

Work Integrated Learning Programmes

M.Tech Software Engineering



Agile Software Processes

Assignment 1

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CASE STUDY 1

QUESTION 1

What are Silos and how were they formed? What techniques and tools did T-Mobile employ to effect this change in their organization?

ANSWER:

Silos and how they are formed:

The term “silo” comes from farmyards, where large containers are used to keep grain separate.

In business, organizational silos refer to the situation that occurs when team members from different departments don't share important information or processes with other members because they are that isolated, exclusive, or remote.

This lack of knowledge sharing can impact workplace productivity and result in collaboration failures. A business structure like this leads to a silo mentality. Many companies are moving towards agile to break the silos between the business and the technology teams.

Silos get formed due to the misalignment and miscommunication between business and technology teams. The cultural differences between the teams also add to the communication gap.

There are various kinds of silos created due to several aspects such as,

1. Technology vs Technology: When different teams work on the same problem or same type of project and end up developing different solutions.
2. Role Silos: Each role has different responsibilities across the value stream mapping. But there is overlap in the work and collaboration friction. Example: Product manager vs scrum masters, technical product manager vs product manager vs product owners
3. Team Silos: UX team vs Development team vs QA (Quality Assurance) team. Each team is aware of their own task and responsibilities only and when the tasks overlap there could be issues.
4. Performance metrics: The performance metrics are different for the business side and development side. Also, there is not often a lot of communication with the development team to help them understand the business metrics.
5. The way the organization is seen is important. Most of the companies want to be identified as a technology company. But it is important to look at any organization with a holistic perspective.

The silos are created due to,

1. **Agile manifesto:** It is the manifesto for agile software development and not manifesto for product development. It was published in 2001 by software developers without the involvement of business stakeholders. The aim was to solve the software development problem at that time. Now, after 18 years of practicing it, the need to include other practices has arisen to be current.
2. **Scrum Guide:** The scrum guide is extremely focused on roles and processes and practices across product management and the development focus is very much on what. The development teams really prefer that the business focus only on what features and functionalities to prioritize and do not like it when they chime in on how they want it to be delivered. This is a very siloed approach.
3. **Organizational Structure:** The structure of the organization has an enormous impact on the projects the organization delivers. The Conway law produced convincing evidence that supports the hypothesis that product architecture mirrors the structure of an organization. So, a product architecture of the result of a project mirrors the communication structure and architecture structure of an organization because of how it is structured because of the people who work in those groups and in those organizations.
4. **Perception:** The way we breakdown the information and perceive can lead to silos. Misconceptions, labels, and unconscious bias can also add to this.

Techniques and tools used by T-Mobile:

At T-Mobile, to break down the silos, the following methods were used,

- Inception and discovery workshop
- Story mapping
- Real time demos

1. Inception and Discovery Workshop

It is a workshop that attempts to help the project management team to start looking at the requirements together across all the roles involved. It involved the development team as well. This way they did not start from nothing. They already had project managers and business analysts who had done some investigation and research.

The project managers present the state of their research to an entire audience and that audience was composed of additional product managers, product owners, technical product owners, developers or dev lead architect, managers etc. When the workshop was completed, it was beneficial because they presented all their requirements, what they had, and the development team was there and was able to ask them a lot of questions. It was beneficial for the development team to be part of that process early of a front-right upstream and it was interesting for the business analyst and the product managers who did all the assessment work.

At the end of this activity, they had a plan on what was to be done in the next few weeks and it was clear to all the stakeholders involved in the project

2. Story Mapping

Story mapping is a method for arranging user stories to create a more holistic view of how they fit into the overall user experience.

After the inception and discovery session, the story mapping activity is done. It is an exercise where high-level functionalities or requirements such as initiative features are broken down. With the help of a few DevOps teams in the room, they broke down the features that they would be working on. Towards the end of the workshop all those plans were integrated. The one-day workshop allowed all the stakeholders in the room to have what we call a sprint plan for the next full month. When they left the room, they knew what the product was about and that happened in one day. They had follow-on refinement meetings of course, but that was a huge achievement and the organization saw the value of value.

3. Real Time Demos

As the product was developed, the clients were involved, and real-time demos were given as the product development progressed. This enabled them to foresee any changes and then add it to the product backlog and fix it as soon as possible.

