

Development of Cloud-Based Media Player using Microsoft Azure Services

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Abstract

Playing songs offline consumes internal storage capacity of a device. Besides, playing songs, most of the time is an individual acting as a hobby and many song listeners do not have a common platform to share their hobby with others. By putting it on the cloud, the internal storage capacity can be reduced and the chance to share the common hobby with others is available. This paper aims to present the development of a Cloud-Based Media Player (CBMP) to ease the users in managing their song files and sharing with others. The CBMP utilizes a website as the main controller and connects to the Microsoft Azure Services to host the music database. Two separate sections are created for the user to upload and download their songs as *private* and *share* sections. Accordingly, users can choose the favored section they want to access. Not only features to upload and download songs are provided, but the CMBP also provides a search function that enables users to search songs in both different to make a search process faster. Due to latency in the cloud services, the suggested song format for CMBP is .MP3 files. The .MP3 files promote better compression rate than .MP4. Besides, .MP4 has higher latency that makes users waiting longer for processing the songs. The .MP3 is a light load and makes buffering time faster to process user's favorite songs. The CBMP is developed using Visual Studio 2017, SQL Server Management Studio and Microsoft Azure Portal with the database connection.

Keywords

Cloud services, Media Player, Microsoft Azure, Software as a Service (SaaS).

Introduction

The media player is defined as a computer program that specifically created to play multimedia files, like video, music, and movies. Many years ago the media player was known as physical devices like a tape recorder or compact disc player. Things are changed afterward since the emerged software technology was created to play such files as a mainstream process which is controlled by operating systems. At least, one operating system has its own pre-built media player. For example, Windows has Windows Media Player, OSX has Quicktime player, Linux has SMPlayer, Amarox, Audacious, Banshee, Rhythmbox, MPlayer, Totem, VLC, and Xine. Mobile operating systems like Android has Google Play Music and many apps were available like Pweramp, VLC and Beautiful Music Player.

The most common thing that all those media player have is the ability to play music offline, not online. By having it offline, the multimedia files occupies the memory in the computer and it grows bigger when more files are downloaded by the user. This thing demands costs as more upgrades are required when memory capacity is decreasing. This situation highlights a weakness in term of physical memory allocation for the multimedia files. Hence, the cloud services are one of an efficient solution to solve this problem.

Beside memory allocation, current media players are designed to satisfy personal use (DeMarta, S. P., Ovadia, D. J., Winer, P. W., Sturgis, J., & Navaneethakrishnan, R., 2015). It does not support communications among users that have similar hobby i.e. listening to certain music, watch certain videos, etc. to share their collections. In the twentieth century as now, when social media is very booming and most people look for it. The demand to have a platform whereby users are able to share their music collections are increased. Currently, users utilize social media outside media players to share their collections e.g facebook, twitter, youtube, etc (McMillan, D., Brown, B., Sellen, A., Lindley, S., & Martens, R., 2015). They do not use the media player itself because such a facility is yet to deliver (Ko, S., & Lemay, S. O., 2015).

Hence, this paper attempts to address the two main issues as explained earlier i.e. reducing the cost of physical memory and sharing platform among users. A cloud computing technology (CCT) is proposed in this paper because CCT is a collection of applications, hardware, and software that can be adopted by users to create their services. The CCT has a datacenter that deploys the required hardware and software and it offers a wide range of services including storage (to solve the first issue) and different modes of exploitation for example infrastructure as service, platform as service and software as service (to solve the second issue).

Generally, CCT has advantages for users as follows:

1. The advantages of using cloud services are that the owner of the application no need to worry about the indirect cost since the service providers are the one who is going to manage the software maintenance, storage and space management, electricity and more. (Kim, W., 2009)
2. The other advantages of using cloud services are it has a flexible adjustment. In the peak seasons of the company, the manager can request for more resources from the service provider. (Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J. and Ghalsasi, A., 2011).

3. Cloud services can fit into any kind of software development life cycle, so it is very useful when it comes to combining the life cycle as the ways that the developer likes and create the necessary applications. (Srinivasan, S., 2014).
4. Furthermore, the benefit to the customer is that if they required a new platform for other application or hardware changes, it only takes a few days to make the new system operational. (Srinivasan, S., 2014)

Microsoft Azure (MAz) is one of CCT that provides service created by Microsoft. It can build, test, deploy and manage applications and services. MAz is administered by a global network of Microsoft data centers. This paper utilizes MAz to host the multimedia files, but this paper limited only using music files first, as a prototype. With the help of a website, the CBMP has an interface to control the executions of music files: upload, download, and search.

