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M.H. SABOO SIDDIK COLLEGE OF ENGINEERING

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Department of Computer Engineering

Project Synopsis Report

On

“Information Technology Service Management System”

By

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Of Final Year/Second year (B.E./S.E Semester VII/III) degree course in Computer Engineering has completed the specified project synopsis on,

"Information Technology Service Management System"

As partial fulfillment of the project work in a satisfactory manner as per the rules of the curriculum laid by the University of Mumbai, during the Academic Year July 2019 — June 2020.

Internal Guide

Internal Examiner

External Examiner

Head of Department

Principal

ACKNOWLEDGEMENT

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We are highly thankful to our internal project guide Dr. Zainab Pirani whose valuable guidance helped us understand the project better, her constant guidance and willingness to share her vast knowledge made us understand this project and its manifestations in great depth and helped us to complete the project successfully.

We would also like to acknowledge with much appreciation the role of the staff of the Computer Department, especially the Laboratory staff, who permitted them to use the labs when needed and the necessary material to complete the project.

We would like to express our gratitude and appreciate the guidance given by other supervisors and project guides, their comments and tips helped us in improving our presentation skills.

Although there may be many who remain unacknowledged in this humble note of appreciation there are none who remain unappreciated.

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ABSTRACT

ITSM (Information Technology Service Management System) is a Cloud-Based Web App that is designed to handle the workflow of various IT projects that are undertaken in an organization. The workflow includes the commencement of the idea of the project from the Business Department to the Central Technical Surveillance Department, which monitors the entire workflow, and the IT Department which is responsible for the development of the project. There are various stages from the Initialization of the project, Documentation, and Validation. The Validation stages are further divided into various sub-stages where the idea is presented to each department for assessment and for providing a rough estimation of the cost that would be incurred while working on the project. The members of various Departments may hold meetings to discuss and to infer upon the changes or modifications that are necessary to incorporate in the project. The Web App aims to serve as a platform where the information can be stored, and shared centrally, to ensure a smooth workflow.

INTRODUCTION

1. INTRODUCTION

“The Airline Group” or “TAG” is a consortium owning a group of airlines in Europe. The company has around 50,000 employees across the airline is up. TAG has it’s own IT division with its branding – “TAG tech”. “TAG tech” handles all the IT operations across the airline group.

TAG tech has 3 major functions:

- ➔ Managing Business-As-Usual (BAU) operations of the various applications running on its infrastructure
- ➔ Track and fix issues and bugs
- ➔ Programs / Projects to align with the companies strategy/vision

Managing Business – As – Usual (BAU) operations

The functioning of business applications that support day to day operations is critical to the very existence of the organization. They are also called business-critical applications. The IT infrastructure (servers, networks, support, etc) are the backbone of these applications. This function tools/agents the existing IT infrastructure can support the optimal running of these applications. This function can include application end users, helpdesk support teams, application maintenance teams, monitoring tools/agents.

Track and fix issues/bugs

IT systems (hardware/software) need to have efficient issue tracking and fixing mechanisms to ensure business continuity. This function continually monitors bugs/issues reported by the users or system monitoring tools and tracks them to completion/issue resolution. The organization has employed ample resources to ensure any issues in its business-critical systems are promptly investigated and fixed.

Deliver Programs / Projects to align with the companies strategy/vision

Every organization needs to keep up with the changing market conditions and rapid technological advancement. To cater to this, TAG tech has this major function of initiating, managing, and delivering software projects that would keep the organization aligned to

its mission statement as well as keep up with the market trends and latest technologies. TAG tech implements the PRINCE2 & Agile project management methodology to manage its portfolio.

The **ITSM (Information Technology Service Management) system** ensures that it caters to all the needs that are required by “TAG - Tech”.

LITERATURE SURVEY

2.LITERATURE SURVEY

The purpose of the literature survey is to identify regularly models, and papers in our proposed research area in an attempt to appreciate, make use of, as well as bridge a missing gap, if any, between different research.

BUSINESS CASE

What is a Business Case:

A PRINCE2 business case is a component of the Project Initiation Document (PID) and lies at the heart of every PRINCE2 project. It is the key driver of all projects undertaken using the PRINCE2 method. During the project, a PRINCE2 business case is a major control document that is referenced on a regular basis to ensure and confirm that the project remains viable. PRINCE2 business cases will contain justifications for a project, such as value for money for what is to be done and why it should be done now. The Business Case's key goal is to test the viability of the project.

How to create a Business Case

The format of a PRINCE2 business case is not prescribed in the PRINCE2 methodology and will therefore vary from company to company. However, as a guideline, the following questions should be considered:

- Why do we need to undertake this project?
- What are the business benefits?
- What are the risks?
- What are the potential costs?
- How long will the project take?

SUMMARY TABLE

Year	Author(s)	Overview
2019	Hendro Gunawan	The research paper focuses upon why strategic IT planning is required in an IT organization and how a Management system helps to achieve that. The company or organization must consider building and implementing a clear Information Technology Service Management (ITSM) that can control all IT services better. The paper explains us the various models and the dependent frameworks that are present and will be useful for an ITSM implementation.
2019	Abdulazeez Ftahi, Abdul Hafeez-Baig, Raj Gururajan	The purpose of this paper is to examine how knowledge application capability effectiveness (KACE) in ITSM can be affected through several knowledge management processes. In ITSM, IT service desk function deals with various IT problems and incidents daily through utilization of all available knowledge resources (i.e., organizational knowledge and personal knowledge). A framework was developed to identify factors that affect KACE in IT service desk function. The framework focuses upon socialization, externalization, internalization, and combination as contributors to the formation of KACE. The results are founded upon qualitative data in which manual and computer-aided content analysis were undertaken.
2018	Vipul Jain, O.P. Wali, Raveendra Saradhi	This is a literature review that explores the various ITSM that are adopted by various companies worldwide between 2010 - 2018. It finds that not all ITSM practices are uniformly adopted, and some processes tend to be adopted more widely than others. The review also discusses the various measurement models that can be used for validation of an ITSM model or Framework.
2016	Anup Shrestha Aileen Cater-Steel Mark Toleman	This research addressed the problems of the lack of transparency and the need for efficiency in ITSM process assessment. Using the Design Science Research methodology, it developed an innovative Software-mediated Process Assessment (SMPA) approach that automates assessment of ITSM processes and supports the decision-making of IT Service Managers. It implemented a

		decision support system (DSS) to automate the SMPA approach and evaluated it at two IT service providers. The evaluations indicated that the SMPA approach supports decision-making on process improvements.
2015	Ali Yazici, Alok Mishra, Paul Kontogiorgis	This article provides an overview of Information Technology Service Management (ITSM) and investigates the education and research activities in this discipline from a global perspective. The objectives of the study are to inform the training organizations (e.g., universities, training institutes) on the current status of the educational activities in ITSM at undergraduate and graduate levels; and to guide the researchers by providing quantitative data on the research activities conducted in the field.
2014	Narges Shahsavarani, Shaobo Ji	This paper presents the results based on a study of comprehensive review of publications in ITSM from 2000 to 2010. A total of 152 research papers from leading information systems (IS) journals and conference proceedings were identified, categorized, and analyzed from the perspectives of reference discipline, theoretical foundation, research method, level of analysis, and research topic. The findings suggested five primary conclusions: 1) lack of theoretically driven researches; 2) the field is still improving 3) ITSM performance issues, justifications, and IT Infrastructure Library (ITIL) are popular topics of research; 4) ITSM researchers do not seem to consider research at an individual level; 5) the most popular research method was the conceptual orientation. Recommendations for future research in ITSM are presented and articulated.
2013	J Iden, T. R. Eikebrokk	This article provides a systematic review of existing research related to the implementation of IT Service Management (ITSM) and the Information Technology Infrastructure Library (ITIL). The review's main goals are to support research; to facilitate other researchers' search for relevant studies; and to propose areas for future studies within this area.
2013	Jon Idena, Tom Roar Eikebrokk	This paper provides a systematic review of existing research related to the implementation of IT Service Management (ITSM) and the Information Technology Infrastructure Library

