Milestone 3 Systems Design

Yengkong Sayaovong

Dr. Derex Griffin

6/25/23

Table of Contents

Background....3
Problem Statement....3
Technology Solution....3
Process Maps....4
Functions and Requirements Table....6
User Interface....7
Wireframe 1: Name of Wire frame....7
Description....7
Wireframe 2: Name of Wire frame....11
Description....11
Infrastructure Architecture....15
Network Topology....15
Information Architecture....17
Entity Relationship Diagram....17
Security and Privacy Architecture....20
Programming....22
References....24

Background

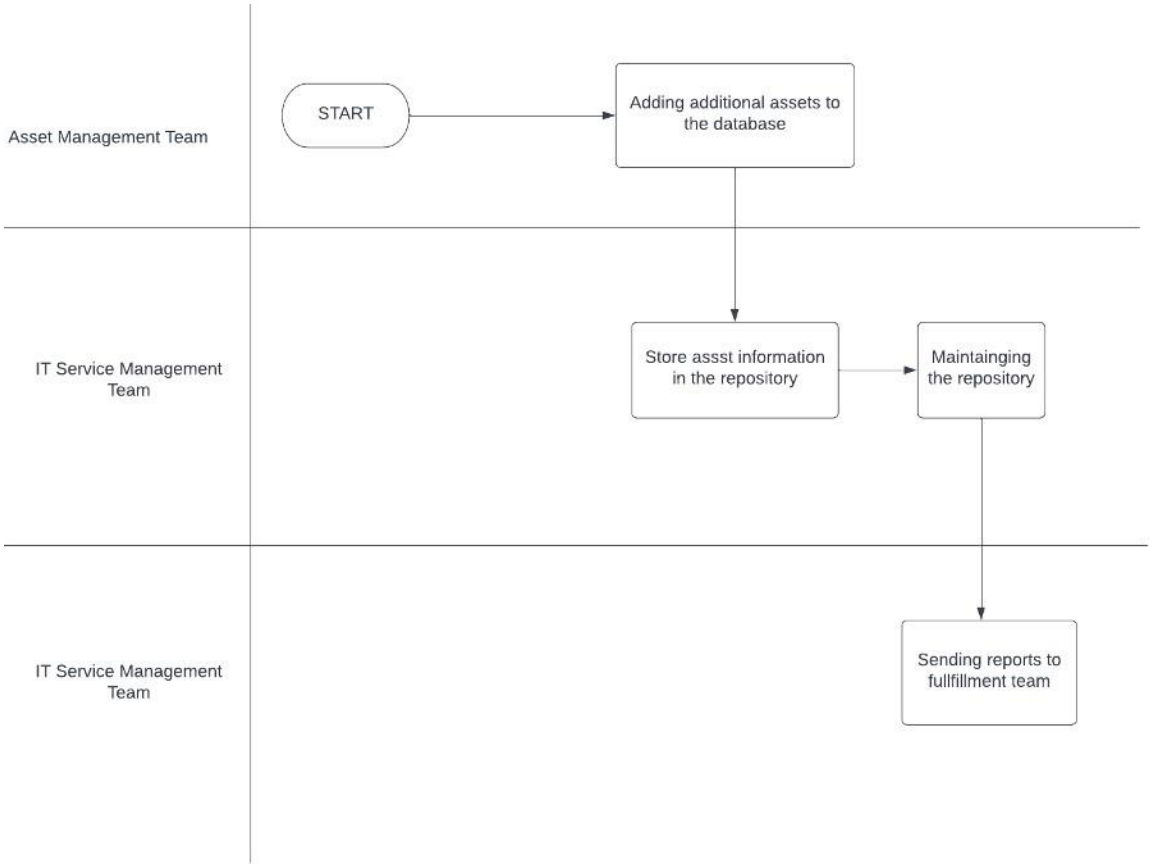
Problem Statement

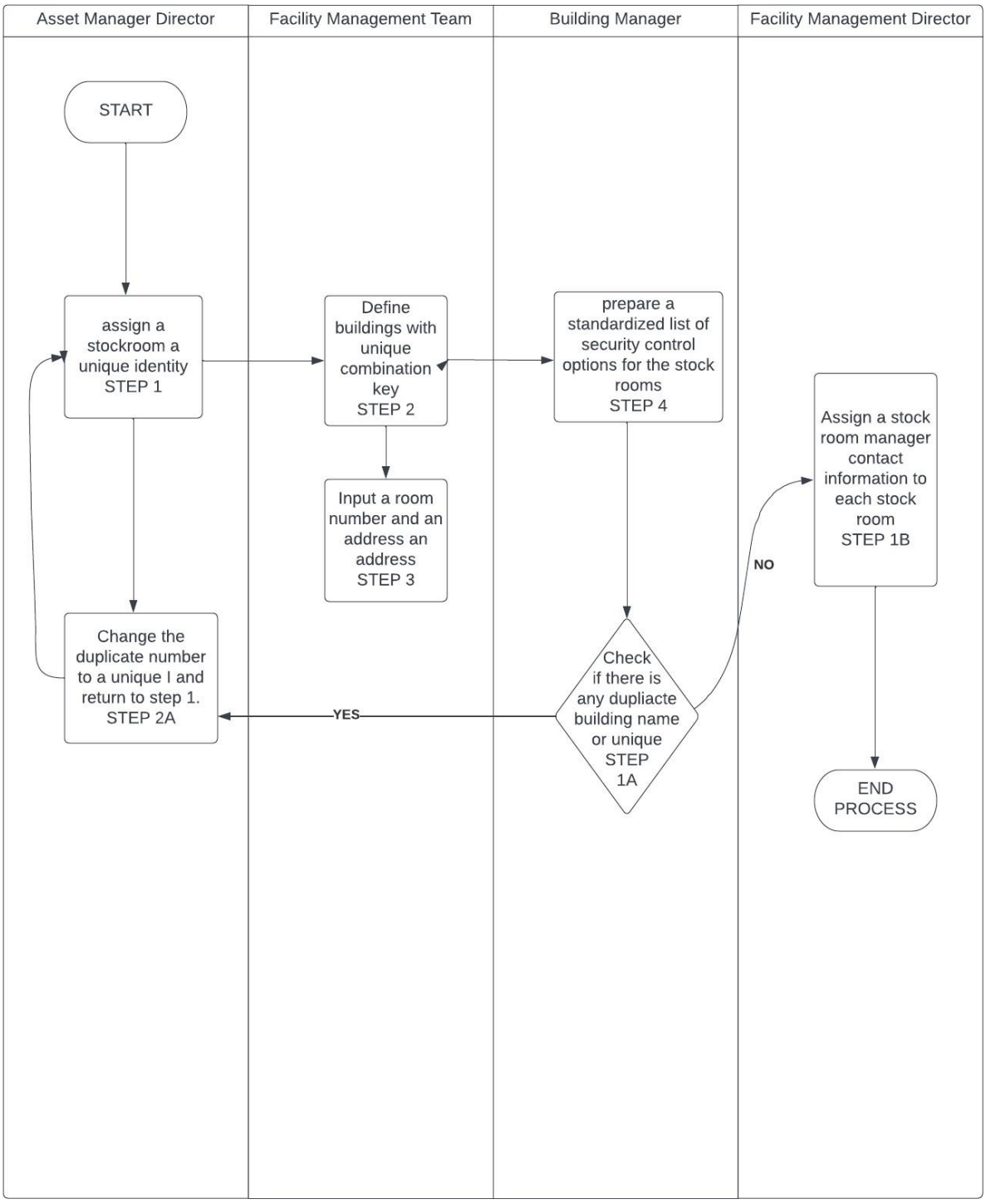
IniTech Solutions' asset management system suffers from consistency, integrity, redundancy, andmonitoring difficulties, necessitating the deployment of an automated IT asset management system.