QUESTION 2

How do you incorporate this into your own organization?

ANSWER:

It can be incorporated into my organization by the following value driven agile practices.

1. Conducting an inception and discovery workshop at the beginning of a project phase to completely understand and plan the project activities. This will enable faster decision making as it involves most of the stakeholders in one room and senior tech specialists who can help in speeding up the process.
2. Value stream mapping can be done. It is a visual tool that displays all critical steps in a specific process and easily quantifies the time and volume taken at each stage.
3. Story mapping can be implemented. It is the method of arranging user stories to create a more holistic view of how they fit into the overall user experience.
4. Get regular customer feedback through real customer interaction. The feedback can then be incorporated into the product to improve customer experience.
5. Regular real-time demos to make sure the product development is going in the right direction.

6. Speeding up the MVP (Minimum Viable Product) feedback and reducing the time to market.
7. Continuous improvement and learning can be done through,
 - Organizational big room retrospective.
 - Product launch retrospective.
 - Product and dev leadership retrospective.
 - etc.
8. Embracing agility and maintaining agile mindset throughout the organization. The members should think at the product/project level beyond their role or group. The team should pivot together and lead without title.

The following can be done to break down the silo mentality in an organization.

- Nurture a unified vision: By creating a unified vision that the entire workforce understands, the various teams in the company can build their objectives with that vision in mind.
- Use collaboration tools: With digital collaboration tools, we can unite remote teams, and foster smooth communications and workflows, even when employees are scattered around the globe.
- Improving socializing and cooperation in workplace: With regular joint meetings and focus groups, all employees will have the chance to mingle with those from other teams.
- Create cross-functional teams: Silo thinking tends to get deeply entrenched in corporate culture. You can break the silo mentality by encouraging cross-functionality across departments.
- Set common goals: In order to beat the silo mentality, it is critical to determine the underlying issues that may be causing the ripple effect of silos. Often, companies identify several strategic goals and objectives for every department, however, it is imperative to define the single, qualitative focus that is common among all departments as the top priority.

CASE STUDY 2

AGILE SOFTWARE PROCESS

Facify-Me

Introduction

United Arab Emirates has planned for an international event, where around 13 country football teams are expected to participate. Facify-Me is the Facilitations System that is going to be used by the football team members & Coaches to know their respective schedule and location of their matches and practice games arranged in local grounds. The matches are going to run for 21 days.

User Roles

There are going to be different types of users for Facify-Me such as,

- Team Member (~260)
- Coaches (~26)
- Facility Support Team (~50)
- Facility Admin (~10)
- Executives (~5)

Overall, the Facify-Me system will serve around 360 users including a buffer.

System Data

The Facify-Me system will include the following data points,

- User details - User Name, User base number, Role, etc.
- Ground information - Ground name, location, slots (4 slot by default) etc. for 7 grounds.
- Practice match details - Match name, ground, slot, team, coach etc. for 7 matches.
- Match details – Match details such as match name, ground, slot, team, coach etc. for 23 matches.
- Ground booking information.

System Requirements

The Facify-Me system will include the following,

- Facify-Me Web Application
 - a. The web application will include all the required features based on the user role.
 - b. It will connect with the API's provided by the backend application and present all the data in the application.
- Facify-Me Mobile Application
 - a. The mobile application will let the user view data about the matches and receive notifications and alerts.
 - b. It will connect with the API's provided by the backend application and present the data to the user.
- Facify-Me Backend API Application
 - a. The backend application will connect with the database and provides API's for the web application and the mobile application.
 - b. It will act as the common backend for both the web application and the mobile application.
 - c. The push notifications will be triggered through a scheduler.

Team Details

The team going to work on the system includes,

- Product Owner (1)
- Scrum Master (1)
- Development Team (6)

The total members in the team are going to be 8.

Assumption –

The development team includes 3 backend developers and 3 UI developers who can work on the web and mobile application.