		(ITIL). The review's main goals are to support research; to facilitate other researchers' search for relevant studies; and to propose areas for future studies within this area. In addition, the researchers provide IT managers with useful information on ITSM and ITIL, based on research-based knowledge of their implementation. The review results suggest that motives, critical success factors, implementation status, and benefits are the most frequently studied areas, and that each of these areas would benefit from further exposure.
2013	Thorsten Proehl, Koray Erek, Felix Limbach, Ruediger Zarnekow	This research examines the IT Service Management (ITSM) research literature, starting from passed up to the present. The applied research method is the literature review, in which a search is conducted across 8 major global, regional, and national conferences as well as 71 international journals. To classify the results, a morphological box is used. Moreover, a keyword analysis is conducted to obtain an overview about research topics. This paper shows which areas and topics are explored, and which are underexplored. A research agenda was proposed to handle the identified areas of future research.
2010	Antti Lahtela, Marko Jantti, Jukka Kaukola Tieto	This paper focuses on the implementation of an ITSM in IT Infrastructure Library (ITIL) Framework.ITIL is the most widely used IT service management framework. It consists of best practices that can be used in implementing, for example service support processes, such as incident management and problem management.

2.1 SURVEY EXISTING SYSTEM

The existing workflow uses a manual document-based system where each committee that wishes to modify the document has to follow a series of steps which involves manual documentation for every step which is involved in the development of a product, throughout its lifecycle.

Even though the existing system has multiple layers of stages and guidelines the communication through each stage follows a more traditional approach of contacting via emails and for decision-making events, a panel of meetings is called, and then a collective decision is made.

The updates for every iteration of delivering the product is usually communicated via meetings and/or by email and spreadsheets. The estimation of the cost, assigning of Project Manager, Proposal Lead, individual tower head, subject matter experts are done only through the spreadsheet, and for every new revision, a new sheet instance is used as it helps in maintaining time-based data. For every update in cost of expenditure that would include CAPEX, OPEX and a total of both of these will be updated and a new revised instance of the cost sheet will be created (the term cost sheet refers to a record that is maintained digitally and/or traditionally via the concerned authority). The record for FDR (Front Door Request) also creates a chain for updates in all the corresponding documents so that the records are saved, for all these steps the necessary and respective authorities are informed and are requested to update their records as well. To keep track of all the meetings for every step/iteration/epoch of the development cycle there are specific action trackers maintained by the organization, these trackers are known as:

1. Triage Tracker
2. Solution Sketch Tracker
3. Statement of Work Tracker

Each of these trackers maintains the records for their respective category and are later used for the analysis of the development to gain various insights such as the efficiency of the development, improvement over the previous work, how well the particular team performed, the number of meetings conducted, the performance of every individual team leader i.e. Proposal Lead and Project Managers, and then these factors along with or without others can be used to improve the overall development of future applications.As the initially mentioned TAG is referred to as The Airlines Group which specifies a cluster of companies under the parent name of TAG improvement of the company as a whole is an important aspect which in turn leads to providing the employees to work along with cross-company, though the process remains same it gives an employee of one child company a chance to understand the work culture, ethics, and environment of other company.

2.2 LIMITATION EXISTING SYSTEM OR RESEARCH GAP

- ➔ The current workflow involves a lot of interaction between stakeholders that happens outside the project process.
- ➔ The current workflow is based on excel sheets. This makes data handling, storage, analysis a big overhead for the organization.

- ➔ As there is no central system managing this document workflow, email is used to communicate and send documents. This makes the system prone to human errors and unnecessary duplication of data.

2.3 PROBLEM STATEMENT AND OBJECTIVE

TAG Tech has a change management process to initiate a Project and engage Business, IT / Infra & Project Management teams. This is coordinated by the CMO (Change Management Organisation) team. TAG tech has been facing a lot of issues with the current workflow in the past and has identified a lot of potential problems that can occur which will have a major impact on the business. The current workflow involves a lot of interaction between stakeholders that happens outside the project process. The current workflow is based on excel sheets. This makes data handling, storage, analysis a big overhead for the organization. As there is no central system managing this document workflow, email is used to communicate and send documents. This makes the system prone to human errors and unnecessary duplication of data. The organization requires an improved workflow and software that will streamline and digitize the process, make it transparent to stakeholders, and store key data that can be used for performance analytics and process improvements.

OBJECTIVES

- ➔ To ensure that all stakeholder interactions within the project process workflow happen smoothly.
- ➔ To efficiently store data and give insights based on the stored data to improve performance.
- ➔ Centralize the entire workflow.
- ➔ Avoid duplication of the data.
- ➔ Minimize the probability of human error that existed in the previous system.

2.4 SCOPE

2.4.1 JUSTIFICATION

An IT Service Management System (ITSM) serves as the backbone of any IT firm. It becomes a crucial part of an IT-based organization to ensure that it has a streamlined and smooth process. It is also the sole purpose of an ITSM to ensure that all the

stakeholders get access to the entire workflow. It facilitates effective collaboration for the smooth functioning of the organization/company.

2.4.2 PRODUCT SCOPE DESCRIPTION:

This ITSM application can be adopted and implemented by different kinds of technology-based companies providing services in any kind of sector. It is useful for industry users to use this application conveniently anywhere and at any time through the company's may be situated necessarily not in the same country/state. The issues faced by any user at any time can be addressed by the concerned authority through the feature of messaging within the application.

2.4.3 ACCEPTANCE CRITERIA:

- ➔ The product performs well within the expectations for completely automating the workflow.
- ➔ The interactions of the stakeholders outside the project are reduced to the bare minimum or until necessity arises.
- ➔ From project initiation to project completion, the team can maintain a smooth chain of communication via the web application.
- ➔ The product adheres to the work ethics and principles of the organization.
- ➔ The product follows the guidelines set by PRINCE2 for business cases.
- ➔ The product fulfills the objectives as mentioned in the above section.

2.4.4 DELIVERABLES:

- ➔ A Web Application that has adopted the existing workflow of the organization.
- ➔ To ensure that each user gets access to the Web App according to the privilege level assigned to them.
- ➔ A robust and centralized system.
- ➔ A digital system with minimal scope for human error in the system.

2.4.5 ASSUMPTIONS:

- ➔ The End User has a device with a browser to access the Web App.
- ➔ The End User is aware of the existing workflow of the organization.
- ➔ The End User has the appropriate and legal credentials to access the web app.

PROPOSED SYSTEM

3. PROPOSED SYSTEM

The existing approach is disadvantageous as it follows a traditional approach as mentioned in drawbacks of existing systems. Therefore, an advanced and automated system is required which overcomes the drawback of the existing approach.

