them, it excites them and they are set to deliver the system for implementation within the deadline.

2.6 WORK PLAN

A work plan outlines a set of goals and processes that a team needs to accomplish, and also offers the reader a better understanding of the project scope. ERS project tasks are identified, and time frame is set for each activity and the project consists of 6 phases listed in the table below.

Table 2.13 Breakdown of Tasks

TASK	ACTIVITY	DESCRIPTION	DATES	DURATION (WEEKS)
Phase 1	A	Project Proposal	12-23 February 2018	2
Phase 2	B	Feasibility and Planning	12-30 March 2018	3
Phase 3	C	Analysis	03-29 June 2018	4
Phase 4	D	Design	23 Jul – 14 Sept 2018	8
Phase 5	E	Implementation	01-26 October 2018	4
Phase 6	F	Evaluation and Maintenance	27 October 2018 - Ongoing	On-going

2.6.1 Gantt chart

A Gantt chart shows a visual view of project tasks and activities scheduled over a period of time by day, week, month or year.

Table 2.14 Gantt chart

TASK/WEEK	2	4	6	8	10	12	14	16	18	20	22
Documentation	█	█	█	█	█	█	█	█	█	█	█
Project proposal	█										
Planning		█	█								
Analysis				█	█						
Design						█	█	█	█		
Implementation										█	█
Maintenance										█	█

2.6.2 Program Evaluation and Review Technique (PERT)

PERT is a statistical tool used to analyze and present project tasks involved on a network model that allows for randomness in activity completion times and shows the critical path of a project before development commences.
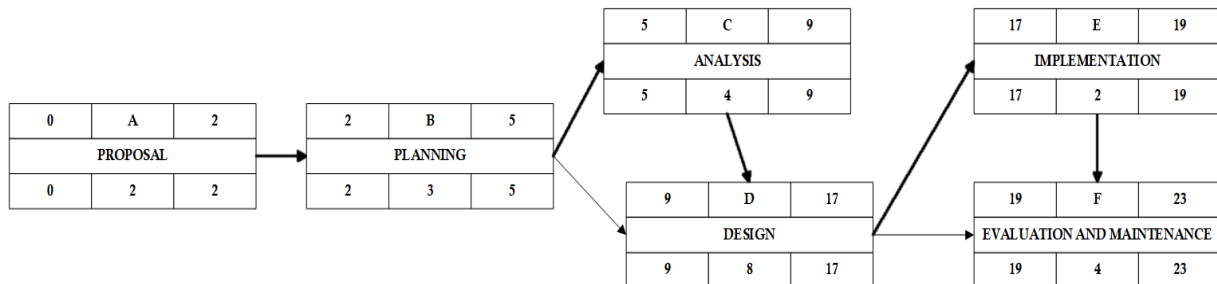
Figure 2.1 PERT

According to PERT the critical path is: **START => A => B => C => D => E => F** and **START => A => B => D => E => F**

2.7 CONCLUSION

The planning phase has shed light into what the researcher pursues to achieve. The business value outlined corporate values of the organisation. Feasibility study was successful and yielded positive results justifying development and implementation of the project. Stakeholder's analysis defined the users of the system and their sentiment towards this development. Potential risks were highlighted and their contingency actions were put in place. A work plan was drafted listing the activities and a breakdown of tasks to be performed. The next phase is Analysis which looks at the information gathering tools that were used, analysis of the existing system, analysis of data, weaknesses in the current system, evaluation of alternatives to the current system and requirements analysis for development.

CHAPTER 3: ANALYSIS PHASE

3.1 INTRODUCTION

This phase gives a clear outline of the current system through analysis. Information gathering tools such as interviews, questionnaires and observations will be used for data collection. Data collected will then be analysed. Data flow in the current system will be shown using a context and data flow diagram. Weaknesses in the current system will be outlined, evaluation of alternatives will be done and a requirements analysis will be drafted outlining the functional and non-functional aspects of the ERS.

3.2 INFORMATION GATHERING METHODOLOGIES

Information gathering is a process of acquiring data through the use of different methodologies. In order to gather stakeholder's views observations, questionnaires, interviews were conducted so as to understand how the current system works. A clear review for each method used is shown to highlight its advantages and disadvantages.

3.2.1 Questionnaires

The researcher used structured questionnaires which provided both tick boxes and free response sections to gather data. Questionnaires were handed to individuals and some were sent through the email to respondents. Some advantages and disadvantages of questionnaires are listed below as administered during the research.

Advantages

➢ Potential information was collected on a large portion of a group in a short period of time and at a reasonably cost effective way.

➢ Comprehensive data on the impact of the current system was collected due to the uniformity of the questions asked in the questionnaire.

➢ Statistics tests were made possible due to the nature of data that was being collected.

Disadvantages

➢ Open ended questions created huge volumes of information that also took a lengthy times to compile and analyse.

> Some people were not keen to respond to questions because they felt that they will not benefit from answering back.

Interviews

Interviews are a method of information gathering from a single person or a group of people through a structured and systematic format. Interviews can occur between two or more people, where one is the interviewer and the latter is the interviewee. The researcher conducted one-on-one interviews, using structured interview questions as well as unstructured questions where clarification was needed. The advantages and disadvantages related to interviews as an information collection methodology during research are discussed below.

Advantages

> Interviews gave the researcher specific guidelines in line with the current system which allowed accurate information to be collected.

> Interviews were done face to face and the interviewer could see the gestures and knowhow emanating from the interviewee's way of responding.

> Specific data related to the research was easy to obtain by asking further questions to gain more in-depth information.

> Interviews were objective as responses were gathered in a standardised manner using pre-written guideline questions.

Disadvantages

> Interviews were time consuming as the interviewer managed to interview one person at a time.

> Limited amount of data collected may not reflect the views of the wider population.

Observations

Observations are a form of information gathering technique where the researcher observes what people actually do and how the current system works. The researcher used structured

checklists which allow for documentation of issues that emerged from the observation. During fact finding the following observations were made:

Advantages:

➢ The experience gave the researcher first-hand information as events unfolded.

➢ Observations provided access to backstage information that is richly detailed.

➢ Provided opportunities for viewing and participating in unscheduled events.

Disadvantages:

➢ Observations were time consuming in some cases where one has to travel from one geographic location to the next.

➢ Some people acted accordingly because they knew that they were being monitored.

The approaches used provided information on the current system limitations and requirements needed to develop a new system. Template sample documents for interviews, questionnaires and observations are found in *Appendix D*.

3.3 ANALYSIS OF EXISTING SYSTEM

The processes involved in radio broadcasting system will be analysed based on the findings gathered in the previous section. The sections to be covered are News Broadcasting, Show Broadcasting, Advertising, Music Engineering and Engineering and Technical Services.

3.3.1 Show Broadcasting

ZBH broadcasts different radio programmes namely: News, Dialogs, and Sports. These programmes are broadcast on live radio. Dialogs include those programs where the DJs allow listeners to join and take part into a debate or informative show through phone calls or social media. Some of these programs may not be suitable for a certain group of listeners but there are no systems of restricting them from taking part and listening.

3.3.2 Music Engineering

Music playlists are created by the DJ according to their taste and from the requests made by listeners. These playlists mostly contain different types of music genres that are played

randomly which may in turn jolt a listener from one mood to another making the whole music experience confusing. In the current system the user is not empowered to create their own playlists so that they listen to what they want.

3.3.3 Advertising

Advertising play a vital role in revenue generation for ZBH other than radio licensing. Besides revenue generation, advertising sensitizes listeners on new products and services provided by certain companies and also the Broadcasting Corporation itself. In the current system advertising mostly interferes with music playlists and there is no way to prevent advertisements from popping up during programmes.

3.3.4 Engineering and Technical Services

Radio signal transmission starts from the broadcasting console, which then forwards content to the audio for processing through an audio processor. Audio signals are then sent to the modulator which converts the signals into FM Radio signals. These signals are then sent to the antenna for transmission and lastly the listener receives the signal through the FM Radio receiver where the listener will hear the content.

3.4 PROCESS ANALYSIS

In this section, the current system processes will be analysed. Entities will be listed, and processes transforming input data to output information will be highlighted.

Table 3.1 Inputs, Processes and Outputs

Entity	Inputs	Processes	Outputs
Listener	Music requests Listener subscription Survey information	Music playlist generation Subscription billing Vote allocation	Music playback Subscription details Awards allocation
Disc Jockey	Music requests Listener views.	Music search and playback Show topic evaluation.	Music playlists playback.
Engineering and Technical Services	Broadcast data. Audio format data. Signal data. Programme details.	Audio engineering. Signal modulation. Signal transmission. Programme time slotting.	FM Radio signal transmission. Programme line up.
Accounts	Subscriber details Award request details	Update subscriber account Update artist account	Subscriber invoice Artist payment invoice

3.5 DATA ANALYSIS

Data flowing in the current system is analysed and the processes transforming this data are represented diagrammatically through a Context Diagram and a Data Flow Diagram.

3.5.1 Context Diagram

A context diagram is a high level view of the ERS that defines system boundaries showing entities that interact with it. Interaction between external entities and the system is shown as inputs and outputs.
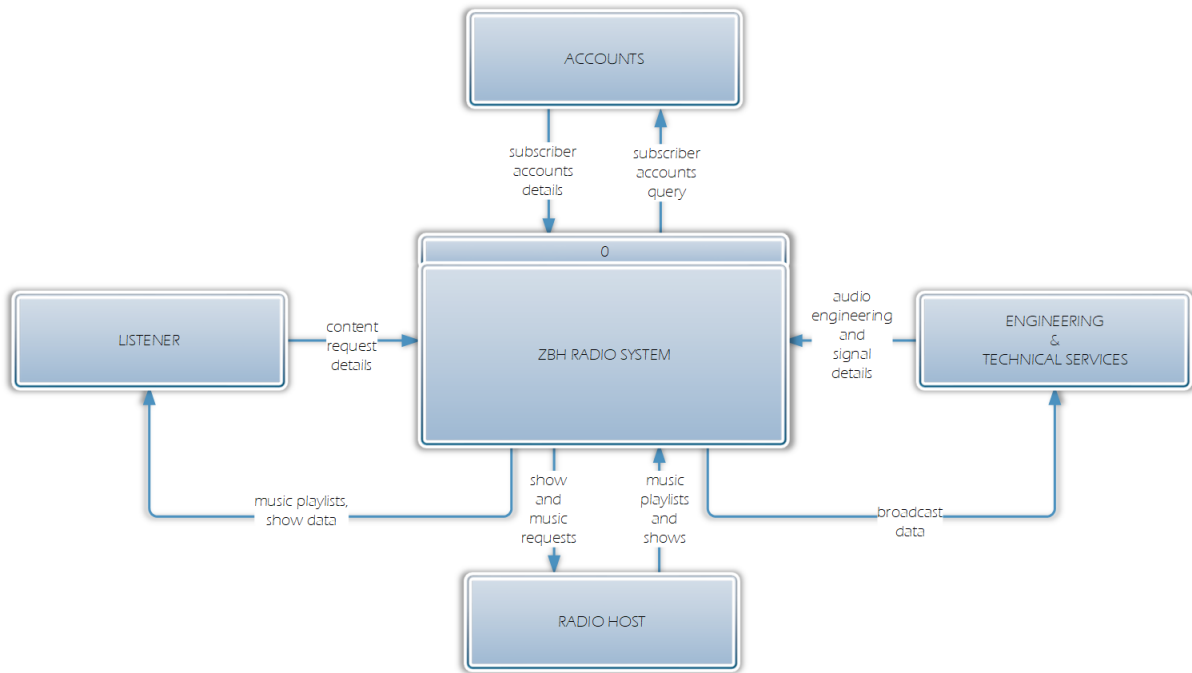
Fig 3.1 Context Diagram of the Current System

Key for the Context Diagram

Data Flow
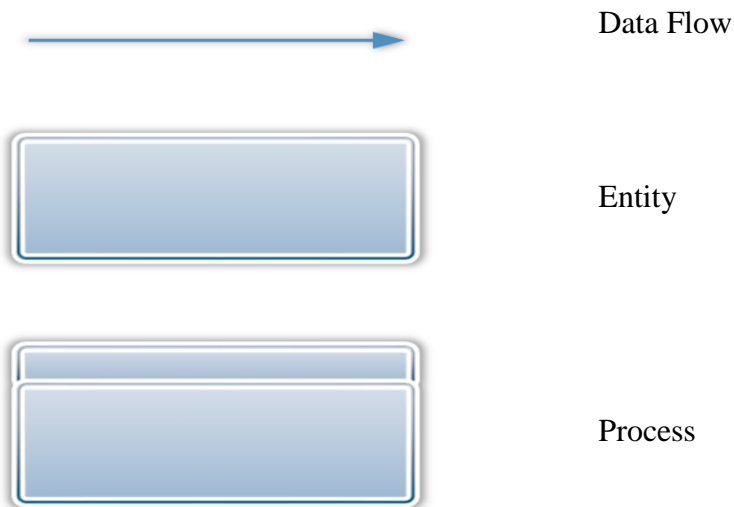
Entity

Process

3.5.2 Data Flow Diagram

A data flow diagram shows how information flows through the ERS. It includes entities, data input, processes, output and various sub processes that the data moves through. DFDs are used as a pre-development step of creating a system overview without going into greater detail.
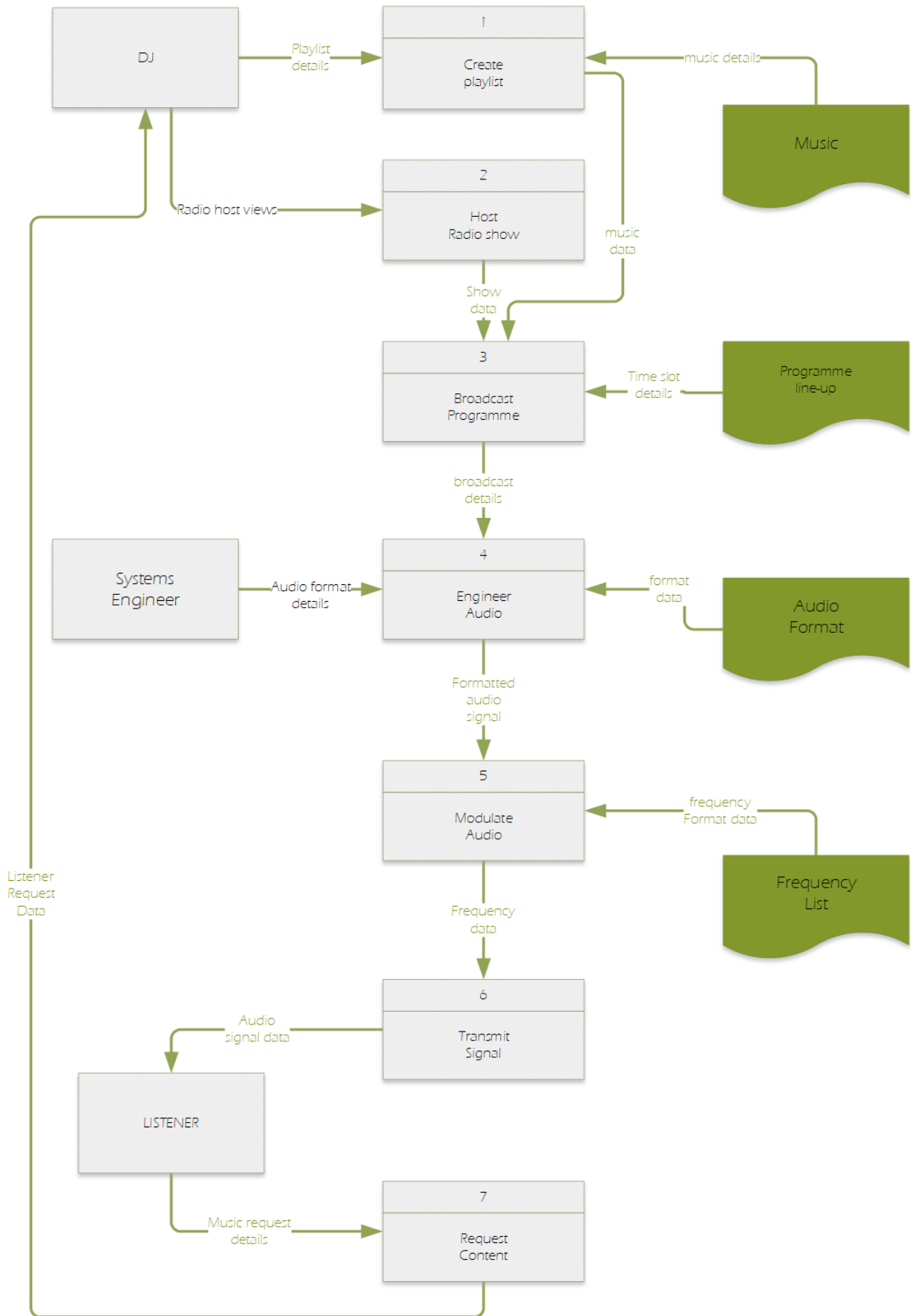
Fig 3.2 Data Flow Diagram of the Current System

Key for the Data Flow Diagram

———————▶	Data Flow
	Entity
	Process
	Data Store
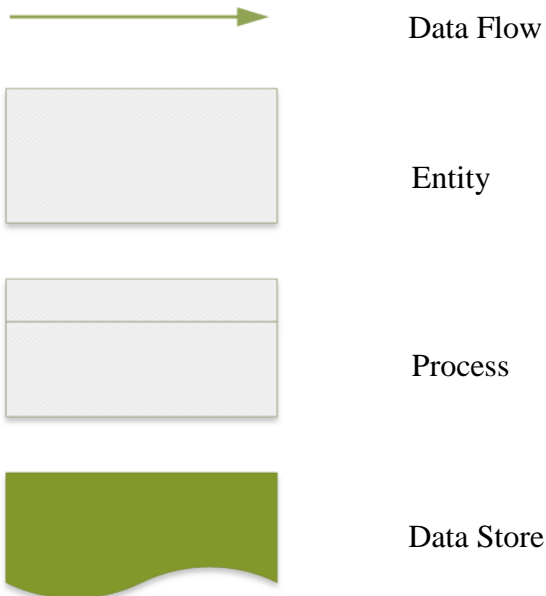
3.6 WEAKNESSES OF CURRENT SYSTEM

The following weaknesses in the current system were identified:

➢ There is little or no radio signal is some parts of the country.

➢ Requests turnaround time depends on the DJ's work dexterity.

➢ Program content in some shows is not filtered.

➢ Music is being scheduled according to the DJ's preference.

➢ There is low subscription payment for radio services.

➢ Award presentation and vote tallying depends on studio team counting efforts.

3.7 EVALUATE ALTERNATIVES

Alternatives to system development are analysed taking into consideration the feasibility study that has already been carried out in the planning phase. The three alternatives to be analysed answer the question whether the system should be outsourced, improved or developed in-house.

3.7.1 Outsource

Outsourcing refers to the assignment of an independent software development house to deliver a system. This entails that the project team from the external company works with the project planning team and users from the contracting organisation to gather objectives. Some advantages and disadvantages of outsourcing are outlined.

Advantages:

➢ More time is allocated in testing and evaluating delivered system prototypes before actual implementation.

➢ Risk of system failure and repair is the contractor's side.

Why not outsource:

➢ System source code remains with the contractor.

➢ The contractor may not understand system objectives leading to the delivery of a malfunctioning system.

➢ Updates to the system may become expensive as it depends on the contractor.

➢ A lot of revenue may be lost in licensing costs.

➢ The system may not be modifiable to suit growing organisation needs.

3.7.2 Improvement

Improvement is a process of making the processes better by altering or employing new strategies to the existing processes yet not changing many system processes. This also implies that all the problems noted, will not be fully solved.

Advantages:

➢ The system comfortably fits within the existing infrastructure.

➢ There is no need for further training of users.

➢ There are no further costs incurred in improving this system.

➢ Most of the current processes will remain the same and will rely on DJ input.

Why not improve:

➢ Requires more storage space.

➢ There is no adequate security of data.

➢ Errors will not be reduced.

➢ It is hard to trace fowl activities in handwritten documents.

3.7.3 Development

Development of the system is done by a development team and users who belong to the same organisations and the development process is influenced by the existing infrastructure. Most of the methodologies and techniques used are dictated by local standards and not by the project team leader.

Advantages:

➢ The system can be tailor made to suit the problem at hand.

➢ In-house system developers have adequate information pertaining the needs of stakeholders involved in the crafting of the system.

➢ System functionality redundancy is minimized.

➢ Source code remains with the organization.

➢ The system can be designed to easily fit and interact with currently available systems.

➢ System prototype review time is minimized because the users are locally available.

➢ Cost of hiring a developer maybe directed to other matters that need attention.

➢ The organisation already has a developer and the infrastructure to develop the system.

Disadvantages:

➢ System development consumes more time of productivity.

➢ The system has to be tried, tested and monitored, thus affecting normal operations of the organisation.

➢ The developer may need extra training in the language to be used in system development.

N.B * After analysing all alternatives, in-house software development is the best choice as it unifies all departments that are going to be affected in bringing out a stable system.

3.8 REQUIREMENTS ANALYSIS

Requirement analysis is going to highlight what the proposed system is supposed to deliver once it is fully implemented. This part of analysis focuses on functional and non-functional requirements.

3.8.1 Functional Requirements

The system will offer the following functions and services to effectively meet objectives. A case diagram will illustrate how external entities will interact with the ERS.

Table 3.2 Functional requirements

Functional requirements	Description
Listener profiling	listeners will be able to create user accounts to login.
Subscription payments	listeners will be able to pay for the radio subscriptions online.
Royalty awards	the system will compile most played music statistics that will be used to award royalties to artistes.
Content filtering	the system will filter sensitive content from illegible listeners.
Listener-specific playlist	the system will create a music playlist that suits listener's taste and preference.

3.8.2 Case Diagram

The case diagram categorizes the different types of users in the ERS and the user's interaction with the system. It displays the connection amongst users and the different use cases in which they are involved.
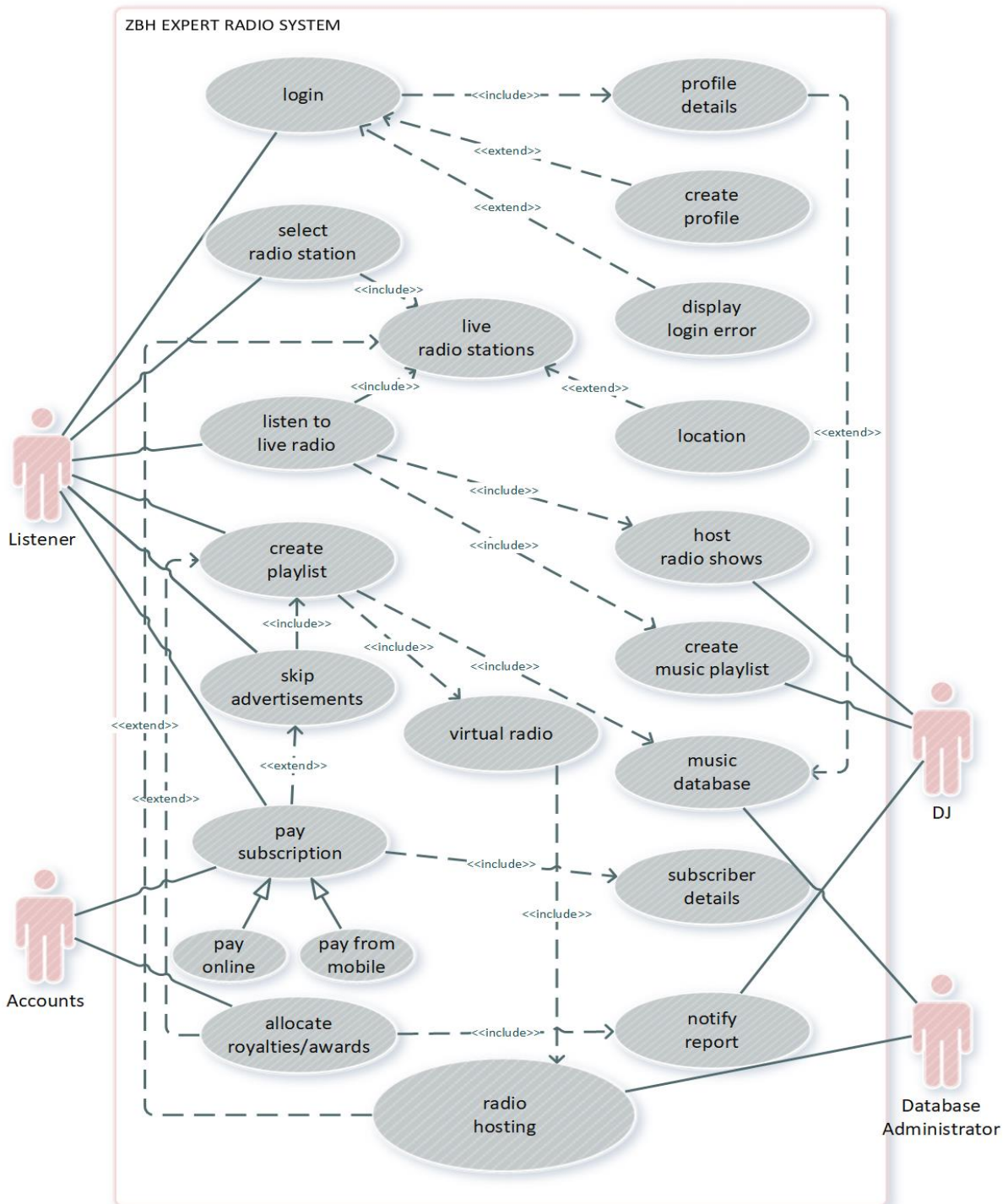
Fig 3.3 ERS Case Diagram

3.8.3 Non-functional requirements

These are system requirements needed during development to meet system objectives. ERS non-functional requirements include the Graphic User Interface, Error handling and throughput. Constraints related to these requirements will be highlighted.

Table 3.3 Non-functional requirements

Non-functional requirement	Constraints
Graphic User Interface	It is going to be difficult to come up with a design that will be simple and easy to understand yet encompassing all system functionality.
Error handling	The system must have error handling, verification and validation algorithms when creating listener profiles, and aligning profile details to the correct listener.
Throughput	Listener profile information and music files must be readily available when needed they are needed. Request turnaround time and radio signal transmission must be quick.

3.9 CONCLUSION

This phase defined all tasks in the existing system and presented an understanding of the inputs, processes and output. Information gathering tools were evaluated and provided positive feedback. Weaknesses in the current system were outlined and alternatives were evaluated where developing an in house system was found justifiable. A context diagram was shown listing all activities in the current system and a data flow diagram was drawn to show process data flows. Requirements analysis noted the specific functions of the system and how they will be employed, non-functional requirements showed other system functions not related to the goal of this project. Analysis phase was successful, the next phase is design which looks at system design, drawing the context diagram and DFD of the ERS, an architectural design, physical design, database design, interface design, pseudo code and security design of the ERS.

CHAPTER 4: DESIGN PHASE

4.1 INTRODUCTION

Software design states all of the activities involved in conceptualizing, framing, implementing, commissioning and modifying existing systems, Ralph and Wand (2009). The design phase gives a detailed outline of the proposed system. In this phase, a context diagram and data flow diagram will be drawn to show the flow of data. Logical arrangement of system components will be shown in the architectural design while the physical design gives an understanding of the hardware and software to be employed. The description and relationships between system entities will be presented through the database design. Interface design presents what the main menu, sub-menu, input and output form designs of the system will look like once developed. A pseudo code will be written and physical, network and operational security designs will be explained.

4.2 SYSTEM DESIGN

System design defines the architecture, modules, interfaces and data that is used in a system to satisfy requirements, Bentley et. al. (2004). A clear understanding of the current system has been shown in the analysis phase and all functionality to be incorporated has been highlighted. Improvement of the current system will span interface design, additional system input, processes and system outputs that will be discussed below.

4.2.1 System Inputs

Inputs encompasses all data that is put into the system for processing to provide output. These inputs will be listed in the table below.

Table 4.1 System Inputs

System Inputs	Description
User login details	Includes details of listeners and that of organisation employees that will be used to create user profiles.
Radio station ID	A unique ID that is used to identify a radio station.
Location details	Listener's current geographical data that is used to search for available radio stations.
Playlist details	Contains a list of music that a user to listen to from the virtual radio or the list of music a DJ wants to play.
Subscription details	Details of the listener, amount to be paid and the medium of payment to be used.

4.2.2 System Processes

A process is an instance of a program that is in execution stage and it also contains activity and program code. ERS processes are listed below.

Table 4.2 Processes

System Processes	Description
Profile registration	Capture, validation and safe storage of user data in the system database.
Location verification	Analyses location data and looks up and presents a list of available radio stations in geographical area.
Royalty allocation	Collects data on most played music, then tallies the artist name and number of votes and streams attached to a song/ album.
Subscription payment	Payment of a listener license is initiated through a safe online payment gateway.
Radio hosting	Involves broadcasting of live and virtual radio signals through the internet medium.

4.2.3 System Outputs

System output refers to the information produced by a system process from an input. ERS output are listed in the table below.

Table 4.3 System Outputs

System Outputs	Description
User profile	New user profiles are created.
System alerts	System alerts will pop up when a user provides invalid login details.
Radio station list	A list of available live radio stations is shown.
Music playlist	Music list is returned for playback.
Subscriber details	Details of subscription made is returned.
Royalties report	Contains a list of most played music and artist name that qualify for royalties awards.
Radio stream signal	A stream of digital internet data that enables listeners and the system to interact simultaneously.