Technology Solution

An automated asset management procedure that assists the IT department in managing serialized IT assets and reporting on their ownership and value over the course of those assets' lives.

Process Maps




Asset Manager Director
Facility Management Team
Building Manager
Facility Management Director
START
assign a stockroom a unique identity STEP 1
Define buildings with unique combination key STEP 2
prepare a standardized list of security control options for the stock rooms STEP 4
Assign a stock room manager contact information to each stock room STEP 1B
Input a room number and an address an address STEP 3
Change the duplicate number to a unique I and return to step 1. STEP 2A
YES
Check if there is any dupliacte building name or unique STEP 1A
NO
END PROCESS

Functions and Requirements Table

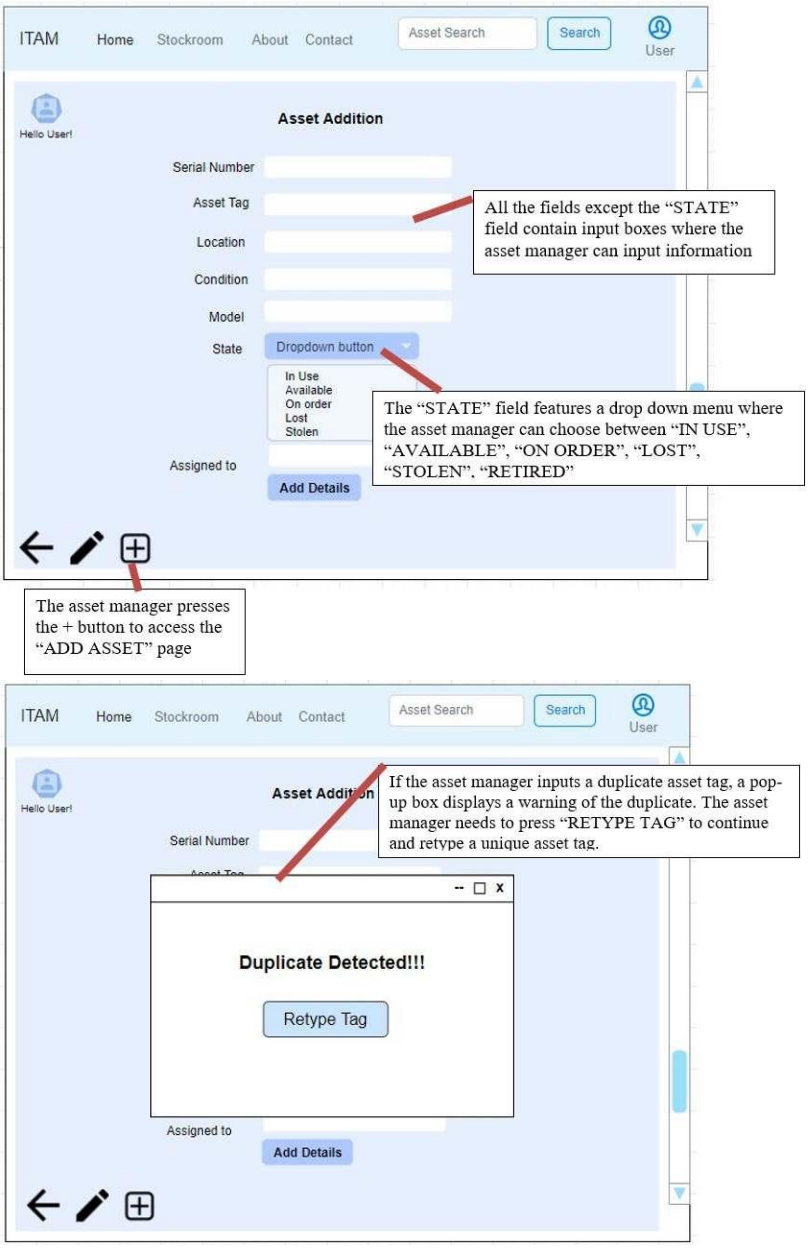
FUNCTION	REQUIREMENTS
To solve the issue of duplicate and erroneous model numbers, IniTech Solutions has developed serialized asset tracking for the collection of serialized assets associated with an appropriate model, which has a serial number and asset tag. Each thing stands for a different asset.	• The user would be able to follow serialized assets using a special identification. • The status of a specific asset must be shown on the screen right now. • The system must be able to choose an asset model. • The user can choose a storage location for assets that are on hand. The system will designate a user to receive the asset.
Storage rooms are self-contained objects or locations that can be recognized by their special identity. They are kept in the stockroom when the status of the IT assets is "In stock." The Stockroom Manager is in charge of keeping an inventory, placing supplier orders, and avoiding the excess stock. The facility management director is in charge of the room and its infrastructure, while the asset manager is in charge of the stockroom's technology. These rooms are autonomous, independent entities within our IT Asset Management program.	• Each stockroom will receive a distinct identifier from the system. • The system will assist in choosing a structure. • It will be possible to enter a room number into the system. • The system will be made to take address input. • The technology will give stockrooms uniform security control options. • The user will have access to the management of the store room.