The proposed system aims to make use of principles of the traditional approach and provide a more simple, central, and automated approach. Thus reducing various factors such as data redundancy, inefficient communication and human based error. For understanding the system we can divide it into various modules and understand them:

- **Databases:** The database is the most fundamental part of the application as the entire record maintenance will be on the cloud, more precisely a centralised cloud. The database architecture for each operating company is separate with some exceptions where an employee works in more than one organisation. There will be a centralized database for FDRs, costing sheet, action trackers corresponding to the respected employees working on it. The database for users will be centralized for reasons such as reducing latency while logging in, this also helps the switching of operating companies and/or domains easily. Now from the above description one can easily conclude one or both of the two things:
    a. The generated database would be large
    b. And, how will you perform analysis

  considering both the points the database technology that will be used is MongoDB or simply non relational databases, or NoSQL databases, as these store the data in the form of documents storing and analysis both becomes relatively easy and simple. Along with giving us the benefits we need it easy to scale and relatively easy to work with once the engine is properly configured.

- **The Web Stack:** Since the entire application will be automated one major concern would be to make the system responsive, this provides the flexibility to the user to make the necessary changes on the go from a smartphone, a laptop, tablet, a computer, this improves the overall efficiency of working for an organisation, consider an example, if there are 10 FDRs under a single business user, in a traditional system you have to browse thrice the number of revisions to go through them and check the status of the development, when it was last updated, what is the current status of the same and if the latest update is missing the user will have to contact the proposal lead of each projects to know their status, but our system makes all of these as simple as browsing to the dashboard and then selecting the required FDR and all the details are visible, at the same time if the

business user wishes to add the comment he/she does not needs to contact the respected authority, all he/she has to do is just add a comment for that.

So now the question arises is it possible to scale the entire application to be able to work with the entire group of companies individually while being centralized at its core, and how well can the team deal with the latency issues. Answering them, yes it is true to scale the entire application using the right tools for it, and in our case we are using the Django framework which is built for large scale applications such as ours and is secure because of its strictness, as for being centralized the concept of subdomains, splitting of the databases (as in our case) can be used. Now coming towards latency issues the technique to deal with it is on both the hardware and software front, the application should be optimized to use the process, fields that are necessary, while using caching for storing less secure details on the users system such as the styling and UI components, as for the hardware front a decently configured server along with the 10 bit gigabit ethernet for data transfer, the latency issues would be resolved.

- **The Workflow on the ITSM:** The workflow will be completely automated and the approach will remain the same as that of the traditional system that is being followed, so the users will have less to no efforts getting accustomed to the application. The application will work in the following ways:
    - Every user will have a dedicated dashboard for them with the normal permissions and rights that a user gets with his/her designation. Eg:
        - The business user will have the option to create the FDR and monitor it
        - Proposal lead will have the option to update the FDR, corresponding costing sheet, action trackers along with the option for updating the details of the mentioned documents if needed.
        - The project manager will have the ability view and update the FDRs, and the Triage Action Tracker in the read only mode.
        - Each SME will have the option to update the costing sheet, FDRs as necessary for their respective towers.
    - The costing sheets, FDRs being centralized can be viewed and updated by only the necessary user and then forwarded for further actions, and then the further actions can be taken on the same object (document) thus reducing the redundancy of the documentation. While at the same time the timestamp of each of these actions being recorded for future analysis.

- The application will provide a simple drop down for the users who belong to multiple companies for them to switch between the organizations with no effort.
- The status update of the FDR fields, and the individual status will be automatically updated by the application thus removing the possibility of the human error of closing a particular FDR later to its actual date. And these actions will be recorded as well. Each FDR will have the option to upload the images, pdfs, docs for the solution sketch and statement of work.
- Coming to the communication between the users, it will be accomplished by either/both medium of commenting on the documents and by using an inbuilt mailing service.
- The application will have inbuilt analysis and reporting service thus removing or reducing the need to depend on external tools, while giving the ability to perform organization specific analysis with ease and at the same time being available within a common application.
- There will be a superuser or admin who will be granted the ability to create the users, as the application is organization specific signing up can only be provided to the user by superuser or admin.

- **Security:** Coming from all the above mentioned points it is an obvious question how secure is the application. And to answer that question there are few things that are required to be implemented (or will be implemented if absent), those are a good firewall, SSL integration and secure hosting platform. Other than these the application provides domain specific logins, load balancing for simultaneous logins, access only to the necessary ports, communication within the application to avoid any data leak/breach that can happen, records of every email sent or received to trace the origin of the issue if any happens, and etc. depending upon the requirements.

3.1 ANALYSIS/FRAMEWORK/ALGORITHM

1. Django - 3.05
2. Djongo - 1.3.3
3. Jinja2

3.2 DETAILS OF HARDWARE & SOFTWARE

3.2.1 HARDWARE REQUIREMENTS

1. Processor: Intel Core i7 10875H or AMD Ryzen 7 5800x or higher
2. System Memory: 16 gigabytes or higher
3. Disk Requirement: 256Gb of SSD for storing application
4. Database: A cloud-based database which can be scaled depending upon requirements

