Project Proposal

Outline the problem statement, objectives, scope, methodology, expected outcomes, timeline, and other relevant details. Your proposal should provide a clear and concise overview of the entire project.

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# Project Overview

The project aims to enhance the user experience of a business web application by addressing the issue of lost search configurations and records when staff users return to the search page. Currently, users face frustration due to the lack of continuity in their search process. To resolve this problem, the project seeks to implement a solution that retains user search settings and results while ensuring scalability and optimal performance of the web application.

# Project Goals

1. Enhance User Experience: The primary goal is to improve the user experience for staff users of the business web application. Users should be able to return to the search page and find their previous search configurations and records intact, reducing frustration and increasing efficiency.
2. Data Persistence: Implement a mechanism that stores and retrieves user search settings and the associated search results, allowing users to seamlessly continue their work without starting their searches from scratch.
3. Optimal Performance: Maintain or improve the overall performance of the web application. The solution should not introduce latency or slowdowns in the search process. Users should still experience fast and responsive search functionality.
4. Scalability: Ensure that the solution can handle a growing number of users and data without compromising performance. As the user base and data volume increase, the system should remain responsive and efficient.
5. User-Friendly Interface: Design an intuitive and user-friendly interface that allows staff users to easily manage and access their saved search configurations and results.

# Project Outcomes

1. Reduced User Frustration: Staff users should no longer experience frustration when returning to the search page. They will find their previous search settings and records intact, enabling them to resume their work seamlessly.
2. Increased Productivity: With the ability to retain search settings and results, staff users can be more productive by avoiding the need to recreate their searches repeatedly.
3. Improved User Satisfaction: A more user-friendly and efficient search experience is likely to lead to higher user satisfaction, enhancing the reputation of the business web application.
4. Scalable Solution: The implemented solution should be scalable to accommodate a growing number of users and data, ensuring that the system can handle increased usage without performance degradation.
5. Maintained Performance: Despite the additional functionality, the web application's overall performance should remain at an optimal level, providing a responsive and efficient user experience.

# Problem statement

Our company's web application's staff users are currently confronted with a critical usability problem. The search functionality of the application allows them to look for particular documents, but if users go back to the search screen, their search settings and recently visited information are lost. Users are becoming frustrated and inefficient as a result of having to repeatedly replicate their searches, which interferes with their ability to do their jobs well.

The online application cannot save user search preferences and the accompanying search results, which makes it difficult for users to continue their work without interruption and lowers user happiness.

# Research objectives

1. Reduce user frustration and increase productivity. Staff users should no longer experience frustration when returning to the search page. They will find their previous search settings and records intact, enabling them to resume their work seamlessly. With the ability to retain search settings and results, staff users can be more productive by avoiding the need to recreate their searches repeatedly.
2. Provide a scalable solution while maintaining performance. The implemented solution should be scalable to accommodate a growing number of users and data, ensuring that the system can handle increased usage without performance degradation. Despite the additional functionality, the web application's overall performance should remain at an optimal level, providing a responsive and efficient user experience.

# Research questions

**Main Research Question:**

* How can the usability and performance of our company's web application be improved to address the issue of lost search settings and records, ultimately enhancing staff user satisfaction and efficiency?

**Research Sub-Questions:**

* What user-centered design and data persistence strategies can be implemented to effectively reduce staff user frustration and increase their productivity when interacting with the search functionality of the web application?
* What technical solutions and system architecture enhancements can be introduced to ensure the scalability of the web application as the user base and data volume grow, while simultaneously maintaining or improving its overall performance and responsiveness?

# Project Scope

## Literature review

Data storage is a fundamental consideration in web development, impacting an application's performance and scalability. This review examines three common data storage methods—relational database storage, session storage, and local storage—while also briefly discussing other storage alternatives, with a focus on their performance and scalability aspects.

**Relational Database Storage**

Relational databases, such as MySQL and PostgreSQL, are renowned for their robustness in managing structured data and supporting complex queries (Elmasri & Navathe, 2016). However, as web applications grow, scaling relational databases can become challenging due to increased data volume and complex joins, impacting performance (Stonebraker et al., 2005).