The CBMP also enhances the navigation capabilities and the file directories. The CBMP has functions such as play-by-genre or play-by-artist, and it displays the related information to the users. Those such functions are not available in the existing Media Players. Moreover, the CBMP also allows users to skip the media play time with a track bar. The CBMP also includes the existing traditional function like "Play", "Next", "Previous", "Repeat", "Random", "Pause".

The objectives of this paper are as follows:

1. To find the strength and weakness of current available Media Players.
2. To design and develop a Cloud-Based Media Player (CBMP) as solutions of weakness in current Media Players.
3. To perform user testing towards the developed CMBP.

Methodology

The methodology that has been carried out in this paper is listed below.

1. Requirement Gathering and Quick Design.

Two main activities are conduction in this stage to understand the requirement and analysis of the CBMP. Firstly, a literature reviews that highlight the strength and weakness of the current Media Player. The Literature Reviews involves some documents (papers, journal, and documents related to cloud computing and Media Players). Secondly, the data collection method that allows direct communication with the users who are familiar with Media Players. A mini questionnaire and interview are conducted to identify more detail information from the perspective of users. The results of both activities are recorded and used as the foundation of design and implementation of the proposed CBMP.

2. Building and Refining the CBMMP

The CBMP is written in Microsoft Visual Studio 2017, SQL Server Management Studio and Microsoft Azure services. The following figures show the setting and configuration of all.

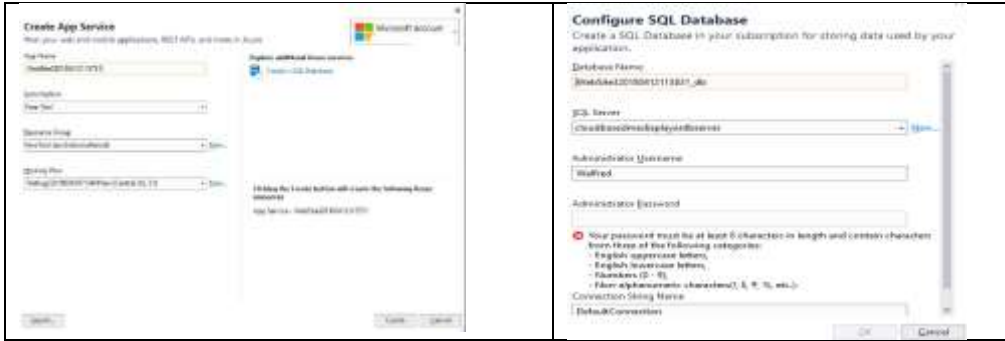


Figure 1. Creating app service and configure SQL database

Next, the MAz dashboard in Figure 2 and 3 is shown with all services available to be employed by the CMBP.