4.2.4 CONTEXT DIAGRAM OF THE PROPOSED SYSTEM

A context diagram is a high level view of the ERS that defines system boundaries showing entities that interact with it. Interaction between external entities and the system is shown as inputs and outputs. The aim is to produce a formal description of all context information present in the surroundings of the system. The context diagram also simplifies the task of creating context aware systems, Guelfi (2006).
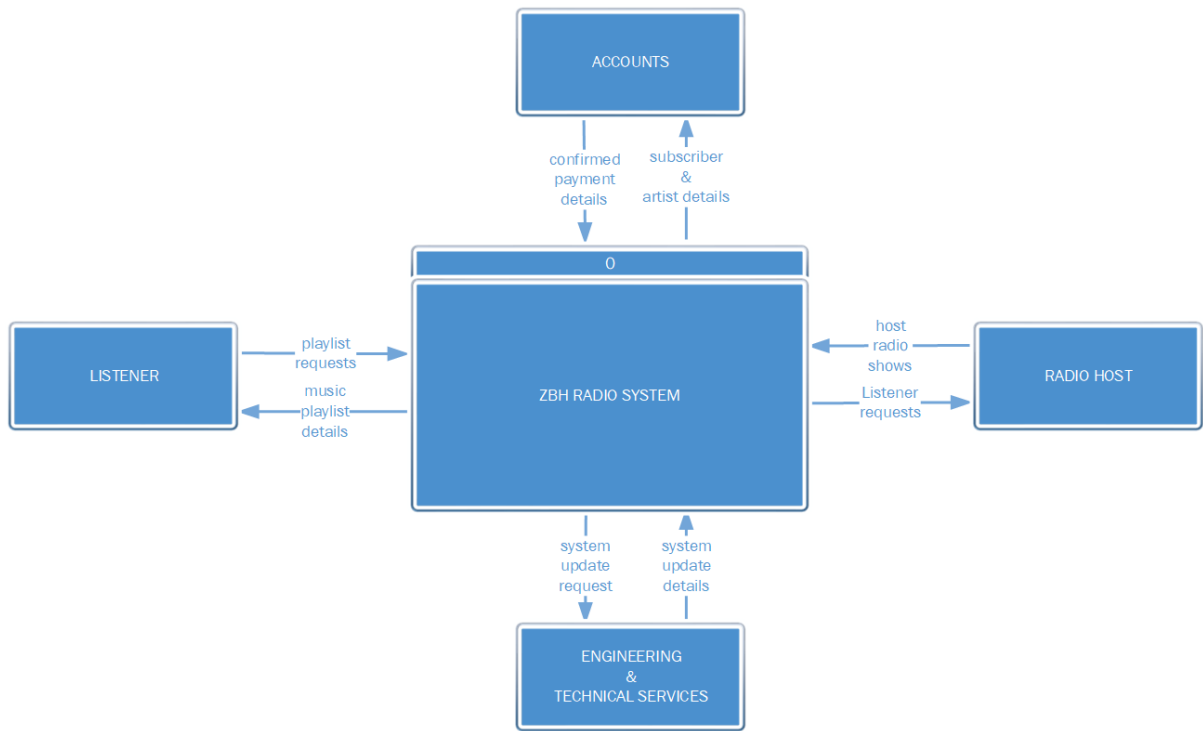
Fig 4.1 Context Diagram

Key for the Context Diagram

 Data flow
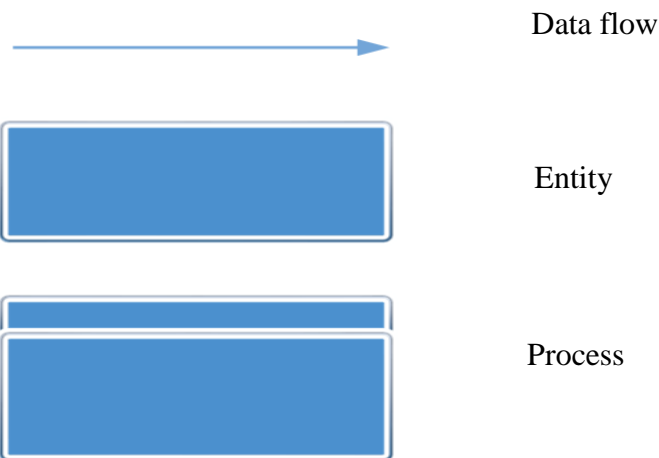
 Entity

 Process

4.2.5 DATA FLOW DIAGRAM OF THE PROPOSED SYSTEM

A data flow diagram shows how information flows through the ERS. It includes entities, data input, processes, output, data stores and numerous sub processes that data moves through. DFDs are used as a pre-development step of creating a system overview without going into greater detail.
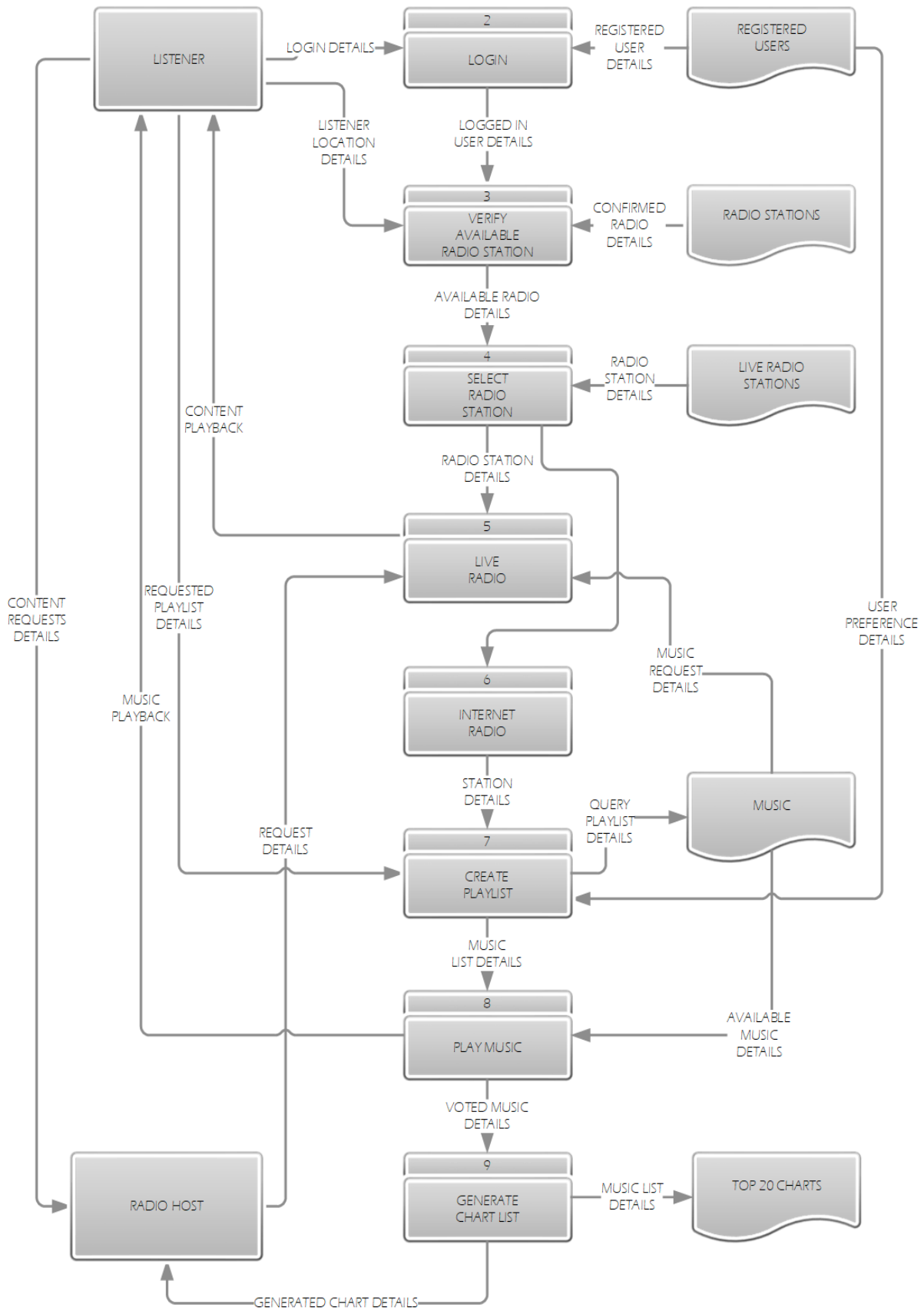
Fig 4.2 Data Flow Diagram of the Proposed System

Key for the Data Flow Diagram

⟶	Data flow
	Entity
	Process
	Data store

4.3 ARCHITECTURAL DESIGN

Architectural design is the practise of defining a collection of software and hardware modules and their interfaces to create a framework for developing a computer system, Sommerville (2004). The logical and physical design of the database will be shown. The database schema consists of four levels namely; the external view, the conceptual schema, internal schema and the physical storage. The external view level shows the database interface that is visible to the user, the conceptual schema is the level where user access is specified for each user. The internal schema contains algorithms that transforms user requests into relational algebra that will be used to execute given commands, and physical storage level is where the actual data is manipulated and stored for use.
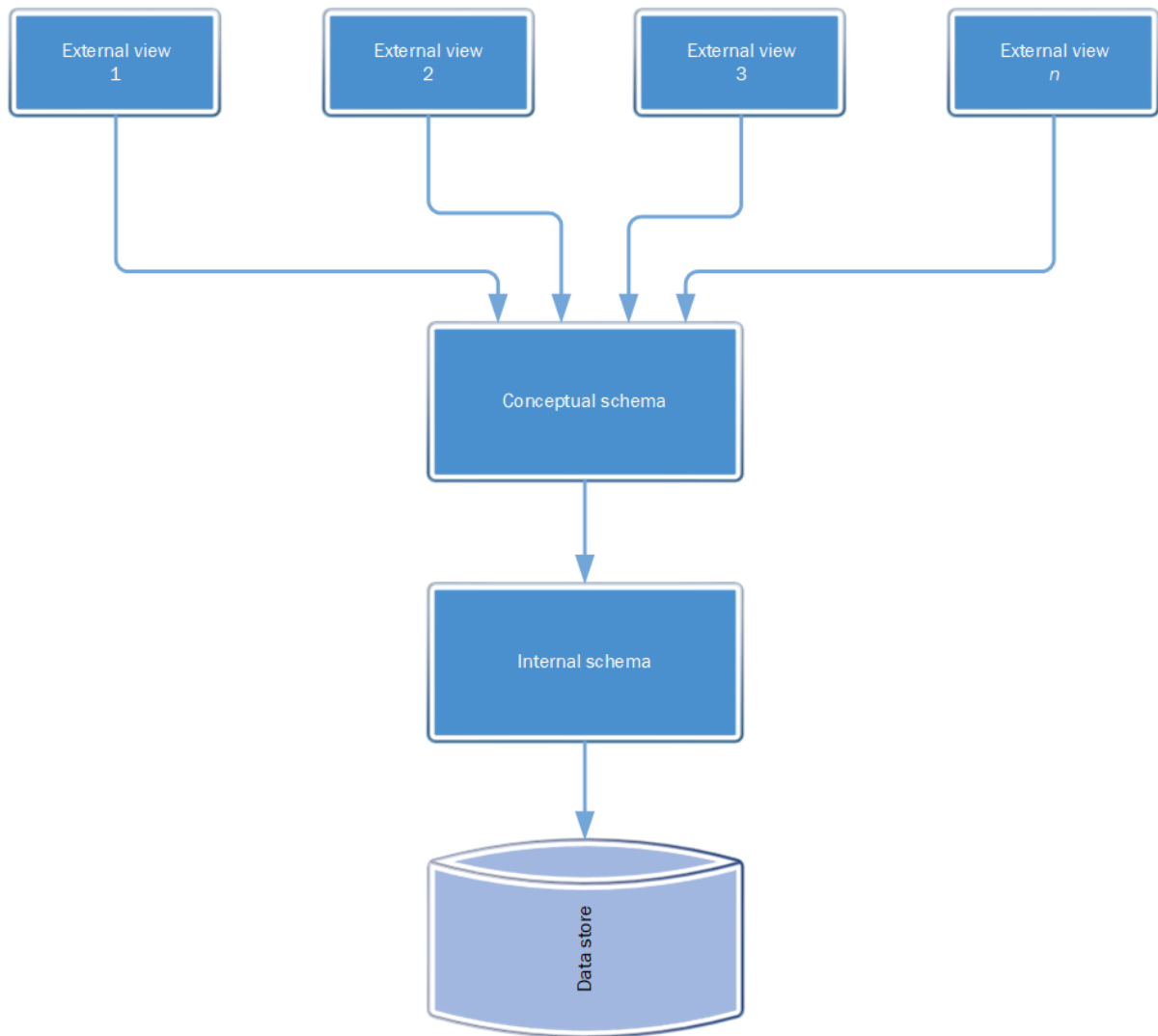
Fig. 4.3 Architectural Design of the ERS

4.4 PHYSICAL DESIGN

Physical design is the use of the existent world design constraints applied to the logical design, Ulrich (2000). The arrangement of infrastructure and the process of data input, processing and delivery in the system will be shown. The ERS will be operating from LAN where a database server, streaming media server, live radio studios, e-commerce server and a backup storage are connected to the internet through switches and routers. A high speed optic fibre connection is used to connect the ERS to the internet. A firewall is setup between ZBH systems and the incoming internet connection to prevent unauthorised access and manipulation of data. Radio signal will be accessible over several mediums namely, satellite, Wi-Fi and radio transmission towers allowing listeners to listen from smartphones, laptops and tablets.
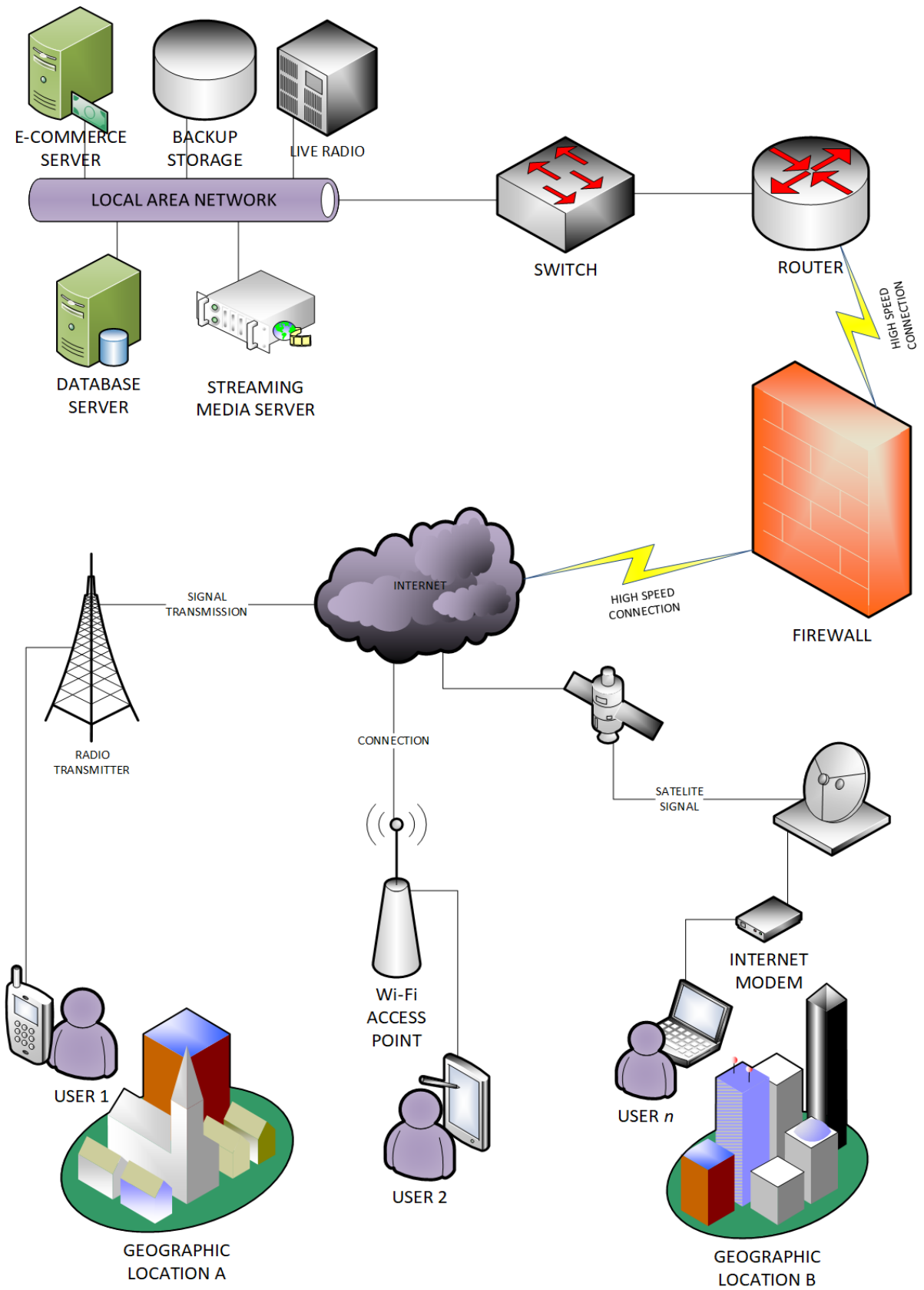
Fig. 4.4 Physical Design of the ERS System

The system to be setup at ZBH will use an IceCast and ShoutCast Server for broadcasting. An IceCast Server enables a DJ to simultaneously play music from a playlist and record voice over feed and broadcast them at the same time over the internet. This means listeners can simultaneously access the system from within and outside the organisation over the internet enabling them to listen to radio and music.
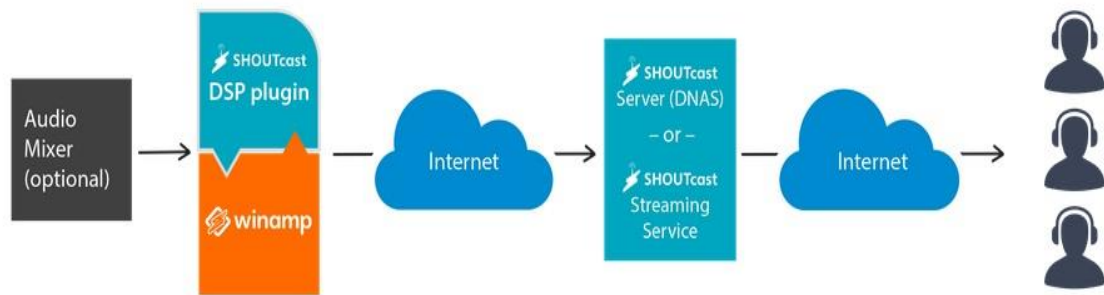
Fig. 4.5 IceCast Broadcasting Design

Table 4.4 System Components

System Components	Description
e-Commerce server	The server will be running systems that process listener subscriptions and royalty payment details.
Database server	A storage of all user and listener data and will be used for hosting the ERS and a ShoutCast server.
Streaming media server	Stores all media files that will be used by the internet radio and live radio studios.
Live radio studio	Will be broadcasting live radio shows, news, sport and music.
Backup storage	A storage facility for important system files in case of system malfunction.

System Components	Description
Local Area Network	A network of ZBH systems.
Firewall	A software used to filter unwanted connections from infiltrating organisation systems over the internet.
Internet	A network of interconnected computers that share resources and services through the World Wide Web.

4.5 DATABASE DESIGN

Database design focuses on organising data according to a chosen database model. It is also a process of developing and maintaining enterprise data, Teorey (2005). A relational database will be used to present entities on tables showing the primary key and unique key.

cast_svr   (id(**PK**), svr_address)

chart   (id(**PK**), song_id, vote, voter)

day_slot   (id(**PK**), day_name)

genre   (id(**PK**), genre(**Unique Key**))

listen_log   (id(**PK**), listener, logged_in, logged_out)

pvt_cast_svr   (id(**PK**), svr_address)

listeners   (id(**PK**), username(**Unique Key**), password, gender, location, joined)

programme_lineup (id(**PK**), title, age, dj, day_id, time_period)

users   (firstname, surname, username(**Unique Key**), sex, password, role, stage_name, createdby, status, creation_timestamp, id(**PK**))

time_slot   (id(**PK**), period)

songs   (id(**PK**), title, genre_id, artist, album_art, created)

4.5.1 Database Tables

Database tables show attributes in each relation, primary or foreign key, data type and length of data that can be stored.

Table 4.13 Live Radio

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Live radio station ID
svr_address	varchar(255) NOT NULL	Live radio server address

Table 4.10 Chart

Attribute	Data type	Description
id	varchar(11) NOT NULL	Name of program
song_id	varchar(11) NOT NULL	Listener rating of program
vote	int(11) NOT NULL	Number of votes
voter	varchar(45) DEFAULT NULL	Name of voter

Table 4.11 Day slot

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Identifies programme
day_name	varchar(25) NOT NULL	Day of broadcasting

Table 4.12 Genre

Attributes	Data type	Description
id	int(11) NOT NULL(**PK**)	Genre identification
genre	varchar(45) NOT NULL(**Unique key**)	Name of genre

Table 4.9 Listen log

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Listener ID
listener	varchar(100) NOT NULL	Listener username
logged_in	datetime NOT NULL	Time listener logged in
logged_out	datetime NOT NULL	Time listener logged out

Table 4.14 Internet Radio

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Internet radio station ID
svr_address	varchar(255) NOT NULL	internet radio server address

Table 4.6 Listeners

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Listener identification
username	varchar(50) NOT NULL(**Unique key**)	Listener username
password	varchar(100) NOT NULL	Listener password
gender	varchar(15) NOT NULL	Gender of listener
location	varchar(100) NOT NULL	Location of listener
joined	Datetime DEFAULT TIMESTAMP	Date profile is created

Table 4.7 Programme line-up

Attribute	Data type	Description
id	varchar(15) NOT NULL(**PK**)	Programme ID
title	varchar(100) NOT NULL	Programme title
age	int(3) NOT NULL	Age restriction
dj	varchar(100) NOT NULL	Identifies programme host.
day_id	int(11) NOT NULL	Identifies scheduled day.
time_period	int(11) NOT NULL	Programme time slot

Table 4.5 Users

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Employee identification
username	varchar(25) NOT NULL(**Unique key**)	Employee username
firstname	varchar(50) NOT NULL	Name of employee
surname	varchar(100) NOT NULL	Surname of employee
sex	varchar(10) NOT NULL	Employee sex
role	varchar(100) NOT NULL	Employee role
password	varchar(100) NOT NULL	Password
stage_name	varchar(100) NOT NULL	Employee work alias
status	varchar(15) DEFAULT NULL	Employee active status
creation_timestamp	DEFAULT CURRENT_ TIMESTAMP	Date profile is added
createdby	varchar(100) NOT NULL	Name of user who created the account

Table 4.15 Time slot

Attribute	Data type	Description
id	int(11) NOT NULL(**PK**)	Programme ID
period	varchar(65) NOT NULL	Programme time allocation

Table 4.8 Songs

Attribute	Data type	Description
id	varchar(11) NOT NULL(**PK**)	Id number of song
title	varchar(255) NOT NULL	Name of song
genre_id	varchar(11) NOT NULL	Name of genre
artist	varchar(255) NOT NULL	Name of song artist
album_art	mediumblob	Song picture art
created	date NOT NULL	Date the song is added.

4.5.2 EER Diagram

An EER diagram is a high level data model that incorporates additions to the initial database tables used in the early stages of database design. The EER includes the subclass and superclass of the ERS which are all concepts of the ER model, Shamkant (2011).
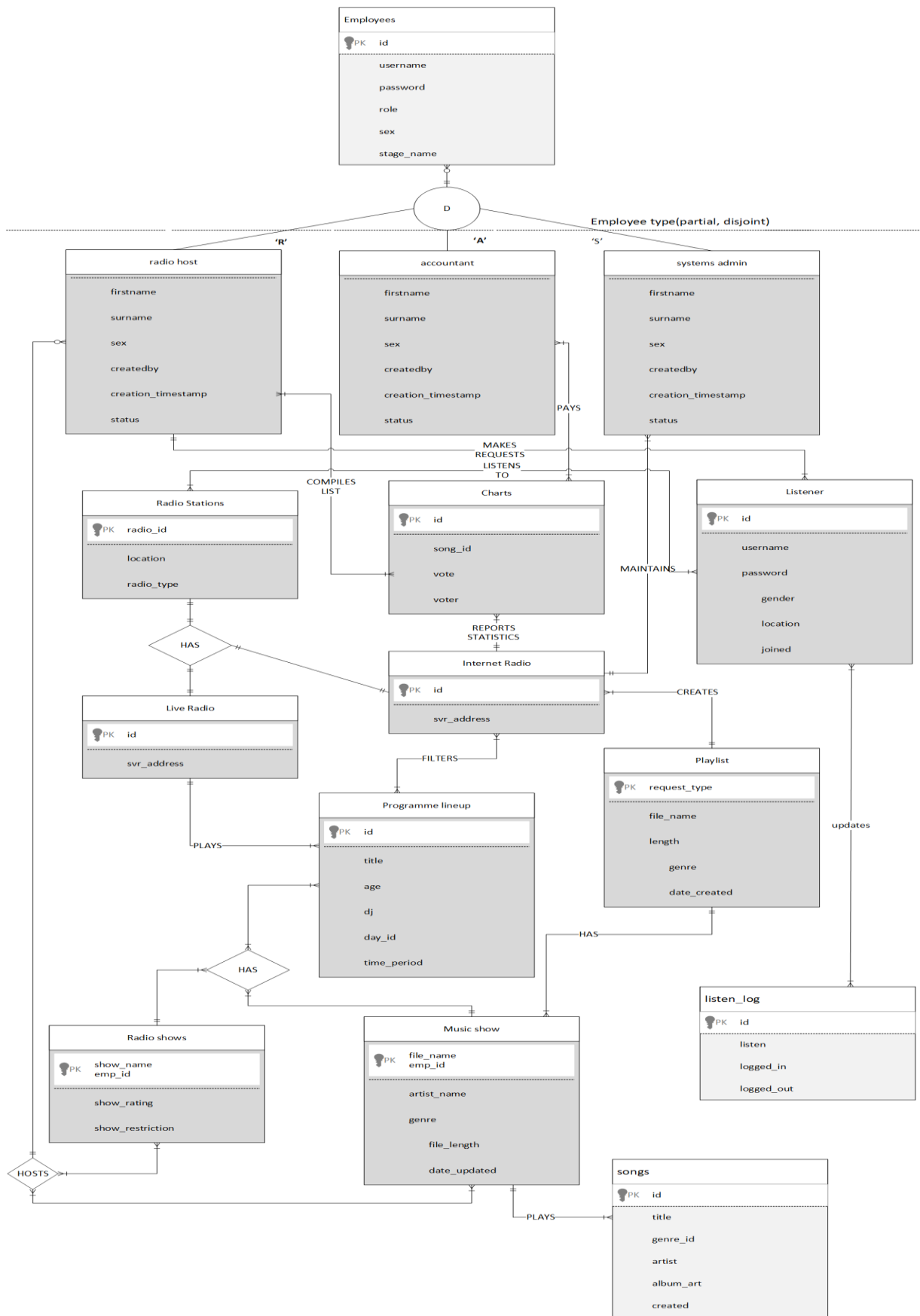
Fig. 4.6 EER Diagram

4.6 PROGRAM DESIGN

These are a collection of activities succeeding a requirement of some necessary program to a depiction of the system. Program design involves planning and recording methods and techniques in software.

4.6.1 Package and Class Diagram

Class diagrams represent a system's notion, properties and inter-relations. The structure of the system is described by displaying system's classes, characteristics, operations and relationships amongst objects. A conceptual view represents the models supported by the system while the physical perspective represent classes implemented by an object language.

Users

id(pk)
username()
password()
role()
sex()
stage_name()
addNew()
update()
addRole()

Employee type(partial, disjoint)

RADIO HOST

firstname()
surname()
sex()
createdby()
creation_timestamp()
status
addRole()
update()

ACCOUNTANT

firstname()
surname()
sex()
createdby()
creation_timestamp()
status()
addRole()
update()

SYSTEMS ADMIN

firatname()
surname()
sex()
createdby()
creation_timestamp()
status()
addRole()
update()

compiles list

makes request

pays

listens to

maintains

RADIO STATIONS

radio_id(pk)
-memberName
location()
radio_type()
addNew()
update()

CHARTS

id(pk)
song_id()
vote()
voter()
addNew()
update()

LISTENER

id(pk)
username()
password()
location()
addNew()
update()

updates

has

reports statistics

INTERNET RADIO

id(PK)
svr_address()
addNew()
update()

LIVE RADIO

id(PK)
svr_address()
addNew()
update()

filters

creates

PLAYLIST

request_type(pk)
file_name()
length()
genre()
date_created()
request_type(pk)
addNew()
update()

shows

PROGRAMME LINEUP

id(pk)
title()
age()
dj()
addNew()
update()

has

has

LISTEN_LOG

ID(pk)
listen(fk)
logged_in()
logged_out()
addNew()
update()

RADIO SHOWS

show_name(pk)
emp_id(fk)
show_rating()
show_restriction()
addNew()
update()

MUSIC SHOWS

file_name(pk)
emp_id(fk)
artist_name()
genre()
file_length()
date_updated()
addNew()
update()

SONGS

id(PK)
title()
genre_id()
artist()
album_art()
created()
addNew()
update()

hosts

plays

55

Fig. 4.7 Class Diagram

4.6.2 Sequence Diagram

Sequence diagrams also known as event diagrams show the flow of logic within a system in a visual manner. Different processes are shown as vertical lines, horizontal arrows depict the messages exchanged between them and the order in which movement occurs. This allows for representation of scenarios in a graphical manner, OMG (2011).