**Session Storage**

Session storage provides a client-side option for storing temporary data during a user's session, improving performance by reducing server requests (Mozilla Developer Network, 2021). However, session storage's scalability is limited by its per-session storage capacity and volatile nature (Chapple, 2020).

**Local Storage**

Local storage offers persistent client-side storage with larger capacity than session storage, enhancing performance by caching static assets and reducing server requests (Mozilla Developer Network, 2021). Nonetheless, it may not be suitable for storing large datasets and should be used judiciously to avoid potential security issues (Lawrence & Kasunic, 2008).

**Performance and Scalability**

Performance and scalability are critical concerns in data storage. Relational databases can experience performance bottlenecks when handling extensive datasets, leading to increased latency (Boncz et al., 2005). Scaling relational databases often necessitates complex strategies such as sharding and replication (Stonebraker et al., 2005).

Session storage can improve performance by reducing server load, but it is inherently limited in scalability due to session-based data isolation (Chapple, 2020). Local storage can enhance performance by minimizing server requests but may face challenges with large, dynamically changing datasets.

**Other Data Storage Methods**

Beyond relational databases, session storage, and local storage, alternative storage options include NoSQL databases like MongoDB, which offer improved scalability for certain use cases (Chodorow, 2013). Additionally, distributed file systems such as Hadoop HDFS can handle big data and offer scalability advantages (Shvachko et al., 2010).

## Research methodology

Desk research, also known as secondary research, will be conducted to address the research objectives and questions identified by the researcher. This approach is suitable for collecting information from existing academic sources related to usability problems, data persistence, scalability, and web application performance (Zhou & Nunes, 2016).

## Research design

The research design for this desk research will be primarily exploratory and analytical. It involves reviewing existing academic literature, scholarly articles, conference papers, and case studies related to web application usability, data persistence, scalability, and performance. The research will also incorporate elements of evaluative research to assess potential solutions and strategies outlined in the literature.

## Research approach/method

The information collected through the literature review, content analysis will be evaluated and synthesized to form a comprehensive understanding of the challenges and potential solutions related to improving usability, data persistence, scalability, and performance in storing the search criteria for the business web applications.

## Data collection method

The Acceptance Criteria of the Project will be firstly be requested from the business analyst/product owner. Once the Acceptance Criteria is obtained, analysis will be performed on the existing code base to gain better overview and determine whether there are unforeseen implementation complications surrounding the structure of the code.

Conduct the Sprint Planning meeting to gain a high-level understanding of the user requirements as well as goals of the Project from the Product Owner/Business Analyst. Determine if the Acceptance Criteria needs to be updated and if so, ensure that the document is updated. During the Sprint Planning, the development team also determines the complexity of the story.

After the Sprint Planning is complete, create work task items required to develop the project whilst testers produce a Test Plan. The test plan entails all general use cases of the Project as well as edge cases which may expose software defects (bugs) upon testing.