User Interface

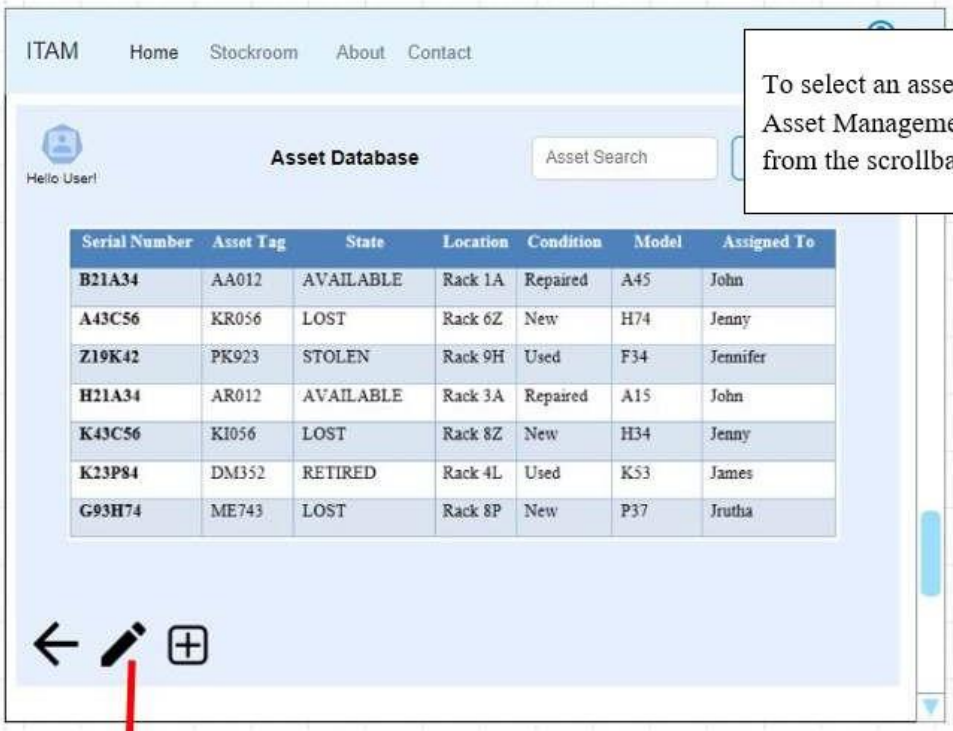
Wireframe 1: Name of Wire frame

Description

Serialized Asset Tracking is the process of assigning unique serial numbers and asset identifiers to assets. To add details about new assets, the Asset Manager navigates to the "ADD ASSET" page. The following fields allow all forms of input to offer the Asset Manager flexibility: "SERIAL NUMBER", "ASSET TAG", "LOCATION", "CONDITION", "MODEL", and the "ASSIGNED TO" field. Despite the fact that the "ASSET TAG" box accepts any type of input, a duplicate asset tag will raise a warning, prompting the Asset Manager to submit a fresh and unique asset tag. The "status" portion is special in that it contains a drop-down menu from which asset management may choose whether the asset is "IN USE," "AVAILABLE," "ON ORDER," "LOST," "STOLEN," or "RETIRED". The Director of Asset Management can navigate to the "Pick ASSET" page to select an asset that the Asset Manager has input. The "MANAGE ASSET" page opens with the Asset Manager's information already filled in. If the asset status is "AVAILABLE," the "LOCATION," "MODEL," and "ASSIGNED TO" sections can be updated to assist the Director of Asset Management in maintaining asset tracking. To allocate an asset to a new user, the Director of Asset Management chooses "Allocate" and inputs their ID.


ITAM
Home
Stockroom
About
Contact
Asset Search
Search
User
Hello User!
Asset Addition
Serial Number
Asset Tag
Location
Condition
Model
State
Dropdown button
In Use
Available
On order
Lost
Stolen
Assigned to
Add Details
All the fields except the "STATE" field contain input boxes where the asset manager can input information
The "STATE" field features a drop down menu where the asset manager can choose between "IN USE", "AVAILABLE", "ON ORDER", "LOST", "STOLEN", "RETIRED"
The asset manager presses the + button to access the "ADD ASSET" page

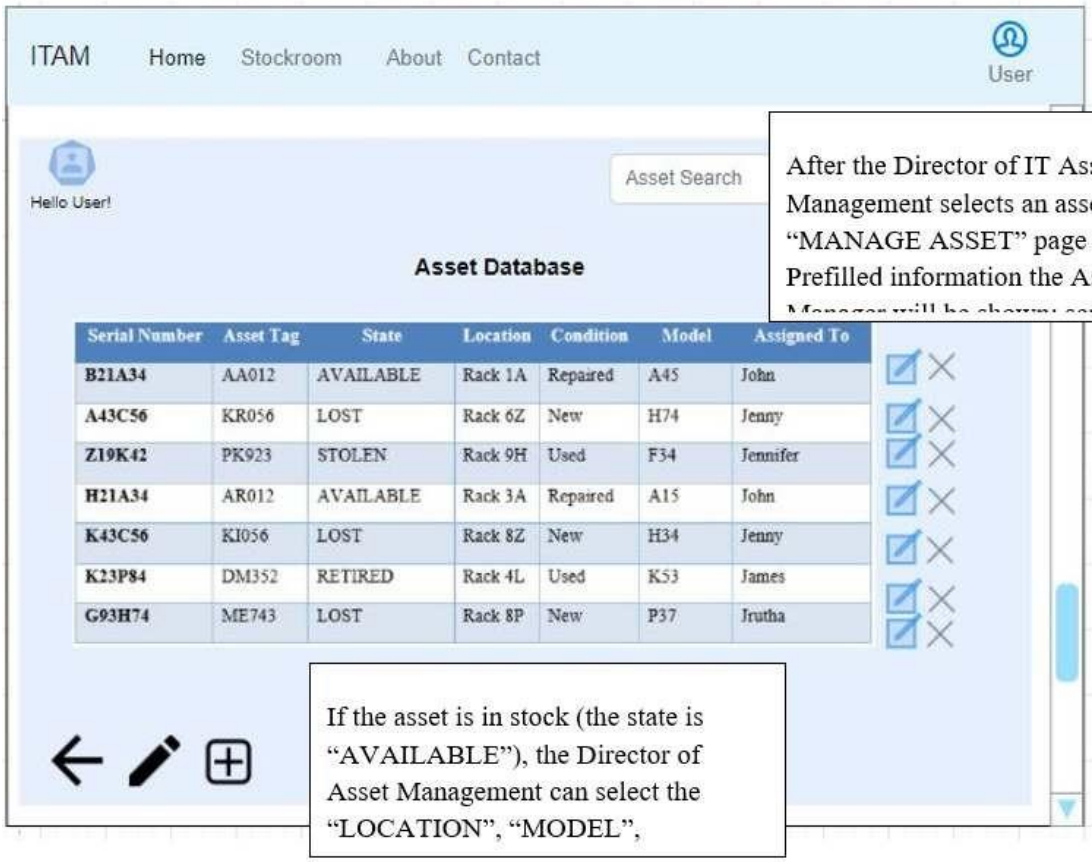
ITAM
Home
Stockroom
About
Contact
Asset Search
Search
User
Hello User!
Asset Addition
Serial Number
Duplicate Detected!!!
Retype Tag
Assigned to
Add Details
If the asset manager inputs a duplicate asset tag, a pop-up box displays a warning of the duplicate. The asset manager needs to press "RETYPE TAG" to continue and retype a unique asset tag.