Fig. 4.8 Sequence Diagram

Key of the Sequence Diagram

System activation

Message

System response

External participant

Internal system component
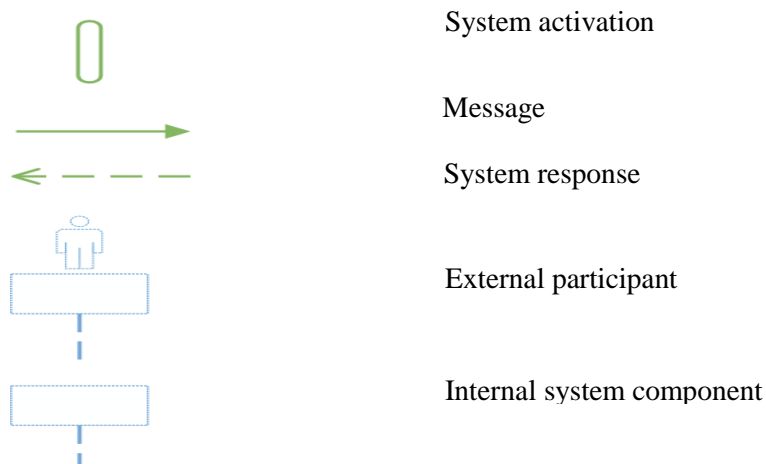
4.7 INTERFACE DESIGN

Interface design involves all activities involved in designing user interfaces for the software and machines. Graphic user interface provides a user the means of interacting with a system, Norman (2002). The ERS interface design will be designed to allow users to understand system functionality. Interface design spans menu designs, main menu, sub menus and input and output designs.

```
                          ┌─────────────┐
                          │ LOGIN FORM  │
                          └─────────────┘
                                 │
                          ┌─────────────┐
                          │  USERNAME   │
                          └─────────────┘
                                 │
                          ┌─────────────┐
                          │  PASSWORD   │
                          └─────────────┘
                                 │
                          ┌─────────────┐
                          │MAIN INTERFACE│
                          └─────────────┘
```
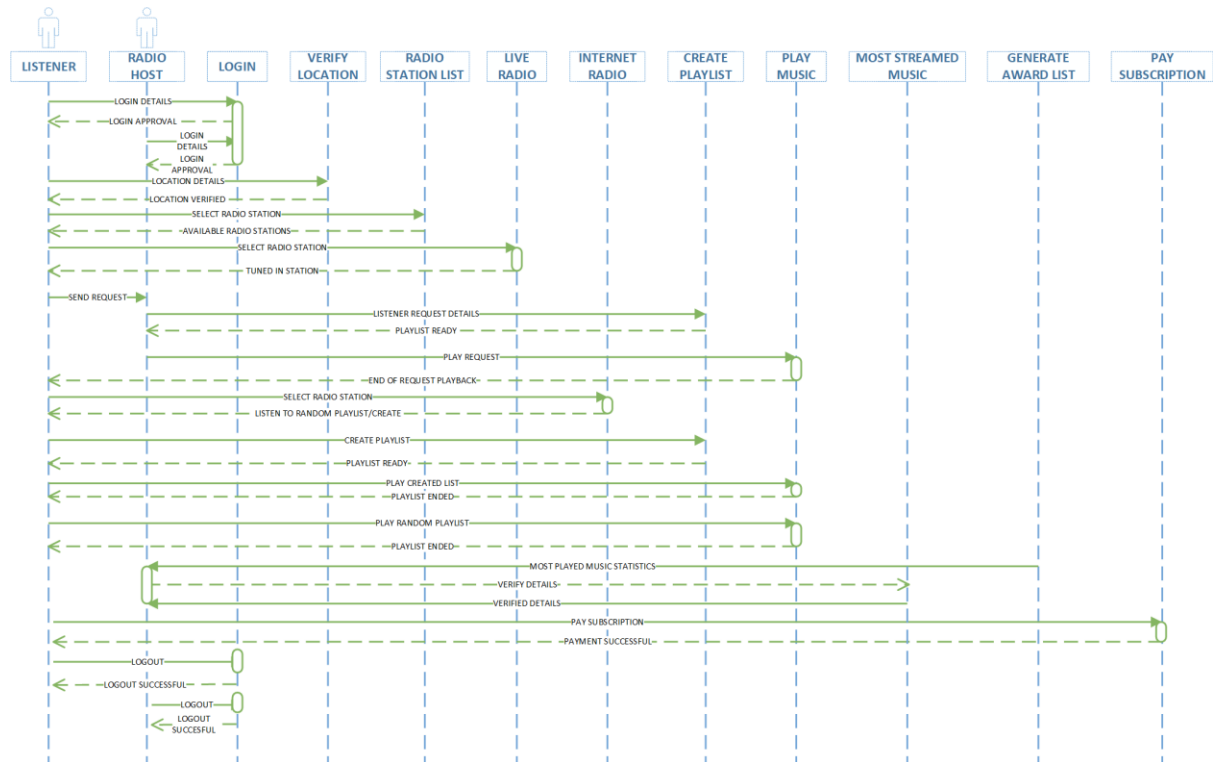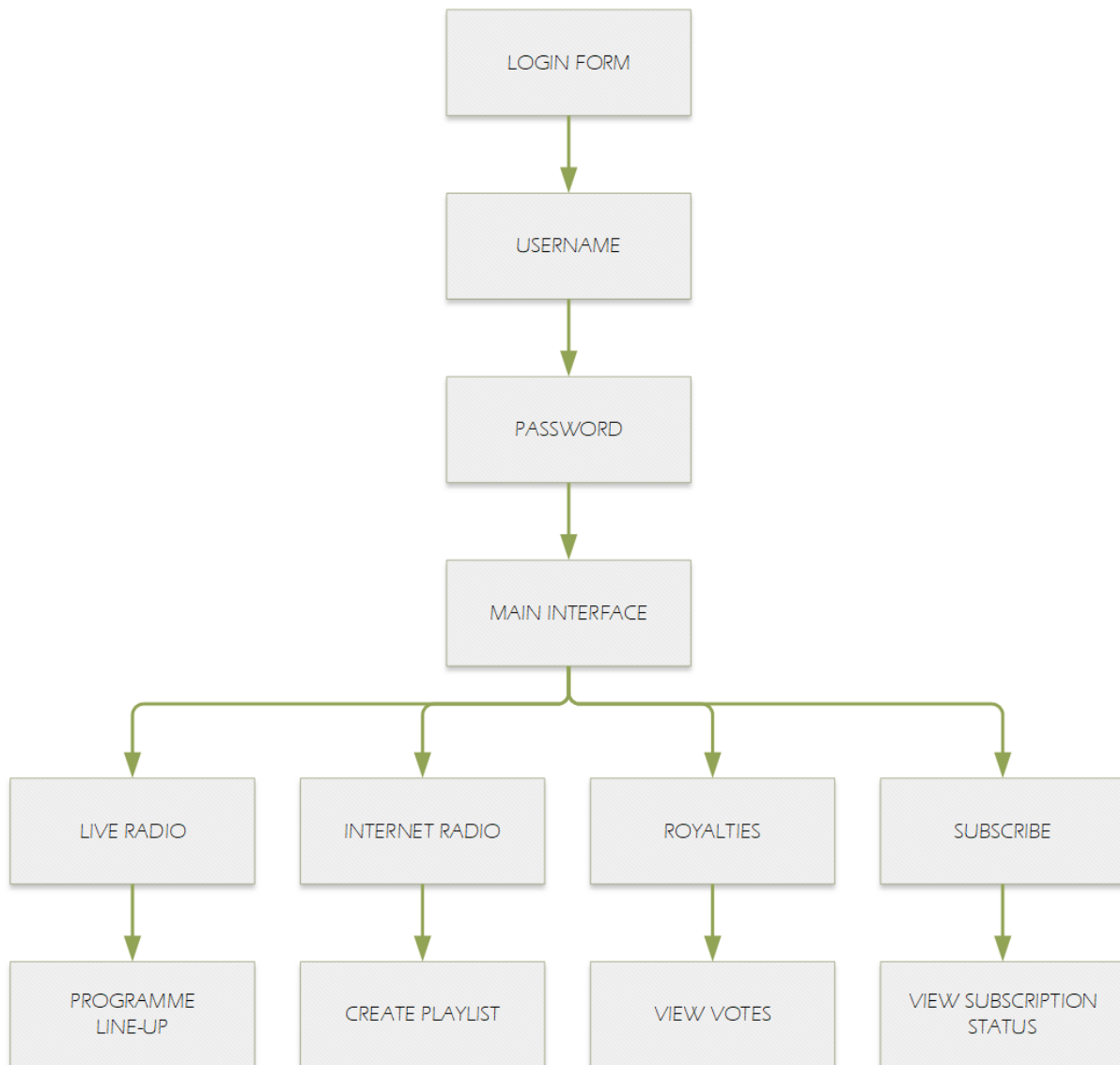

Fig. 4.9 Interface design

4.7.1 Menu design

The menu of the ERS is a graphic user interface and it consists of two main components namely, the main menu and sub-menus. Main menu is the landing page where the user is

directed to after logging in and sub-menus provide access to different functions of the ERS.

4.7.1.1 Main menu

Main menu shows provides a user of the ERS with options to execute from as shown on the figure below.
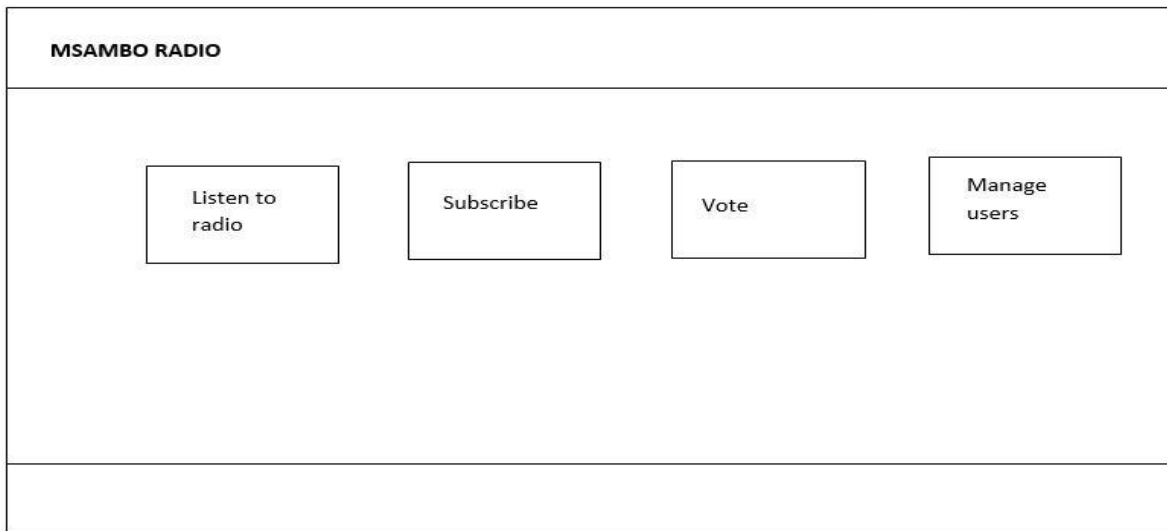
Fig. 4.10 Main menu

4.7.1.2 Sub-menu

After selecting a module function, a user is redirected to a sub-menu as shown on the figure below.
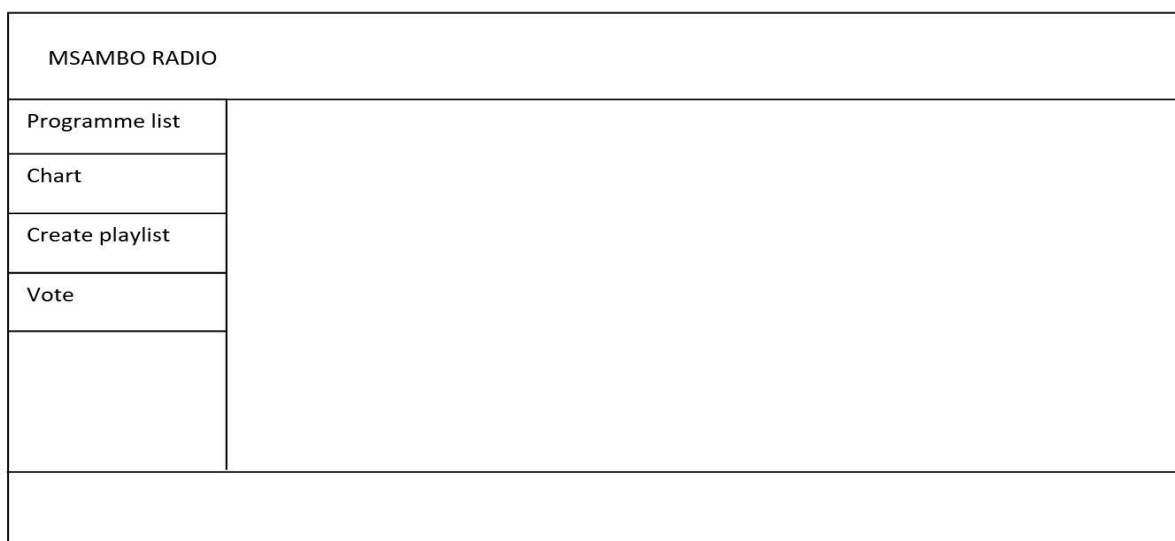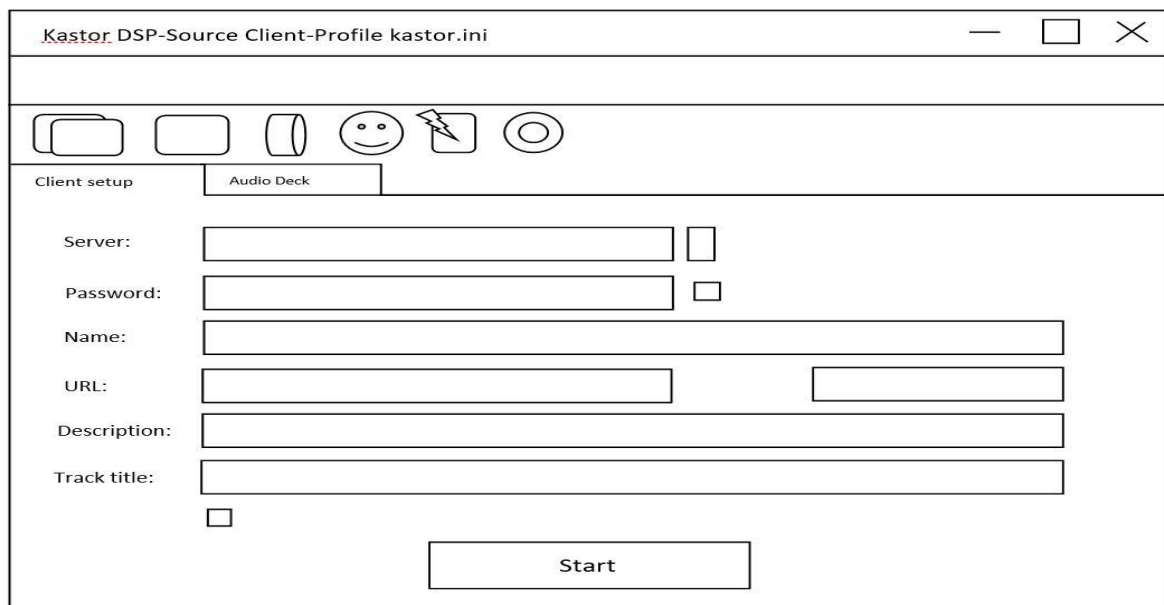
Fig. 4.11 Sub-menu

4.7.2 Input design

ERS input form designs are drawn to give a representation of what they will look like in new system.

4.7.2.1 Setup ERS

The systems administrator will provide server address, name, password, URL, port details and upon saving the ERS ShoutCast server will start running automatically.
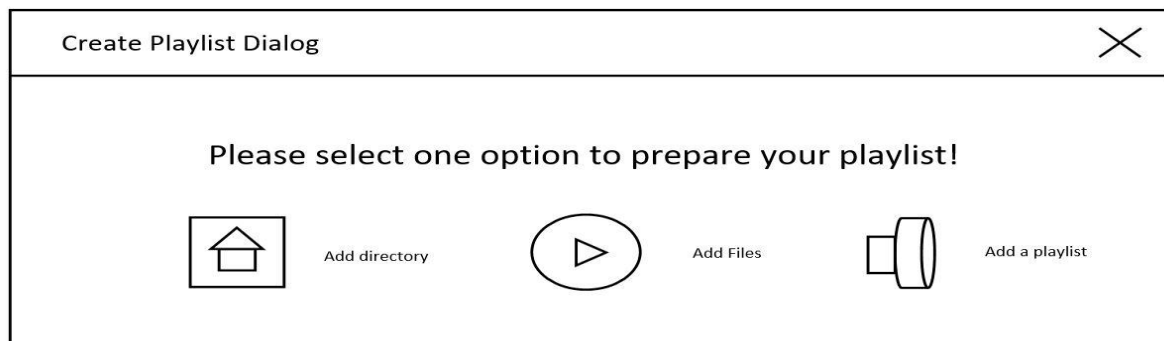
Fig. 4.12 Setup ERS

4.7.2.2 Create playlist

There are 3 options available to create a playlist, namely add directory, add files and add a playlist file.

Fig 4.13 Create playlist

4.7.2.3 Add directory
This method adds an entire music folder to act as a source of playlist for the user.
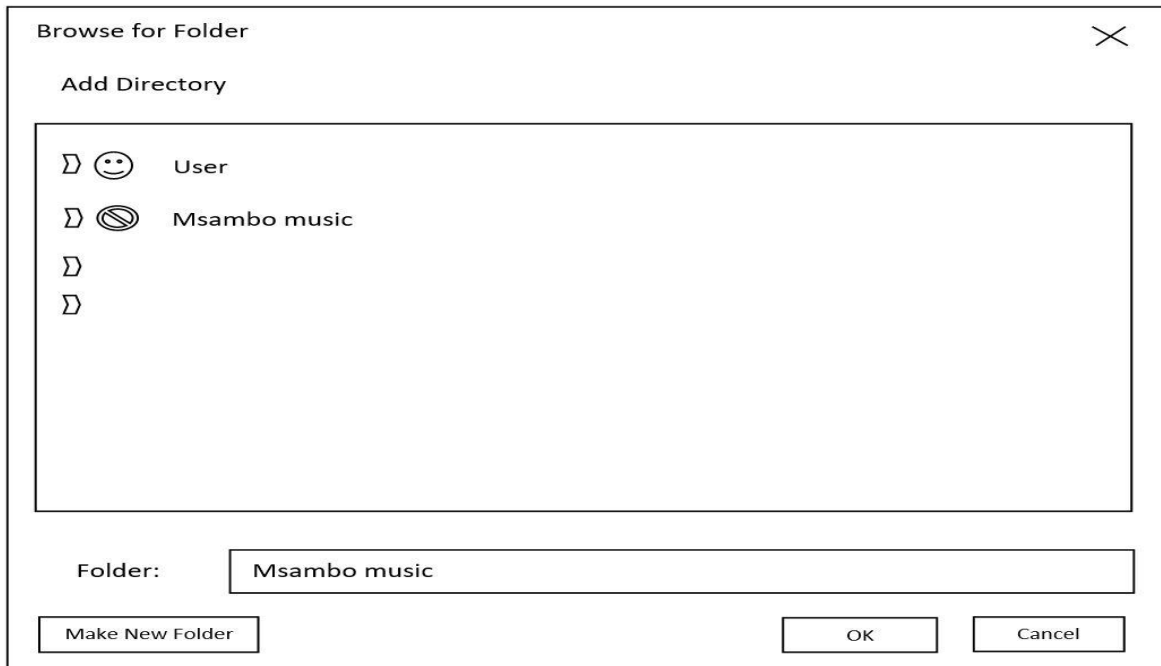
Fig 4.14 Add playlist directory

4.7.2.4 Add file to playlist
Music files can be added separately to the playlist by selecting them individually to the list.
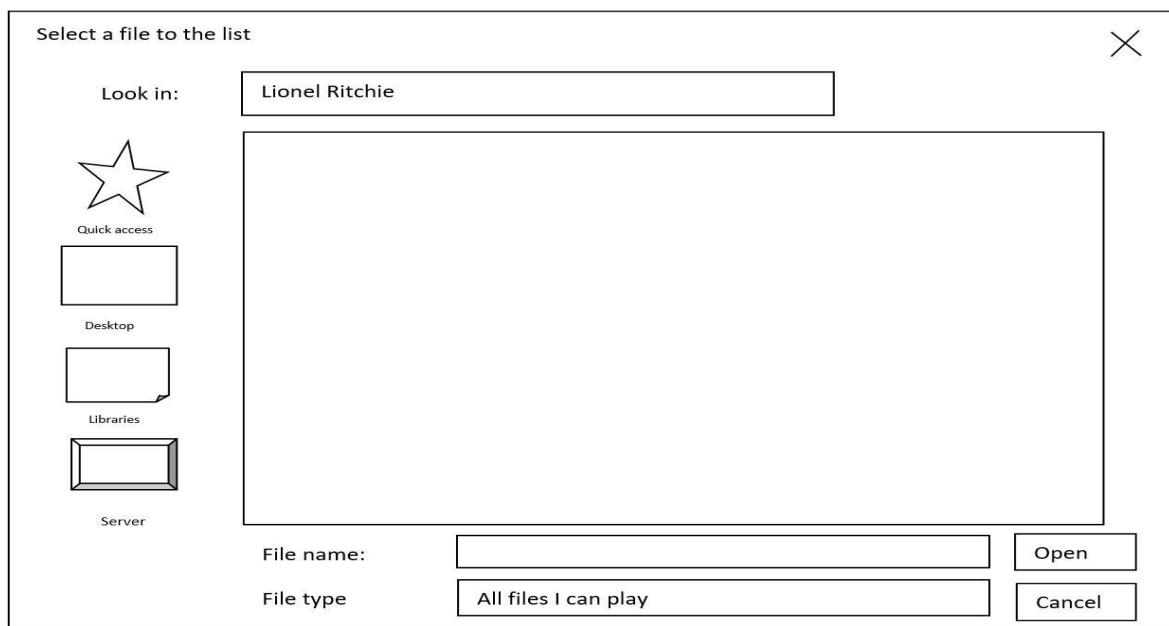
Fig. 4.15 Add file to playlist
60

4.7.2.5 Add playlist file

This method enables the user to add an already saved playlist file to the music player.
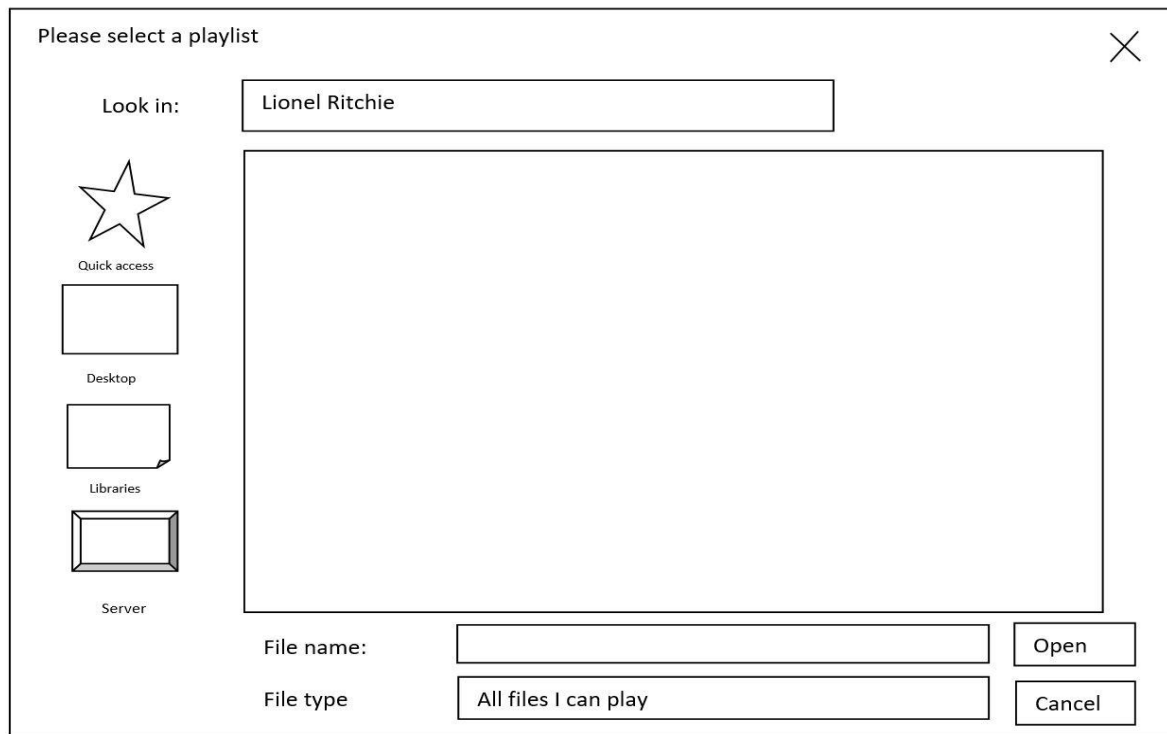
Fig. 4.16 Add playlist file

4.7.3 Output design

ERS output designs show how data will be shown and read by the user after input processing is complete.

4.7.2.6 ERS Server Status

The status of connections, streams, number of connected users and server uptime will be shown on a log in the window.
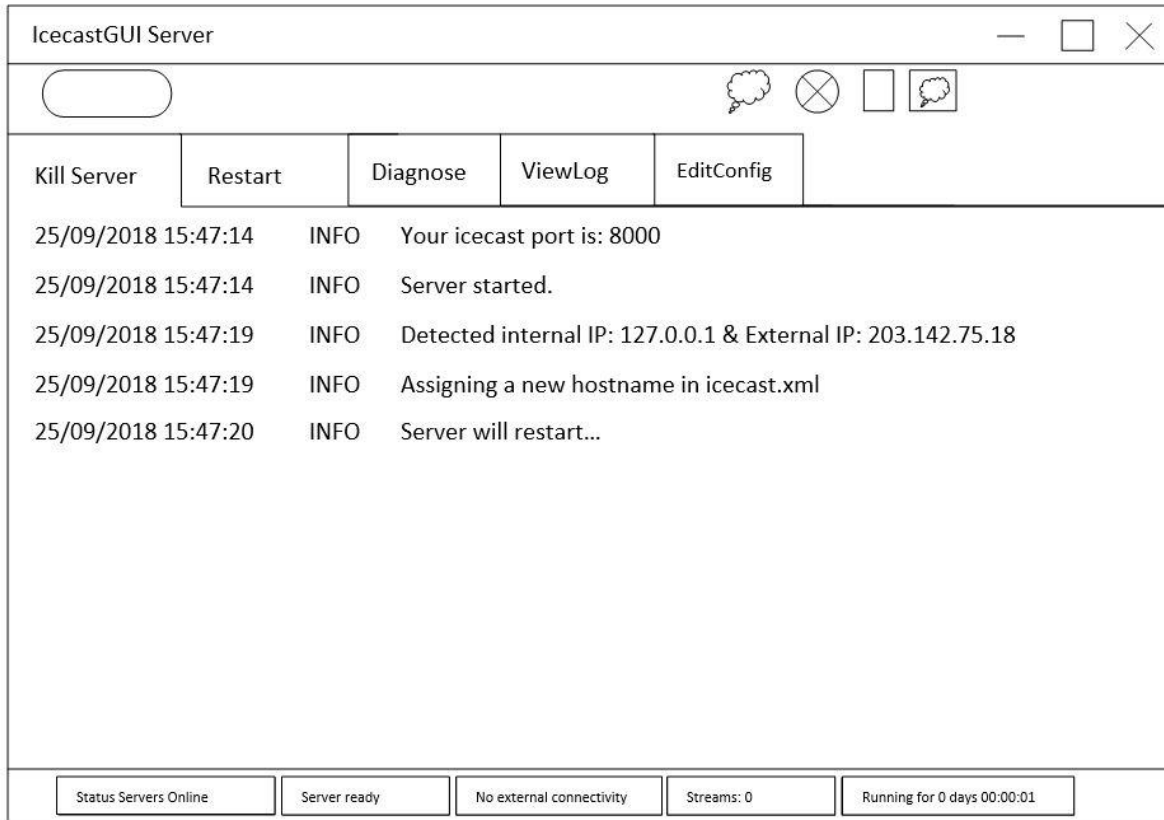
Fig. 4.17 ERS Server status

4.7.2.7 Music player

Plays music and shows song information of a playing song. Music player also provides the user with other controls to help manipulate contents of a playlist.
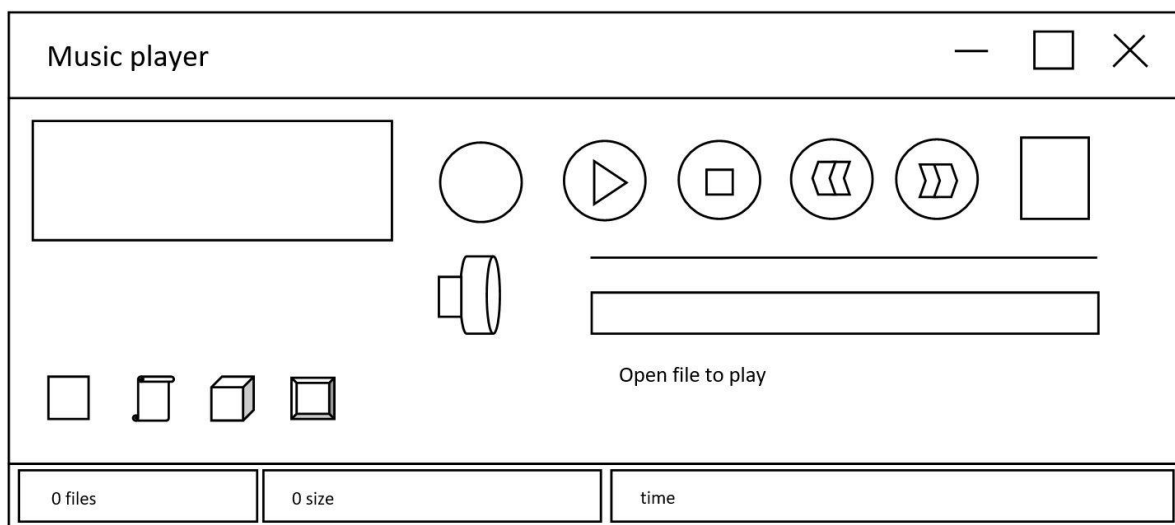
Fig. 4.18 Music player