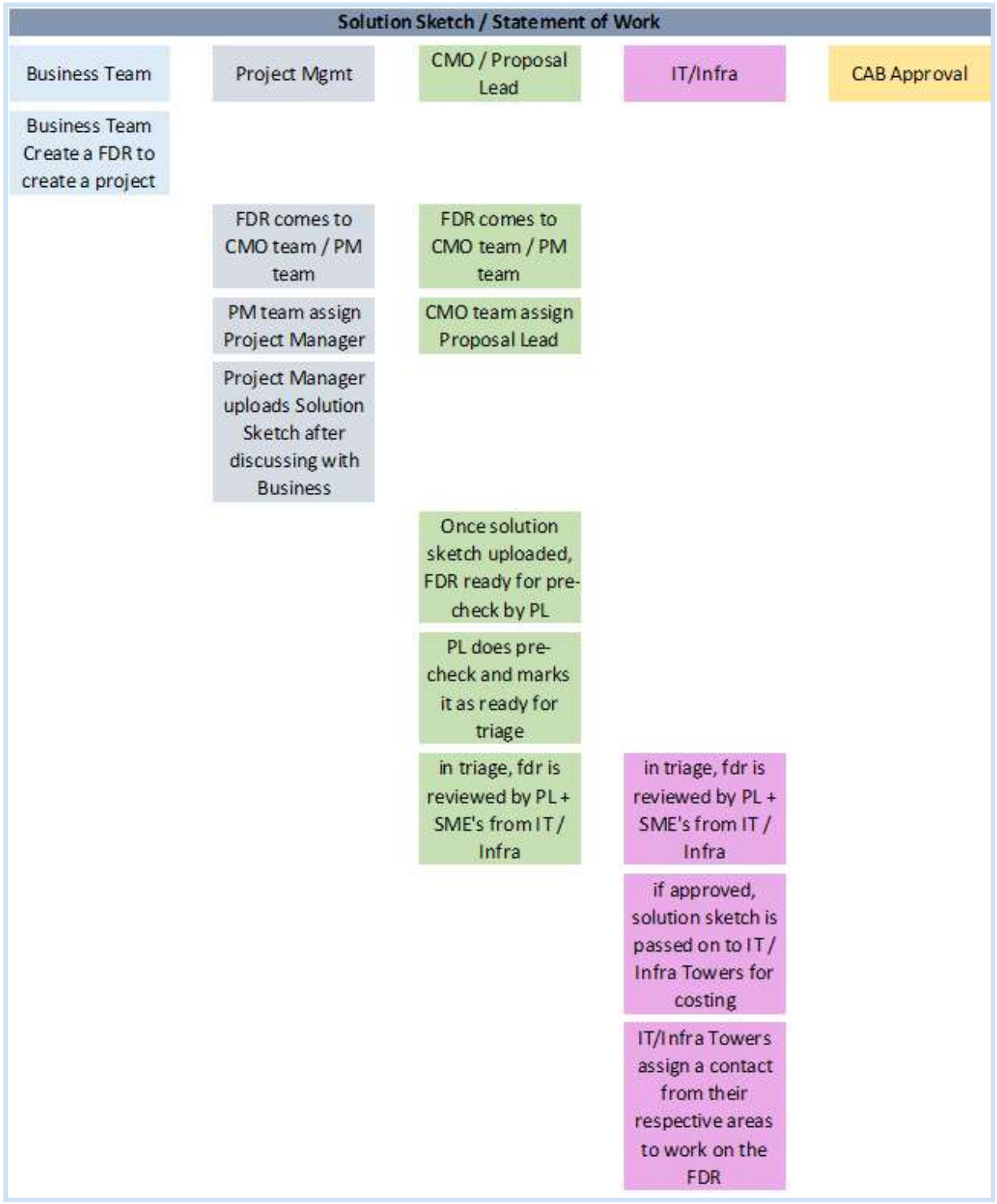
3.2.2 SOFTWARE REQUIREMENTS

1. Modern Web Browsers (Google Chrome, Microsoft Edge, Mozilla Firefox)
2. An operating system that supports modern web browsers
3. A web server for hosting the application

