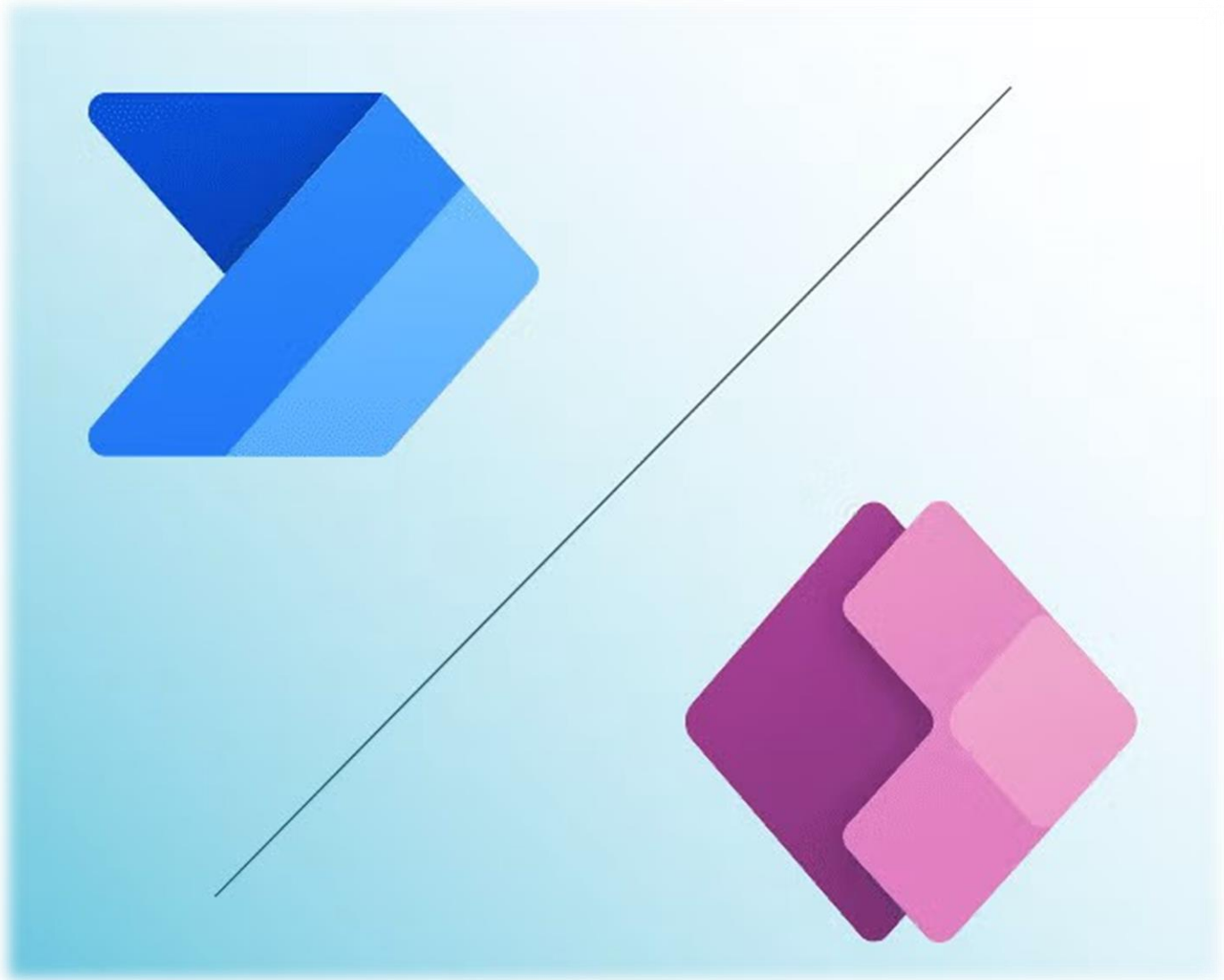




## Microsoft Power Apps & Microsoft Power Automate





**General Sir John Kotelawala Defence University**  
**Faculty of Management, Social Sciences, and**  
**Humanities**  
**Department of Languages**

