



Museum Management System

Project proposal from CloudXi team

About (viết về ý tưởng project)

When visiting a museum, it is really frustrating for many people to navigate around and get detailed information about the masterpieces they see. Some of the people even can not get tickets to enter the museum. That's when we are questioning: "What if there is a Museum Management System that will be in charge and solve all of these problems?". We see that if we can build a Museum Management System, that will be a great supporter not only for the Museum Managers themselves but also for the visitors.

Now instead of getting frustrated because of not being able to navigate around the museum, by using our system, navigating to your favorite artwork is no more a hassle. Now instead of wandering around not knowing anything about the fascinating artwork, it is easy to search for detailed information about the masterpieces by accessing the database.

By using the Museum Management System (MMS), instead of selling goods and tickets offline, the Museum can also sell goods or souvenirs and tickets online to customers using our products.

To do that, we can develop an MMS that will have some special features in order to support Museum Staff in management and visitor experience.

Vision

Several management systems and apps were made before. However, we have provided our product with many renovated features that will make ours different from others and will definitely enhance users' experience to the next level.

Platforms

To provide the customer with the best experience, two platforms will be developed and delivered by our team. The first platform will be the website application, which is the main primary objective of our project, and the second one is the mobile application.

The product will be developed based on the three-tier and microservice architecture so two platforms of our product will share the same databases and algorithms. The main difference between the two platforms is the application tier, which is the User Interface Design. Customers can easily access our service with the mobile application while visiting the museum.

Benefits

There are several benefits why a museum might want to develop a management system:

Enhancing the Visitor Experience: A Museum Management System (MMS) can offer an interactive and immersive experience for visitors. It can provide information about exhibits, artifacts, and the museum's history, and can offer multimedia content, such as audio guides, videos, and interactive maps. Visitors can also use the web app to plan their visit, including buying tickets, reserving parking, and finding the best routes to navigate the museum.

Engaging Visitors: MMS can help museums engage visitors before, during, and after their visit. Museums can use the system to send notifications and alerts about upcoming events, new exhibits, and other special offers. Visitors can also use the web app to connect with the museum's social media platforms and share their experiences.

Improving Accessibility: Museums can use apps to improve accessibility for visitors with disabilities. The app can offer features such as audio descriptions, captioning, and sign language interpretation to enhance the visitor experience for people with different abilities.

Management Supporting: A MMS can help visitors to book online tickets for entering the museum or upcoming events which will lead to a time-saving check-in. Moreover, visitors can go shopping online for museum goods and souvenirs.

Overall, our Museum Management System with many renovated features can help museums to offer a more engaging and interactive visitor experience, improve accessibility, and collect valuable data to improve their operations.

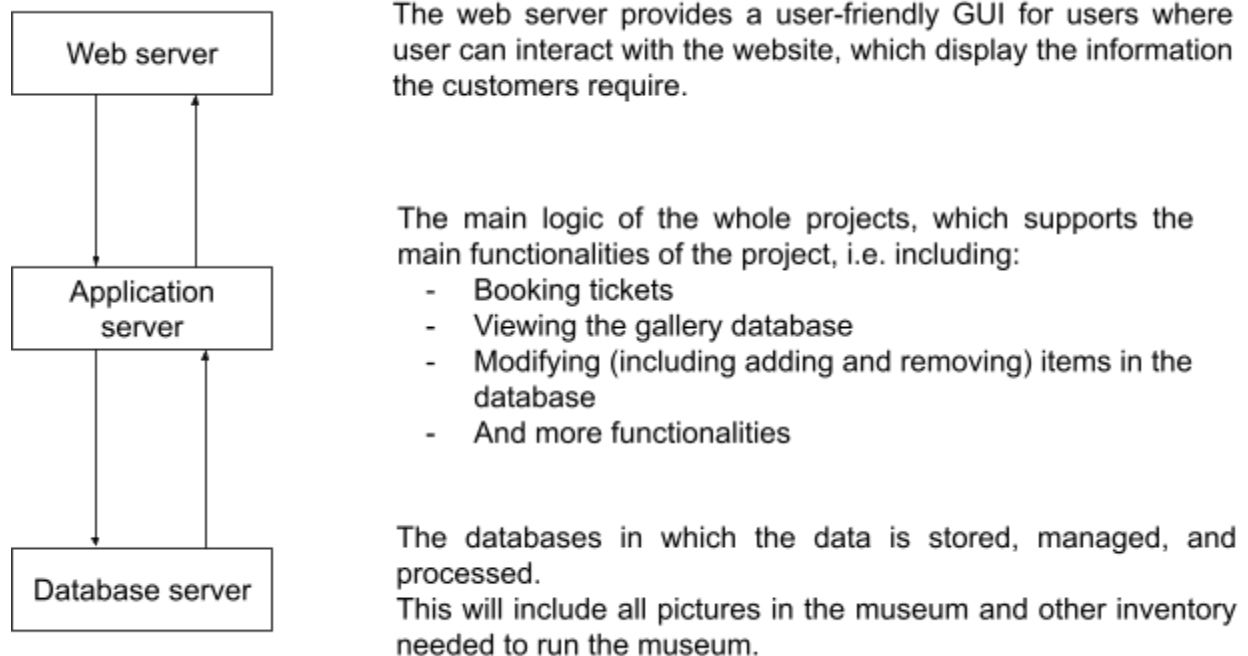
Technical Approach

To realize the project, a number of technical approaches would have to be first planned before actually committing to writing the project.