3.2.3 TECHNOLOGY USED

1. Python
2. MongoDB
3. HTML5
4. CSS3
5. JavaScript ES6
6. Jquery
7. Bootstrap

3.3 DESIGN DETAILS



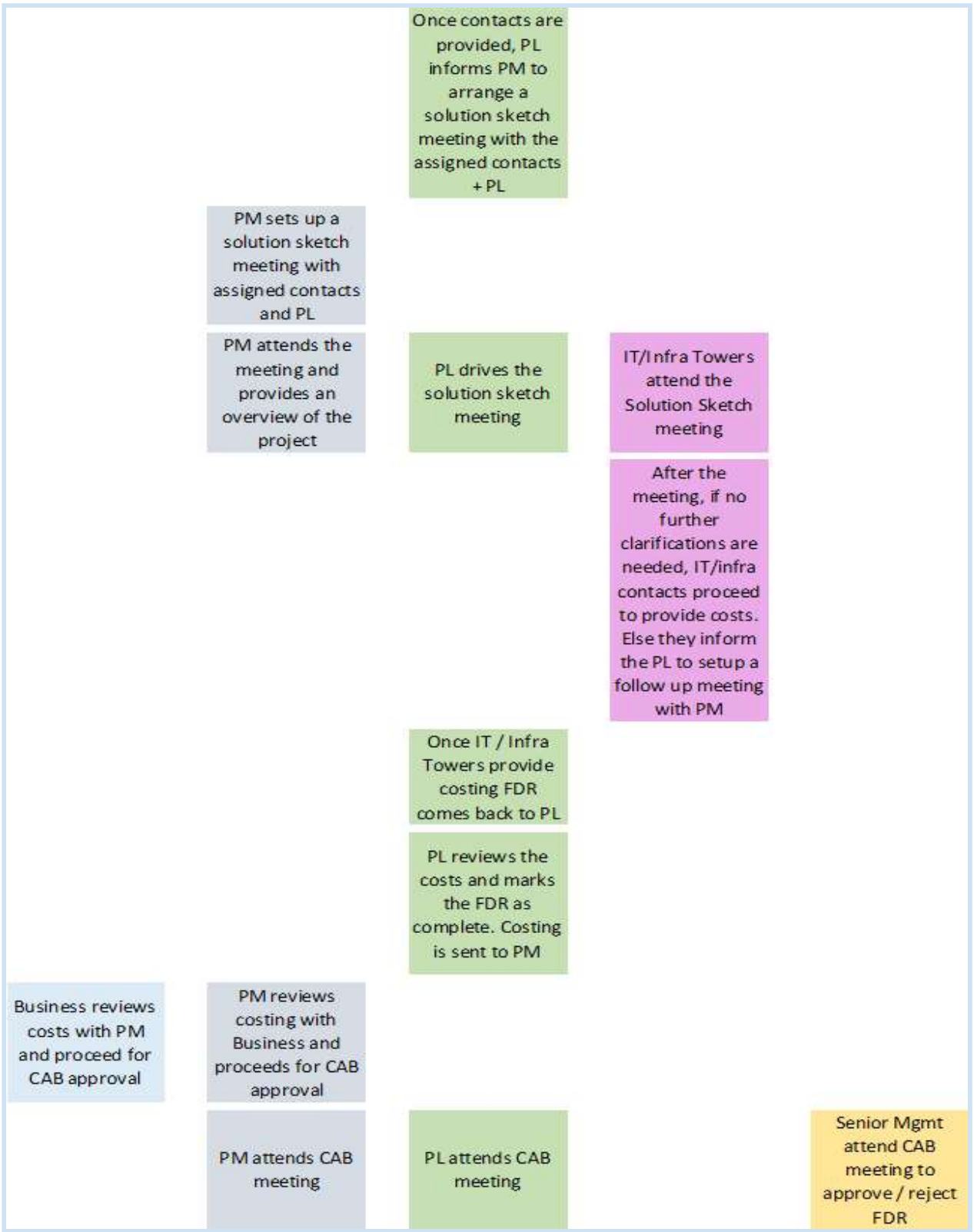


FIG 3.1 : DETAILED WORKFLOW OF THE SYSTEM

3.3.1 FLOWCHART

FIG 3.2: CURRENT WORKFLOW

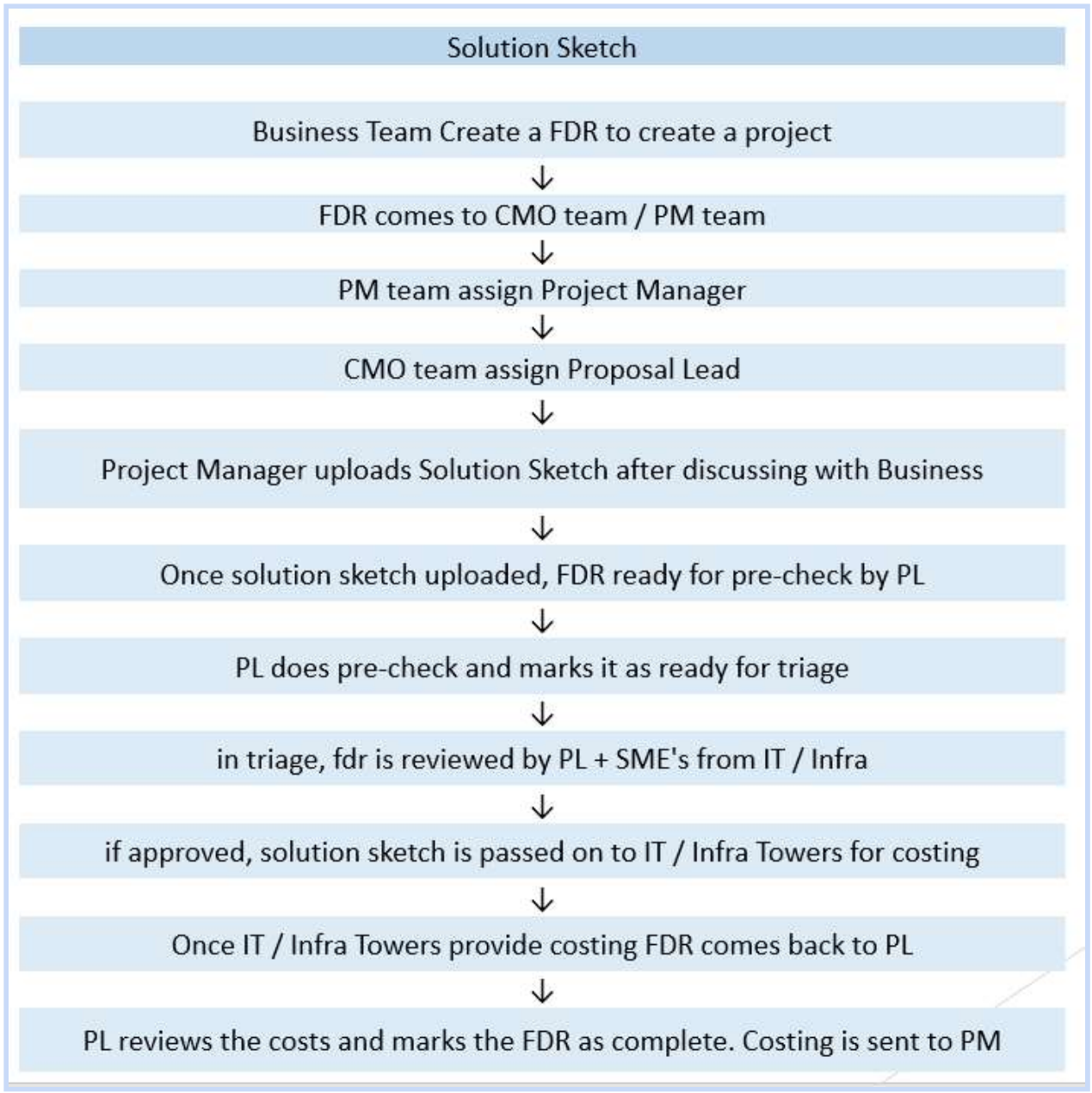


FIG 3.3 : CURRENT WORKFLOW-SOLUTION SKETCH

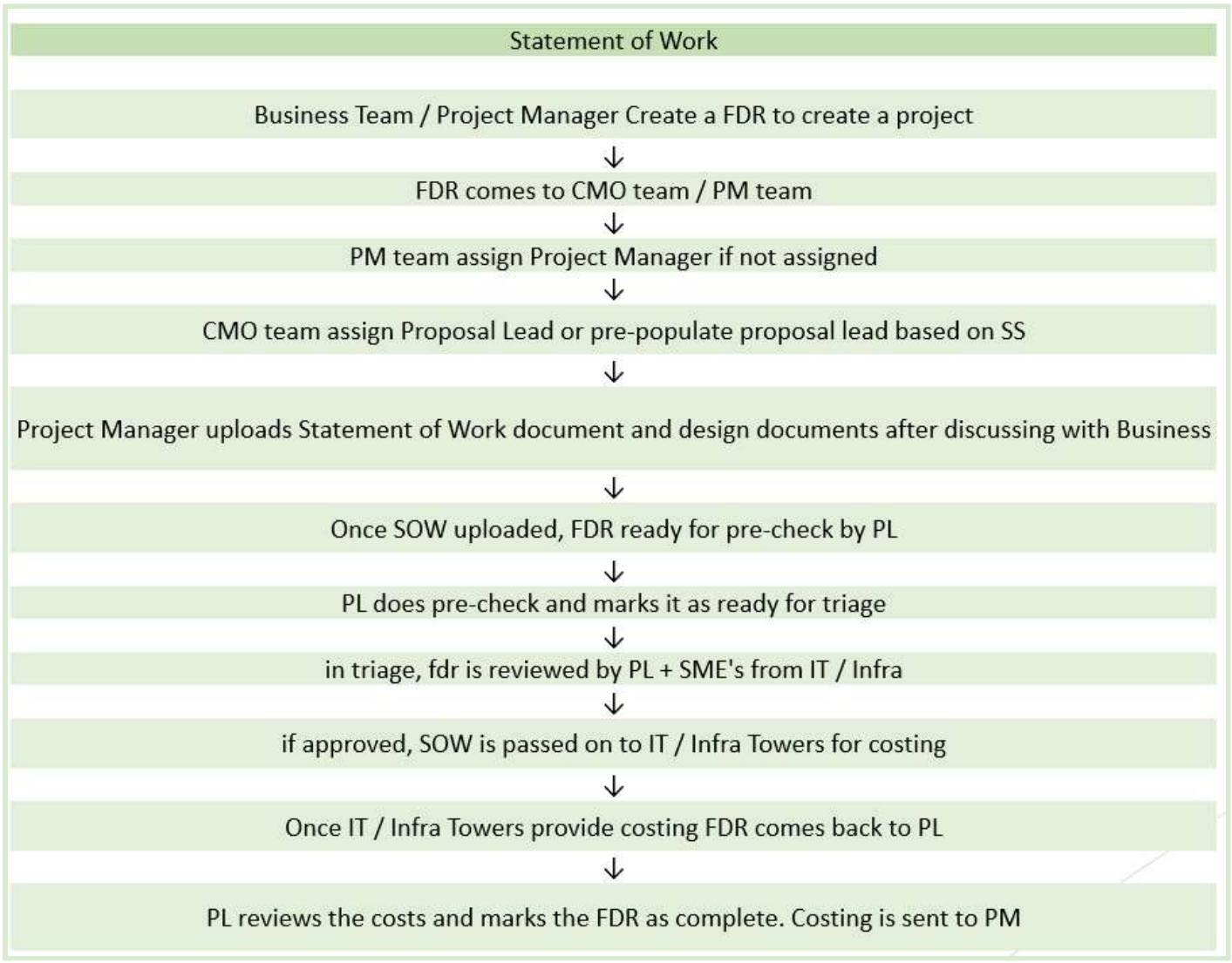


FIG 3.4 : CURRENT WORKFLOW-STATEMENT OF WORK

3.3.2 DATA FLOW DIAGRAM

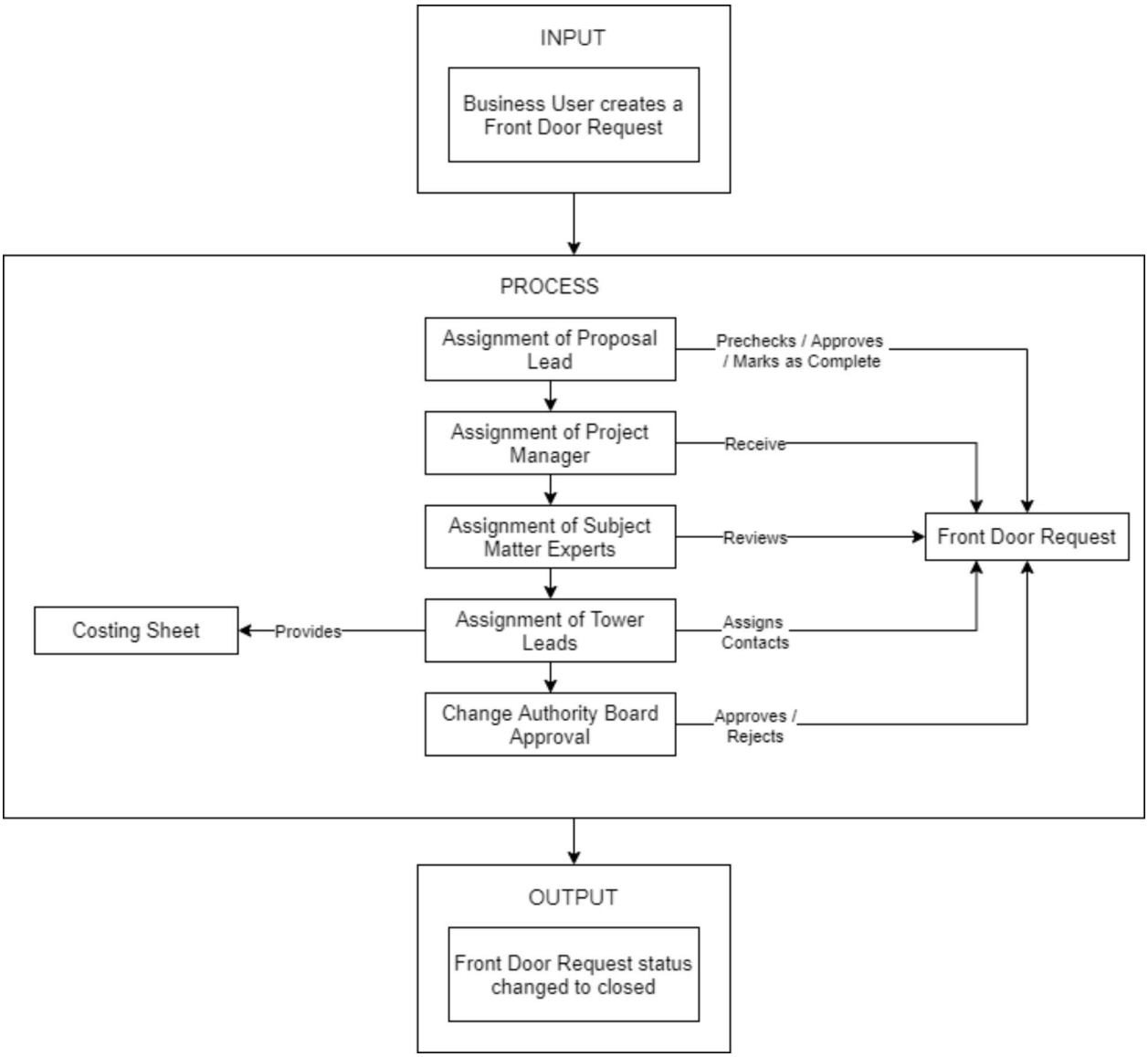