4.7.2.8 Playlist details

Playlist content are shown including the number of music files contained, total length of music and additional options to add or remove files in the list.
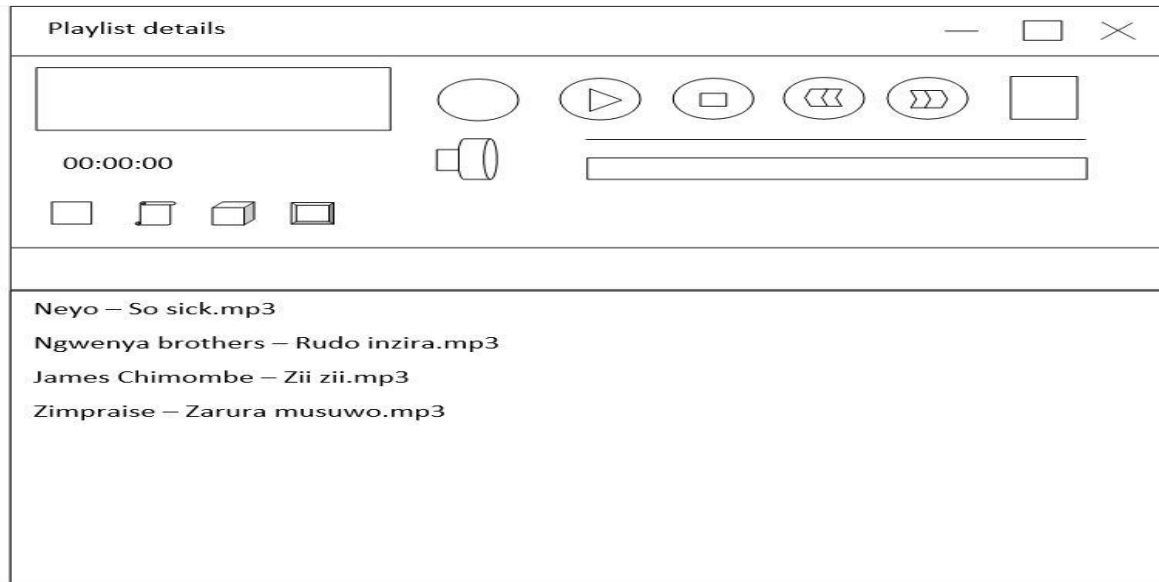
Fig. 4.19 Playlist details

4.7.2.9 Programme List

Live radio programmes day and time slots are listed as well as the radio hosts.
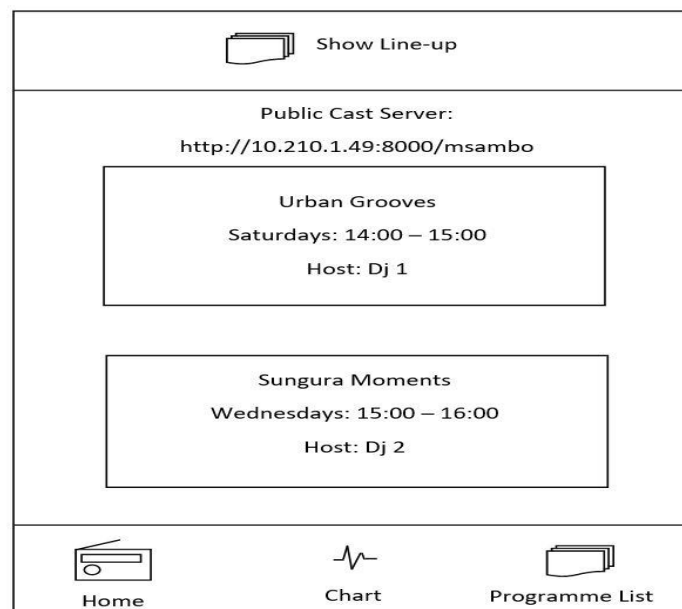
Fig. 4.20 Programme List

4.7.2.10 Chart

Top trending music in the ERS are listed as well as the number of votes received for each song.
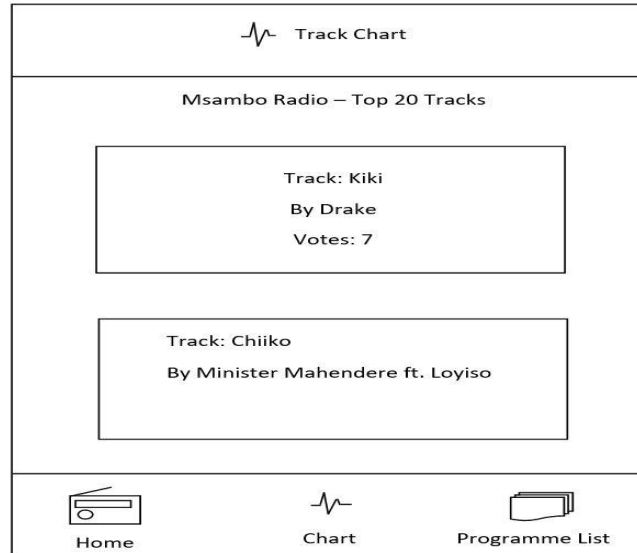
Fig. 4.21 Chart

4.8 PSEUDO CODE

Connecting to the ERS

If connection is not set then

Set the connection

Else

Ignore

End If.

Registering a new user

Validate all information

If user input is invalid

Report error

Else

    Save details

End if.

Login

Enter username and password

    If password and username are correct then

        Go to ERS main menu

    Else

        Try again

    End if.

Creating music playlist

Get the music file ID

Retrieve music file

    If music file is not found then

        Report error

    Else

        Display requested music file

    End if.

Streaming live radio stations

Go to the live radio panel

Check if the radio station exists

If not then

    Report error

Else

    List available radio stations

If some of the input is invalid

    Report error

Else

    Establish connection

End if.

Posting an advertisement

Go to the Advertisement upload menu

Select advertisement option

    If advertisement update is successful

        Send notification

    Else

        Report error

    End if.

4.9 SECURITY DESIGN

Security in system development is an ongoing process comprising people and practises that ensure application integrity, confidentiality and availability, Steward (2012). In this section, all security aspects will be evaluated in relations to the safety of the new system. The physical, network and operational security of the ERS are discussed below to reveal how system and data integrity is going to be maintained.

4.9.1 Physical security

The system servers are going to be kept in a physically locked server room and the locks will include a biometric system, screen doors and CCTV. Heat circulation will be regulated by an air conditioner unit to reduce the possibility of hardware failure. The server room is going to be water tight and sound proof to reduce noise from infiltrating to other working space.

4.9.1.1 Biometric system

An authorised employee will scan their work ID, provide a pin and a fingerprint to access the ERS server room. Biometric system is necessary to identify and authenticate correct personnel in case other credentials fall into wrong hands.

Fig. 4.22 Biometric system

4.9.1.2 Screen doors

Screen doors and locks are required as extra reinforcement and security against violent entry attempts. The screen doors will be located outside the server room and locks will be used to secure them.

4.9.1.3 CCTV

CCTV will be installed in the premise and around the building to record activities that occur on a daily basis. Recorded video feed will be stored on hard drives and backup copies will be saved in the cloud servers.
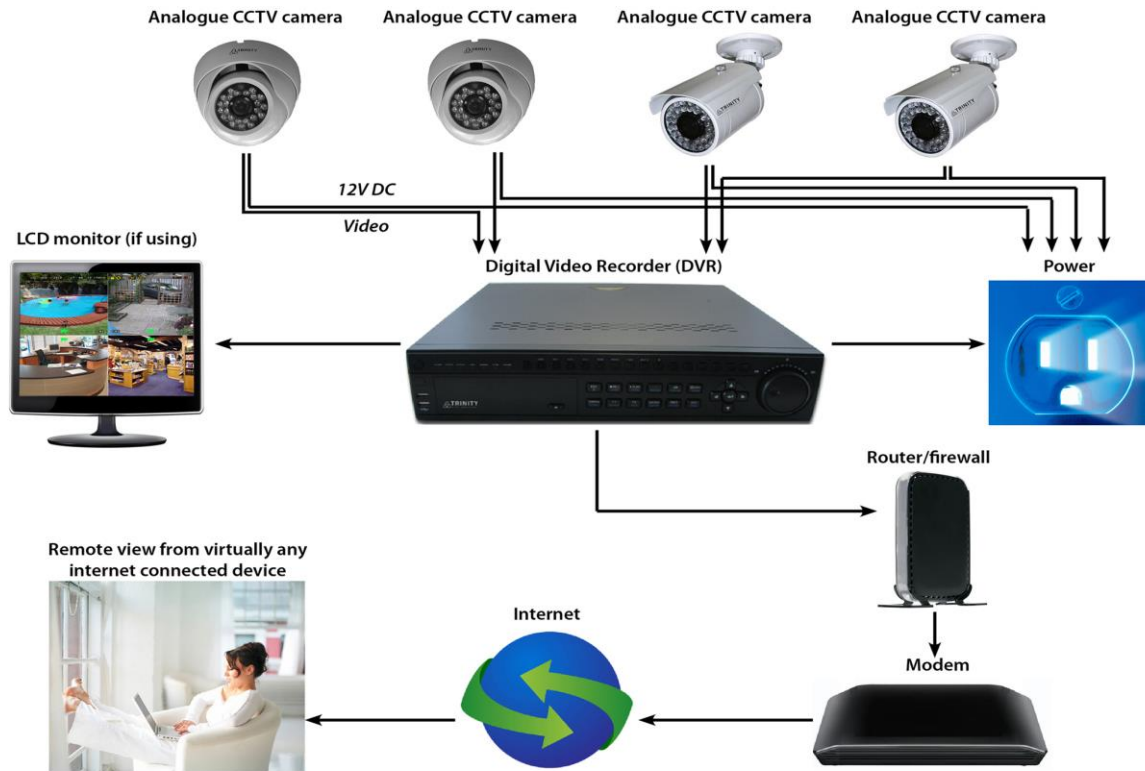
Fig. 4.23 CCTV

4.9.2 Network security

The ERS will be hosted through an internet based network infrastructure. Anti-virus and a firewall software will be installed as a security measure against viruses, ransomware and unwarranted information syphoning by hackers. Data will be encrypted from the source and then decrypted at the receiving end during transmission.

4.9.2.1 Anti-virus

Avast internet antivirus will be installed on the server to scan for security threats which may infiltrate through the internet or through the use of removable media. The license will be renewed every year, and virus definition updates will be scheduled to install automatically over the internet.

4.9.2.2 Firewall

A hardware firewall will be installed between the network and the connected devices to protect them from internet security threats such as viruses, worms and other unauthorised software access to data within ZBH.
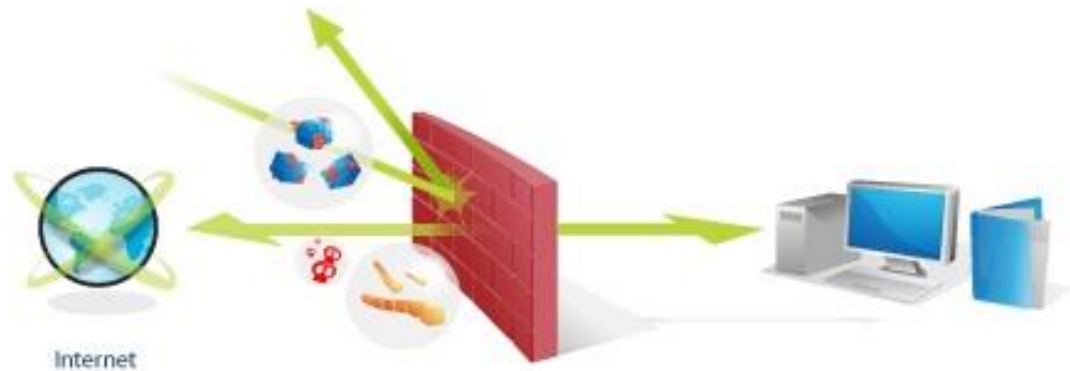
Fig. 4.24 Firewall

4.9.3 Operational security

Identification and authentication procedures will be implemented so as to restrict unauthorised users from accessing system resources. Priviledges to the system will be determined by access levels to employees, and the systems administrator will have full access to the system while listeners can create playlists and stream live radio stations.

4.10 CONCLUSION

The design phase showed a preview of the system through a context diagram and data flow diagram. Architectural design gave a glimpse of all levels of data views and the storage of data in the database. The physical design identified all hardware to be used and its interconnection with software. Database tables highlighted database entities as well as their data types, and an enhanced entity relationship diagram showed the entity relationships diagrammatically. Program packages and sequence diagrams showed interaction and sharing of resources within the ERS. User interface designs were drawn to show all menu, main menu, sub-menus; and input and output forms that will be used. Pseudo code was written to define the process and functionality of the system. Security design uncovered all aspects

involved in safe keeping of information through physical, network and operational security. The next phase is implementation which looks at coding, testing, installing, maintaining and making recommendations for future development of the ERS.

CHAPTER 5: IMPLEMENTATION PHASE

5.1 INTRODUCTION

Implementation marks the final development stage of the ERS. The system will be developed, compiled and run for the first time. System code will be written and testing will be performed using various test cases including system security testing which reveals how security is applied as per security design of sub-heading 4.9 in the previous phase. Users will be trained to equip them with knowledge to use the ERS. Data migration techniques to be used will be discussed and system changeover strategies will be evaluated where a recommended strategy will be identified and used. Maintenance strategies will be discussed and recommendations for future development will be made.

5.2 CODING

ERS code will be written and debugged before compiling. Source code will be maintained by the programmer and a blue print will be kept. Code will be written in PHP for web interface and Java for the Android application. For code snippet, see *Appendix E*.

5.3 TESTING

The ERS will be tested for functionality and logic. Defect testing, module testing and acceptance testing will be performed as test cases to ensure that the system meets the minimum requirements of the objectives. The testing process that will be used is shown in the figure below.
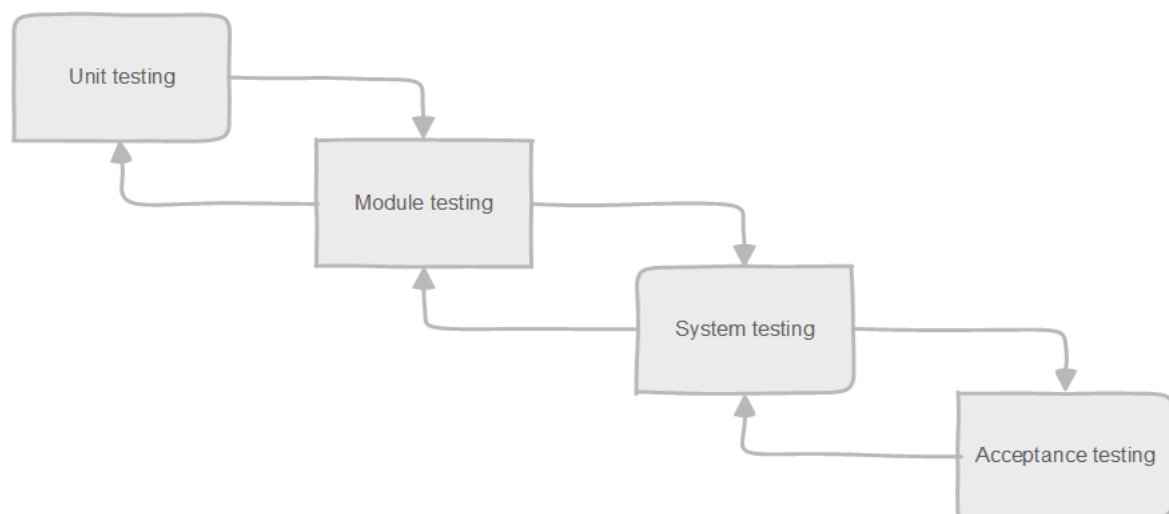
Fig. 5.1 Testing process

5.3.1 Defect testing

Rigorous tests will be conducted to help trace defects within the ERS before its delivery for first use. Input and output specifications of the whole system will be tested using random test data and results will be collected.

5.3.1.1 Invalid credentials

When invalid credentials are provided on login, an error massage will pop up at the bottom of the screen saying "*Invalid Credentials*".
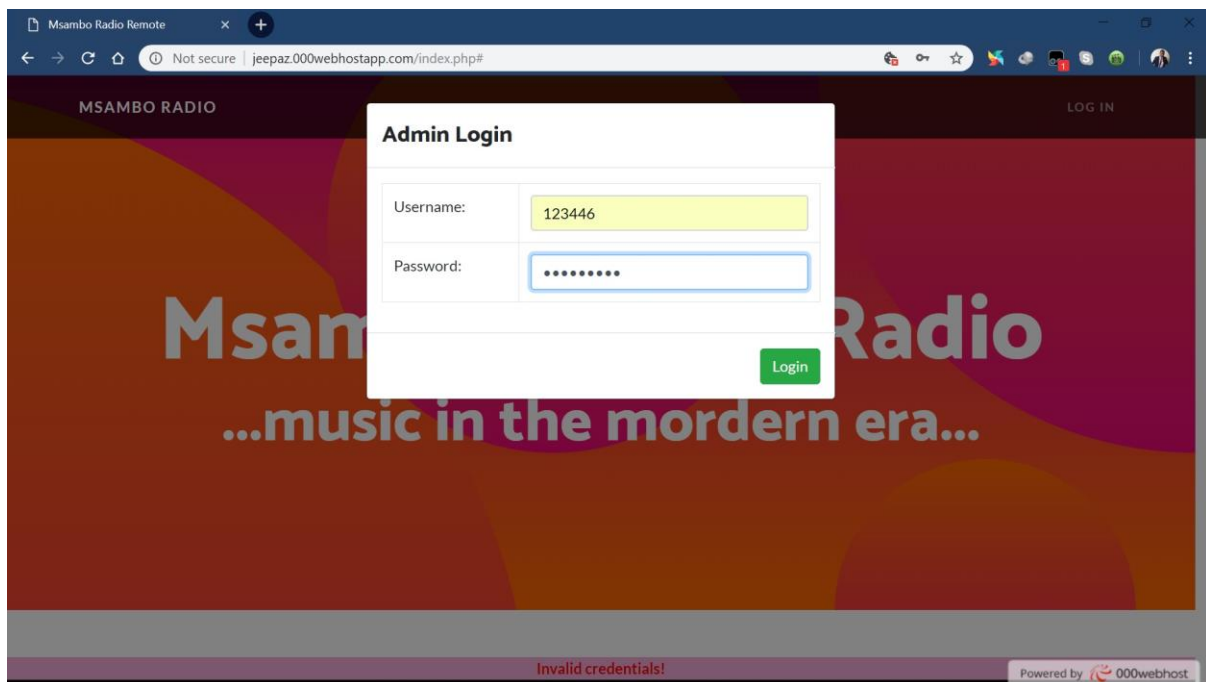
Fig. 5.2 Invalid credentials

5.3.1.2 Invalid IP Address

When an invalid IP address is provided in the Host IP address section, an error message will pop up on the top part of the screen.
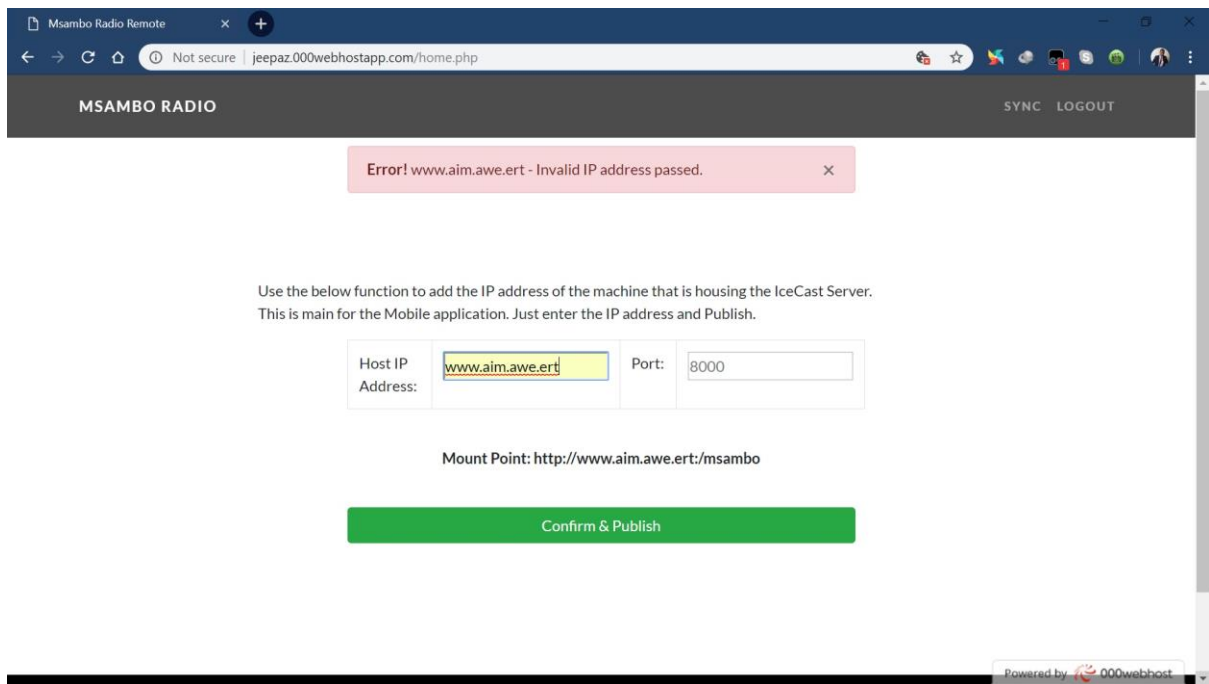
Fig. 5.3 Invalid IP Address

5.3.2 Module testing

Modules in the system will be tested independently as they are completed. White box testing will be conducted to uncover process errors and results will be collected.

5.3.3 Acceptance testing

The ERS will be finally tested for functionality and requirements before it is rolled out for full use. The main purpose is to appraise the ERS's compliance with ZBH business requirements and to confirm if it has met the necessary standards for distribution to end users, Graham et. al. (2012). Alpha tests will be conducted by the developers and errors will corrected. Beta testing will be done by employees and a sample population of the listeners.

5.3.4 System security testing

Intrusion tests will be conducted on the ERS server room biometric system, CCTV equipment will be installed and tested for functionality. The system will be tested for validation and verification of data. The major aim will be to ensure that the ERS supports the business value of ZBH through a properly functioning system. Test cases will be conducted and results will be shown.

5.3.4.1 Validation

Validation assesses the ERS' ability to meet set operational needs in the real environment and whether the specifications capture the user needs. Validation addresses the question, "Are we building the right product?" and the main aim is to ensure that the system supports the operations of ZBH ensuring smooth integration of all services. Test cases for validation are shown below.

5.3.4.1.2 Username validation

A username is required to sign into the ERS. If not provided a popup message will appear.
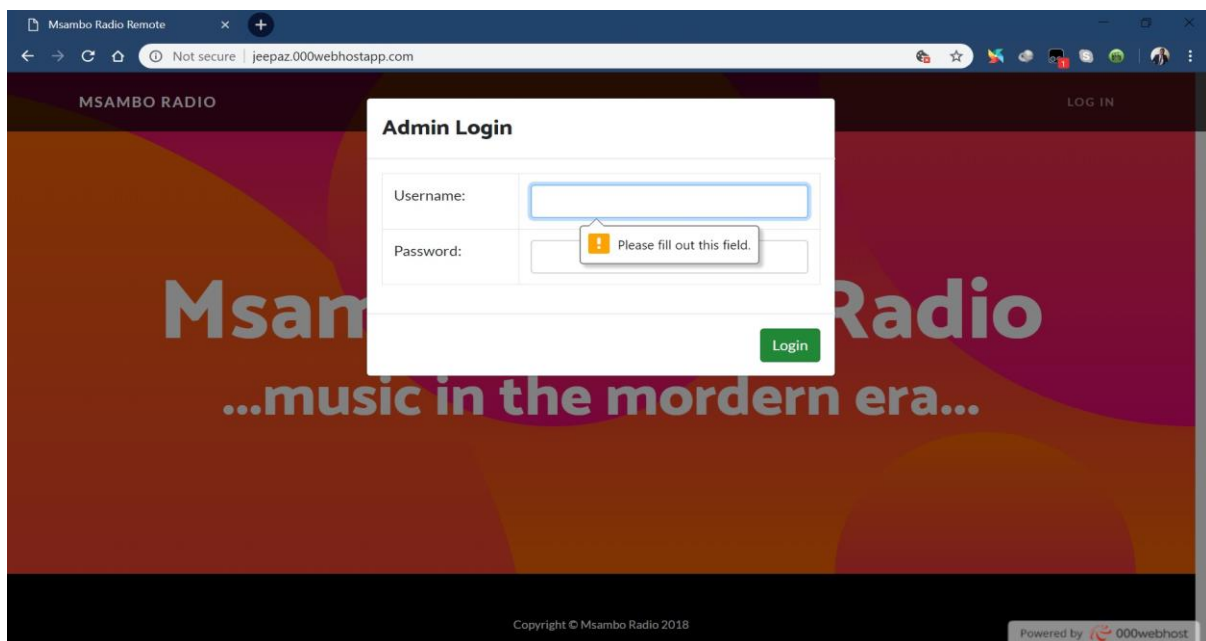
Fig. 5.4 Username validation

5.3.4.3 Password validation

A username and password is required to sign into the ERS. If a username and not a password is provided a popup message will appear.
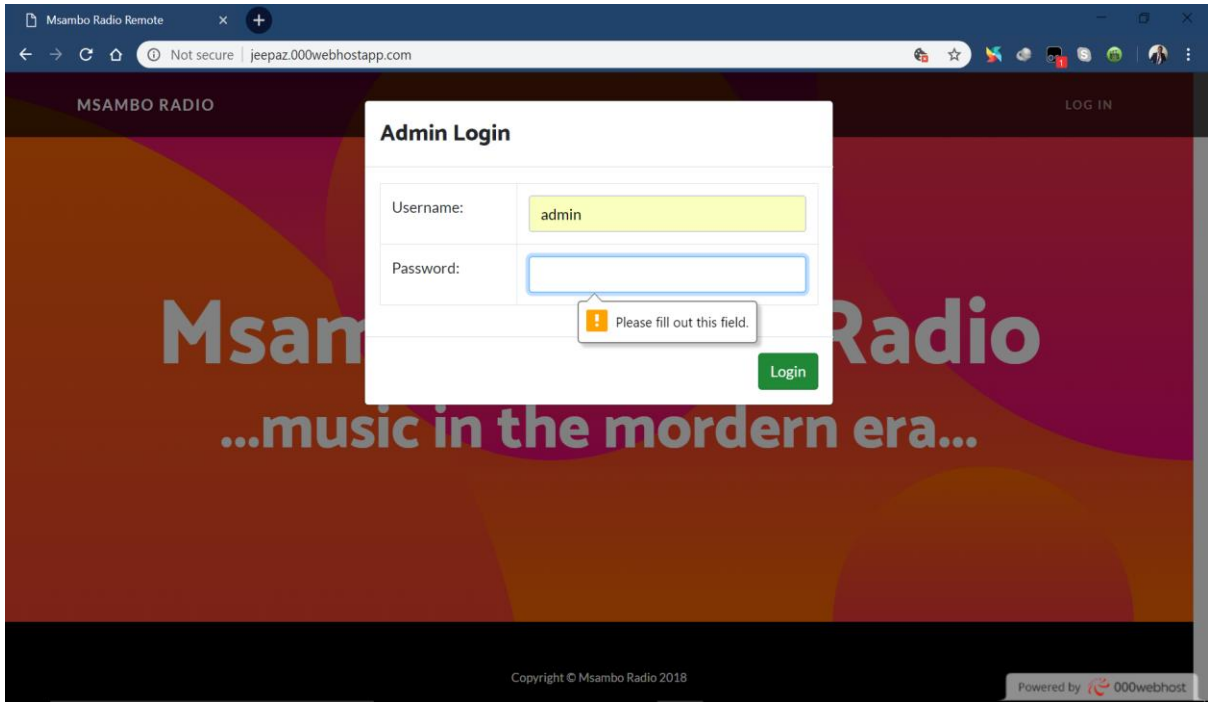
Fig. 5.5 Password validation

5.3.4.3 Host IP Address validation

The host IP address is required and it is not provided a pop-up message prompting update will appear.
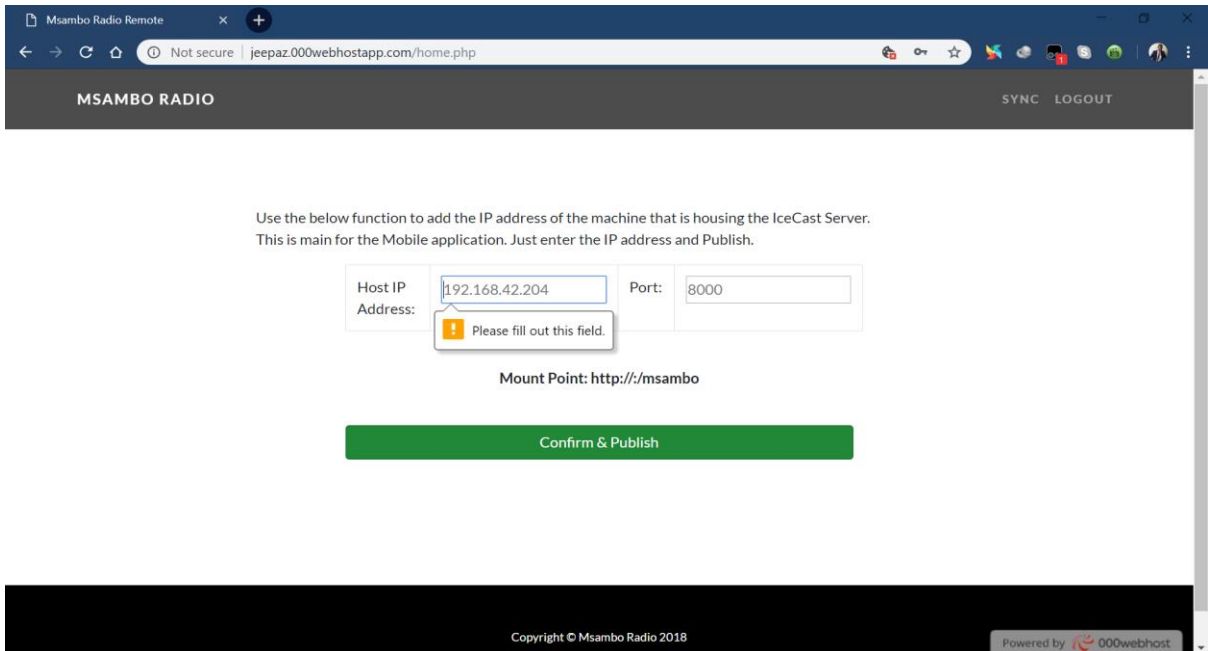
Fig. 5.6 Host IP Address validation

5.3.4.4 Host Port validation

The host IP address and Port number is required and if the Host IP address is provided and not the Port details, a pop-up message prompting update will appear.
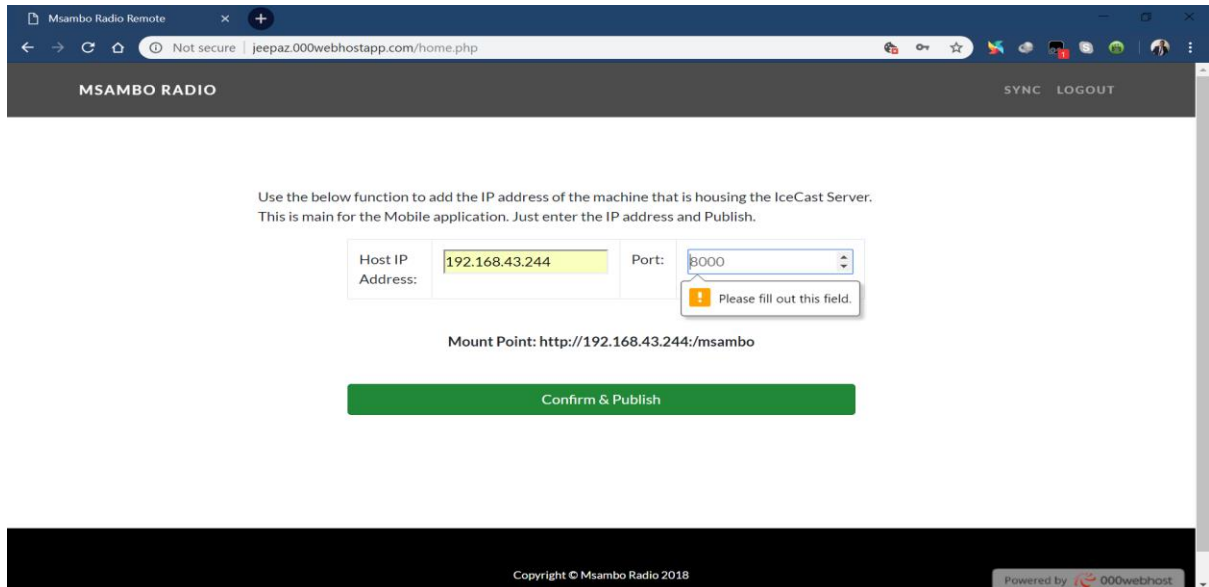
Fig. 5.7 Host Port validation

5.3.4.2 Verification

Verification will determine whether or not the ERS fulfils the requirements and specifications established for it. This process is also concerned with whether the system is well designed and error free. Test cases will be conducted and results will be shown.