Serial Number	Asset Tag	State	Location	Condition	Model	Assigned To
B21A34	AA012	AVAILABLE	Rack 1A	Repaired	A45	John
A43C56	KR056	LOST	Rack 6Z	New	H74	Jenny
Z19K42	PK923	STOLEN	Rack 9H	Used	F34	Jennifer
H21A34	AR012	AVAILABLE	Rack 3A	Repaired	A15	John
K43C56	KI056	LOST	Rack 8Z	New	H34	Jenny
K23P84	DM352	RETIRED	Rack 4L	Used	K53	James
G93H74	ME743	LOST	Rack 8P	New	P37	Jrutha

To select an asset, the Director of IT Asset Management clicks on an asset from the scrollbar menu

The Director of IT Asset Management presses the pencil button to access the "SELECT ASSET" page


ITAM
Home
Stockroom
About
Contact
User
Hello User!
Asset Search
Asset Database
Serial Number
Asset Tag
State
Location
Condition
Model
Assigned To
B21A34 AA012 AVAILABLE Rack 1A Repaired A45 John
A43C56 KR056 LOST Rack 6Z New H74 Jenny
Z19K42 PK923 STOLEN Rack 9H Used F34 Jennifer
H21A34 AR012 AVAILABLE Rack 3A Repaired A15 John
K43C56 KI056 LOST Rack 8Z New H34 Jenny
K23P84 DM352 RETIRED Rack 4L Used K53 James
G93H74 ME743 LOST Rack 8P New P37 Jrutha
After the Director of IT Asset Management selects an asset, the "MANAGE ASSET" page is shown. Prefilled information the Asset
If the asset is in stock (the state is "AVAILABLE"), the Director of Asset Management can select the "LOCATION", "MODEL",