**LB 2224 - Advanced SQL and Cloud Databases**

**Report Content**  
**App Development Documentation**

**13.09.2024**



## **Department of Languages**

**Faculty of Management, Social Sciences and Humanities**

**General Sir John Kotelawala Defence University**

### **Assignment Information**

**Year 2: Semester 2**

**Assignment number 3**





<b>Assignment Information</b>		<b>Microsoft Power Apps &amp; Microsoft Power Automate</b>	
<b>Assessment Title:</b>			
<b>Program Code(s):</b>	<b>LB 2224</b>	<b>Issue date1:</b>	<b>13/09/2024</b>
<b>Weighting:</b>	<b>20% of the total module mark</b>	<b>Submission date:</b>	<b>15/12/2024</b>
<b>Assessor(s):</b>	<b>Dr Charith Silva &amp; Ms Chamodhi Wickramasinghe</b>	<b>Return date:</b>	<b>The final mark will be available at least four weeks after submission.</b>

## Member Contributions

Student Number	Student Name
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D/ADC/23/0024	<b>KGT Randika</b>
D/ADC/23/0006	<b>HTSH Samadhi</b>

## **EXECUTIVE SUMMARY: Travel Request Application**

- **Purpose:**
  - Automates and streamlines the travel request and approval process.
  - Reduces administrative workload and improves communication.
- **Key Features:**
  - **Travel Request Submission:** Employees can submit travel requests with necessary details.
  - **Approval Workflow:** Multi-stage approvals involving team leads, managers, and senior managers through **Microsoft Teams**.
  - **Automated Notifications:** Instant notifications on approval or rejection powered by **Power Automate**.
  - **Role-Based Access:** Customized views based on user roles (employees, team leads, managers).
- **User Experience:**
  - **Responsive Design:** Accessible across various devices and screen sizes.
  - **Intuitive Navigation:** Simple interface with role-based access.
- **Impact:**
  - Enhances operational efficiency and ensures timely communication.
  - Scalable with secure data management.
- **Future Enhancements:**
  - Integration with flight and hotel bookings.
  - Advanced travel expense reporting and multi-language support for global use.
- **Technical Implementation:**

<b>Data Storage</b>	Utilized <b>SharePoint</b> for secure data storage.	 SharePoint
<b>App Development</b>	Built using <b>Microsoft Power Apps</b> .	
<b>Automation</b>	Integrated <b>Power Automate</b> for workflow automation and notifications.	
<b>Approval Process</b>	Managed through <b>Microsoft Teams</b> for seamless communication and decision-making.	 Microsoft Teams

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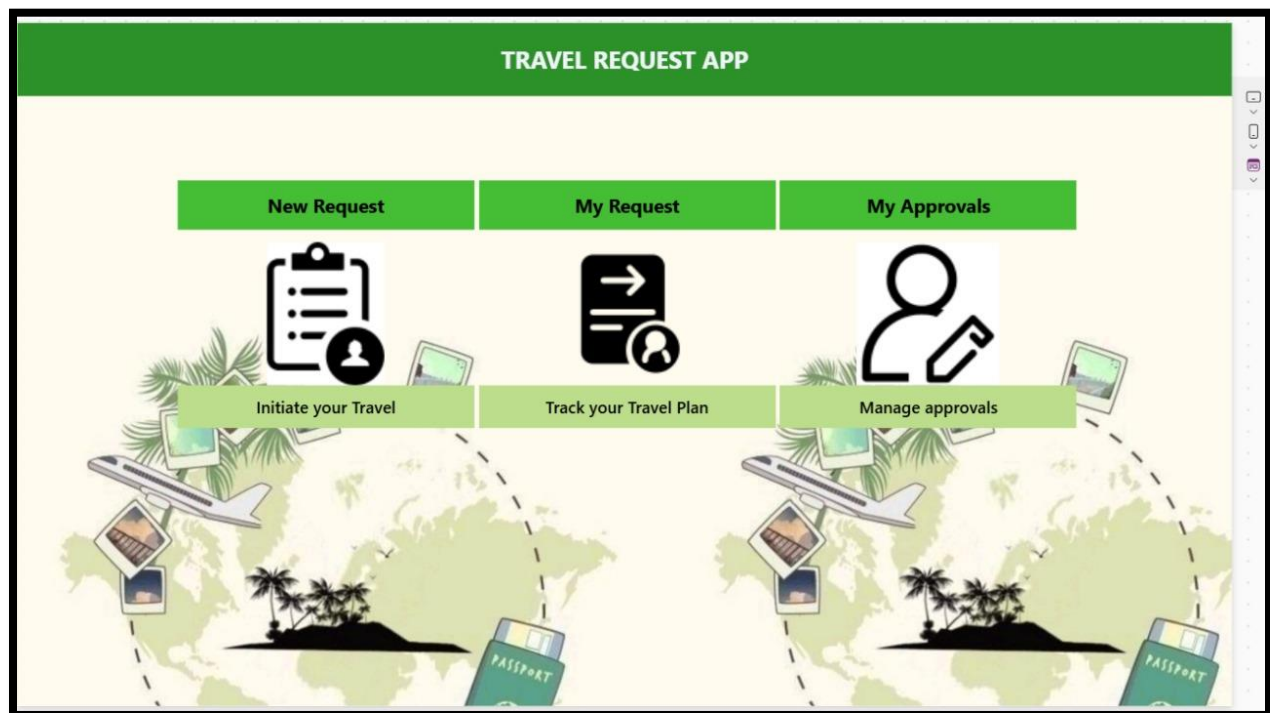
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# Task 1: Travel Request Application