FIG 3.5: DATA FLOW DIAGRAM

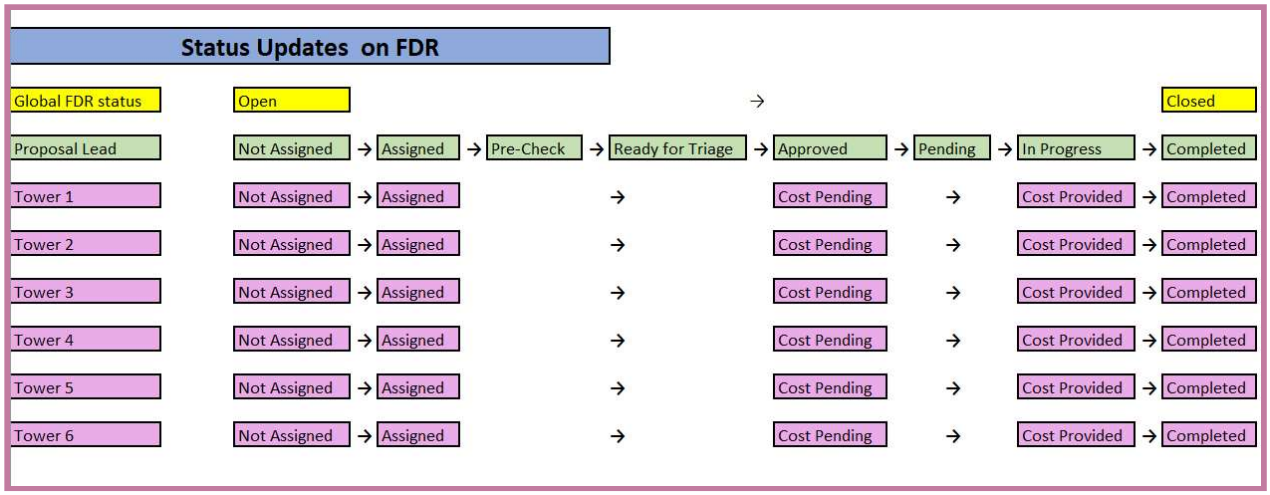


FIG 3.6 : FDR LIFECYCLE

3.3.3 USE CASE DIAGRAM

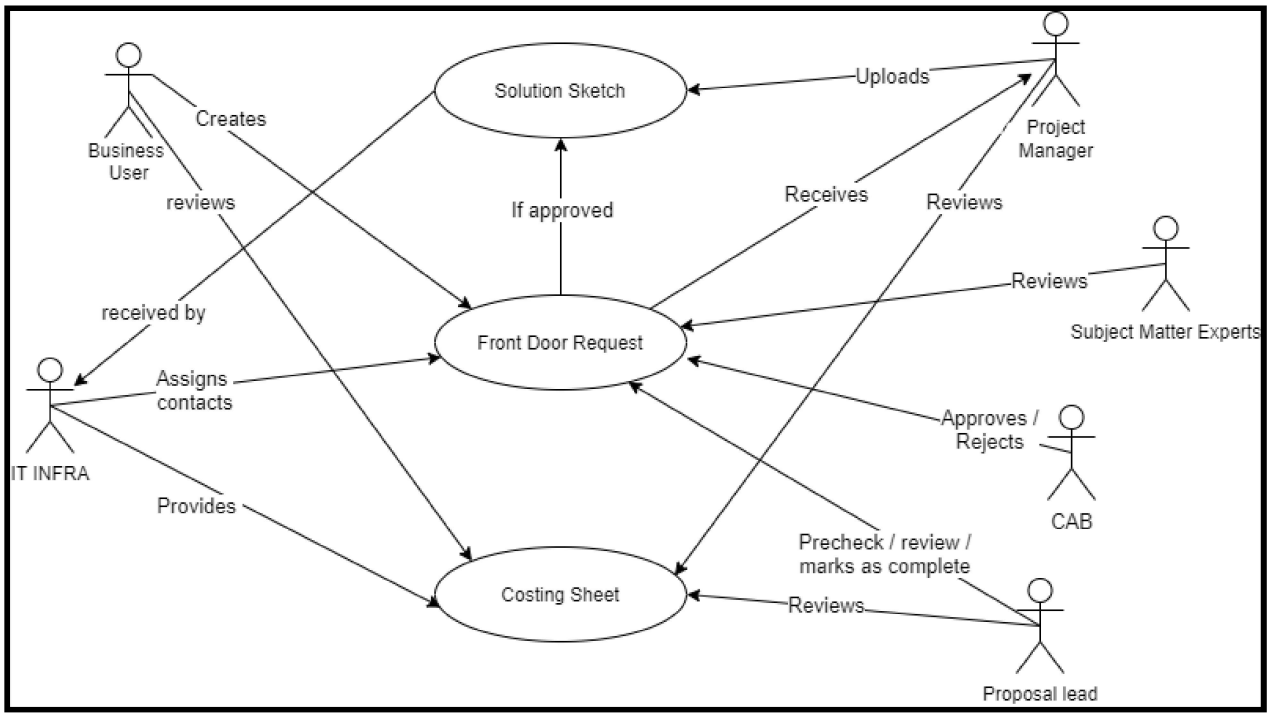


FIG 3.7 : UML Diagram

3.4 METHODOLOGY

Introduction - Agile Methodology

Agile is the ability to create and respond to change. It is a way of dealing with, and ultimately succeeding in, an uncertain and turbulent environment.

A prime feature of this methodology is that it allows extreme agility in project requirements.