System Architecture

Three-tier architecture for web development

The project architecture will be divided into 3 separate tiers, implementing the Three-tier Architecture for web development, with each server functioning independently, with its own purposes.



By subdividing the project into a number of tiers, the project will undergo a number of advantages in the development stage, including

- Faster development, as the tier can be implemented independently and simultaneously, thus also helping work scheduling and distribution.
- Mobile application development, as the tier handles different purposes, to develop a mobile application for the system, it is now only required to rewrite the Presentation Tier for the application, instead of having to build the application from scratch.

Interfaces

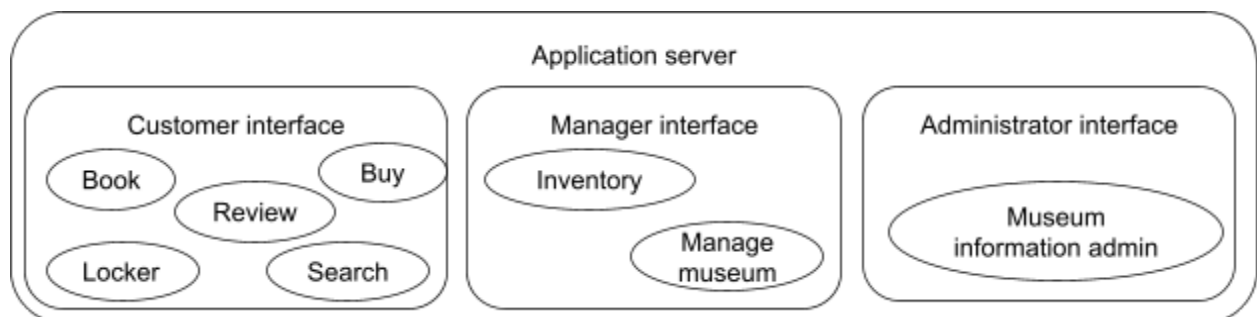
The project will provide 3 different interfaces for different roles operating in the museum, including

Customer interface	Employee interface	Administrator interface
<p>The interface for the customers who are visiting the museum.</p> <ul style="list-style-type: none">- Book/buy tickets- Search for pictures- Buy museum goods- Like/review the pictures/ museum	<p>The interface for the employees of the museum to manage the inventory of the museum</p> <ul style="list-style-type: none">- Modify information about the pictures- Locker and shop inventory management- View information about time blocks	<p>The interface for the administrator of the museum to monitor and manage the museum as a whole</p> <ul style="list-style-type: none">- Add and remove pictures from the museum- Provide and modify the building layouts

Microservices architecture

The Microservices Architecture will be implemented to realize the interfaces needed in the Interface section. With the Microservices Architecture, the Application Server will then be further divided into smaller chunks, each with different functionalities, serving a different interface.

The use of Microservices Architecture will further improve the development speed of the project, also improving the scalability of the projects, as new and innovative features will be easily integrated into the project at a later stage.



Technology

Based on the proposed architecture and approaches, an appropriate set of technologies for the three tiers and tools are considered.

In the Web server, our UI in the web app needs to be responsive to our client's interactions. Because we provide tools for our clients to modify the layout and information of the website, therefore, React would be the suitable library for us to design simple views for each state in our application, and React will efficiently update and render just the right components when our data changes. Typescript would be used simultaneously with React.

Considering the application server, we need a tool that interacts well with the presentation tier as well as the database tier. The tool must be robust, strong, and popular since we need a powerful society to support us in learning and implementing. As all is considered, we propose to use NodeJS for developing on the application tier, which works well with ReactJS on the presentation tier, and MySQL on the data tier. In addition to NodeJS, ExpressJS may be used in order to create a RESTful API.

For the database server, we need to process a small-sized database without the need for scalability. The security and safety features need to be concerned since the website has the function to book and buy tickets. As all are concerned, we propose to use MySQL for database development. As we have learned SQL in the database module, the learning phase would be shortened.

Tools

To support all technologies we require above, we consider Visual Studio code as a lightweight but powerful source code editor which runs on desktops and is available for many platforms (Windows, macOS). It also strongly supports git, which suits us to work as a team. Besides that, it is free for students and easy to debug.

For hosting solutions, we propose the use of virtual servers provided by Microsoft Azure. The reason is that Azure provides a user-friendly interface and stable servers. Azure also has plans for students, which decreases the cost of the project. For server control, we would use PuTTY for SSH access and FileZilla for file transferring.

Risk management

Developing a system always involves risks that can lead to tremendous problems, thus affecting the delivery of the project. Our project also faces problems involving security, design, and two platforms that we are going to develop.

Security

Due to the lack of knowledge about internet and transaction security, the booking and good buying functions may not be able to meet security requirements. Therefore, they may not be safe enough to be used in reality.

Design Problems

Due to the lack of experience in planning and architecture design, design problems may arise. Those problems may be fatal since the project must be delivered in a short time.

Delivery

As mentioned above, based on the user's experience, two platforms of our product are developed and delivered to the customer. The basic platform is a website and the portable one is the mobile application for our customers. With the application, users are able to view their location, search for information, receive locker numbers, and so on while they visit the museum.

Two platforms of the product may not be delivered on time due to the complexity of the product and the short period of the project development time. Therefore, the website platform is our first crucial priority to develop and deliver, then the second one is the mobile platform.

However, the mobile application may not be delivered because of the short amount of time.

Group information

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