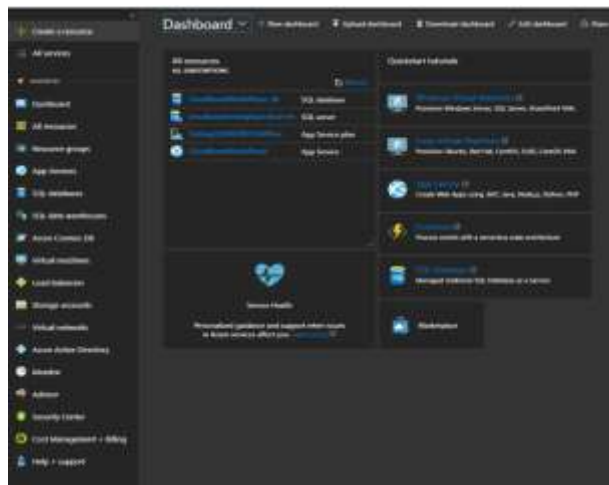


Figure 2. The MAz dashboard

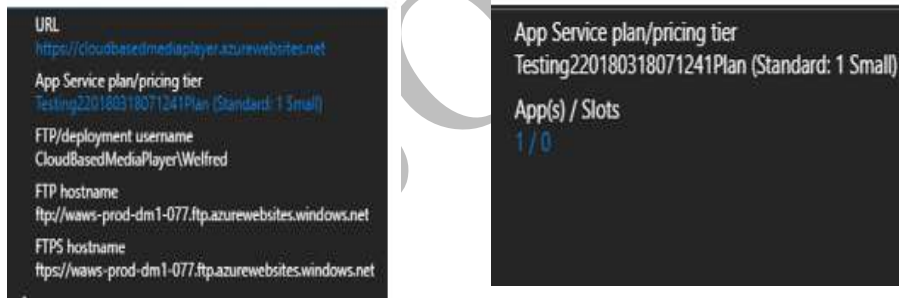


Figure 3. The configuration of App service and App service Plan

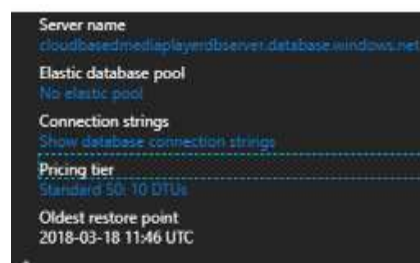
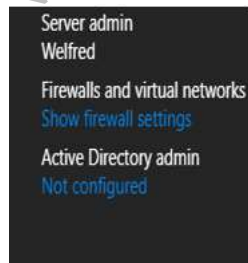


Figure 4. The configuration of server and database

Once user connects with the provided URL from direct connection with Microsoft Azures, the user needs to enter particulars identity before using the cloud services. The interface for this section is depicted in the following Figure 5.



Figure 5. Main Page of the CBMP

Afterward, the user is navigated to the next interface that allows them to access private and shared library. The private section allows the user to manage their own private collection and Sharing Library allows them to communicates/shares with other users who have logged to CBMP. This interface is depicted in Figure 6 as below.



Figure 6. The interface after login

The sharing library interfaces together with the search function interface is depicted in the following Figure 7.



Figure 7. Shared section and search function for users

3. User testing for the CBMP.

User testing is very important because it reflects the degree of user acceptance towards the CBMP. The degree of acceptance corresponds with the number of users that potentially use the CBMP system. User testing is conducted towards users who are using the CBMP features. They need to provide feedback on what they first thought in using the CBMP. The testing content focuses on the following matters: interface design, usability, readability, upload section, download section, shared and a private section, search function and overall ratings. The results are presented in the next section.

Results and Discussions

The charts below are shown as analysis of the values entered by the users after they used the CBMP system. Figure 8 below the analysis of the CBMP system interface. Out of 20 responses in this section, 10 respondents agreed that the interface is too simple. Means, the CBMP can be improved further in term of interface design.

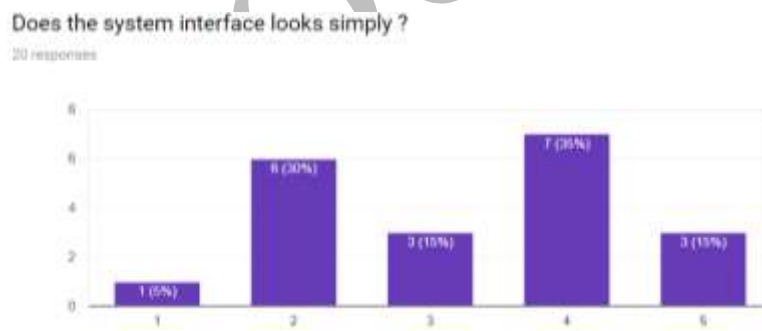


Figure 8. System Interface results

The next section is about the easiness (user-friendly) while using the CBMP. Almost all users agree that the interface is easy to understand and works fine in navigating them while using the CBMP.

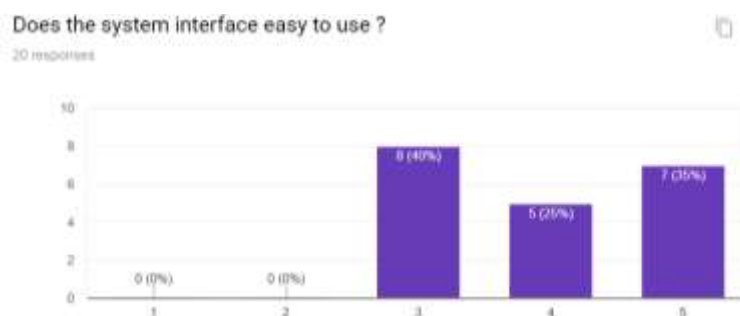


Figure 9. The easiness of using interface results

The next section is the results of system readability that shows 11 response is positive towards the question.



Figure 10. System Readability results

The next section Figure 11 is depicted the satisfactory level of using upload song features. 11 response satisfies with this function.