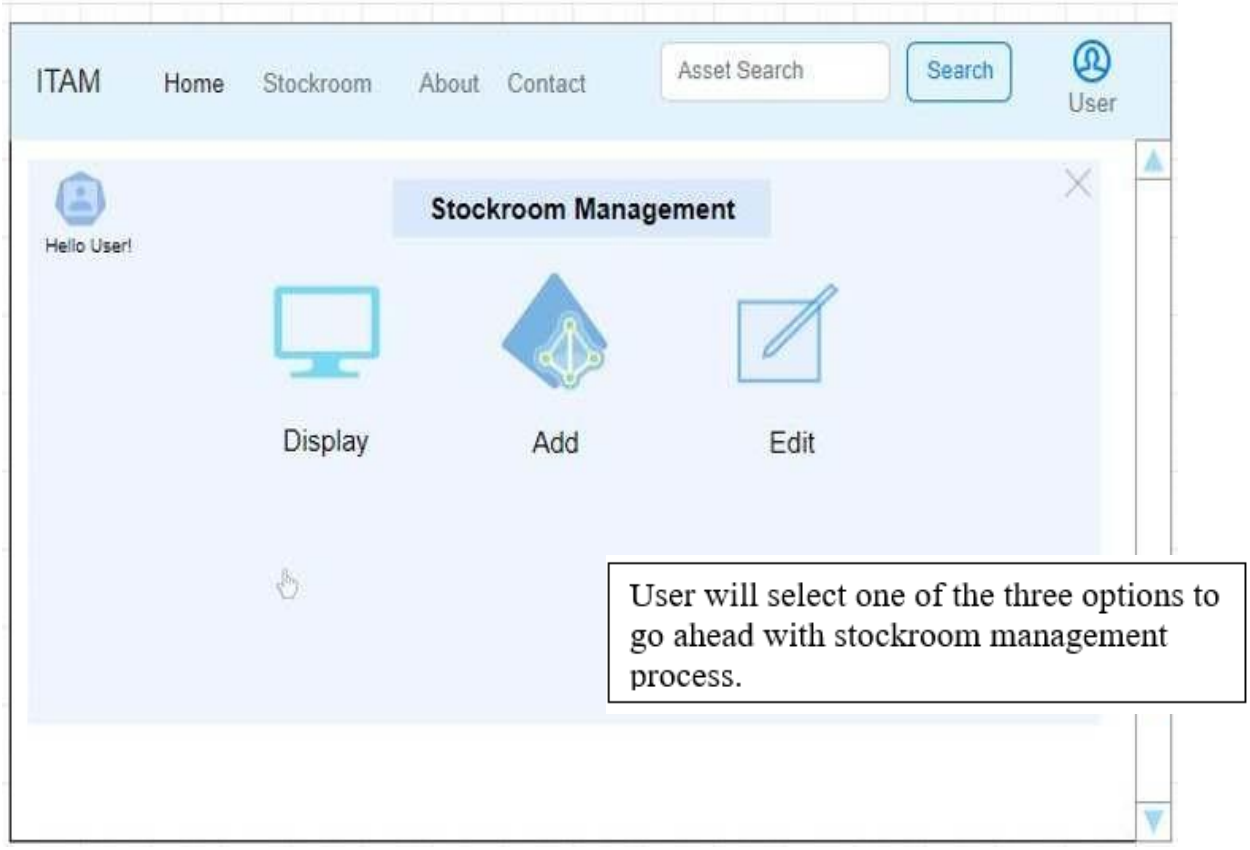
Wireframe 2: Name of Wire frame

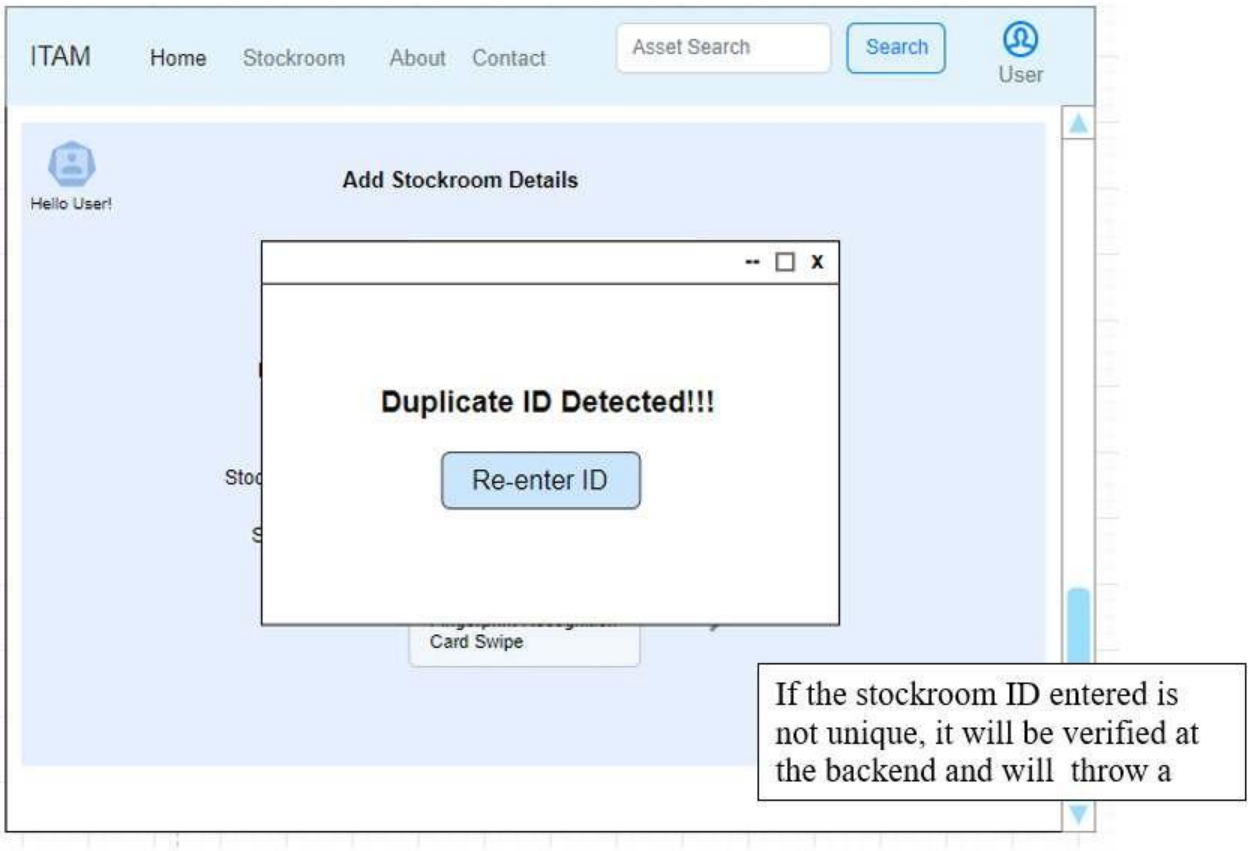
Description

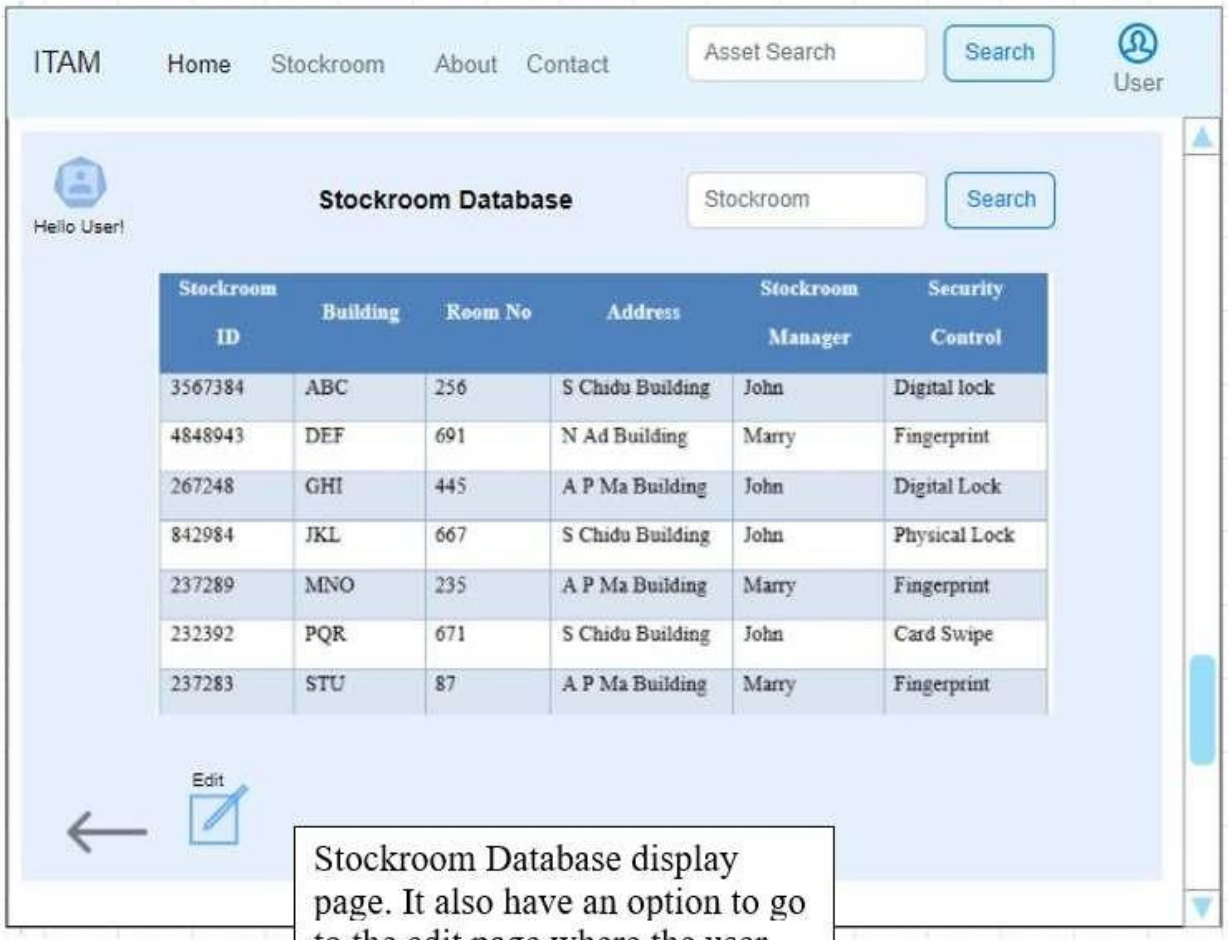
Stockroom management may assist to reduce labour costs by giving the appropriate work to the right person at the right time. The supply chain has been simplified, and the assets are traceable, allowing a check to be performed if any of the assets are missing. Stockroom management that is effective leads to good shipment management, which enhances customer service.