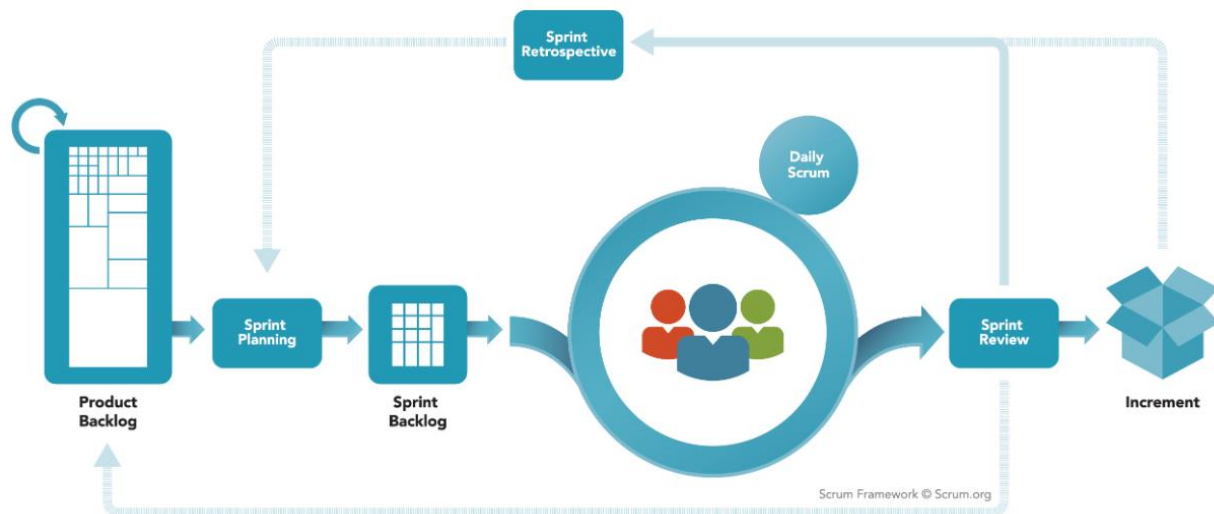
There will be separate QA members to test the application and devops members to perform the CI/CD operations.

Project Execution

For Facify-Me, we are using the “Scrum” agile methodology based on sprints.

Scrum is an agile development methodology used in the development of Software based on an iterative and incremental processes.

The below diagram depicts the various steps and processes involved in the scrum model.



The product owner brainstorms the requirements with various stakeholders and comes up with a list of user stories that goes into the product backlog.

Product backlog is nothing but the list of pending user stories that will be picked up and worked on in the future sprints.

Each sprint includes the following steps:

- Sprint planning
- Sprint backlog refinement
- Development process that includes a daily scrum call
- Sprint review
- Increment deployment
- Sprint retrospective

In the sprint planning on day one of the sprint, the features to be developed in this sprint is selected and added into the sprint backlog. The tasks are assigned too the respective team members and the estimates are finalized.

From the day 2, the development cycle starts. Each day a scrum call will be setup felicitated by a scrum master. During the call, the team members share the progress and the plans for that day.

At the end of the sprint, the minimum viable product (MVP) is deployed and the sprint review is conducted.

The sprint review will include the customers or the leadership team where the progress is shared and reviewed.

After the completion of the sprint, a sprint retrospective meeting is organized to discuss about the good and bad during the sprint. This is for the team members to improve themselves and any process that could be made better.

At last, the cycle continues and the next sprint is initiated.

Assumptions:

- Each sprint will last for 2 weeks.
- Discarding the weekend, each sprint will have 10 days.
- For each day, the number of working hours is 8.
- For the scrum call and discussions within the team members, we can have 1 hour per day. So, each day a development member will be able to work for 7 hours effectively.
- On an average, each developer will be

The sprint point estimation is going to be done using the planning poker estimation method where the team will estimate in the order of Fibonacci series, i.e.

1, 2, 3, 5, 13,

Features to be Prioritized

1. User registration should support only registered member (assumption, you have the registered user's list from the UAE event management and use the provided user base number).
2. "facify-me" should provide dashboard summary on app home page.
3. Facility Admin should be able to book the grounds with approval of any Two Executives.
4. Ground list should only show Available / Free ground list at the time of booking by multiple Admins.
5. Ground should be made automatically available when the schedule is canceled Each ground should show Four slots.
6. Up on every schedule confirmation, respective team members and coaches should get a notification on their mobile application Coach should be able to make request for any changes in ground selection or Schedule changes.
7. The request for change in Ground and Schedule should pass through the approval from Facility Admin Team and any of Two Executive.