5.3.4.2.1 Login verification

A login successful popup message appears after correct credentials have been provided.
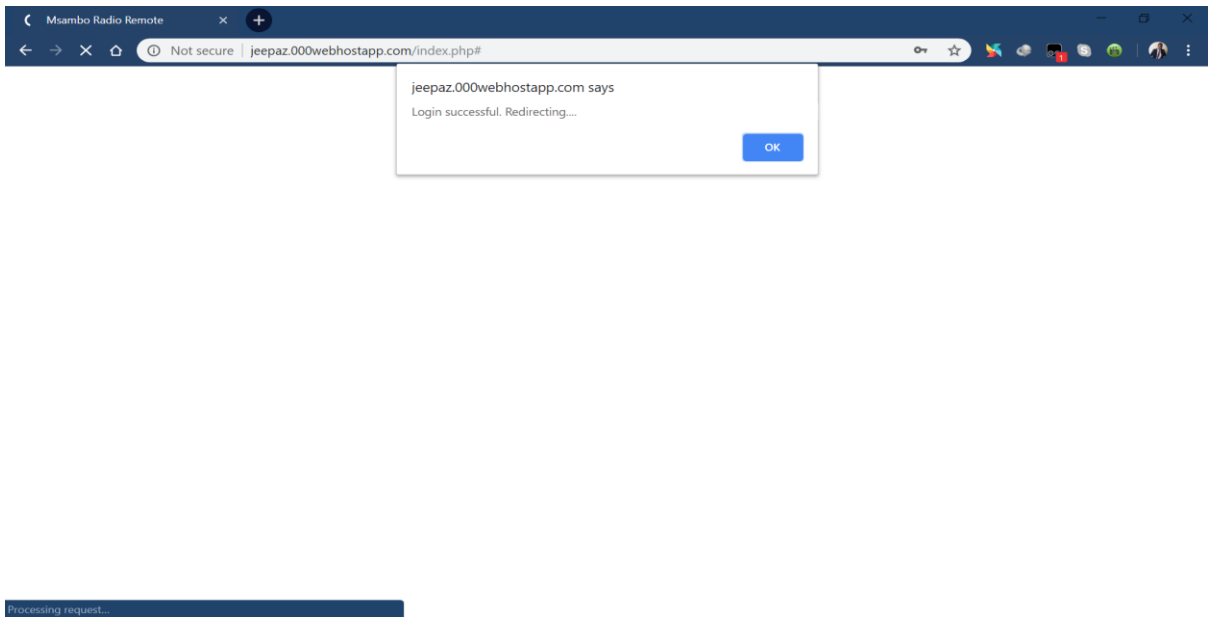
Fig. 5.8 Login verification

5.3.4.2.2 Host IP and Port address verification

A verification message shows on-screen if correct IP and Port addresses have been provided.
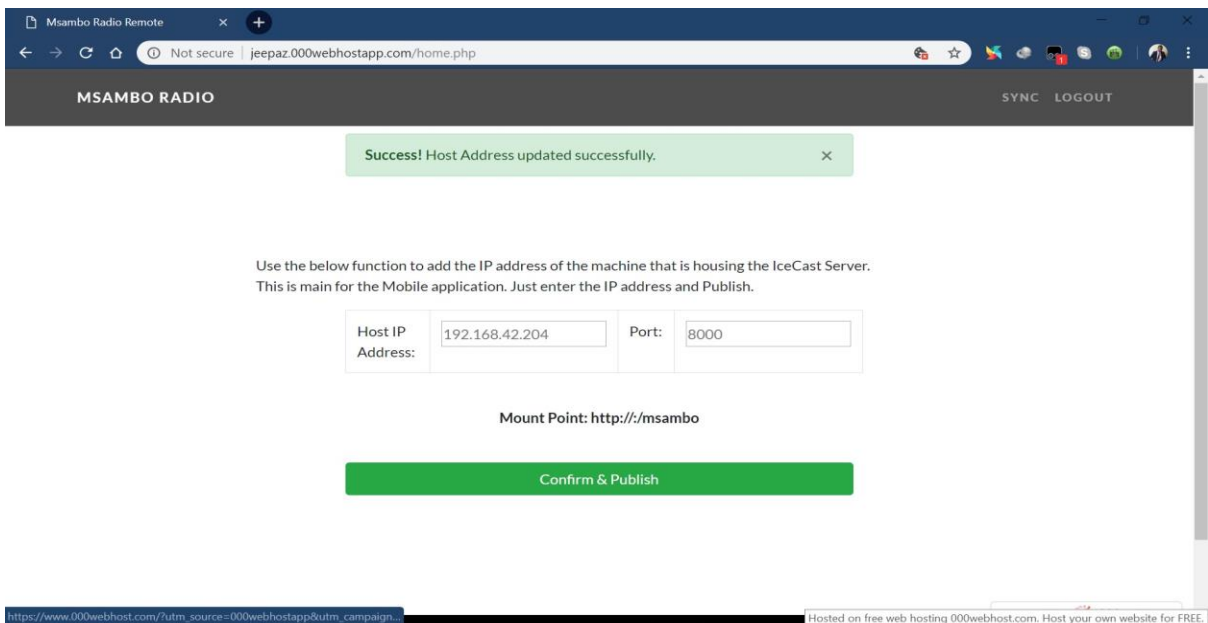
Fig. 5.9 Host IP and Port address verification

5.3.4.2.3 Sync database verification

When the ERS database has been successfully uploaded to the cloud, a message will pop up on the screen.
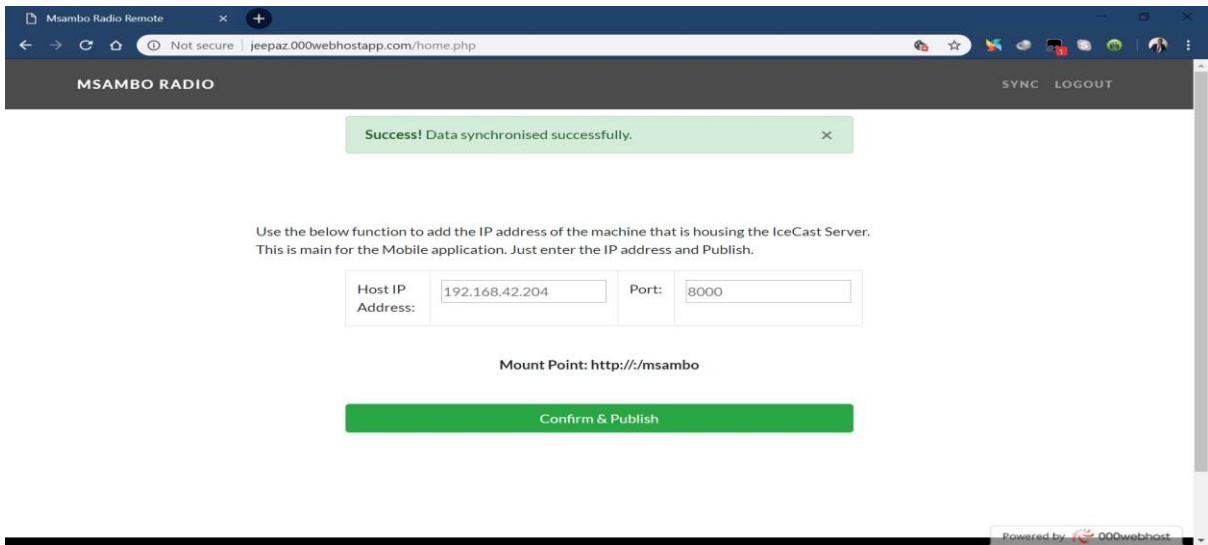
Fig. 5.10 Sync database verification

5.3.5 System vs. Objectives

The ERS will be evaluated for functionality according to the system objectives that were set in the Introduction. Objectives to be tested are scheduling of music according to listener preference, filtering of content according to profile, publishing of listener advertisements, recommending radio stations based on location and awarding royalties to most streamed music. The test cases will be shown below.

5.3.5.1 To publish news online
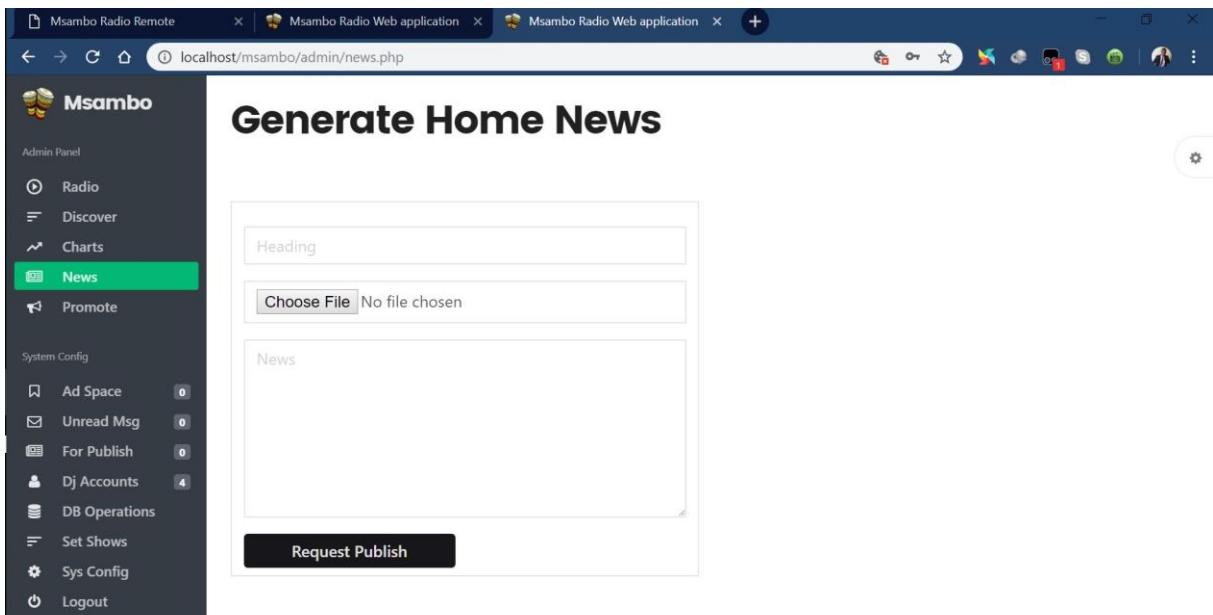
Fig. 5.11 To publish news online

5.3.5.2 Filter programme content according to profile

The ERS is able to filter adult programme content from eligible listeners.
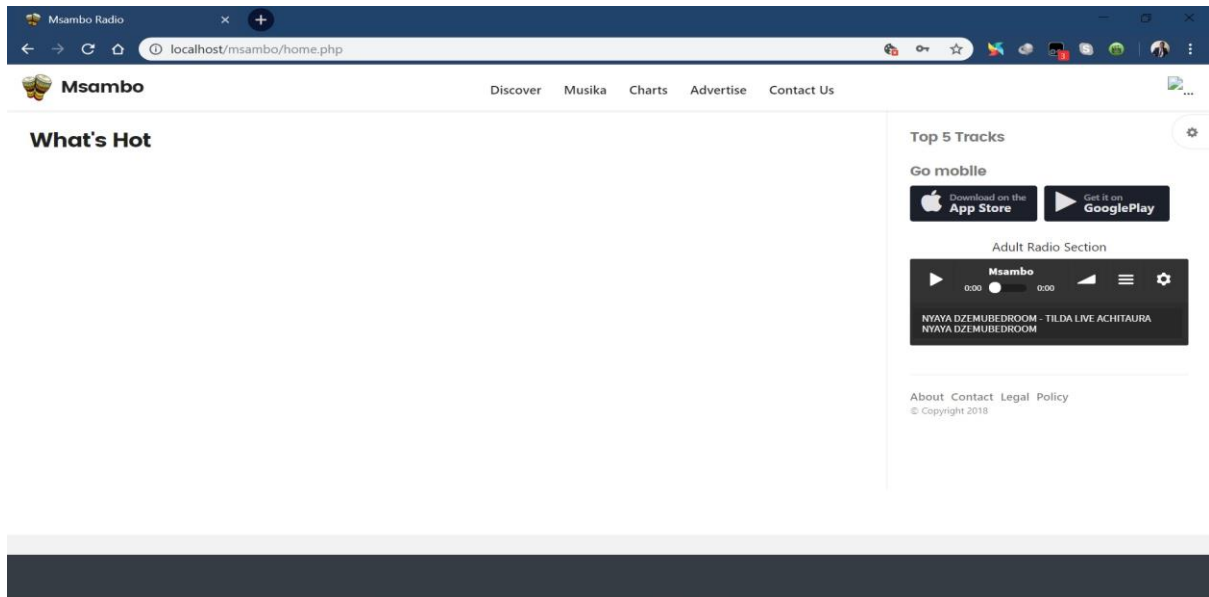
Fig. 5.12 Filter programme content according to profile

5.3.5.3 To publish listener advertisements

A listener is able to upload an advertisement through the radio website and wait for approval from the website Administrator.
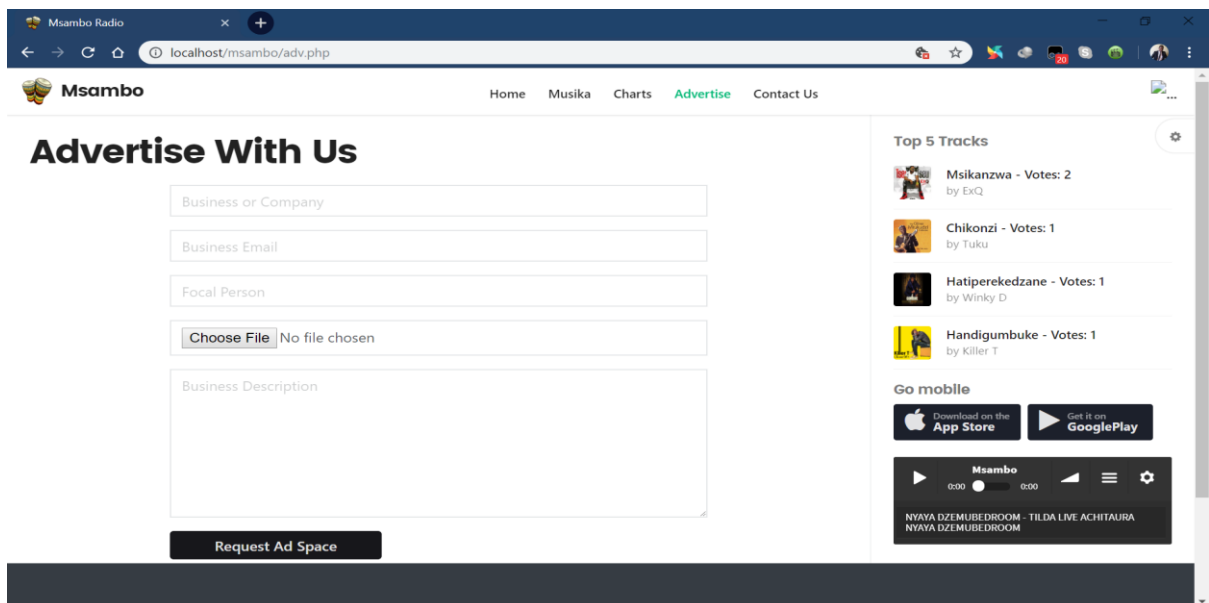
Fig. 5.13 To publish listener advertisements

5.3.5.4 Award royalties to most streamed music
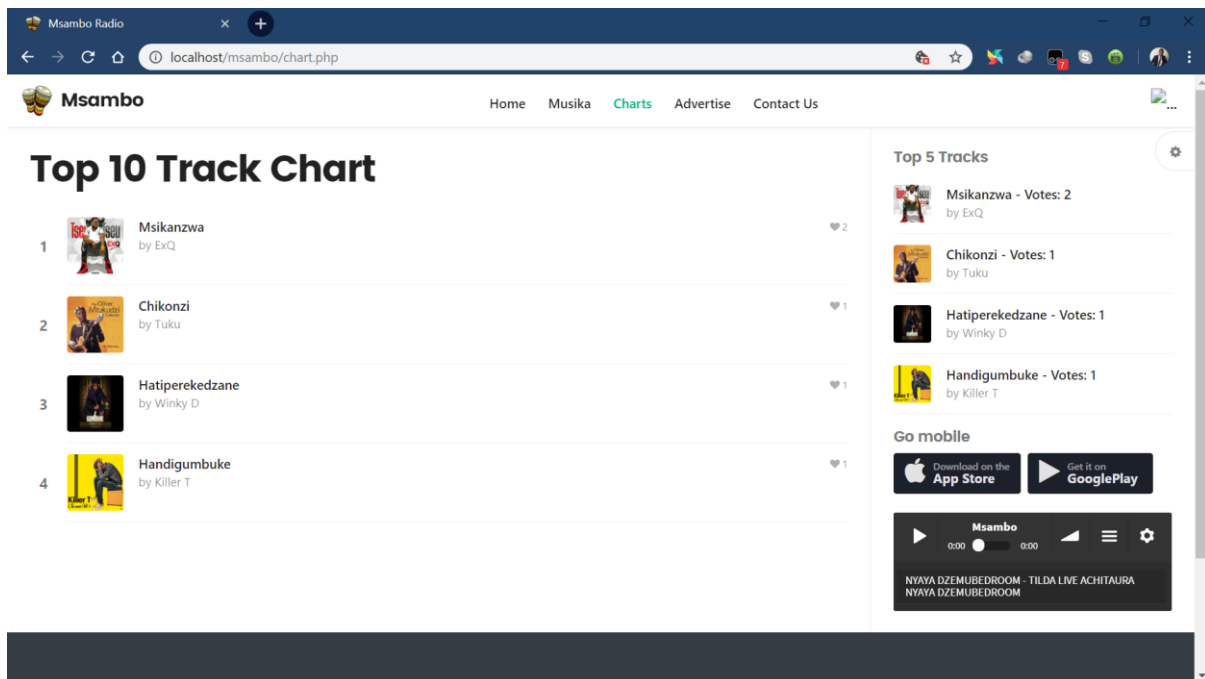
Fig. 5.14 Award royalties to most streamed music

5.4 INSTALLATION

The ERS, ShoutCast and Xampp will be installed on a central server PC secured in a server room. The systems analyst will ensure that the system and hardware are compatible. User training and data migration techniques will be discussed. Changeover strategies will be evaluated and a recommended strategy will be adopted.

5.4.1 User training

Users will be trained to fully understand and utilize the ERS. In-house training will be conducted for employees soon after the system is installed. Listeners will be sensitized on the new system changes and benefits through broadcast, road shows and advertisements in the press and social media.

Table 5.1 Types of users

Type of user	Description
Listener	The end-user of the system who is able to make requests and listen to content being played on radio.
Radio Host	Uses the system during radio show hosting and broadcasting.
Accountant	Generates reports and reconcile subscriber accounts from the system.
Systems Administrator	Plans and maintains the system to ensure undisrupted service.

5.4.2 Data migration

Data migration focuses on the methods to be used to transfer data between storage of the old system to the ERS. Data backup of the old system will be done before moving it to the new system to minimize risk of data loss. System changeover strategies to be employed will be discussed.

5.4.3 System changeover strategies

System changeover strategies outline the different methods that may be used in switching from the old ZBH system to the ERS. Direct changeover, parallel changeover, pilot changeover and phased changeover strategies will be discussed.

5.4.4 Direct changeover

A direct approach in which an old system is cut off and replaced by a new system immediately. Roberts (2001) defines this approach as an abrupt switch from the old system to the ERS as soon as it becomes operational. It is a least expensive strategy but it carries a huge risk of data loss.

5.4.5 Parallel changeover

Parallel changeover strategy requires both the old and new system to work together at the same time for a specified period of time (Dennis et al, 2012). Users get a background of the system and learn as time progresses and there is a possibility of recovering data from the old system if system failure is encountered. Users, developers and management can abandon the old system if they are satisfied with the new system performance. Parallel strategy carries a low risk if the new system results in failure.

5.4.6 Phased changeover

Phased changeover is a combination of direct changeover and parallel changeover but it works in different stages and phases. In this approach, part of the system is rolled out to some users instead, and another part of the system to all users. The risk of system errors and failures is limited to the employed module only and it is less costly compared to full parallel implementation. Phased changeover can be costly in cases where the system requires many separate phases.

5.4.7 Pilot changeover

Pilot changeover comprises employing the ERS at a selected location in an organisation. A selected user group is tasked to use this system and they are also known as a pilot site. The previous system remains operational throughout the whole organisation including the pilot site. The new system is implemented using the direct changeover strategy after it proves to be successful at the pilot site. Pilot conversion is a mixture of parallel and direct changeover strategies. This strategy lowers the risk of system failure and is also less costly.

5.4.8 Recommended changeover strategy

➢ **Parallel Conversion**

Parallel conversion will be used as a system changeover strategy for the ERS and the following steps will be taken during implementation:

    i. Installation of the system in every branch of the organisation.

    ii. Train users in that department.

    iii. Evaluate results resulting from organisation branches using the old and new system.

iv. Maintenance of the implemented system if there are variations in results.

v. Give recommendations for further improvement.

5.5 MAINTENANCE

System maintenance is an on-going activity which covers various activities such as debugging of design-time and code error, updating of system documents and assessment data, and bringing up-to-date user support strategies. System maintenance strategies to be covered are corrective maintenance, adaptive maintenance and perfective maintenance.

5.5.1 Corrective maintenance
Corrective maintenance strategy aims at removing system errors that may have been present due to wrong assumptions or a faulty design. Process failures as well as performance errors are also repaired.

Recommendations:

➢ Procedures for corrective maintenance should be put in place to help in countering errors that may exist from the development stage of the ERS.

5.5.2 Adaptive maintenance
Adaptive maintenance aims at adapting the system to the ever changing system environment and information needs of users. This is necessary in every organisation in preparation of changes that maybe encountered as time passes.

Recommendations:

➢ Standard procedures must be put in place to help adapt the ERS to the ever changing environment.

5.5.3 Perfective maintenance

This strategy entails the modification of existing system modules to improve performance of the ERS. Perfective maintenance is undertaken to react to user's supplementary requirements which may be internal or external. External changes may render the ERS ineffective if maintenance is not done in time, e.g. introduction of new technology, government policies.

Recommendations:

➤ A plan should be clearly written to allow for further tweaking of the ERS to align with the changing policies and trends.

5.6 RECOMMENDATIONS FOR FUTURE/FURTHER DEVELOPMENT

The ERS implementation was undertaken using the parallel changeover strategy and it implies that the whole organisation was left using both the old and new system. Therefore, there is still room for moving back to the old system in case of system malfunctions. After the ERS passed testing and proved to be working as expected, the researcher suggests the following recommendations for future development:

➤ ERS updates must be delivered regularly to align with organisation activities and to minimize system bugs.

➤ Physical and network security upgrades must be delivered to protect the system from hacking and unauthorised access.

➤ Systems analysts must monitor the operations and performance of the system from time to time and take necessary action.

➤ Programs and procedures must be reviewed to ensure correct performance of the system.

5.7 CONCLUSION

The implementation phase covered coding and code maintenance, as well as delivery of the ERS to users through the installation process. Test cases were done and screenshots were provided for login validation, updating host server address and syncing database files to the cloud. User training for identified system users will be conducted. Data migration covered system changeover strategies and the recommended strategy selected to be used is parallel changeover. Maintenance strategies covered the different strategies that can be used and recommendations for each strategy were outlined. Recommendations for future development of the ERS were outlined. The implementation of the ERS was successful and the next phase is system maintenance which will be an on-going process.

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APPENDIX A: USER MANUAL

Installation

The ERS uses a ShoutCast Server software, a web-based system and an android application which will be installed on a Microsoft Windows Operating System platform. The ShoutCast Server software setup, ERS web-system and android application are provided.