Key feature of this approach are –

1. Short term delivery cycles
2. Agile requirements
3. Less restrictive project control
4. Dynamic culture and real time communication.

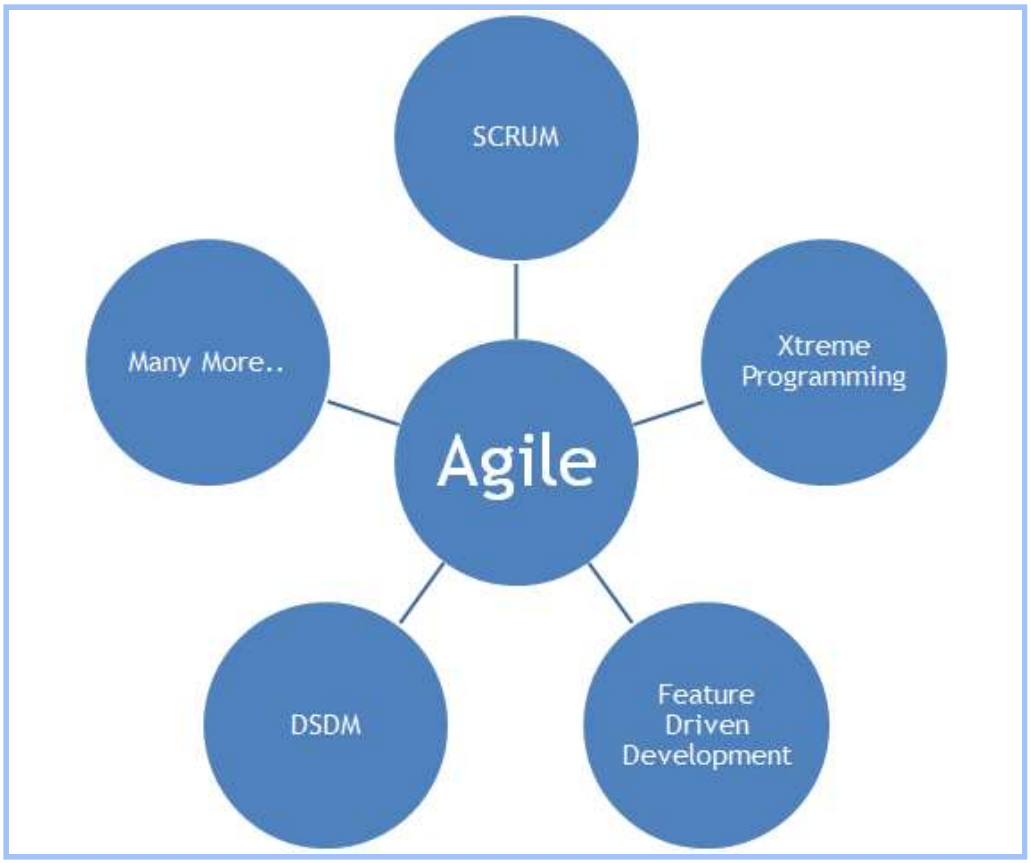


FIG 3.8 : AGILE FRAMEWORKS

SCRUM

- Increased uncertainty in projects can be due to
- Changing market conditions impacting requirements
- Advancement in technology
- Impossible to predict how the product should be developed

