**Business Case**

Big Data Solution Architecture, Conestoga College

PROG8410-21F-Sec1-: NO SQL Database Implementation

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| **BUSINESS CASE** | |
| **Proposed Project** | NFC Card Based Login (Backend) |
| **Date Produced** | September 25, 2021 |
| **Project Team Members** | 1. Khrisnajee Ramma 2. Siddhantha Ramphall 3. John Vincent Miro 4. Wai Ki Ip |
| **Background** | A company is expanding and the number of employees are increasing on a daily basis, a high percentage do point out that the login system is obsolete, not secure enough.  The subject of this business case is the work involved into producing the backend database that will support the frontend of the nfc login system. |
| **Business Need/ Opportunity** | For companies that have many employees and where people work at a very fast rate and it is important to maintain the simplicity and the security aspect as well.  A proper solution based on the two factor authentication concept for now and the future would ensure smooth running of the operations while ensuring the speed and security aspect of the login system. |
| **Project Goals** | Completing this project would provide necessary engine into handling the NFC data processing it against a database and returning required result value that shall continue the process on the frontend. |
| **Project Scope Description** | The project including resources required has an estimate budget of $20, 000 and upon completion shall achieve the following objectives as per specification of the project:   1. A backend database system for an nfc login system. 2. Implementation NoSQL based database 3. Database table structure 4. Data model and data type 5. Create, Read, Update, Delete function 6. Handling of captured NFC data 7. Returning result according to processed NFC data |
| **Cost-Benefit Analysis (ROI)** | |
| Backend NoSQL database  Costs:   * Budget: $20,000 * Replacement of previous login system * Handing over to front end developers for integration into the login system   Benefits   * Such a system requires usage of database, using NoSQL instead of a traditional Relational database shall reduce the cost greatly as (relational database management system) RDBMS are heavy in terms of implementation and the associated infrastructure costs, thus ROI is much greater on the project with the use of NoSQL technologies. * As efficiency is a key to the business objective, another pros is that the response time of NoSQL is faster than a RDBMS. * As the other key factor of the program is increasing security, the integration of security measures in terms of database management system is larger in NoSQL when compared to RDB | |
| **Recommendations** | |
| NoSQL model: Document Store  The document store model has been defined as the most suitable for the following reasons:   1. Schema free 2. Records will be stored as documents and provide faster processing 3. Encoding types used by document stores are highly adaptable and widely compatible with more powerful querying (some encoding types include: JSON, XML, YAML). 4. The records are going to contain a specific set of data which will not require much changes thus keeping the records documents low in size favoring the fast processing. In case this would have been a database where the records would be increasing exponentially wide column stores would have been advisable. 5. The scalability will not be an issue based on the data that will be stored in the records. | |
| **Data Model** | |
| The project will technically, input the NFC card value, compare it to matching records, and return results, it will be the same principle for the update and deletion and the creation will just insert the data records.  Based on the above specification the data model design will be as follows:  <employee>  <ID>01<ID>  <NFCid>xxxxxxxxxx</NFCid>  <Name>jim jim</Name>  <email>[jimjim@sipakimoggt.com](mailto:jimjim@sipakimoggt.com)</email>  <access>admin/user</access>  <timestamp>xxxxxx</timestamp>  </employee> | |
| **Data model Example** | |
| {  "\_id": 00001,  "nfc\_id": "xxxxxxxxx",  "name": "khris Ramma",  "email": "khrisnajee.ramma@gmail.com",  "access": "user",  "timestamp": "2021-09-25-7:30"  } | |
| **Business Rules** | |
| Based on the data model the business rules will be as follows:   1. The nfc tags will have a unique random id assigned in the NDEF data upon creation 2. Those unique NDEF data are going to be assigned to an employee or user by the administrator upon creation. 3. The backend database shall thus process the NDEF message received from the NFC tag when scanned on the nfc reader/writer 4. CRUD operations must be executable on the record 5. Create/Update/Delete function shall insert/update/delete the nfc id stored in the NDEF message with related employee details 6. Read function will mostly be associated with user, as they will scan the tag to login mainly 7. ID data must be a minimum of 5 integer characters 8. ID data must be unique for each employee 9. ID must not contain special characters or alphanumeric data 10. NFC\_id data must be unique for each employee (2 employees may not have same nfc id) 11. NFC\_id data must not be null 12. NFC\_id data must be able to handle alphanumeric characters 13. Name data, must contain value of first and last name and cannot be null 14. Name data, must not contain numeric or special characters 15. Email data must be validated to hold proper type of data (valid email) 16. Access data must be either “user” or “admin” but must not hold both values 17. Access data must not be null 18. Timestamp data must take actual data format from user’s machine 19. Timestamp data must be updated each time a user logs in 20. Timestamp shall be null on first creation of the record 21. Once the requested function realised against the database, the desired response should be the output, i:e admin must be able to create/update/delete and successful or failure response will be expected. 22. User expected response shall be successful login or access denied in case of unsuccessful query on the database. | |