Stockroom management may assist to reduce labour costs by giving the appropriate work to the right person at the right time. The supply chain has been simplified, and the assets are traceable, allowing a check to be performed if any of the assets are missing. Stockroom management that is effective leads to good shipment management, which enhances customer service.

For the stockrooms, a consistent set of Security Control choices will be given. The number will be transformed into unique after the uniqueness of the building name and identification is confirmed. The backend will verify the uniqueness of the identifier, i.e. stockroom Id, and if a duplicate is found, a popup window will be presented. To continue adding details, the individual must re-enter a unique id. When the user presses the display button, a webpage with stockroom information in the form of a database appears. If the client wants to alter or update any of the entered data, he should select the edit icon, which will lead him to an interactive database where he may modify and save the information. The display webpage also has a link to the edited webpage.

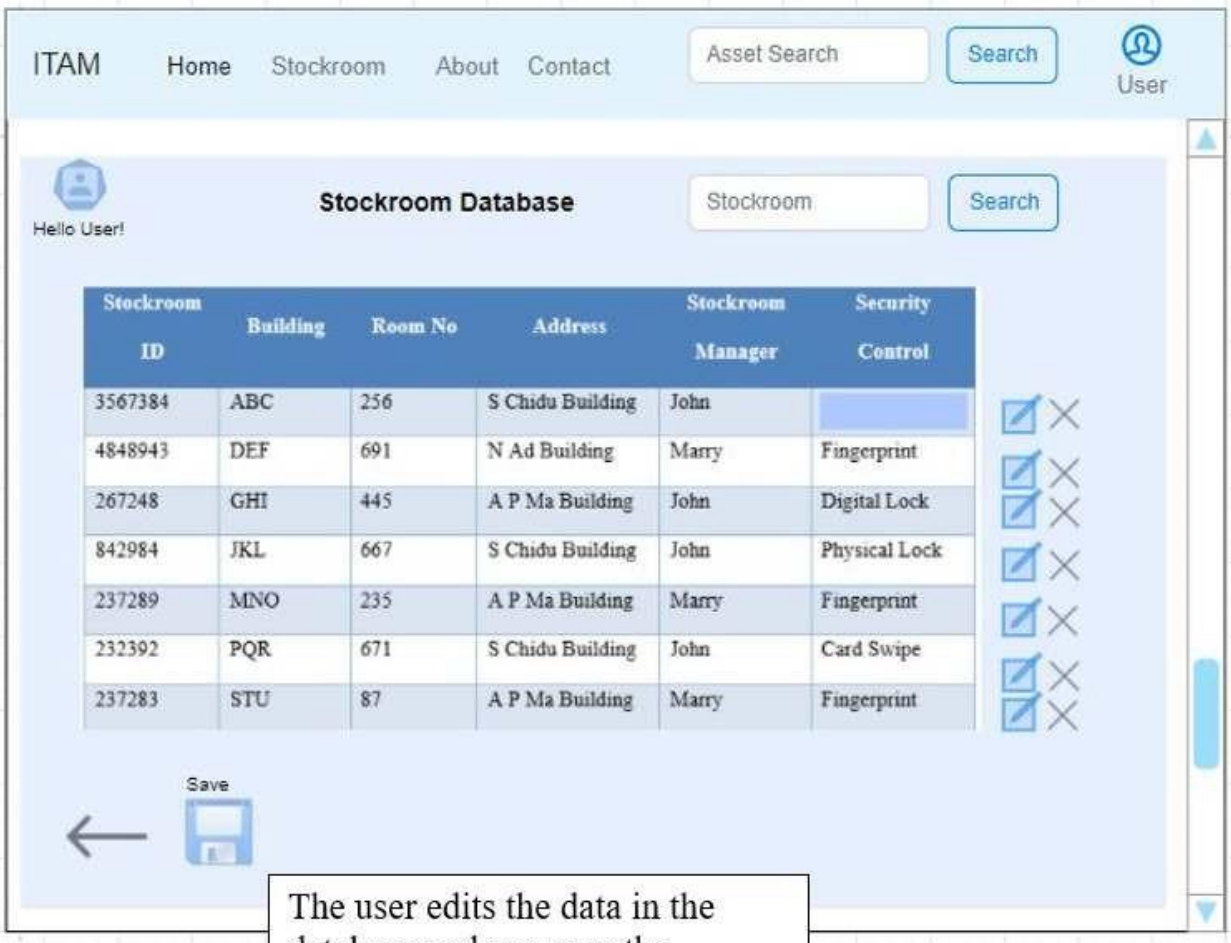



ITAM
Home
Stockroom
About
Contact
Asset Search
Search
User
Hello User!
Add Stockroom Details
Duplicate ID Detected!!!
Re-enter ID
Card Swipe
If the stockroom ID entered is not unique, it will be verified at the backend and will throw a



Stockroom ID	Building	Room No	Address	Stockroom Manager	Security Control
3567384	ABC	256	S Chidu Building	John	Digital lock
4848943	DEF	691	N Ad Building	Marry	Fingerprint
267248	GHI	445	A P Ma Building	John	Digital Lock
842984	JKL	667	S Chidu Building	John	Physical Lock
237289	MNO	235	A P Ma Building	Marry	Fingerprint
232392	PQR	671	S Chidu Building	John	Card Swipe
237283	STU	87	A P Ma Building	Marry	Fingerprint