Setting up the ShoutCast Server

After installing the software, enter your server name, port and station id. For the hosting server this must be input as *localhost:8000/msambo.* After entering all required information, make sure that the Auto-reconnect checkbox is selected and click the Start button.
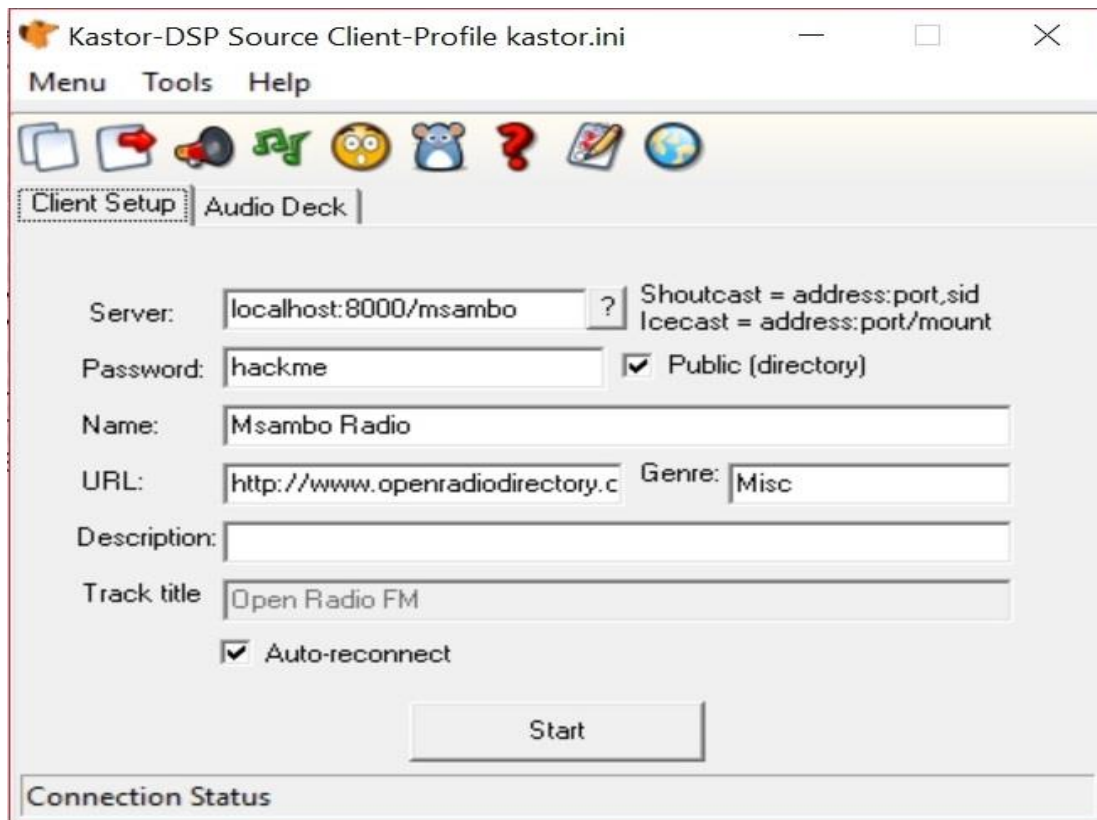
Fig. A.1 ShoutCast Server setup

The server will restart and a log screen will appear showing the Server status, connected devices and server activity. The log screen will appear as shown below.
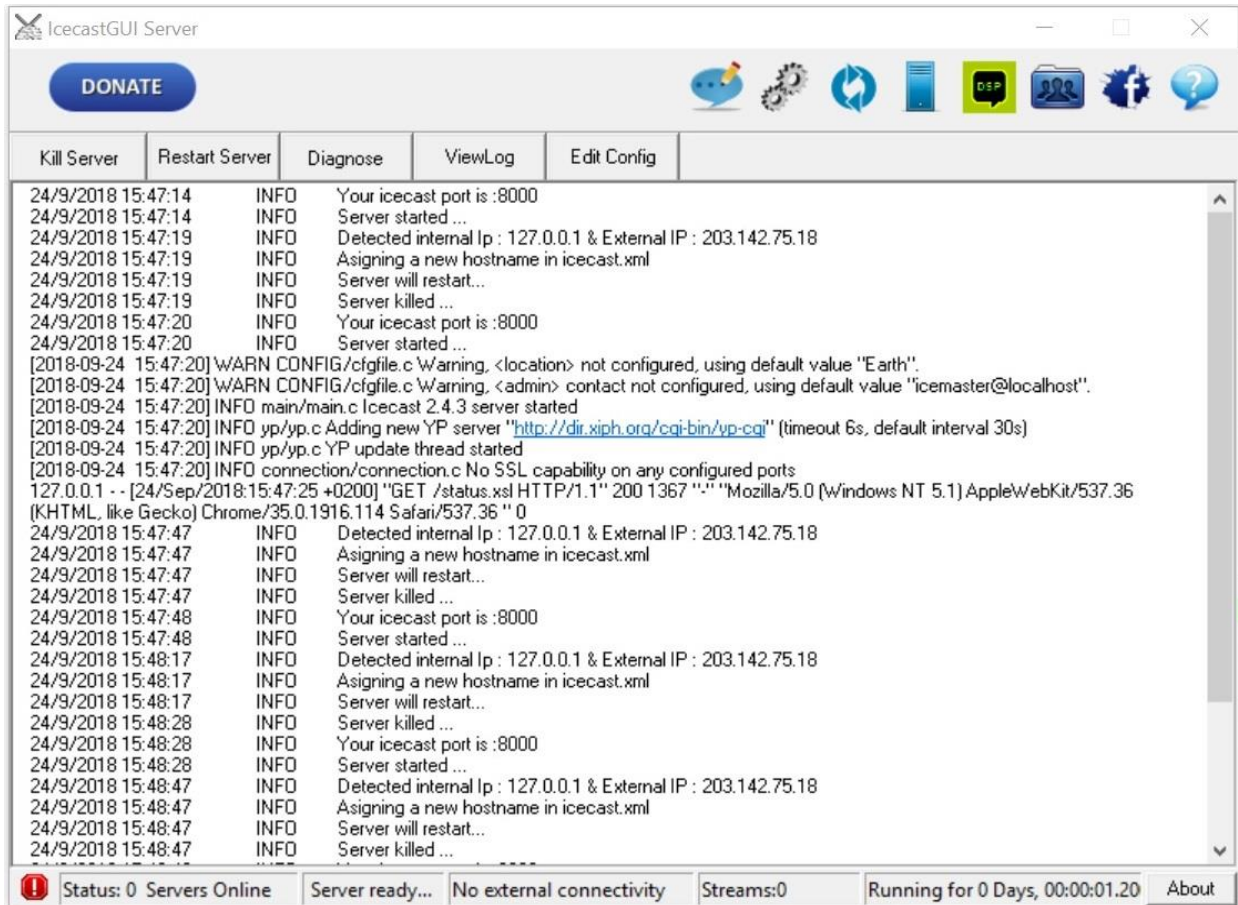
Fig. A.2 ShoutCast Activity log

After the log screen pops up, a media player playlist prompt dialogue box will appear on screen and on that dialogue box, select **Yes.**

Fig. A.3 Add music prompt

Add your music to the playlist using any of the options provided on the next dialogue box.
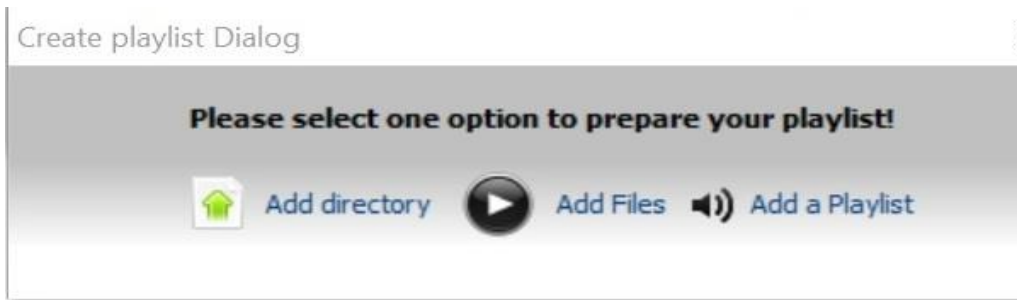
Fig. A.4 Create playlist options

After successfully adding your music to the playlist, you can now play from the Music player on the hosting server and record voice over while music is being played.

Fig. A.5 Media Player

To record sound, select the Red button on the player and a record dialogue will open.
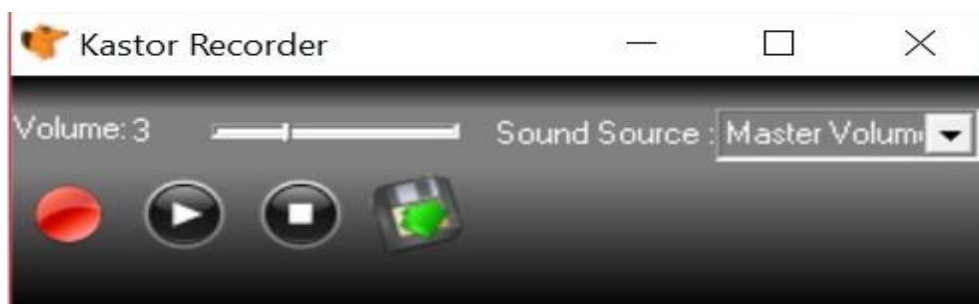
Fig. A.6 Sound recorder

Setting up Android Application settings

After preparing the server configurations and the playlist, now visit this link *http://jeepaz.000webhostapp.com* and login with Admin credentials to setup the Host Server

IP address so that your android applications can be able to communicate with the broadcasting server.
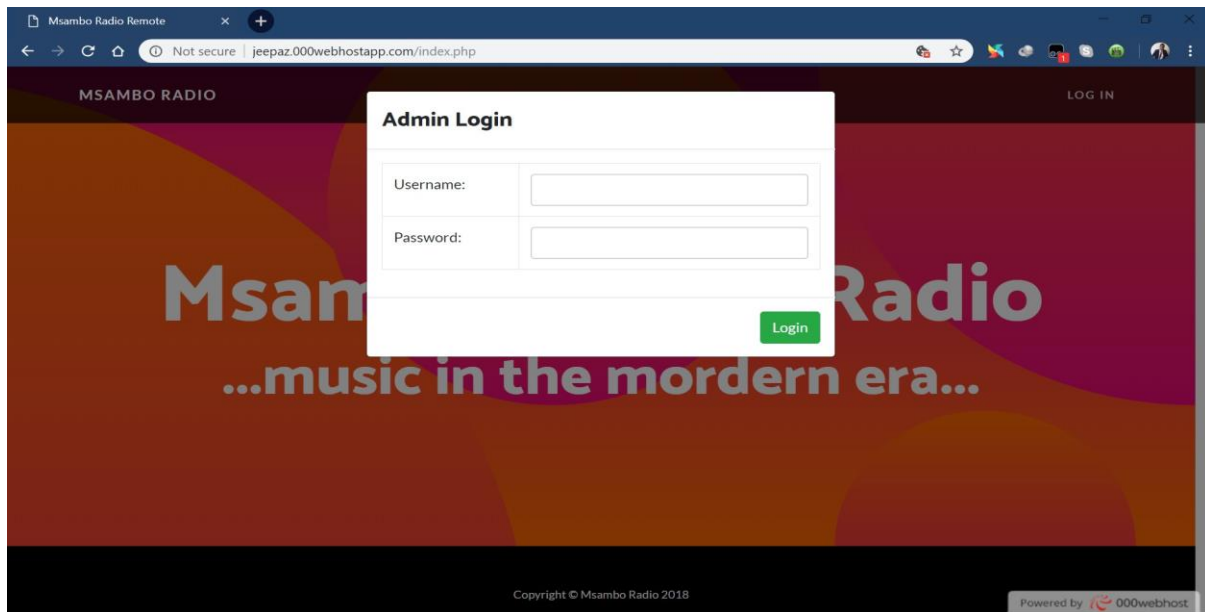
Fig. A.7 Admin login screen

Now enter the IP address of the server hosting the ShoutCast server and the Port number on the screen that is shown below and click *Select and Publish.* To find your server IP address go to your *Network Settings* and check on the network you are connected to.
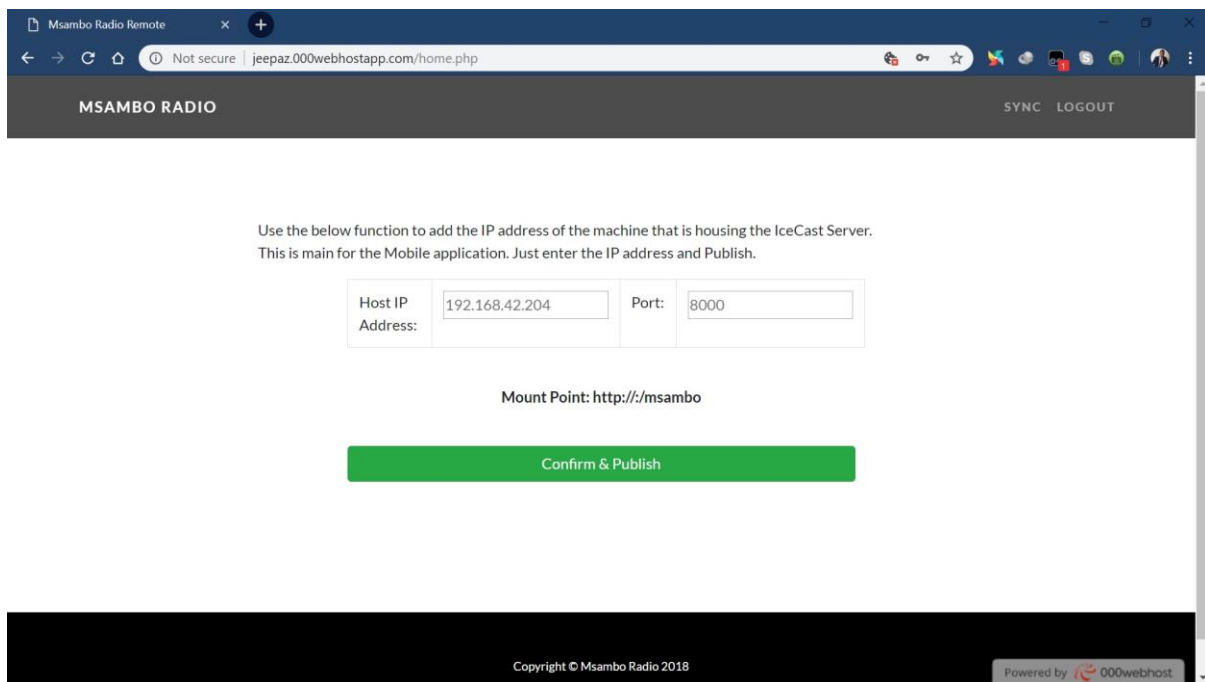
Fig. A.8 Host IP and Port Address update

The system should confirm a successful Host update.
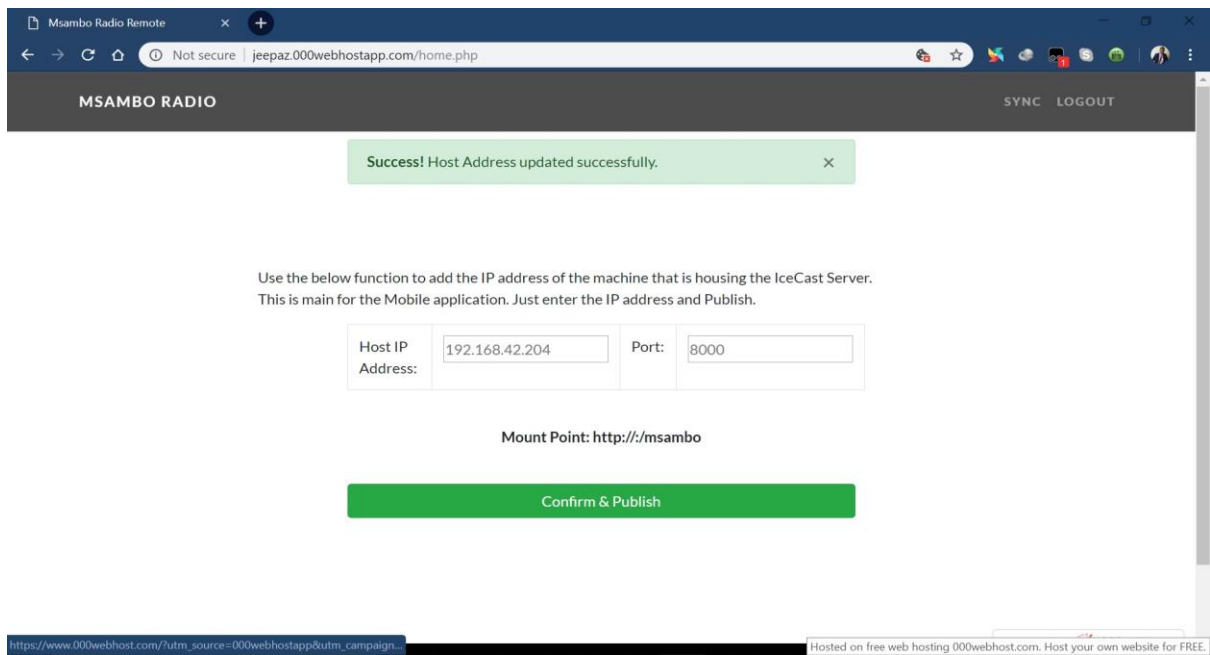
Fig. A.9 Host IP address and Port update successful

Connecting the Android Application

Now connect your android phone that has the ERS Application installed to the network on which you are broadcasting. You should be able to hear music playback from the playlist you have created.

Fig. A.10 Android application music playback screen

You will be able to play and pause music as it streams from the broadcast server.

Setting up System configurations

To access the admin panel go to *https://localhost/msambo/admin*. Enter the host machine address for live radio broadcast and another one for adult content broadcast under System Config.
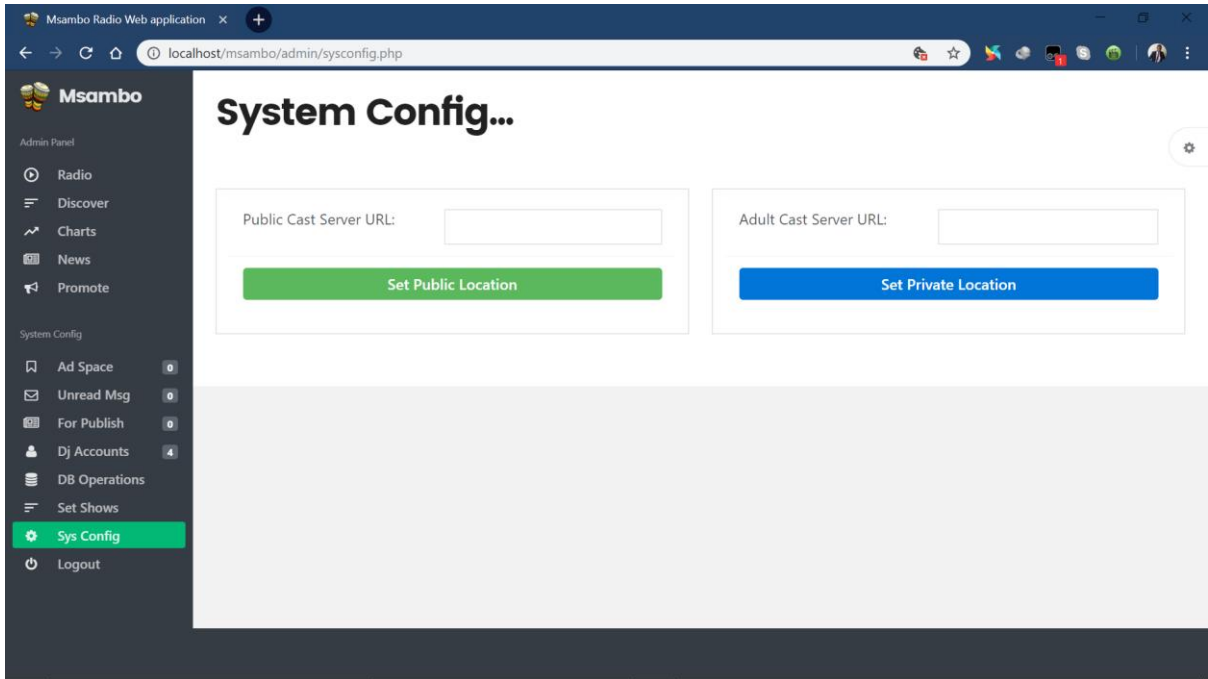
Fig. A.11 System Config

Setup system user accounts

Two types of users can be added, namely the Dj or Systems Admin. Name, surname and role name are required to complete registration.
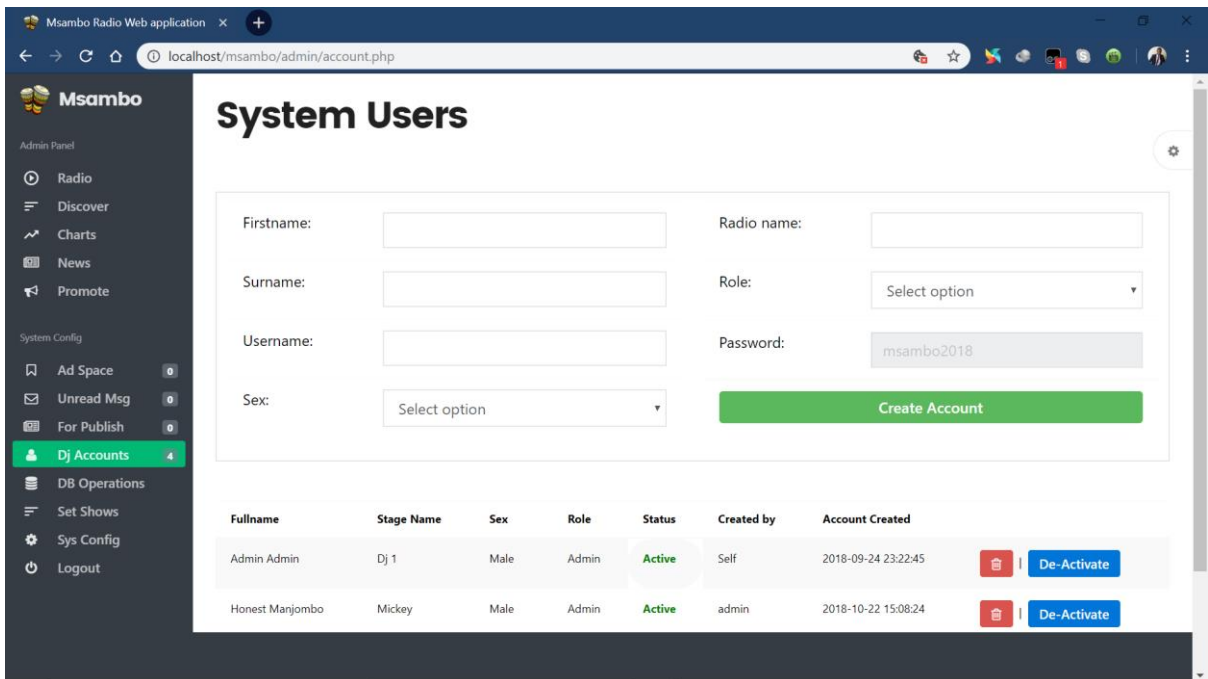
Fig. A.12 Setup system user accounts

Authorize advert requests

An admin can authorise advertisement requests made by listeners through their profiles.
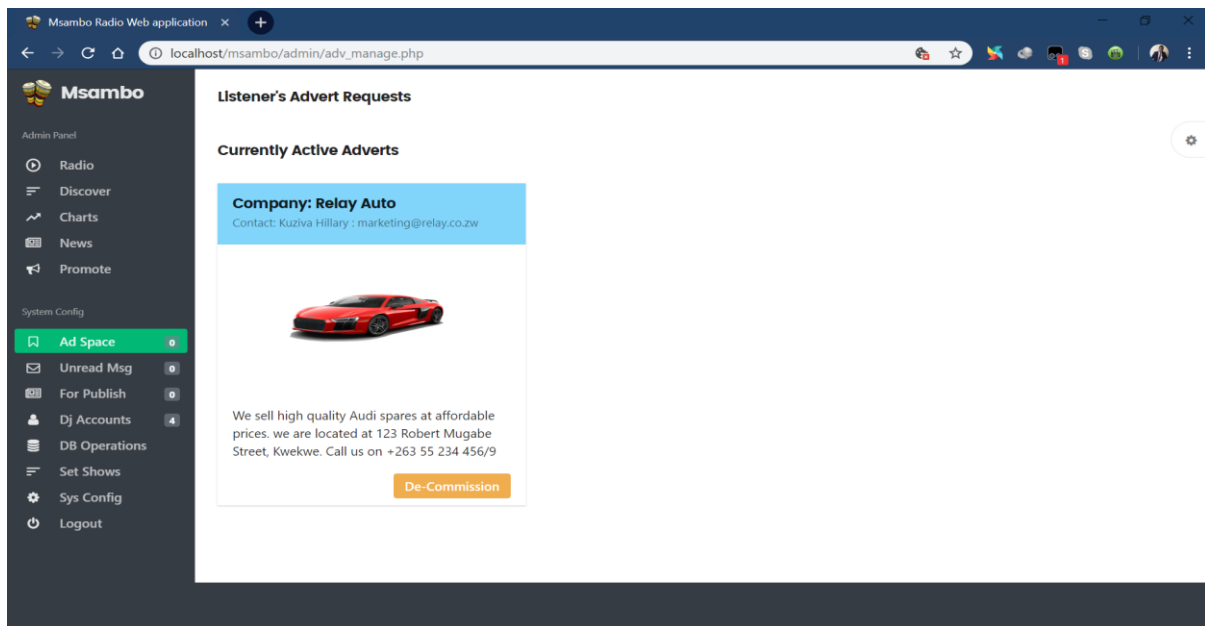
Fig. A.13 Authorize advert requests

Promote music tracks

Music can be promoted through the use of this function to help in compiling vote statistics for trending music in a category. A genre can further be added to help identify a song's class.
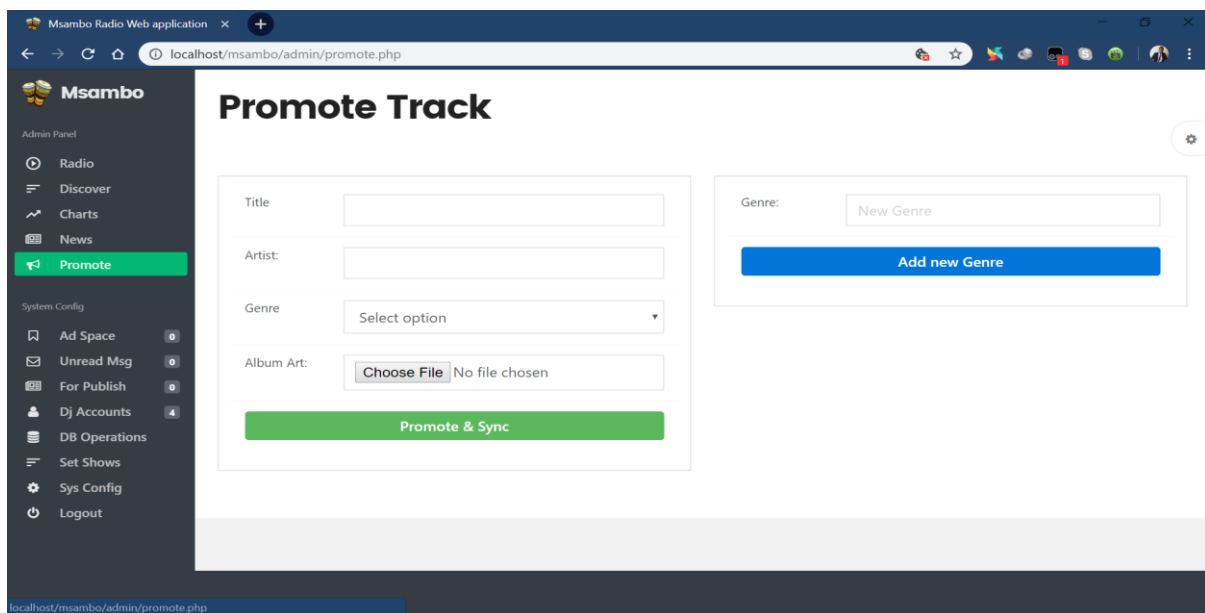
Fig. A.14 Promote music tracks

Generate news section

News can be added by an editor and then submitted for publishing which will be done after a manager or admin's approval.
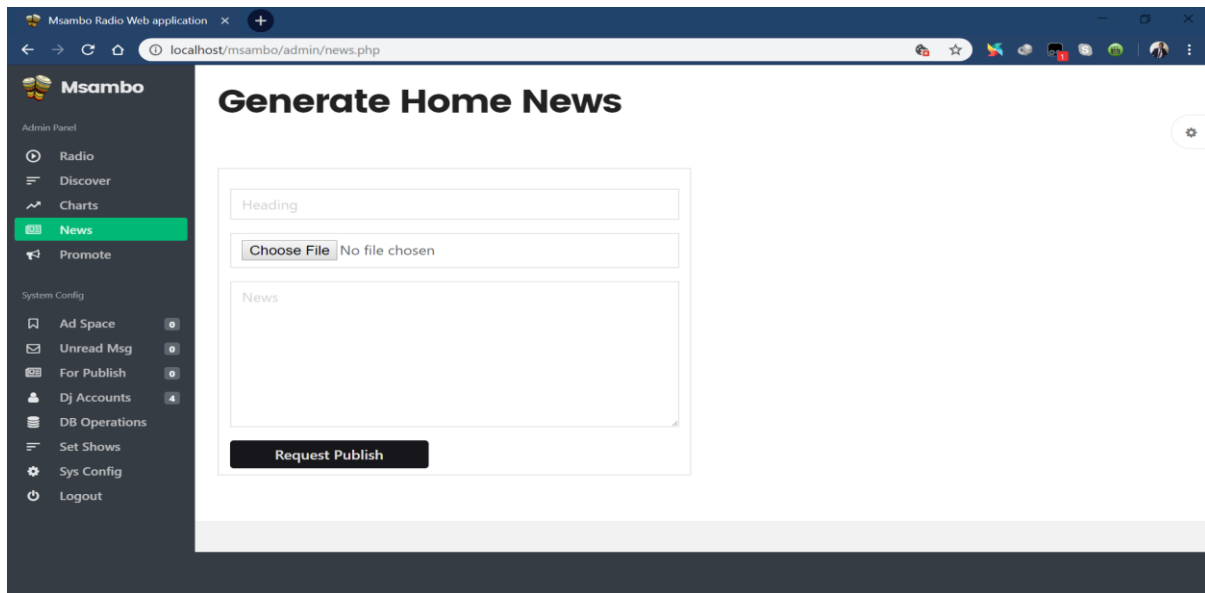
Fig. A.15 Generate news section