Product Backlog

Based on the features requested as priority, the product owner lists down the user stories and add them to the product backlog.

Below is a table with the list of user stories and their respective sprint point and sprint number.

Note: Only the title is specified here for the user story. The description and tasks will be listed in the further sections.

User Story	User Story Title	Story Point	Sprint
1	Registering the users	3	1
2	Enabling registered users to login into web application.	5	1
3	Displaying summary dashboard for logged in users in web application.	5	1
4	Ground list page with real time availability in web application.	3	1
5	Booking ground feature for facility admin in web application.	5	1
6	Approval feature in the web application.	5	1
7	Requesting changes in ground selection/schedule feature in web application.	5	1
8	Sending notification to team member/coaches on schedule confirmation.	5	2
9	Enabling registered users to login into mobile application.	5	2
10	Displaying summary dashboard for logged in users in mobile application.	3	2
11	Ground list page with real time availability in mobile application.	3	2
12	Booking ground feature for facility admin in mobile application.	5	2
13	Approval feature in the mobile application.	5	2
14	Requesting change in ground selection/schedule feature in mobile application.	5	2

Sprint and Velocity Calculation

Velocity is a measure of the amount of work a Team can tackle during a single Sprint and is the key metric in Scrum. Velocity is calculated at the end of the Sprint by totaling the Points for all fully completed User Stories.

Total number of story points = 62 story points.

It's assumed that each developer can take up to 10 story points in a sprint.

So, approximately, 6 story points per developer ($62/10 = 6.2$).

Total number of developers = 6 developers.

Assumed velocity = 6 story points * 6 developers = 36.

Number of sprints = Total story points / Assumed velocity = $62 / 36 = \sim 1.7 = 2$ Sprints (Rounded)

So, overall, based on the story points the sprint is identified and each sprint has 31 story points.

Total Story Points = 62

Number of Sprints = 2

Assumed Velocity = 36

Sprint 1

In the sprint 1, we mainly focus on the features related to the web application. The screens and the API's related to it are to be developed. The APIs are to be developed in such a manner that it can also be used with the mobile application in the further sprints.

The sprint backlog includes the following user stories,

User Story	User Story Title	Story Point
1	Registering the users	3
2	Enabling registered users to login into web application.	5
3	Displaying summary dashboard for logged in users in web application.	5
4	Ground list page with real time availability in web application.	3
5	Booking ground feature for facility admin in web application.	5
6	Approval feature in the web application.	5
7	Requesting changes in ground selection/schedule feature in web application.	5

Please find below the user stories with their description.

User Story 1

Story	1
Story Title	Registering the users
Description	Based on the registered user's list from the UAE event management, the users should be created in the database. The provided user base number should be used to uniquely identify the user.
Tasks	1. Create a csv file to load the data into the database. 2. Create a table design to store the user information.
Story Point	3

User Story 2

Story	2
Story Title	Enabling registered users to login into web application.
Description	As a registered user, I should be able to login into the web application successfully and navigate to the login page.
Tasks	1. Design the web app to get the user base number as input and make an API call on submit. 2. Create a login API that will accept the user base number and validate the same. 3. Integrate the login API with the web app and handle errors if any.
Story Point	5
Acceptance Criteria	1. The user should be able to view the login page. 2. The user should be able to enter the user base number which accepts only alpha numeric values. 3. Submit button should be enabled once the user types any value. 4. Clicking submit should call the login API and display a loader meanwhile. 5. If successful, user should be navigated to the homepage of the application with info based on their role. 6. If API fails, an error message should be displayed on the screen.

User Story 3

Story	3
Story Title	Displaying summary dashboard for logged in users in web application
Description	As a logged in user, I should be able to view the summary dashboard in the landing page of the web application.
Tasks	<ol style="list-style-type: none">1. Design the dashboard page to show the required details.2. Create a dashboard data get API that will fetch all the summary data required.3. Integrate the summary API with the web dashboard.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The user should be able to view the summary dashboard.2. The data should be fetched once the user logs in and a loader should be displayed meanwhile.3. If API fails, the user should be navigated to the 404 page.