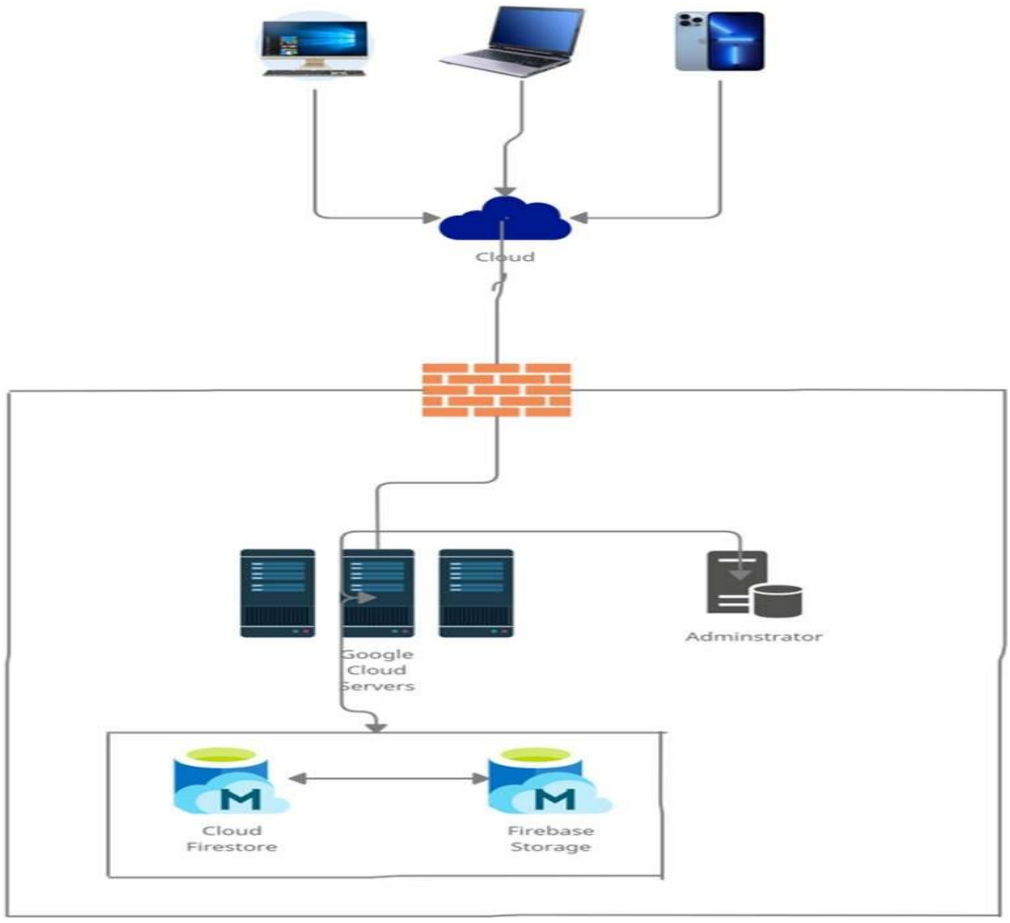
Stockroom Database display page. It also have an option to go to the edit page where the user



The user edits the data in the database and can save the

Infrastructure Architecture

Network Topology



A web browser on a desktop, laptop, or smartphone will be used to access the program, which will be constructed utilizing an internet-based architecture.

Users can connect to the Google cloud servers where the application is housed by using their device to view the application. Using Google's Cloud Functions service, the middleware and business logic will be created and hosted.

We may create a nearly serverless environment with Google Cloud Functions and develop straightforward, single-purpose functions that are linked to events released by cloud database services.

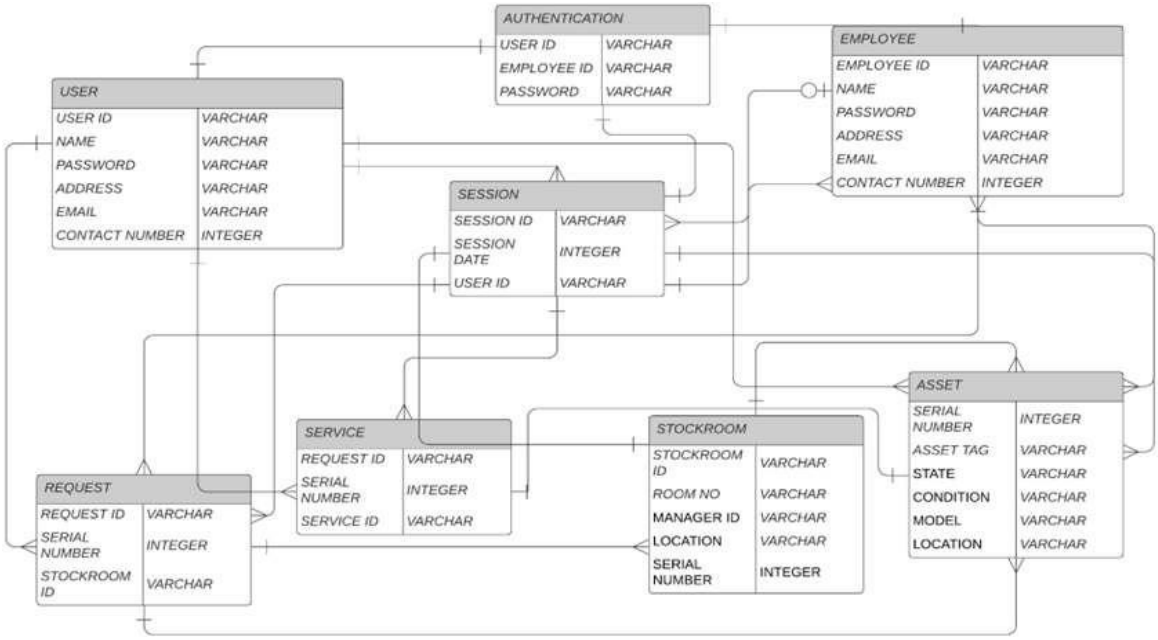
The website administrator can keep an eye on the servers and change settings from their desktops. The business logic is specified by the website administrator, and the cloud servers implement the defined logic. The server interfaces will only be accessible to the administrator.

Google's Cloud Firestore and Firebase Storage can be utilized for the database. Through its NoSQL-based, real-time, cloud-hosted Cloud Firestore and Firebase Storage, Firebase provides database services.

User data will be kept in the Firestore, while images and video files will be kept in the Firebase Storage. To guarantee that only valid user requests are carried out on the database, the website administrator will specify the access rules for the database services.