Db Operations

Allows a user to generate a local backup file that can be used later to recover from system malfunctions and a remote backup can also be published to sync to the android application.
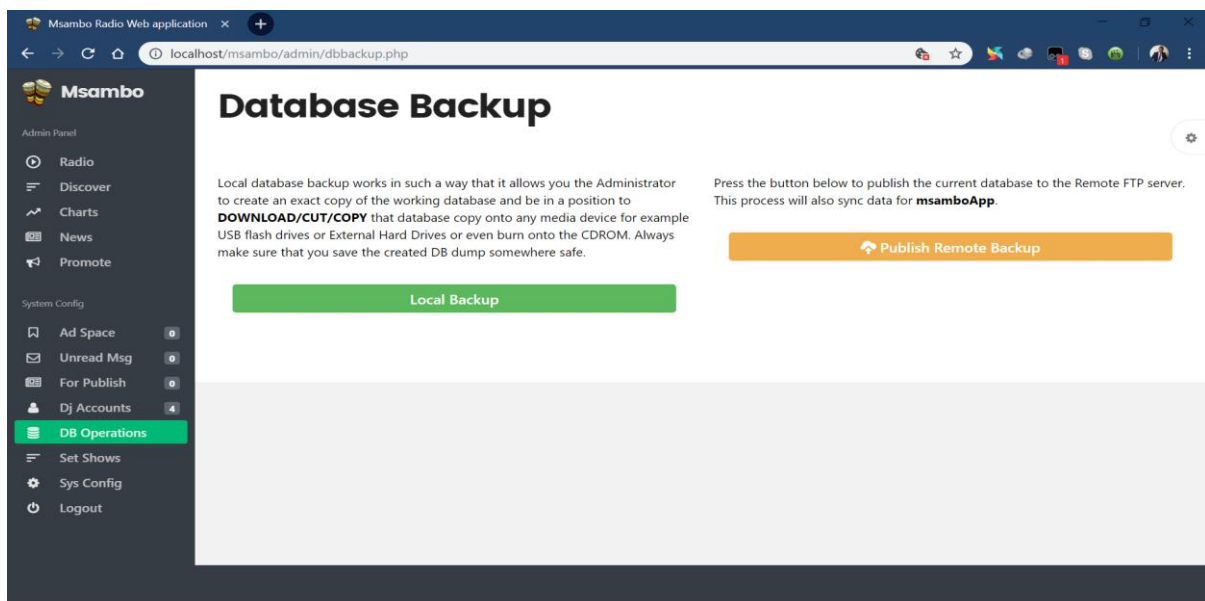
Fig. A.16 Db Operations

Listener login

To login visit *https://localhost/msambo* to activate content filter, to vote for your music and also upload advertisement requests through the website.
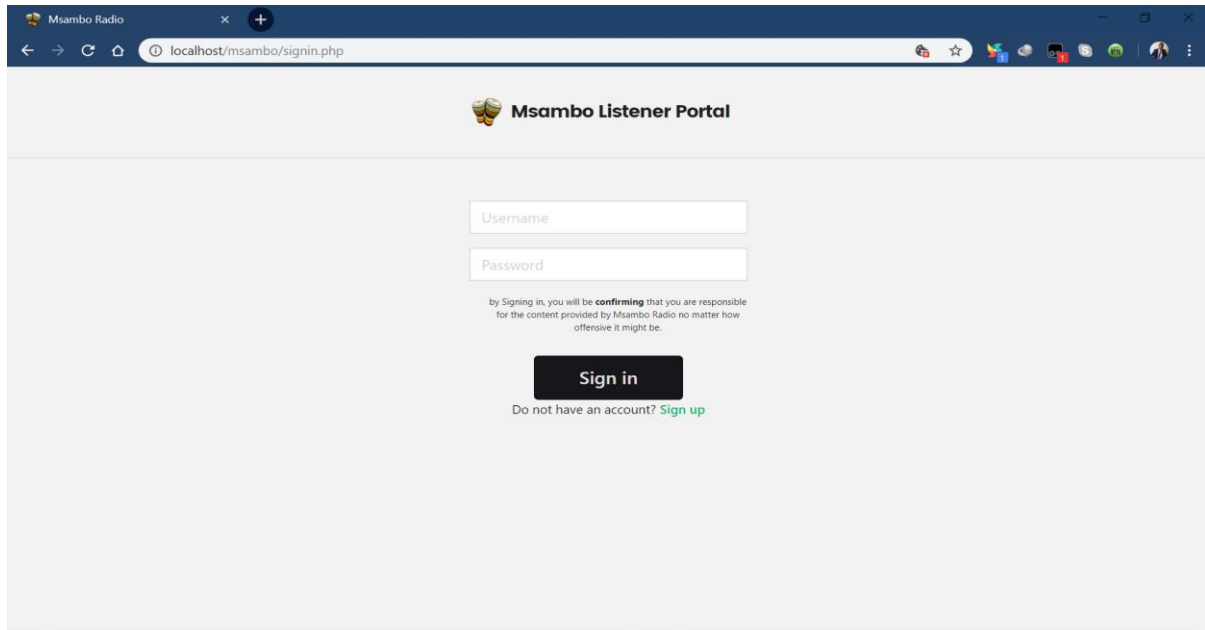
Fig. A.17 Listener login

What's hot

Brings you latest updates on news and other updates.
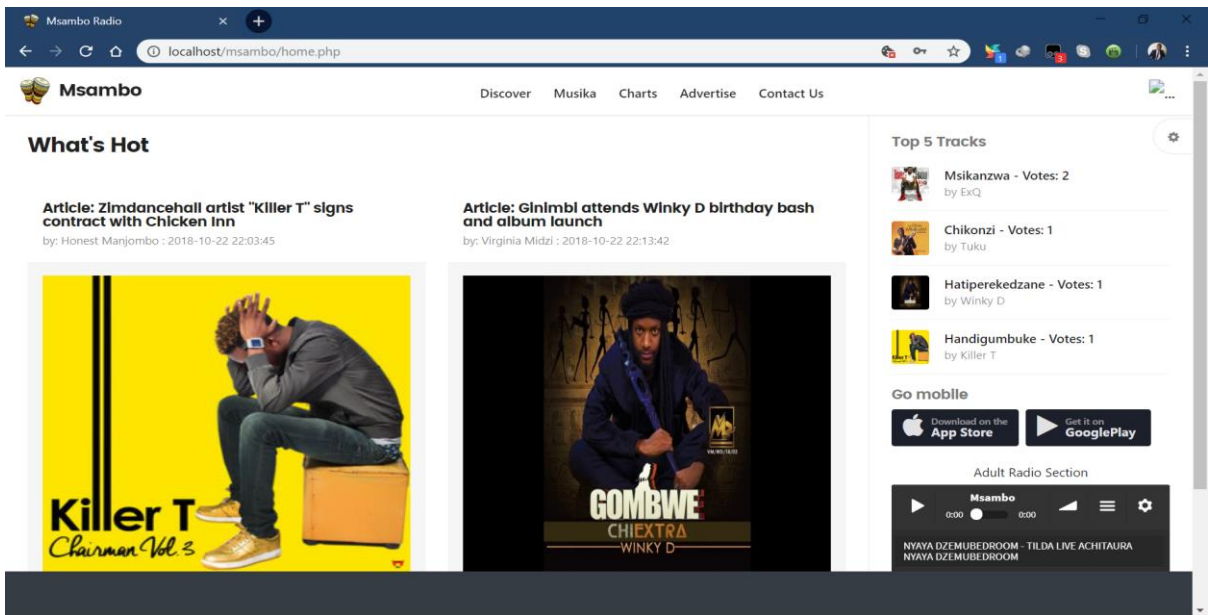
Fig. A.18 What's hot

Musika

Showcases visual classifieds ads posted on the website.
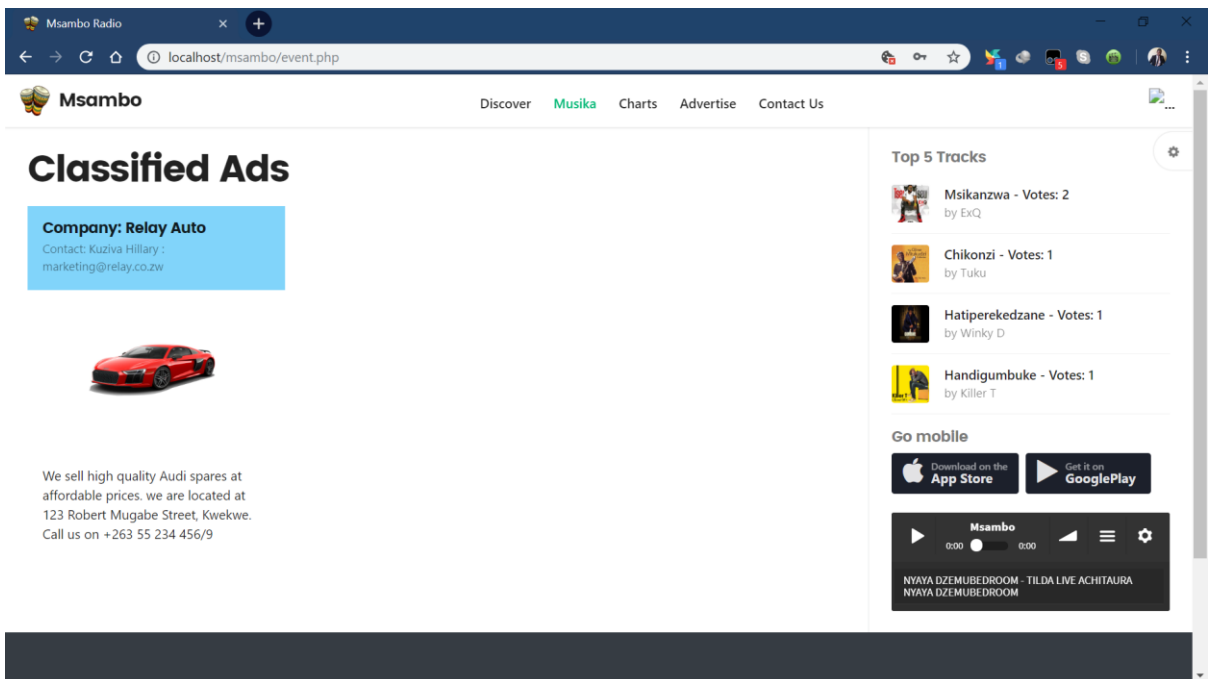
Fig. A.19 Musika

Charts

Lists top 10 voted tracks and the number of votes per track.
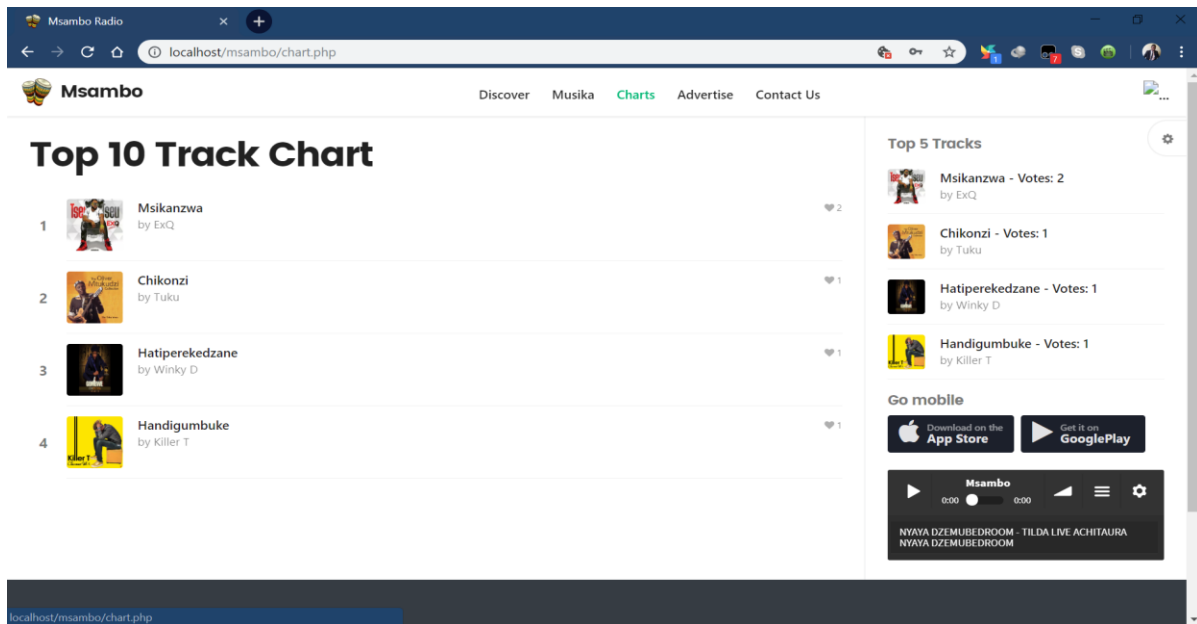
Fig. A.20 Charts

Advertise

Allows a listener to post advertisement content through the use of text and images.
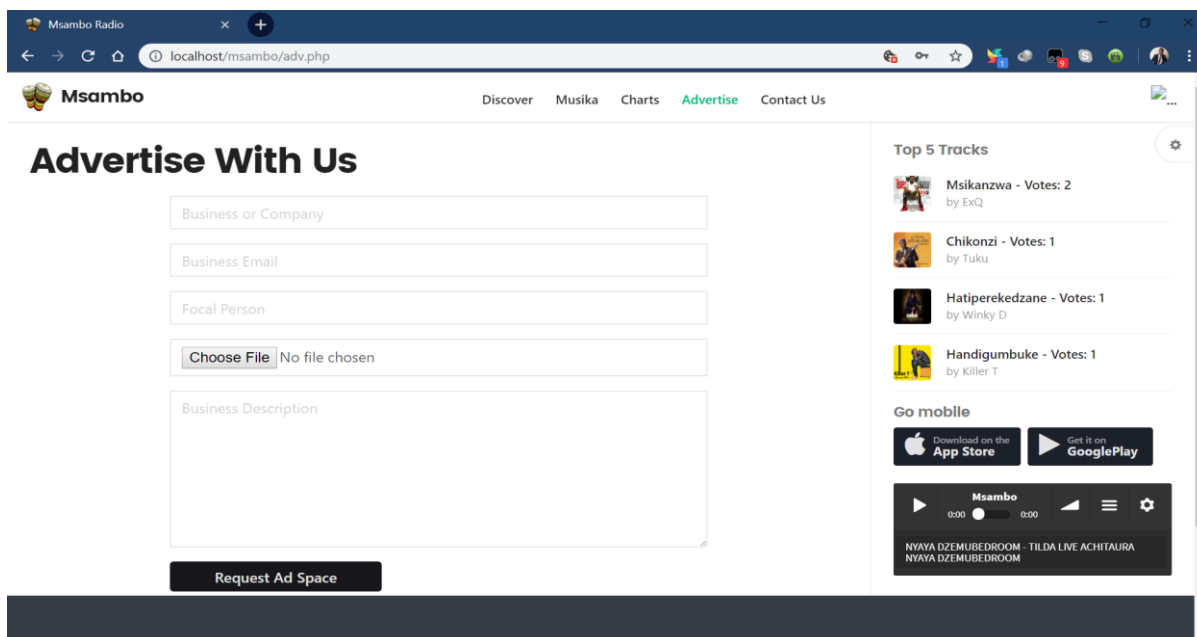
Fig. A.21 Advertise

Filtered content

The media player will only pop up in the bottom right corner if content is suitable for the logged in listener as shown below.

99
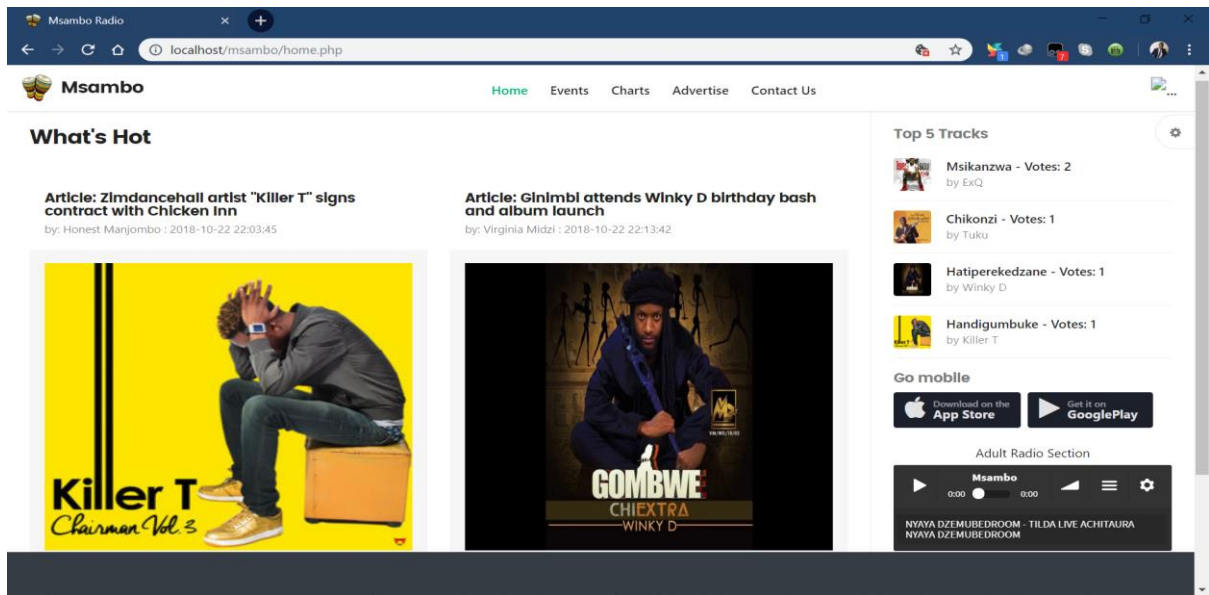
Fig. A.22 Filtered content

USER LOGIN CREDENTIALS

Admin username: *admin*

Admin password: *msambo2018*

APPENDIX B: INTERVIEW CHECKLIST

Interview questions.

Q1. What is your role in ZBH?

Q2. How does the current radio system work?

Q3. Are there any challenges with current radio system? If so, what are the challenges?

- o Are you able to perform tasks effectively in the current system?

Q4. Which area of the system do you think is contributing to the situation at hand?

Q5. What can be done towards improving the processes of the radio system?

- o Do you think upgrading this system to an online internet radio would solve some of the problems being faced?

Q6. What are your suggestions in regards to improving quality programming on live radio?

Q7. What are your recommendations to the proposed online radio system and ZBH?

APPENDIX C: QUESTIONNAIRE CHECKLIST

Answer all questions giving accurate details in your answers.

a. Which radio stations do you listen to?

Radio Zimbabwe ☐   Power FM ☐   Khulumani FM ☐

98.5 Central Radio ☐   Classics 263 ☐   National FM ☐

b. Which one is your favourite and why?

_____

_____

_____

c. How long have you been listening it?

< 1 year ☐   1-5 years ☐   6-10 years ☐   > 11 years ☐

d. Which media device do you use to listen to radio?

Radio/Home Theatre ☐   Decoder ☐   Laptop ☐

Mobile Phone ☐

e. How best can you describe the signal reception quality?

Excellent ☐   Good ☐   Fair ☐   Poor ☐

f. Which programmes do you listen to on radio?

News ☐   Music ☐   Radio Shows ☐   Sport ☐

g. According to your choices in (f.), how is your experience with:

News

Are you able to stay updated with current news even if you have missed the bulletin?

Yes ☐   No ☐

Music

Are you able to reach the DJ in time for music requests?

Yes   ☐   No   ☐   Sometimes   ☐

Are your music requests attended to in time?

Yes   ☐   No   ☐

Does the DJ music playlists suit your music preference?

Yes   ☐   No   ☐   Sometimes   ☐

Radio Shows

Are radio shows content relevant to you?

Yes   ☐   No   ☐   Sometimes   ☐

Are there any radio shows you feel that they deliver sensitive content that is not suitable for a certain age group? If yes, should they be filtered?

Filter   ☐   Do not filter   ☐

Sport

Does radio cover all sport activities?

Yes   ☐   No   ☐

Does radio cover live sports?

Yes   ☐   No   ☐

Advertisements

Do you find advertisements useful?

Yes   ☐   No   ☐   Sometimes   ☐

Do advertisements interrupt your listening experience? If yes, how annoying are they?

Very annoying [ ]   Annoying [ ]   Not annoying [ ]

h. How do you feel about radio license pricing in comparison with service offered?

Affordable [ ]   Expensive [ ]

i. According to your experience in (g.), what do you think can be done to improve the programmes?

_____

_____

_____

_____

_____

_____

_____

j. Are they any weaknesses you are facing using the current radio stations at ZBH? If yes, give a brief description.

_____

_____

_____

_____

_____

k. What measures do you think can be taken on the current system?

Leave it the same [ ]   Upgrade to Internet Radio [ ]

l. Do you have any idea how an internet radio works?

Yes [ ]   No [ ]

m. Is internet easily accessible as compared to radio signal?

Yes [ ]   No [ ]

n. Do you have any recommendations towards the current/future system?

_____

_____

_____

_____

_____

_____

_____

APPENDIX D: OBSERVATION SCORE SHEET

Observation Guide

Date: 23 - 07 - 2018   Time: 16 :45 HRS

Observation details:

Signal Coverage

Radio signal coverage is poor in some areas within the nation where mobile network coverage is available.

Program Content

Some programmes aired on radio include sensitive content not suitable to other age groups of listeners.

Music Playback

Music playback depends on the DJ's taste and preference and not on the user.

Advertisements

Commercial breaks interrupt music playback on live radio therefore distracting attention.

Conclusion

An internet radio station will help in integrating all services of radio through broadcasting over the internet which is accessible in most parts of the nation. Program content can be filtered and listeners can also be able to select music they wish to listen to.

APPENDIX E: SNIPPET OF CODE

```php
1   <?php
2
3   if(!isset($_SESSION)){
4     session_start();
5   }
6   $username = $_SESSION['listener'];
7   $age = $_SESSION['age'];
8   $joined = $_SESSION['joined'];
9
10  include 'config\database.php';
11  require_once 'corez.php';
12
13  if (!isset($username)){
14      header('location:signin.php');
15  }
16
17  $public_svr_url_QRY = mysqli_query($mysqli,"select * from cast_svr where id=1");
18  if($public_svr_row = $public_svr_url_QRY->fetch_assoc()){
19   $public_svr_url = $public_svr_row['svr_address'];
20  }
21
22  ?>
23  <!DOCTYPE html>
24  <html lang="en">
25  <head>
26    <meta charset="utf-8" />
27    <title>Msambo Radio</title>
28    <meta name="description" content="Music, Musician, Bootstrap" />
29    <meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1, minimal-ui" />
30    <meta http-equiv="X-UA-Compatible" content="IE=edge">
31
32    <!-- for ios 7 style, multi-resolution icon of 152x152 -->
33    <meta name="apple-mobile-web-app-capable" content="yes">
34    <meta name="apple-mobile-web-app-status-barstyle" content="black-translucent">
35    <link rel="apple-touch-icon" href="admin/images/logo.png">
36    <meta name="apple-mobile-web-app-title" content="Flatkit">
37    <!-- for Chrome on Android, multi-resolution icon of 196x196 -->
38    <meta name="mobile-web-app-capable" content="yes">
39    <link rel="shortcut icon" sizes="196x196" href="admin/images/logo.png">
40
41    <!-- style -->
42    <link rel="stylesheet" href="admin/css/animate.css/animate.min.css" type="text/css" />
43    <link rel="stylesheet" href="admin/css/glyphicons/glyphicons.css" type="text/css" />
44    <link rel="stylesheet" href="admin/css/font-awesome/css/font-awesome.min.css" type="text/css" />
45    <link rel="stylesheet" href="admin/css/material-design-icons/material-design-icons.css" type="text/css" />
46    <link rel="stylesheet" href="admin/css/bootstrap/dist/css/bootstrap.min.css" type="text/css" />
47
48    <!-- build:css css/styles/app.min.css -->
49    <link rel="stylesheet" href="admin/css/styles/app.css" type="text/css" />
50    <link rel="stylesheet" href="admin/css/styles/style.css" type="text/css" />
51    <link rel="stylesheet" href="admin/css/styles/font.css" type="text/css" />
52
53    <link rel="stylesheet" href="admin/libs/owl.carousel/dist/assets/owl.carousel.min.css" type="text/css" />
54    <link rel="stylesheet" href="admin/libs/owl.carousel/dist/assets/owl.theme.css" type="text/css" />
55    <link rel="stylesheet" href="admin/libs/mediaelement/build/mediaelementplayer.min.css" type="text/css" />
56    <link rel="stylesheet" href="admin/libs/mediaelement/build/mep.css" type="text/css" />
57    <!-- endbuild -->
58  </head>
59  <body>
60    <div class="app dk" id="app">
61
62  <!-- ############ LAYOUT START-->
63
64    <!-- content -->
65    <div id="content" class="app-content white bg" role="main">
66      <div class="app-header white lt box-shadow-z1">
67          <div class="navbar" data-pjax>
68              <a data-toggle="collapse" data-target="#navbar" class="navbar-item pull-right hidden-md-up m-r-0
69                <i class="material-icons">menu</i>
70              </a>
71              <!-- brand -->
72              <a href="index.html" class="navbar-brand md">
73                <img src="admin/images/logo.png" alt="." class="">
74                <span class="hidden-folded inline">Msambo</span>
75              </a>
76              <!-- / brand -->
77
78              <!-- nabar right -->
79              <ul class="nav navbar-nav pull-right">
80                <li class="nav-item dropdown">
81                  <a href="#" class="nav-link clear" data-toggle="dropdown">
```

```
 82                        <span class="avatar w-32">
 83                          <img src="images/a3.jpg" alt="...">
 84                        </span>
 85                      </a>
 86                      <div class="dropdown-menu w dropdown-menu-scale pull-right">
 87                        <a class="dropdown-item" href="profile.html#profile">
 88                          <span>Profile</span>
 89                        </a>
 90                        <div class="dropdown-divider"></div>
 91                        <a class="dropdown-item" href="logout.php">Sign out</a>
 92                      </div>
 93                    </li>
 94                  </ul>
 95                  <!-- / navbar right -->
 96
 97                  <!-- navbar collapse -->
 98                  <div class="collapse navbar-toggleable-sm l-h-0 text-center" id="navbar">
 99                    <!-- link and dropdown -->
100                    <ul class="nav navbar-nav nav-md inline text-primary-hover" data-ui-nav>
101                      <li class="nav-item">
102                        <a href="discover.php" class="nav-link">
103                          <span class="nav-text">Discover</span>
104                        </a>
105                      </li>
106                      <li class="nav-item">
107                        <a href="event.php" class="nav-link">
108                          <span class="nav-text">Musika</span>
109                        </a>
110                      </li>
111                      <li class="nav-item dropdown pos-stc">
112                        <a href="chart.php" class="nav-link">
113                          <span class="nav-text">Charts</span>
114                        </a>
115                      </li>
116                      <li class="nav-item">
117                        <a href="adv.php" class="nav-link">
118                          <span class="nav-text">Advertise</span>
119                        </a>
120                      </li>
121                      <li class="nav-item dropdown pos-stc">
122                        <a href="contact.php" class="nav-link">
123                          <span class="nav-text">Contact Us</span>
124                        </a>
125                      </li>
126                    </ul>
127                    <!-- / link and dropdown -->
128                  </div>
129                  <!-- / navbar collapse -->
130              </div>
131          </div>
132          <div class="app-footer app-player grey bg">
133            <div class="playlist" style="width:100%">
134              <iframe src="<?= $public_svr_url; ?>" style="border:none;" height="55px" width="100%"></iframe>
135            </div>
136          </div>
137          <div class="app-body" id="view">
138
139  <!-- ############ PAGE START-->
140
141  <div class="page-content">
142
143    <div class="row-col">
144      <div class="col-lg-9 b-r no-border-md">
145        <div class="padding">
146          <h2 class="widget-title h4 m-b">What's Hot</h2>
147          <br>
148          <div class="row m-b">
149            <?php
150              $data = get_news_client();
151              foreach ($data as $datum) {
152            ?>
153            <div class="col-sm-6">
154              <div class="box">
155                <div class="box-header">
156                  <h3>Article: <?= $datum['title'];?></h3>
157                  <small style>by: <?= $datum['post_by'];?> : <?= $datum['post_date'];?></small>
158                </div>
159                <div class="box-body dker">
160                  <p class="m-a-0">
161                    <?php echo '<img src="data:image/jpeg;base64,'.base64_encode( $datum['news_img'] ).'" style=
162                  </p>
```

```
163                    <br>
164                    <p style="text-align:justify;">
165                      <?= $datum['news_msg'];?>
166                    </p>
167                  </div>
168                </div>
169              </div>
170              <?php }?>
171            </div>
172
173          </div>
174        </div>
175        <div class="col-lg-3 w-xxl w-auto-md">
176          <div class="padding" style="bottom: 60px;" data-ui-jp="stick_in_parent">
177            <h6 class="text text-muted">Top 5 Tracks</h6>
178            <div class="row item-list item-list-sm m-b">
179              <?php
180                $datum = get_top5_tracks();
181                foreach ($datum as $data) {
182              ?>
183                      <div class="col-xs-12">
184                        <div class="item r" data-id="item-8">
185                              <div class="item-media ">
186                <?php echo '<img src="data:image/jpeg;base64,'.base64_encode( $data['album_art'] ).'" style=
187                              </div>
188                              <div class="item-info">
189                                    <div class="item-title text-ellipsis">
190                                          <a href="track.detail.html"><?php echo $data['title'].
191                                    </div>
192                                    <div class="item-author text-sm text-ellipsis ">
193                                          <a href="artist.detail.html" class="text-muted">by <?=
194                                    </div>
195                              </div>
196                        </div>
197                      </div>
198
199              <?php }?>
200
201            </div>
202            <h6 class="text text-muted">Go mobile</h6>
203            <div class="btn-groups">
204                <a href="msamboapp.apk" class="btn btn-sm dark lt m-r-xs" style="width: 135px">
205                  <span class="pull-left m-r-sm">
206                    <i class="fa fa-apple fa-2x"></i>
207                  </span>
208                  <span class="clear text-left l-h-1x">
209                    <span class="text-muted text-xxs">Download on the</span>
210                    <b class="block m-b-xs">App Store</b>
211                  </span>
212                </a>
213                <a href="msamboapp.apk" class="btn btn-sm dark lt" style="width: 133px">
214                  <span class="pull-left m-r-sm">
215                    <i class="fa fa-play fa-2x"></i>
216                  </span>
217                  <span class="clear text-left l-h-1x">
218                    <span class="text-muted text-xxs">Get it on</span>
219                    <b class="block m-b-xs m-r-xs">GooglePlay</b>
220                  </span>
221                </a>
222            </div>
223            <div class="b-b m-y">
224              <center style="margin-bottom: 5px;">Adult Radio Section </center>
225              <?php if((isset($username)) &&($age >= 18) ){ ?>
226              <iframe width="100%" height="135" src="https://www.iradeo.com/station/embed/155012" frameborder="0
227              <?php } ?>
228            </div>
229            <div class="nav text-sm _600">
230                <a href="#" class="nav-link text-muted m-r-xs">About</a>
231                <a href="#" class="nav-link text-muted m-r-xs">Contact</a>
232                <a href="#" class="nav-link text-muted m-r-xs">Legal</a>
233                <a href="#" class="nav-link text-muted m-r-xs">Policy</a>
234            </div>
235            <p class="text-muted text-xs p-b-lg">&copy; Copyright 2018</p>
236          </div>
237        </div>
238      </div>
239    </div>
240
241    <!-- ########### PAGE END-->
242
243      </div>
```

```
244        </div>
245        <!-- / -->
246
247        <!-- ############ SWITHCHER START-->
248          <div id="switcher">
249            <div class="switcher white" id="sw-theme">
250              <a href="#" data-ui-toggle-class="active" data-ui-target="#sw-theme" class="white sw-btn">
251                <i class="fa fa-gear text-muted"></i>
252              </a>
253              <div class="box-header">
254                <strong>Theme Switcher</strong>
255              </div>
256              <div class="box-divider"></div>
257              <div class="box-body">
258                <p id="settingLayout" class="hidden-md-down">
259                  <label class="md-check m-y-xs" data-target="container">
260                    <input type="checkbox">
261                    <i class="green"></i>
262                    <span>Boxed Layout</span>
263                  </label>
264
265                </p>
266                <p>Colors:</p>
267                <p data-target="color">
268                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
269                    <input type="radio" name="color" value="primary">
270                    <i class="primary"></i>
271                  </label>
272                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
273                    <input type="radio" name="color" value="accent">
274                    <i class="accent"></i>
275                  </label>
276                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
277                    <input type="radio" name="color" value="warn">
278                    <i class="warn"></i>
279                  </label>
280                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
281                    <input type="radio" name="color" value="success">
282                    <i class="success"></i>
283                  </label>
284                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
285                    <input type="radio" name="color" value="info">
286                    <i class="info"></i>
287                  </label>
288                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
289                    <input type="radio" name="color" value="blue">
290                    <i class="blue"></i>
291                  </label>
292                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
293                    <input type="radio" name="color" value="warning">
294                    <i class="warning"></i>
295                  </label>
296                  <label class="radio radio-inline m-a-0 ui-check ui-check-color ui-check-md">
297                    <input type="radio" name="color" value="danger">
298                    <i class="danger"></i>
299                  </label>
300                </p>
301                <p>Themes:</p>
302                <div data-target="bg" class="text-u-c text-center _600 clearfix">
303                  <label class="p-a col-xs-3 light pointer m-a-0">
304                    <input type="radio" name="theme" value="" hidden>
305                    <i class="active-checked fa fa-check"></i>
306                  </label>
307                  <label class="p-a col-xs-3 grey pointer m-a-0">
308                    <input type="radio" name="theme" value="grey" hidden>
309                    <i class="active-checked fa fa-check"></i>
310                  </label>
311                  <label class="p-a col-xs-3 dark pointer m-a-0">
312                    <input type="radio" name="theme" value="dark" hidden>
313                    <i class="active-checked fa fa-check"></i>
314                  </label>
315                  <label class="p-a col-xs-3 black pointer m-a-0">
316                    <input type="radio" name="theme" value="black" hidden>
317                    <i class="active-checked fa fa-check"></i>
318                  </label>
319                </div>
320              </div>
321            </div>
322          </div>
323        <!-- ############ SWITHCHER END-->
324
```

```
325    <!-- ########### SEARCH START -->
326      <div class="modal white lt fade" id="search-modal" data-backdrop="false">
327        <a data-dismiss="modal" class="text-muted text-lg p-x modal-close-btn">&times;</a>
328        <div class="row-col">
329          <div class="p-a-lg h-v row-cell v-m">
330            <div class="row">
331              <div class="col-md-8 offset-md-2">
332                <form action="search.html" class="m-b-md">
333                  <div class="input-group input-group-lg">
334                    <input type="text" class="form-control" placeholder="Type keyword" data-ui-toggle-class="hid
335                    <span class="input-group-btn">
336                      <button class="btn b-a no-shadow white" type="submit">Search</button>
337                    </span>
338                  </div>
339                </form>
340                <div id="search-result" class="animated fadeIn">
341                  <p class="m-b-md"><strong>23</strong> <span class="text-muted">Results found for: </span><stro
342                  <div class="row">
343                    <div class="col-sm-6">
344                      <div class="row item-list item-list-sm item-list-by m-b">
345                        <div class="col-xs-12">
346                          <div class="item r" data-id="item-7" data-src="http://api.soundcloud.com/track
347                            <div class="item-media ">
348                              <a href="track.detail.html" class="item-media-content" style="
349                            </div>
350                            <div class="item-info">
351                              <div class="item-title text-ellipsis">
352                                <a href="track.detail.html">Reflection (Deluxe)</a>
353                              </div>
354                              <div class="item-author text-sm text-ellipsis ">
355                                <a href="artist.detail.html" class="text-muted">Fifth
356                              </div>
357                              <div class="item-meta text-sm text-muted">
358                            </div>
359
360
361                          </div>
362                        </div>
363                      </div>
364                      <div class="col-xs-12">
365                        <div class="item r" data-id="item-3" data-src="http://api.soundcloud.com/track
366                          <div class="item-media ">
367                            <a href="track.detail.html" class="item-media-content" style="
368                          </div>
369                          <div class="item-info">
370                            <div class="item-title text-ellipsis">
371                              <a href="track.detail.html">I Wanna Be In the Cav
372                            </div>
373                            <div class="item-author text-sm text-ellipsis ">
374                              <a href="artist.detail.html" class="text-muted">Jeremy
375                            </div>
376                            <div class="item-meta text-sm text-muted">
377                          </div>
378
379
380                        </div>
381                      </div>
382                    </div>
383                    <div class="col-xs-12">
384                      <div class="item r" data-id="item-5" data-src="http://streaming.radionomy.com/
385                        <div class="item-media ">
386                          <a href="track.detail.html" class="item-media-content" style="
387                        </div>
388                        <div class="item-info">
389                          <div class="item-title text-ellipsis">
390                            <a href="track.detail.html">Live Radio</a>
391                          </div>
392                          <div class="item-author text-sm text-ellipsis ">
393                            <a href="artist.detail.html" class="text-muted">Radion
394                          </div>
395                          <div class="item-meta text-sm text-muted">
396                        </div>
397
398
399                        </div>
400                      </div>
401                    </div>
402                    <div class="col-xs-12">
403                      <div class="item r" data-id="item-1" data-src="http://api.soundcloud.com/track
404                        <div class="item-media ">
405                          <a href="track.detail.html" class="item-media-content" style="
```