User Story 4

Story	4
Story Title	Ground list page with real time availability in web application.
Description	As a logged in user, I should be able to view the list of grounds and the slots in the grounds page of the web application.
Tasks	<ol style="list-style-type: none">1. Design the grounds list page to show the ground list with required details.2. Create a grounds list get API that will fetch all the ground data required.3. Integrate the ground list API with the web dashboard.
Story Point	3
Acceptance Criteria	<ol style="list-style-type: none">1. The user should be able to view the grounds list in a table.2. The data should be fetched once the user navigated to the grounds page and a loader should be displayed meanwhile.3. If API fails, the user should be navigated to the 404 page.4. The API should be refreshed every 5 mins to keep it up to date.5. The table should have the searching and sorting functionalities.

User Story 5

Story	5
Story Title	Booking ground feature for facility admin in web application.
Description	As a logged in facility admin user, I should be able to book the ground for the match from the web application.
Tasks	<ol style="list-style-type: none">1. Design the booking ground page show the form for entering the required details and making a booking.2. Create a ground booking post API to save the booking information in the database.3. Integrate the booking post API with the booking page.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The facility admin user should be able to view the book ground page.2. The data should be fetched once the user navigated to the booking page and a loader should be displayed meanwhile.3. If the get grounds data API fails, the user should be navigated to the 404 page.4. The user should be able to enter the required data and submit the form.5. On success, the booking should be listed. Else, error message should be displayed.

User Story 6

Story	6
Story Title	Approval feature in the web application.
Description	As a logged in facility admin user or executive, I should be able to approve the ground booking or updates for the match sent for review from the web application.
Tasks	<ol style="list-style-type: none">1. Design the approval page to show the request with options for approval and denial.2. Create a get API for the list of approvals required based on the user.3. Create a put API to update the approval status.3. Integrate the API with the approval page.
Story Point	5

Acceptance Criteria	<ol style="list-style-type: none"> 1. The facility admin user and the executive should be able to view the approval page. 2. The approval list data should be fetched once the user navigates to the approval page and a loader should be displayed meanwhile. 3. If the get approval data API fails, the user should be navigated to the 404 page. 4. The user should be able to select a request and approve or reject the same. 5. On success, the approval status should be updated. Else, error message should be displayed.
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User Story 7

Story	7
Story Title	Requesting changes in ground selection/schedule feature in web application.
Description	As a logged in coach, I should be request change in the ground selection/schedule from the web application.
Tasks	<ol style="list-style-type: none"> 1. Design the request change page to show the form for entering the required change details. 2. Create a change post API to send an approval request for the change. 3. Integrate the change post API with the request change page.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none"> 1. The coach user should be able to view the request change page. 2. The user should be able to enter the required change information and submit the form. 5. On success, the change should be sent for review. Else, error message should be displayed.

At the end of the sprint 1, the web application with the priority features will be completed and presented for demo.

The total story points completed is 31 story points.

Velocity = 31

It's assumed that there will be a separate team to perform the testing activities and devops.

Sprint 2

By the end of sprint 1, the major features in the web application will be completed and the APIs needed for the mobile application will also be ready. In the Sprint 2, we will focus on the mobile application development and sending the push notifications in the mobile application.

The sprint backlog includes the following user stories,

User Story	User Story Title	Story Point	Sprint
8	Sending notification to team member/coaches on schedule confirmation.	5	2
9	Enabling registered users to login into mobile application.	5	2
10	Displaying summary dashboard for logged in users in mobile application.	3	2
11	Ground list page with real time availability in mobile application.	3	2
12	Booking ground feature for facility admin in mobile application.	5	2
13	Approval feature in the mobile application.	5	2
14	Requesting change in ground selection/schedule feature in mobile application.	5	2

Please find below the user stories with their description.

User Story 8

Story	8
Story Title	Send notification to team member/coaches on schedule confirmation.
Description	Once any booking is approved, a push notification is to be sent to the mobile application to all the relevant team members and coaches.
Tasks	1. Update the approve API to trigger a push notification one the approval is done. 2. Create notification pane in the mobile app to show the notifications.
Story Point	5
Acceptance Criteria	1. Once the confirmation is given, the notification should be received by the coaches and team members.