## How can we streamline the travel request and approval process to reduce the administrative burden and improve efficiency?

In many organizations, the travel request process is slow and cumbersome, involving manual paperwork and multiple stages of approval. For example, an employee like Sarah may have to wait days or weeks for her travel request to be processed, with little visibility into the approval status. This can lead to delays and frustration.

By implementing the Travel Request Application, the process becomes streamlined and automated, reducing administrative workload, ensuring timely approvals, and providing clear visibility throughout the approval chain. This improves efficiency, communication, and transparency, ultimately enhancing the overall workflow.



## 1. Introduction

The Travel Request Application was developed using Microsoft Power Apps to address the challenge of managing travel requests efficiently. This report outlines the app's development process, features, and the value it brings by automating the travel approval workflow. Its implementation significantly improves operational efficiency, making it meaningful and relevant to modern business processes.

## 2. Objectives

The primary objective of this project was to create a scalable and user-friendly application that automates travel request management. The app aims to:

- ✓ Streamline the travel request and approval process.
- ✓ Ensure timely communication and notifications.
- ✓ Enhance data management through seamless integration.

## 3. Scope

The app focuses on travel request submissions, multi-stage approvals, and automatic notifications. The intended users include employees, team leads, managers, and senior managers, each with customized access based on roles.

## 4. Development Approach

The development process followed these key steps:

- I. Requirement Analysis: Identifying user roles, data requirements, and workflow stages.
- II. Data Integration: Connecting to SharePoint for secure data storage.
- III. App Design: Creating an intuitive and visually appealing interface. (Task 1)
- IV. Workflow Automation: Automating approvals and notifications using Power Automate. (Task 2)
- V. Testing and Deployment: Conducting tests to ensure app reliability and performance.

## 5. Key Features

- ✓ Travel Request Submission: Users can submit detailed travel requests with relevant information.
- ✓ Approval Workflow: Multi-stage approval process ensuring role-based reviews.
- ✓ Automated Notifications: Instant notifications upon approvals or rejections.
- ✓ Data Security: Secure storage and controlled access through SharePoint integration.

## 6. Technical Implementation

- Platform Used: Microsoft Power Apps.
- Data Source: SharePoint lists for data storage.
- Automation Tool: Power Automate for workflow automation.



- App Components: Forms, galleries, custom screens, and role-based access controls.

## 7. User Experience

The app's user interface was designed for simplicity and accessibility. Key design considerations included:

- ✓ Consistent Layout: Uniform button positions and labels.
- ✓ Responsive Design: Compatibility with various devices.
- ✓ User Feedback: Interactive error messages and notifications.

## 8. Testing and Evaluation

The app underwent thorough testing phases, focusing on:

1. Functionality Testing: Ensuring all features worked as expected.
2. Performance Testing: Checking app responsiveness.
3. User Acceptance Testing: Gathering feedback from potential users.

## 9. Conclusion

The Travel Request Application successfully automates the travel approval process, reducing administrative tasks and improving decision-making. Its scalable design and secure data management demonstrate the potential of Power Apps in developing impactful business solutions.

## 10. Future Enhancements

Future upgrades could include:

- ✚ Integration with external services for flight and hotel bookings.
- ✚ Advanced analytics for travel expense reporting.
- ✚ Multi-language support for global usage.

This report highlights the development journey, technical implementation, and business impact of the Travel Request Application, showcasing how Microsoft Power Apps can address real-world business challenges effectively.

# Data Integration

Step-by-step breakdown of setting up a SharePoint list for the Power Apps travel request application:

## 1. Introduction to SharePoint:

- Overview of SharePoint as a platform for document management, collaboration, and secure data storage.

## 2. Creating a SharePoint site:

- Create a SharePoint site (Assignment 1) to host the lists within it.