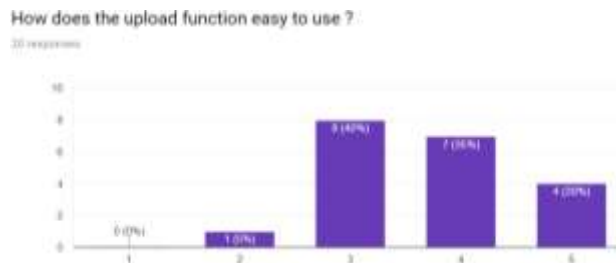


Figure 11. The Upload function result

The next section shows a very positive response of download function provided in the CBMP. 100% response is happy with this function.

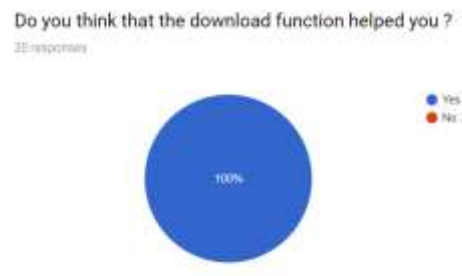


Figure 12. The download function result

The next question in Figure 13 is about sharing content feature with others. All the users who had an answer to this evaluation form agreed that the sharing content page helps them to explore more genre of music. 17 response is very positive about this content. This is a major achievement in this project, as this feature reflects the CBMP ability to solve the problem of current Media Player weakness.

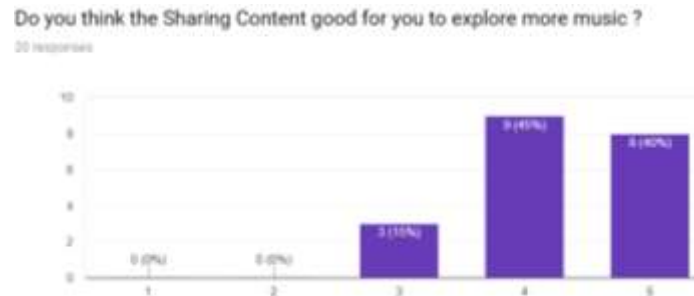


Figure 13. Sharing content result

Next question in figure 14 reflects the majority of the users thinks that the private content is necessary. Only have a few users think that the private content is not a necessity. This shows the common demand in the 21st century about sharing section.

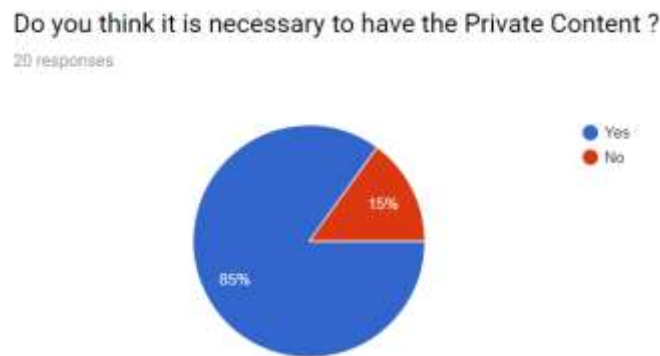


Figure 14. The private content result

Figure 12 reflects the degree of their willingness in using the CBMP as their Media Player. 8 response is very positive with the CBMP, while 11 of them has no decision and 1 response show a negative result. Although the response is a little bit underwhelming, this CBMP is not totally producing a negative result. The sharing of content is a successful feature, while others need improvement like interface and upload function.

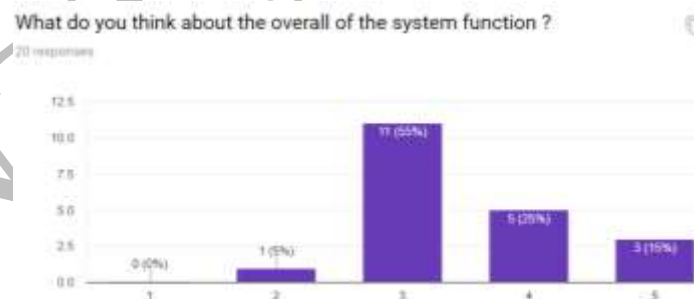


Figure 15. The overall rating of system function

Conclusions

The CBMP development is successfully conducted following the research methodology stated in this paper. The research objectives have been achieved fully. The features of CBMP has been presented to the users during system testing and the sharing content feature receive highly positive feedback (100%). The improvement is required for the CBMP to provide a more interesting interface and features for the users. The development of CBMP is taken place in INTI International University Nilai Campus in the Faculty of Information Technology and Science (FITS). This idea is implemented as a final year project in Bachelor of Computer Science (BCSI).

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