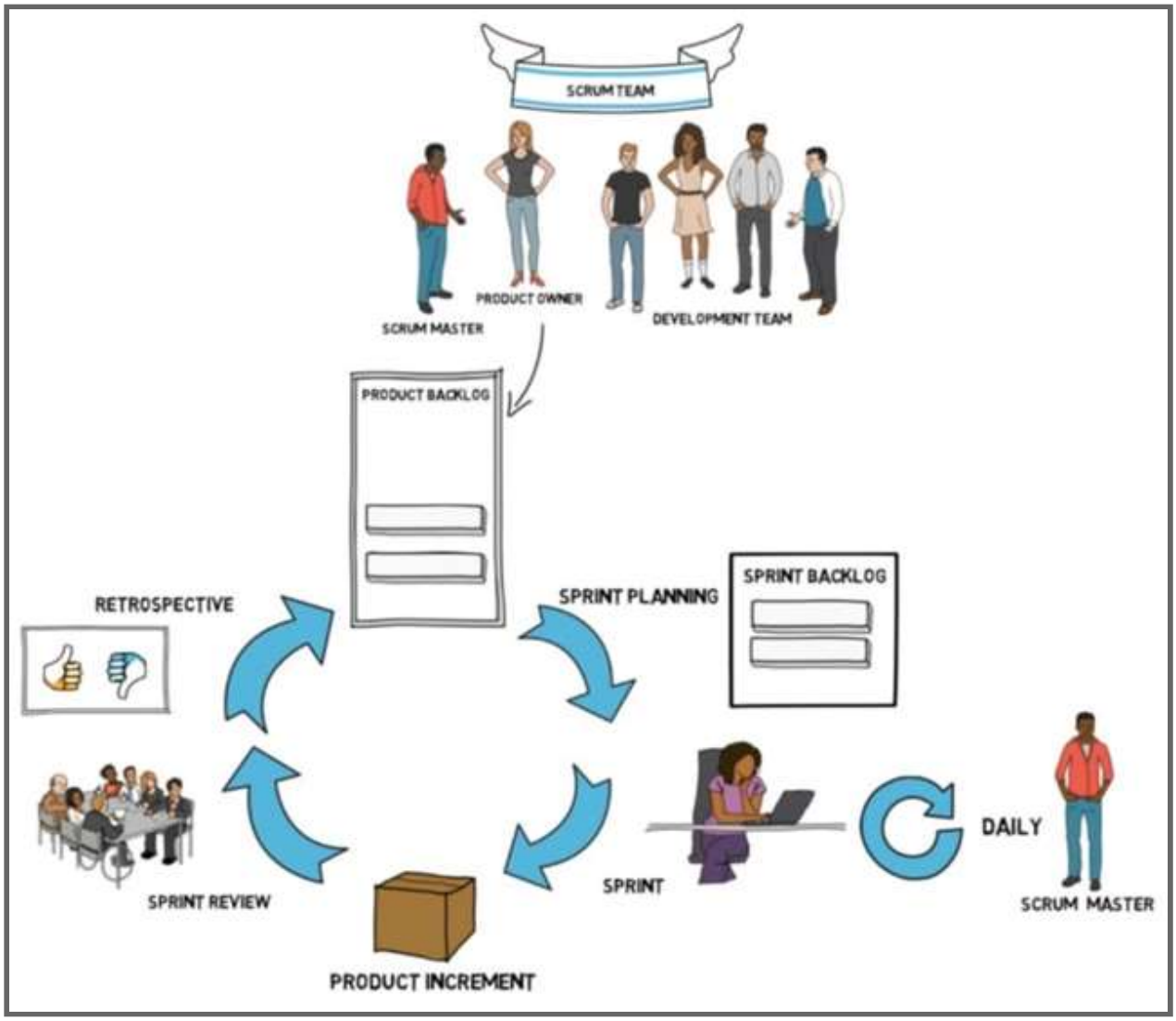


FIG 3.9 : OVERVIEW OF SCRUM

IMPLEMENTATION PLAN FOR NEXT SEMESTER

4. IMPLEMENTATION PLAN FOR NEXT SEMESTER

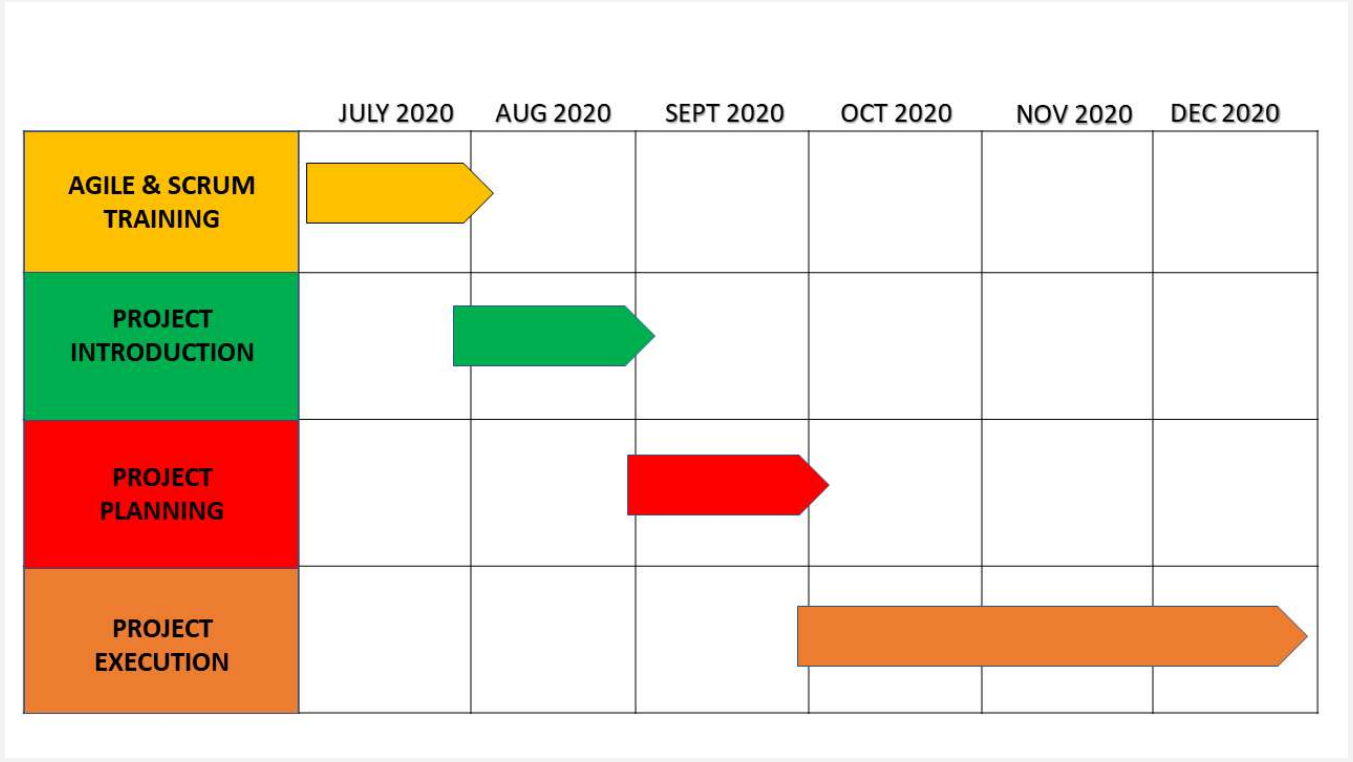


FIG 4.1 :TIMELINE CHART (JULY 2020 TO DECEMBER 2020)

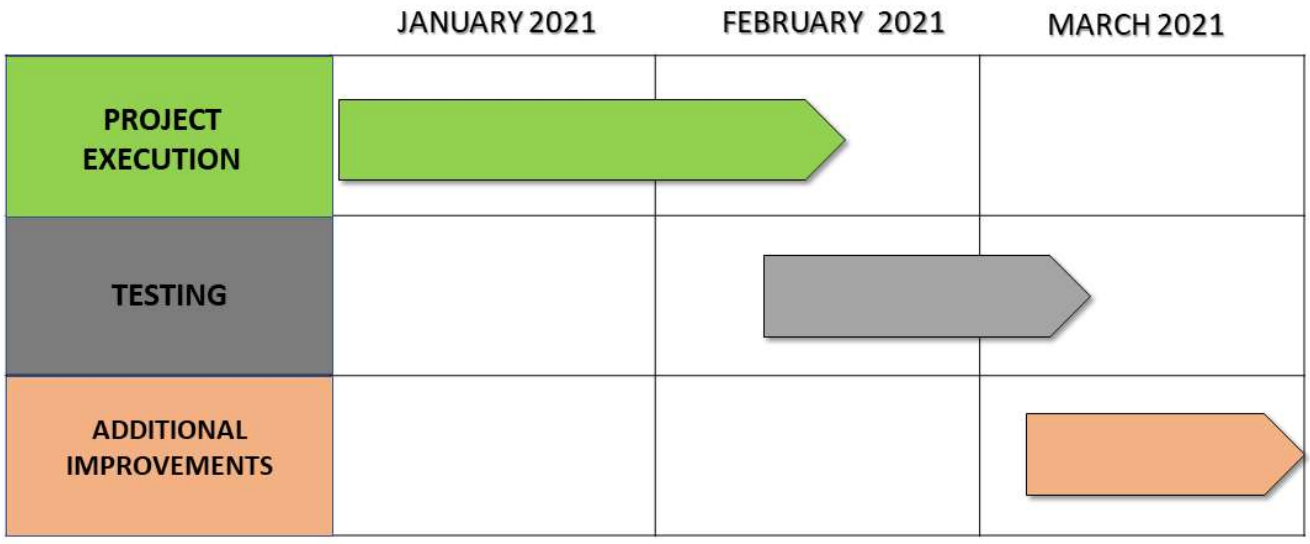


FIG 4.2: TIMELINE CHART (JANUARY 2021 TO MARCH 2021)

CONCLUSION

5. CONCLUSION

We summarized the entire workflow of the functioning of the application and started implementing modules required throughout the application such as the account for logging into the system, the dashboard for displaying tables that are fetched from the database and action trackers for tracking of progress during projects registered into the application. We have implemented the tasks of assigning Project Manager and Proposal Lead for the FDR received for a particular project.The Action Tracker ,Solution Sketch and Statement of Work are also built where meeting notes, FDR creation date and FDR received dates are stored.

6. GLOSSARY

TAG	The Airline Group
TAG - Tech	The technical arm of TAG
Business As Usual (BAU)	The ongoing workflow or the current business processes of the organization.
Change Management Organization (CMO)	Special users of ITSM who specialize in project management.
End User Computing (EUC)	This is a tower (or a sub module) of the IT & Infrastructure team who deals with the hardware needs of the organization
Project management and organization (PMO)	As the name suggests PMO deals with all the activities that are necessary for owning and auditing the projects.
Rough Order Of Magnitude (ROM)	This is a rough estimate of the overall cost of the project, which may change when more project details are discussed.
Capital Expenditure (CAPEX)	It is the money spent during the project to create assets. It is paid only during the duration of the project.
Operational Expenditure (OPEX)	It is the cost for maintaining/ updating / adding additional improvements to the project.
Change Authority Board (CAB)	The senior most group of designations in the organisation.
Front Door Request (FDR)	A request created by the business user to initiate the project.
Project Manager (PM)	The person responsible for handling the development of the project.
Proposal Lead (PL)	Supervising authority over the development of the project.

Solution Sketch (SS)	High level requirements of the project, can be considered as a potential idea that can be realized into a product.
Statement of Work (SOW)	Finalized requirements of the project, detailed list of requirements with exact steps on what will be delivered.
Subject Matter Expert (SME)	Individuals from IT and INFRA departments who are considered to have extensive experience and knowledge about the tower they belong to.

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