Name	Type	Permission Levels
<input type="checkbox"/> Assignment 01 Members	SharePoint Group	Edit
<input type="checkbox"/> Assignment 01 Owners	SharePoint Group	Full Control
<input type="checkbox"/> Assignment 01 Visitors	SharePoint Group	Read

Figure 1. SharePoint Site

- The figure 2 depicts the created SharePoint site. Note that, the users of this app are categorized into three groups. Owners have full control over the app, Members have Editing permission while the Visitors have only Read access.

## 3. Creating a SharePoint List:

- Navigate to the SharePoint site.
- Select the option to create a new list, essential for storing travel requests.

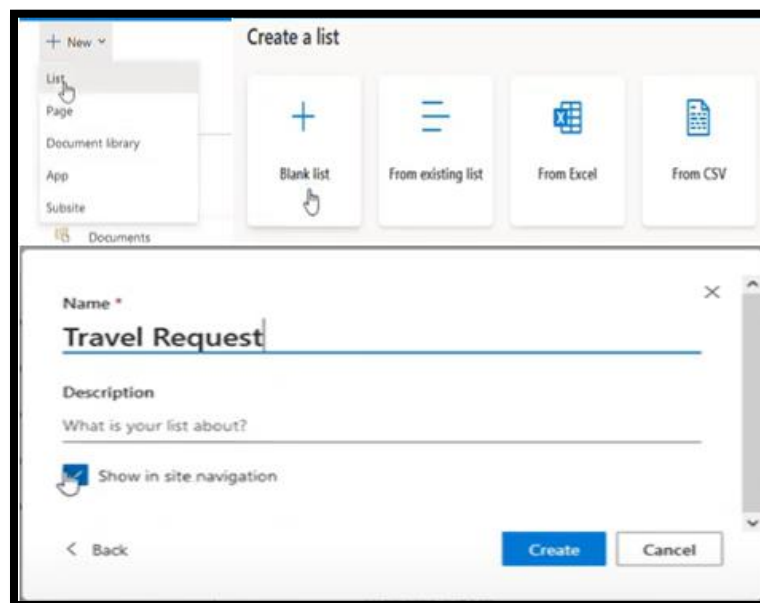


Figure 2. Setting up a SharePoint List

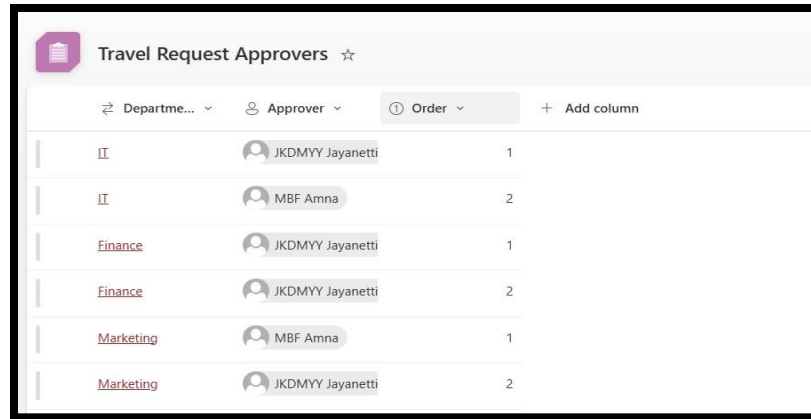
#### 4. Configuring the List:

- Name the list as "Travel Requests".
- Add columns to capture relevant travel request data, including:
  - **Employee Name**
  - **Travel Dates**
  - **Destination**
  - **Purpose of Travel**
  - **Approval Status**
  - **Department (Lookup column)**

Column (click to edit)	Type	Required
Title	Single line of text	
Reason for travel	Multiple lines of text	
Requester	Person or Group	
Travel start date	Date and Time	
Travel end date	Date and Time	
Travel duration (days)	Calculated (calculation based on other columns)	
Airline	Choice	
Estimated airfare	Number	
Estimated hotel cost	Number	
Approval Status	Choice	
Department	Lookup	
Approval Comments	Multiple lines of text	
Travel Destination	Single line of text	
First Name	Single line of text	
Last Name	Single line of text	
Email Address	Single line of text	
Contact Number	Number	
Employee ID Number	Number	
Estimated Cost For Other Activities	Number	
Modified	Date and Time	
Created	Date and Time	
Created By	Person or Group	
Modified By	Person or Group	