User Story 9

Story	9
Story Title	Enabling registered users to login into mobile application.
Description	As a registered user, I should be able to login into the mobile application successfully and navigate to the login page.
Tasks	<ol style="list-style-type: none">1. Design the mobile app to get the user base number as input and make an API call on submit.2. Integrate the login API used with web app for the mobile app also and handle errors if any.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The user should be able to view the login page after the splash screen in the app.2. The user should be able to enter the user base number which accepts only alpha numeric values.3. Submit button should be enabled once the user types any value.4. Clicking submit should call the login API and display a loader meanwhile.5. If successful, user should be navigated to the landing page of the mobile app with info based on their role.6. If API fails, an error message should be displayed on the screen.

User Story 10

Story	10
Story Title	Displaying summary dashboard for logged in users in mobile application.
Description	As a logged in user, I should be able to view the summary dashboard in the landing page of the mobile app.
Tasks	<ol style="list-style-type: none">1. Design the dashboard page to show the required details.2. Integrate the summary API used with the web dashboard for the mobile app also.
Story Point	3
Acceptance Criteria	<ol style="list-style-type: none">1. The user should be able to view the summary dashboard.2. The data should be fetched once the user logs in and a loader should be displayed meanwhile.3. If API fails, the user should be navigated to the 404 page.

User Story 11

Story	11
Story Title	Ground list page with real time availability in mobile application.
Description	As a logged in user, I should be able to view the list of grounds and the slots in the grounds page of the mobile application.
Tasks	<ol style="list-style-type: none">1. Design the grounds list page to show the ground list with required details.2. Integrate the ground list API used with the web dashboard for the mobile app also.
Story Point	3
Acceptance Criteria	<ol style="list-style-type: none">1. The user should be able to view the grounds list in a table.2. The data should be fetched once the user navigated to the grounds page and a loader should be displayed meanwhile.3. If API fails, the user should be navigated to the 404 page.

User Story 12

Story	12
Story Title	Booking ground feature for facility admin in mobile application.
Description	As a logged in facility admin user, I should be able to book the ground for the match from the mobile application.
Tasks	<ol style="list-style-type: none">1. Design the booking ground page show the form for entering the required details and making a booking.2. Integrate the booking post API with the booking page in the app (Same used in the web app)
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The facility admin user should be able to view the book ground page.2. The data should be fetched once the user navigated to the booking page and a loader should be displayed meanwhile.3. If the get grounds data API fails, the user should be navigated to the 404 page.4. The user should be able to enter the required data and submit the form.5. On success, the booking should be sent or approval to the executive. Else, error message should be displayed.

User Story 13

Story	13
Story Title	Approval feature in the mobile application.
Description	As a logged in facility admin user or executive, I should be able to approve the ground booking or updates for the match sent for review from the mobile application.
Tasks	<ol style="list-style-type: none">1. Design the approval page to show the request with options for approval and denial.2. Integrate the get approvals list API and the put API with the approval page.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The facility admin user and the executive should be able to view the approval page.2. The approval list data should be fetched once the user navigates to the approval page and a loader should be displayed meanwhile.3. If the get approval data API fails, the user should be navigated to the 404 page.4. The user should be able to select a request and approve or reject the same.5. On success, the approval status should be updated. Else, error message should be displayed.

User Story 14

Story	14
Story Title	Requesting change in ground selection/schedule feature in mobile application.
Description	As a logged in coach, I should be request change in the ground selection/schedule from the mobile application.
Tasks	<ol style="list-style-type: none">1. Design the request change page to show the form for entering the required change details.2. Integrate the change post API with the request change page as in the web application.
Story Point	5
Acceptance Criteria	<ol style="list-style-type: none">1. The coach user should be able to view the request change page.2. The user should be able to enter the required change information and submit the form.5. On success, the change should be sent for review. Else, error message should be displayed.

At the end of the sprint 2, all the prioritized features for the application are completed.

A demo can be conducted with the clients to roll out the first part of the application.

The velocity of sprint 2 is 31.

A sprint retrospective will be conducted to discuss the learnings of the sprints.

Conclusion

After the execution of 2 sprints of 2 weeks each, roughly after 1 month, the Facify-Me application is ready for customer usage with the prioritized features.