# Timelines

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CAPSTONE PROJECT** | | | | | | | | |
| Project start date: | | 7/24/2023 |  |  |  |  |  |  |
| Team Cost/Hour (Estimate) | | 1,500.00 |  |  |  |  |  |  |
| Dev Cost/Hour (Estimate) | | 250.00 |  |  |  |  |  |  |
| Test Cost/Hour (Estimate) | | 150.00 |  |  |  |  |  |  |
|  | |  |  |  |  |  |  |  |
| **TOTAL ETA COSTS TO DATE:** | | | **R68,450.00** |  |  |  |  |  |
| **WBS Tasks** | | **Assigned to** | **Cost** | **Progress** | **Start** | **End Date** | **Hours** | **Days** |
| **1 Analysis and Design Phase** |  | | **R7,150.00** | **82%** | **7/24/2023** | **10/1/2023** | **9** | **50** |
| 1.1 Sprint Planning Meeting | | Team | R6,000.00 | 100% | 7/24/2023 | 7/24/2023 | 4 | 1 |
| 1.2 Sprint Backlog Grooming | | Team | R250.00 | 100% | 7/24/2023 | 7/24/2023 | 1 | 1 |
| 1.3 Create required tasks catalogue to develop the Project | | Bright Chang  (Developer) | R500.00 | 100% | 7/24/2023 | 7/24/2023 | 2 | 1 |
| 1.4 Determine required development completion date and test completion date for deployment | | Bright Chang  and Tester | R400.00 | 100% | 7/24/2023 | 7/24/2023 | 1 | 1 |
| 1.5 Design Phase Blackboard Submission | | Bright Chang | FREE | 10% | 9/1/2023 | 10/1/2023 | 1 | 21 |
| **2 Development Phase** | |  | **R47,775.00** | **75%** | **7/25/2023** | **8/10/2023** | **155** | **13** |
| 2.1 Daily Stand-ups to review update on development | | Team | R8,250.00 | 100% | 7/25/2023 | 8/8/2023 | 6 | 11 |
| 2.2 Develop each tasked-out requirement | | Bright Chang | R25,500.00 | 100% | 7/25/2023 | 8/8/2023 | 102 | 11 |
| 2.3 Review Acceptance Criteria | | Bright Chang | R500.00 | 100% | 8/8/2023 | 8/8/2023 | 2 | 1 |
| 2.4 Development Phase Blackboard Submission | | Bright Chang | FREE | **0%** | TBA | TBA |  |  |
| **3. Testing and Evaluation Phase** | |  | **R13,525.00** | **100%** | **7/25/2023** | **8/10/2023** | **46** | **13** |
| 3.1 Daily Stand-ups to review update on development | | Team | R5,625.00 | 100% | 8/9/2023 | 8/10/2023 | 4 | 2 |
| 3.2 Create Test Plan | | Tester | R1,200.00 | 100% | 7/25/2023 | 7/25/2023 | 8 | 1 |
| 3.3 Testing | | Tester | R2,400.00 | 100% | 8/9/2023 | 8/10/2023 | 16 | 2 |
| 3.4 Bug fixing | | Bright Chang | R4,000.00 | 100% | 8/9/2023 | 8/10/2023 | 16 | 2 |
| 3.5 Review Acceptance Criteria | | Tester | R300.00 | 100% | 8/10/2023 | 8/10/2023 | 2 | 1 |
| 3.6 Development Phase Blackboard Submission | | Bright Chang | FREE | **0%** |  |  |  | 0 |
| **4 Documentation Phase** | |  | **FREE** | **3%** |  |  |  | **0** |
| 4.1 Document requirements, design decisions, implementation details, and testing procedures. | | Bright Chang | FREE | 5% | TBA | TBA |  | TBA |
| 4.2 Documentation Blackboard Submission | | Bright Chang | FREE | 0% | TBA | TBA |  | TBA |
| **5. Presentation and Documentation Phase** | |  | **FREE** | **0%** | TBA | TBA |  | TBA |
| 5.1 Demo project- Present the project's work to a panel of lecturers, peers, or professionals. | | Bright Chang | FREE | 0% | TBA | TBA |  | TBA |

# Project benefits

1. Increased User Productivity: By allowing staff users to retain their search settings and results, the project will enable users to work more efficiently. They can pick up where they left off, reducing the time spent recreating searches and enhancing their overall productivity.
2. Time and Resource Savings: Staff users will save time previously spent on redundant search efforts. This efficiency gain can translate into cost savings for the company as users become more productive.
3. Improved User Satisfaction: The enhanced search experience and reduced frustration will contribute to higher user satisfaction. Happy users are more likely to continue using the application and speak positively about it, which can improve the company's reputation.
4. Optimal System Performance: The project's focus on maintaining or improving overall system performance ensures that the web application remains responsive and efficient, even with added functionality. This benefit contributes to a consistent and reliable user experience.
5. Scalability and Growth: With a scalable solution in place, the company can confidently accommodate business growth, knowing that the web application can handle increased user numbers and data volume without performance degradation.
6. Better Utilization of IT Resources: With a scalable solution in place, the company can efficiently handle increased user demands and data growth without straining IT resources. This scalability ensures that the company's IT infrastructure remains adaptable and cost-effective.

1. Data-Driven Insights: The implementation of data persistence mechanisms may also enable the company to gather valuable insights into user behaviour and search patterns. These insights can inform future product improvements and strategic decisions.

# Reference List

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