111

```
406                                                </div>
407                                                <div class="item-info">
408                                                        <div class="item-title text-ellipsis">
409                                                                <a href="track.detail.html">Pull Up</a>
410                                                        </div>
411                                                        <div class="item-author text-sm text-ellipsis ">
412                                                                <a href="artist.detail.html" class="text-muted">Summer
413                                                        </div>
414                                                        <div class="item-meta text-sm text-muted">
415                                                        </div>
416
417
418                                                </div>
419                                        </div>
420                                </div>
421                        </div>
422                </div>
423                <div class="col-sm-6">
424                  <div class="row item-list item-list-sm item-list-by m-b">
425                        <div class="col-xs-12">
426                                <div class="item">
427                                        <div class="item-media rounded ">
428                                                <a href="artist.detail.html" class="item-media-content" style=
429                                        </div>
430                                        <div class="item-info ">
431                                                <div class="item-title text-ellipsis">
432                                                        <a href="artist.detail.html">Richard Carr</a>
433                                                        <div class="text-sm text-muted">6 songs</div>
434                                                </div>
435                                        </div>
436                                </div>
437                        </div>
438                          <div class="col-xs-12">
439                                <div class="item">
440                                        <div class="item-media rounded ">
441                                                <a href="artist.detail.html" class="item-media-content" style=
442                                        </div>
443                                        <div class="item-info ">
444                                                <div class="item-title text-ellipsis">
445                                                        <a href="artist.detail.html">Sara King</a>
446                                                        <div class="text-sm text-muted">14 songs</div>
447                                                </div>
448                                        </div>
449                                </div>
450                        </div>
451                          <div class="col-xs-12">
452                                <div class="item">
453                                        <div class="item-media rounded ">
454                                                <a href="artist.detail.html" class="item-media-content" style=
455                                        </div>
456                                        <div class="item-info ">
457                                                <div class="item-title text-ellipsis">
458                                                        <a href="artist.detail.html">Melissa Garza</a>
459                                                        <div class="text-sm text-muted">20 songs</div>
460                                                </div>
461                                        </div>
462                                </div>
463                        </div>
464                          <div class="col-xs-12">
465                                <div class="item">
466                                        <div class="item-media rounded ">
467                                                <a href="artist.detail.html" class="item-media-content" style=
468                                        </div>
469                                        <div class="item-info ">
470                                                <div class="item-title text-ellipsis">
471                                                        <a href="artist.detail.html">James Garcia</a>
472                                                        <div class="text-sm text-muted">9 songs</div>
473                                                </div>
474                                        </div>
475                                </div>
476                        </div>
477                  </div>
478                </div>
479              </div>
480            </div>
481            <div id="top-search" class="btn-groups">
482              <strong class="text-muted">Top searches: </strong>
483              <a href="#" class="btn btn-xs white">Happy</a>
484              <a href="#" class="btn btn-xs white">Music</a>
485              <a href="#" class="btn btn-xs white">Weekend</a>
486              <a href="#" class="btn btn-xs white">Summer</a>
```

112

```html
                    <a href="#" class="btn btn-xs white">Holiday</a>
                    <a href="#" class="btn btn-xs white">Blue</a>
                    <a href="#" class="btn btn-xs white">Soul</a>
                    <a href="#" class="btn btn-xs white">Calm</a>
                    <a href="#" class="btn btn-xs white">Nice</a>
                    <a href="#" class="btn btn-xs white">Home</a>
                    <a href="#" class="btn btn-xs white">SLeep</a>
                </div>
              </div>
            </div>
          </div>
        </div>
        <!-- ############ SEARCH END -->
      <!-- ############ SHARE START -->
      <div id="share-modal" class="modal fade animate">
        <div class="modal-dialog">
          <div class="modal-content fade-down">
            <div class="modal-header">

              <h5 class="modal-title">Share</h5>
            </div>
            <div class="modal-body p-lg">
              <div id="share-list" class="m-b">
                <a href="" class="btn btn-icon btn-social rounded btn-social-colored indigo" title="Facebook">
                    <i class="fa fa-facebook"></i>
                    <i class="fa fa-facebook"></i>
                </a>

                <a href="" class="btn btn-icon btn-social rounded btn-social-colored light-blue" title="Twitter">
                    <i class="fa fa-twitter"></i>
                    <i class="fa fa-twitter"></i>
                </a>

                <a href="" class="btn btn-icon btn-social rounded btn-social-colored red-600" title="Google+">
                    <i class="fa fa-google-plus"></i>
                    <i class="fa fa-google-plus"></i>
                </a>

                <a href="" class="btn btn-icon btn-social rounded btn-social-colored blue-grey-600" title="Trumblr
                    <i class="fa fa-tumblr"></i>
                    <i class="fa fa-tumblr"></i>
                </a>

                <a href="" class="btn btn-icon btn-social rounded btn-social-colored red-700" title="Pinterst">
                    <i class="fa fa-pinterest"></i>
                    <i class="fa fa-pinterest"></i>
                </a>
              </div>
              <div>
                <input class="form-control" value="http://plamusic.com/slug"/>
              </div>
            </div>
          </div>
        </div>
      </div>
      <!-- ############ SHARE END -->

<!-- ############ LAYOUT END-->
  </div>

<!-- build:js scripts/app.min.js -->
<!-- jQuery -->
  <script src="admin/libs/jquery/dist/jquery.js"></script>
<!-- Bootstrap -->
  <script src="admin/libs/tether/dist/js/tether.min.js"></script>
  <script src="admin/libs/bootstrap/dist/js/bootstrap.js"></script>
<!-- core -->
  <script src="admin/libs/jQuery-Storage-API/jquery.storageapi.min.js"></script>
  <script src="admin/libs/jquery.stellar/jquery.stellar.min.js"></script>
  <script src="admin/libs/owl.carousel/dist/owl.carousel.min.js"></script>
  <script src="admin/libs/jscroll/jquery.jscroll.min.js"></script>
  <script src="admin/libs/PACE/pace.min.js"></script>
  <script src="admin/libs/jquery-pjax/jquery.pjax.js"></script>

  <!-- <script src="admin/libs/mediaelement/build/mediaelement-and-player.min.js"></script>
  <script src="admin/libs/mediaelement/build/mep.js"></script>
  <script src="admin/scripts/player.js"></script> -->

  <script src="admin/scripts/config.lazyload.js"></script>
  <script src="admin/scripts/ui-load.js"></script>
```

```
568    <script src="admin/scripts/ui-jp.js"></script>
569    <script src="admin/scripts/ui-include.js"></script>
570    <script src="admin/scripts/ui-device.js"></script>
571    <script src="admin/scripts/ui-form.js"></script>
572    <script src="admin/scripts/ui-nav.js"></script>
573    <script src="admin/scripts/ui-screenfull.js"></script>
574    <script src="admin/scripts/ui-scroll-to.js"></script>
575    <script src="admin/scripts/ui-toggle-class.js"></script>
576    <script src="admin/scripts/ui-taburl.js"></script>
577    <script src="admin/scripts/app.js"></script>
578    <script src="admin/scripts/site.js"></script>
579    <script src="admin/scripts/ajax.js"></script>
580    <script src="https://cdnjs.cloudflare.com/ajax/libs/flexslider/2.6.3/jquery.flexslider-min.js"></script>
581    <script>
582      $(window).load(function() {
583          $('.flexslider').flexslider({
584            animation: "slide"
585          });
586      });
587    </script>
588   <!-- endbuild -->
589   </body>
590   </html>
591
```

APPENDIX F: DATABASE DESIGN

```
1    CREATE DATABASE  IF NOT EXISTS `msambodb` /*!40100 DEFAULT CHARACTER SET latin1 */;
2    USE `msambodb`;
3    -- MySQL dump 10.13  Distrib 5.7.23, for Linux (x86_64)
4    --
5    -- Host: localhost    Database: msambodb
6    -- ------------------------------------------------------
7    -- Server version    5.7.23-0ubuntu0.18.04.1
8
9    /*!40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */;
10   /*!40101 SET @OLD_CHARACTER_SET_RESULTS=@@CHARACTER_SET_RESULTS */;
11   /*!40101 SET @OLD_COLLATION_CONNECTION=@@COLLATION_CONNECTION */;
12   /*!40101 SET NAMES utf8 */;
13   /*!40103 SET @OLD_TIME_ZONE=@@TIME_ZONE */;
14   /*!40103 SET TIME_ZONE='+00:00' */;
15   /*!40014 SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0 */;
16   /*!40014 SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0 */;
17   /*!40101 SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='NO_AUTO_VALUE_ON_ZERO' */;
18   /*!40111 SET @OLD_SQL_NOTES=@@SQL_NOTES, SQL_NOTES=0 */;
19
20   --
21   -- Table structure for table `cast_svr`
22   --
23
24   DROP TABLE IF EXISTS `cast_svr`;
25   /*!40101 SET @saved_cs_client     = @@character_set_client */;
26   /*!40101 SET character_set_client = utf8 */;
27   CREATE TABLE `cast_svr` (
28     `id` int(11) NOT NULL AUTO_INCREMENT,
29     `svr_address` varchar(255) NOT NULL,
30     PRIMARY KEY (`id`)
31   ) ENGINE=InnoDB AUTO_INCREMENT=2 DEFAULT CHARSET=latin1;
32   /*!40101 SET character_set_client = @saved_cs_client */;
33
34   --
35   -- Dumping data for table `cast_svr`
36   --
37
38   LOCK TABLES `cast_svr` WRITE;
39   /*!40000 ALTER TABLE `cast_svr` DISABLE KEYS */;
40   INSERT INTO `cast_svr` VALUES (1,'http://10.210.1.49:8000/msambo');
41   /*!40000 ALTER TABLE `cast_svr` ENABLE KEYS */;
42   UNLOCK TABLES;
43
44   --
45   -- Table structure for table `chart`
46   --
47
48   DROP TABLE IF EXISTS `chart`;
49   /*!40101 SET @saved_cs_client     = @@character_set_client */;
50   /*!40101 SET character_set_client = utf8 */;
51   CREATE TABLE `chart` (
52     `id` int(11) NOT NULL AUTO_INCREMENT,
53     `song_id` int(11) NOT NULL,
54     `vote` int(11) NOT NULL,
55     `voter` varchar(45) DEFAULT NULL,
56     PRIMARY KEY (`id`)
57   ) ENGINE=InnoDB DEFAULT CHARSET=latin1;
58   /*!40101 SET character_set_client = @saved_cs_client */;
59
60   --
61   -- Dumping data for table `chart`
62   --
63
64   LOCK TABLES `chart` WRITE;
65   /*!40000 ALTER TABLE `chart` DISABLE KEYS */;
66   /*!40000 ALTER TABLE `chart` ENABLE KEYS */;
67   UNLOCK TABLES;
68
69   --
70   -- Table structure for table `day_slot`
71   --
72
73   DROP TABLE IF EXISTS `day_slot`;
```

```sql
 74    /*!40101 SET @saved_cs_client     = @@character_set_client */;
 75    /*!40101 SET character_set_client = utf8 */;
 76    CREATE TABLE `day_slot` (
 77      `id` int(11) NOT NULL AUTO_INCREMENT,
 78      `day_name` varchar(25) NOT NULL,
 79      PRIMARY KEY (`id`)
 80    ) ENGINE=InnoDB AUTO_INCREMENT=8 DEFAULT CHARSET=latin1;
 81    /*!40101 SET character_set_client = @saved_cs_client */;
 82
 83    --
 84    -- Dumping data for table `day_slot`
 85    --
 86
 87    LOCK TABLES `day_slot` WRITE;
 88    /*!40000 ALTER TABLE `day_slot` DISABLE KEYS */;
 89    INSERT INTO `day_slot` VALUES
       (1,'Sunday'),(2,'Monday'),(3,'Tuesday'),(4,'Wednesday'),(5,'Thursday'),(6,'Friday'),(7
       ,'Saturday');
 90    /*!40000 ALTER TABLE `day_slot` ENABLE KEYS */;
 91    UNLOCK TABLES;
 92
 93    --
 94    -- Table structure for table `genre`
 95    --
 96
 97    DROP TABLE IF EXISTS `genre`;
 98    /*!40101 SET @saved_cs_client     = @@character_set_client */;
 99    /*!40101 SET character_set_client = utf8 */;
100    CREATE TABLE `genre` (
101      `id` int(11) NOT NULL AUTO_INCREMENT,
102      `genre` varchar(45) NOT NULL,
103      PRIMARY KEY (`id`),
104      UNIQUE KEY `genre` (`genre`)
105    ) ENGINE=InnoDB DEFAULT CHARSET=latin1;
106    /*!40101 SET character_set_client = @saved_cs_client */;
107
108    --
109    -- Dumping data for table `genre`
110    --
111
112    LOCK TABLES `genre` WRITE;
113    /*!40000 ALTER TABLE `genre` DISABLE KEYS */;
114    /*!40000 ALTER TABLE `genre` ENABLE KEYS */;
115    UNLOCK TABLES;
116
117    --
118    -- Table structure for table `listen_log`
119    --
120
121    DROP TABLE IF EXISTS `listen_log`;
122    /*!40101 SET @saved_cs_client     = @@character_set_client */;
123    /*!40101 SET character_set_client = utf8 */;
124    CREATE TABLE `listen_log` (
125      `id` int(11) NOT NULL AUTO_INCREMENT,
126      `listener` varchar(100) NOT NULL,
127      `logged_in` datetime NOT NULL,
128      `logged_out` datetime NOT NULL,
129      PRIMARY KEY (`id`)
130    ) ENGINE=InnoDB DEFAULT CHARSET=latin1;
131    /*!40101 SET character_set_client = @saved_cs_client */;
132
133    --
134    -- Dumping data for table `listen_log`
135    --
136
137    LOCK TABLES `listen_log` WRITE;
138    /*!40000 ALTER TABLE `listen_log` DISABLE KEYS */;
139    /*!40000 ALTER TABLE `listen_log` ENABLE KEYS */;
140    UNLOCK TABLES;
141
142    --
143    -- Table structure for table `listeners`
144    --
```

```sql
145
146    DROP TABLE IF EXISTS `listeners`;
147    /*!40101 SET @saved_cs_client     = @@character_set_client */;
148    /*!40101 SET character_set_client = utf8 */;
149    CREATE TABLE `listeners` (
150      `id` int(11) NOT NULL AUTO_INCREMENT,
151      `username` varchar(100) NOT NULL,
152      `password` varchar(255) NOT NULL,
153      `gender` varchar(45) NOT NULL,
154      `location` varchar(45) NOT NULL,
155      `joined` datetime NOT NULL,
156      PRIMARY KEY (`id`),
157      UNIQUE KEY `username` (`username`)
158    ) ENGINE=InnoDB DEFAULT CHARSET=latin1;
159    /*!40101 SET character_set_client = @saved_cs_client */;
160
161    --
162    -- Dumping data for table `listeners`
163    --
164
165    LOCK TABLES `listeners` WRITE;
166    /*!40000 ALTER TABLE `listeners` DISABLE KEYS */;
167    /*!40000 ALTER TABLE `listeners` ENABLE KEYS */;
168    UNLOCK TABLES;
169
170    --
171    -- Table structure for table `programme_lineup`
172    --
173
174    DROP TABLE IF EXISTS `programme_lineup`;
175    /*!40101 SET @saved_cs_client     = @@character_set_client */;
176    /*!40101 SET character_set_client = utf8 */;
177    CREATE TABLE `programme_lineup` (
178      `id` int(11) NOT NULL AUTO_INCREMENT,
179      `title` varchar(255) NOT NULL,
180      `age` varchar(10) NOT NULL,
181      `dj` varchar(100) NOT NULL,
182      `day_id` int(11) NOT NULL,
183      `time_period` int(11) NOT NULL,
184      PRIMARY KEY (`id`)
185    ) ENGINE=InnoDB DEFAULT CHARSET=latin1;
186    /*!40101 SET character_set_client = @saved_cs_client */;
187
188    --
189    -- Dumping data for table `programme_lineup`
190    --
191
192    LOCK TABLES `programme_lineup` WRITE;
193    /*!40000 ALTER TABLE `programme_lineup` DISABLE KEYS */;
194    /*!40000 ALTER TABLE `programme_lineup` ENABLE KEYS */;
195    UNLOCK TABLES;
196
197    --
198    -- Table structure for table `pvt_cast_svr`
199    --
200
201    DROP TABLE IF EXISTS `pvt_cast_svr`;
202    /*!40101 SET @saved_cs_client     = @@character_set_client */;
203    /*!40101 SET character_set_client = utf8 */;
204    CREATE TABLE `pvt_cast_svr` (
205      `id` int(11) NOT NULL AUTO_INCREMENT,
206      `svr_address` varchar(255) NOT NULL,
207      PRIMARY KEY (`id`)
208    ) ENGINE=InnoDB AUTO_INCREMENT=2 DEFAULT CHARSET=latin1;
209    /*!40101 SET character_set_client = @saved_cs_client */;
210
211    --
212    -- Dumping data for table `pvt_cast_svr`
213    --
214
215    LOCK TABLES `pvt_cast_svr` WRITE;
216    /*!40000 ALTER TABLE `pvt_cast_svr` DISABLE KEYS */;
217    INSERT INTO `pvt_cast_svr` VALUES (1,'google.org');
```

```sql
218   /*!40000 ALTER TABLE `pvt_cast_svr` ENABLE KEYS */;
219   UNLOCK TABLES;
220
221   --
222   -- Table structure for table `songs`
223   --
224
225   DROP TABLE IF EXISTS `songs`;
226   /*!40101 SET @saved_cs_client     = @@character_set_client */;
227   /*!40101 SET character_set_client = utf8 */;
228   CREATE TABLE `songs` (
229     `id` int(11) NOT NULL AUTO_INCREMENT,
230     `title` varchar(255) NOT NULL,
231     `genre_id` int(11) NOT NULL,
232     `artist` varchar(255) NOT NULL,
233     `album_art` mediumblob,
234     `created` date NOT NULL,
235     PRIMARY KEY (`id`)
236   ) ENGINE=InnoDB AUTO_INCREMENT=4 DEFAULT CHARSET=latin1;
237   /*!40101 SET character_set_client = @saved_cs_client */;
238
239   --
240   -- Dumping data for table `songs`
241   --
242
243   LOCK TABLES `songs` WRITE;
244   /*!40000 ALTER TABLE `songs` DISABLE KEYS */;
245   INSERT INTO `songs` VALUES (1,'Gombwe',1,'Winky Dee',_binary ' ','2018-09-20');
246   /*!40000 ALTER TABLE `songs` ENABLE KEYS */;
247   UNLOCK TABLES;
248
249   --
250   -- Table structure for table `time_slot`
251   --
252
253   DROP TABLE IF EXISTS `time_slot`;
254   /*!40101 SET @saved_cs_client     = @@character_set_client */;
255   /*!40101 SET character_set_client = utf8 */;
256   CREATE TABLE `time_slot` (
257     `id` int(11) NOT NULL AUTO_INCREMENT,
258     `period` varchar(65) NOT NULL,
259     PRIMARY KEY (`id`)
260   ) ENGINE=InnoDB AUTO_INCREMENT=25 DEFAULT CHARSET=latin1;
261   /*!40101 SET character_set_client = @saved_cs_client */;
262
263   --
264   -- Dumping data for table `time_slot`
265   --
266
267   LOCK TABLES `time_slot` WRITE;
268   /*!40000 ALTER TABLE `time_slot` DISABLE KEYS */;
269   INSERT INTO `time_slot` VALUES (1,'00:00am - 01:00am'),(2,'01:00am -
       02:00am'),(3,'02:00am - 03:00am'),(4,'03:00am - 04:00am'),(5,'04:00am -
       05:00am'),(6,'05:00am - 06:00am'),(7,'06:00am - 07:00am'),(8,'07:00am -
       08:00am'),(9,'08:00am - 09:00am'),(10,'09:00am - 10:00am'),(11,'10:00am -
       11:00am'),(12,'11:00am - 12:00pm'),(13,'12:00pm - 13:00pm'),(14,'13:00pm -
       14:00pm'),(15,'14:00pm - 15:00pm'),(16,'15:00pm - 16:00pm'),(17,'16:00pm -
       17:00pm'),(18,'17:00pm - 18:00pm'),(19,'18:00pm - 19:00pm'),(20,'19:00pm -
       20:00pm'),(21,'20:00pm - 21:00pm'),(22,'21:00pm - 22:00pm'),(23,'22:00pm -
       23:00pm'),(24,'23:00pm - 23:59pm');
270   /*!40000 ALTER TABLE `time_slot` ENABLE KEYS */;
271   UNLOCK TABLES;
272
273   --
274   -- Table structure for table `users`
275   --
276
277   DROP TABLE IF EXISTS `users`;
278   /*!40101 SET @saved_cs_client     = @@character_set_client */;
279   /*!40101 SET character_set_client = utf8 */;
280   CREATE TABLE `users` (
281     `firstname` text,
282     `surname` text,
```

```
283        `username` varchar(45) NOT NULL,
284        `sex` varchar(10) DEFAULT NULL,
285        `password` text,
286        `role` text,
287        `stage_name` varchar(255) DEFAULT NULL,
288        `createdby` text,
289        `status` text,
290        `creation_timestamp` text,
291        `id` int(11) NOT NULL AUTO_INCREMENT,
292        PRIMARY KEY (`id`),
293        UNIQUE KEY `username` (`username`)
294    ) ENGINE=InnoDB AUTO_INCREMENT=5 DEFAULT CHARSET=latin1;
295    /*!40101 SET character_set_client = @saved_cs_client */;
296
297    --
298    -- Dumping data for table `users`
299    --
300
301    LOCK TABLES `users` WRITE;
302    /*!40000 ALTER TABLE `users` DISABLE KEYS */;
303    INSERT INTO `users` VALUES
       ('Admin','Admin','Admin','Male','07ce13d303734ac6cdd3aad40e15b5164c33463f8d6647a64d256
       bfdd10f3b25','Admin','Dj 1','Self','Active','2018-09-24
       23:22:45',1),('Elsie','Mojapelo','emoji','Female','07ce13d303734ac6cdd3aad40e15b5164c3
       3463f8d6647a64d256bfdd10f3b25','Dj','emoji','admin','Active','2018-09-25
       00:36:37',3),('Norman','Mapeza','nmapeza','Male','07ce13d303734ac6cdd3aad40e15b5164c33
       463f8d6647a64d256bfdd10f3b25','Dj','Dj Nomz','admin','Disabled','2018-09-25
       22:31:43',4);
304    /*!40000 ALTER TABLE `users` ENABLE KEYS */;
305    UNLOCK TABLES;
306    /*!40103 SET TIME_ZONE=@OLD_TIME_ZONE */;
307
308    /*!40101 SET SQL_MODE=@OLD_SQL_MODE */;
309    /*!40014 SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS */;
310    /*!40014 SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS */;
311    /*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
312    /*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
313    /*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
314    /*!40111 SET SQL_NOTES=@OLD_SQL_NOTES */;
315
316    -- Dump completed on 2018-09-26  0:11:11
317
```