Information Architecture

Entity Relationship Diagram



The user entity consists of a user id, name, address, password, email address and contact number.A session is started after the user has been authenticated. The primary key is the user id, and for security purposes, the encrypted password will be stored in the password field. The user or customer may own several items and submit several requests for the items and services. The userid, employee id, and encrypted password make up the authentication entity for security purposes.This object starts a session and authenticates the user.

Session id, session date, and user id make up the session entity. Given that a client or user can start several sessions, the connection between session and user entities is one of many to one. With the exception of the authentication and employee entities, this entity impacts all the other entities and has a one-to-many relationship with them.

The employee entity has the following information: employee id, name, encrypted password, address, email, and phone number. A many-to-many relationship exists between the two entities since several teams may participate in a single session. Stockroom and asset entities are many toone related to the employee entity. When a request is received, the associated team gets to work on it; as a result, there is a many-to-many relationship between the request and employee entitiessince numerous teams may work on a single request and one team can handle several requests.

The serial number serves as the primary key for the asset entity. Additional components includethe asset tag, model, stockroom location, state (use, available, on order, lost or stolen, retired), and condition (new, good, fair, useless, or parts). One stockroom can hold numerous assets, butonly one asset may be held in more than one stockroom without causing problems. This is known as a many-to-one relationship between the asset entity and the stockroom.

The primary key for the stockroom entity is the stockroom id, which also serves as a secondarykey for the room number, stockroom location, and asset records.

The serial number of the asset, the stockroom id for the technician to work with, and the request-id produced for each request submitted by the user make up the request entity. It has aone-to-many relationship with stockroom and asset entities alike.

Each time a user submits a service request, a request id is produced and stored in the serviceentity.

Due to a client's ability to submit many service requests, the connection between the user andservice entities is one to many.

Security and Privacy Architecture

Every information system must have a secure system. Confidentiality, integrity, and availability are the three key components of system security. Unauthorized system access is among the biggest security dangers. Only individuals who are authorized to access a given page or set of data will be able to do so thanks to authentication measures the system will impose. Only after successfully logging in will the user, whoever he or she may be, be permitted access to the system. They must register if they are a new user. The two-factor authentication method, along with the use of an email address and password, will be used to authenticate users. The user's password will be encrypted, making it impossible for anyone to access it from the database, including application administrators. Another security concern that could endanger the integrity of the system is invalid user input. User opinions are not your friend (LRS Web solutions, 2021). All user input will be checked for accuracy before being stored in the database. Fields on every form will go through a thorough form validation process. The input fields will additionally shield the system from injected input. A type of system attack known as input injection involves sending code logic through the input, which then affects the database and ultimately compromises the overall system. The required validation procedures are to be carried out with middleware so that the programming algorithm or a database is sent through as user input. Therefore the variable of a database is secured away from the user in order to safeguard the servers. This guarantees the consistency of the system data and the preservation of the database's integrity. One of the following techniques will be used to protect the stockroom's actual location: With a swipe of your finger, fingerprint recognition unlocks the device, or when you pull up in front of the stockroom with a fob in your pocket, these locks open automatically or to unlock the door, quickly tap or click the fob button. As an alternative, your smartphone can establish a

Bluetooth connection with your lock to control entry remotely and monitor visitors. As you get close, locks will recognize your phone and start to open themselves. Some will text you when someone else opens the door. Lock for surveillance: By taking pictures of anyone who opens your door, it is a kind of lock that combines surveillance which can be accessed easily. You can set up codes for specific people, it will formally welcome me with a cheery LED greeting. Finally, to guarantee that authorized users consistently have access to their data, the servers will be housed on Google's Cloud platform. Google Cloud offers a huge number of powerful machines in addition to reliable storage The system is capable of control by using Google servers so it can control huge network traffic with heavy amounts. The end device and server connection will be over HTTPS, and all traffic to and from the servers will be encrypted. This ensures the privacy of any data sent between the browser and the web server. Users will always have access to the service as a result, and communications are private.

The IT Asset Management program will incorporate SSL code at the application layer on the client and server sides to maintain privacy. SSL code utilizes "existing, highly optimized libraries and classes". The SSL socket receives data in a cleartext way in its unencrypted form without compromising confidentiality before being encrypted and later using less secure protocols.

Programming

The upcoming development will make use of the following tools:

Microsoft Visual Studio Code: This code editor is popular among web developers (Cameron, 2019). This code editor's numerous developer extensions make it the best choice for the creation of this application. Additionally, it has an integrated command line interface and a JavaScript debugger built-in, both of which will make development simpler (Cameron, 2019).

React.js:

Facebook Inc. has released the open-source React.js framework for JavaScript (React, n.d.). React facilitates the creation of reusable UI code and composable user interfaces. React JS helps the client side and the server side with the help of JavaScript in virtual DOM, which boosts performance.

Node.JS:

With thee help of this asynchronous JavaScript runtime environment, programmers can create web applications with event-driven, non-blocking code (Capan, 2013). React.js, another development tool, requires this runtime environment as a prerequisite. The Node Package Manager (NPM) is a component of Node.js that enables developers to swiftly install third-party packages as needed (Capan, 2013).

Google Firebase Console:

The developers can create and test back-end functions using the Firebase console

because the application will use Firebase as its middleware and database. This Console has a variety of developer-friendly documentation for support and can be accessed through a web browser.

The following programming languages will be employed:

JavaScript: -

The middleware's business logic will be programmed in the common JavaScript language.Google Cloud Functions will be used to put the logic into action. The React.js user interface will be created using an extension of JavaScript called JSX (React, n.d.). The React framework can display more helpful error and warning messages thanks to JSX as well. While HTML and CSS give web pages structure and aesthetic appeal, JavaScript adds interactive elements that keep users interested in them. Through the creation of interactive static web pages, JavaScript improves the user experience. In conclusion, JavaScript gives web pages more functionality.2019 (Anurag).

- **HTML, CSS3: -** Technically speaking, HTML and CSS3 are not programming languages. Thecreation and styling of the Web Pages will be done using these.

References

Tilley, S. (2019). Systems Analysis and Design (12th ed.). Cengage Learning.

React. (n.d.). React. Retrieved March 3, 2021, from

https://reactjs.org/Capan, T. (2013, August 13). Why The Hell Would I Use Node.js? A Case-by-Case Tutorial. Toptal Engineering Blog.

https://www.toptal.com/nodejs/why-the-hell-would-i-use-node-js