Figure 3. Columns of Travel Request List

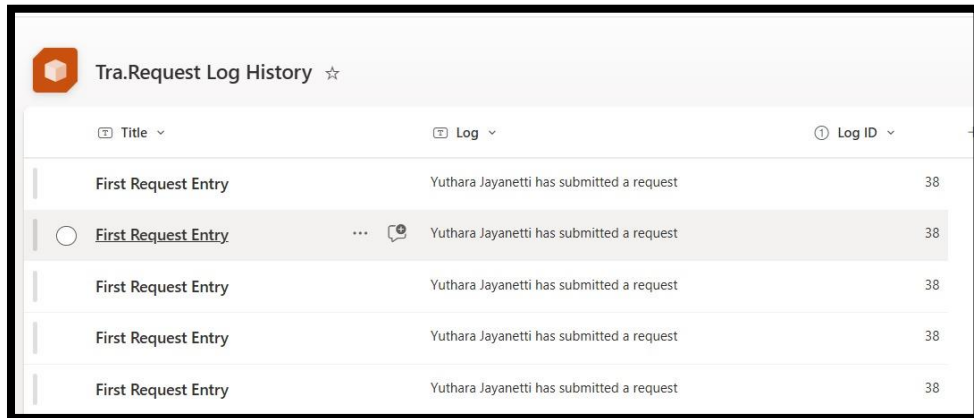
- Similarly, create Travel Request Approvers list was created with an Approver column within the same site.
- Note that, two approvers are listed for the approvals to proceed in order to control access and ensure data security.



Departme...	Approver	Order
IT	JKDMYY Jayanetti	1
IT	MBF Amna	2
Finance	JKDMYY Jayanetti	1
Finance	JKDMYY Jayanetti	2
Marketing	MBF Amna	1
Marketing	JKDMYY Jayanetti	2

Figure 4. Travel Request Approvers Table

- The table below depicts the Travel Request Log history.



Title	Log	Log ID
First Request Entry	Yuthara Jayanetti has submitted a request	38
First Request Entry	Yuthara Jayanetti has submitted a request	38
First Request Entry	Yuthara Jayanetti has submitted a request	38
First Request Entry	Yuthara Jayanetti has submitted a request	38
First Request Entry	Yuthara Jayanetti has submitted a request	38

Figure 5. Travel Request Log History Table

## 5. Integration with Power Apps:

- SharePoint list will be connected to Power Apps to create a seamless and user-friendly travel request application.

This SharePoint list serves as the data backbone for the Power Apps application, ensuring smooth data storage, access control, and integration for the travel request workflow.

# App Design

## 1. Introduction to Solutions.

- Create **travel request solution** in Power Apps, which organize app components for better management and deployment.
- Solutions act as a **toolbox**, helping to organize app components like workflows, tables, and forms for efficient app management.

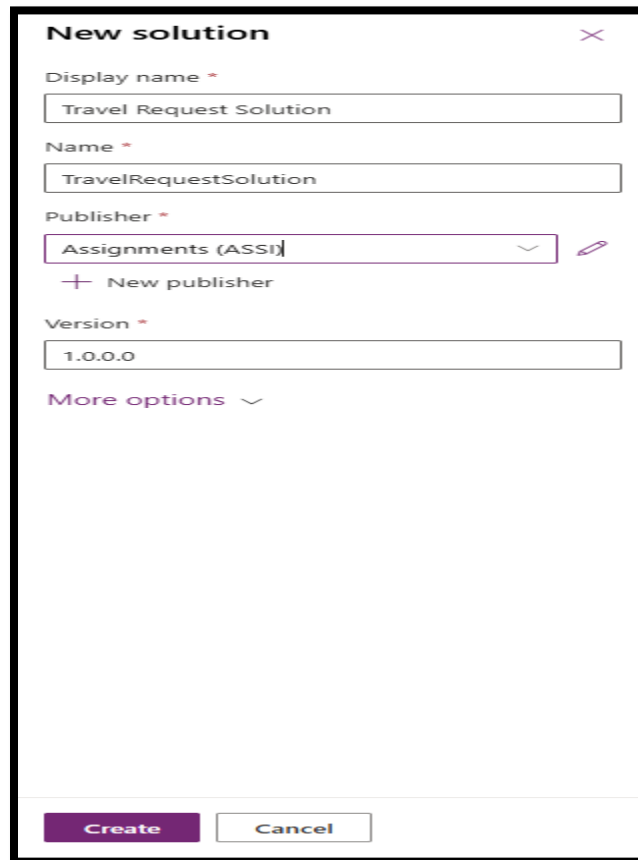


Figure 6. New Solution

- The **SharePoint lists** are needed for data sources and permissions, ensuring security and proper access control for users.

## 2. Setting Up Role-Based Security

- starts by focusing on **role-based security** in Power Apps. This ensures that only authorized users have access to specific parts of the travel request application. **Use a development**

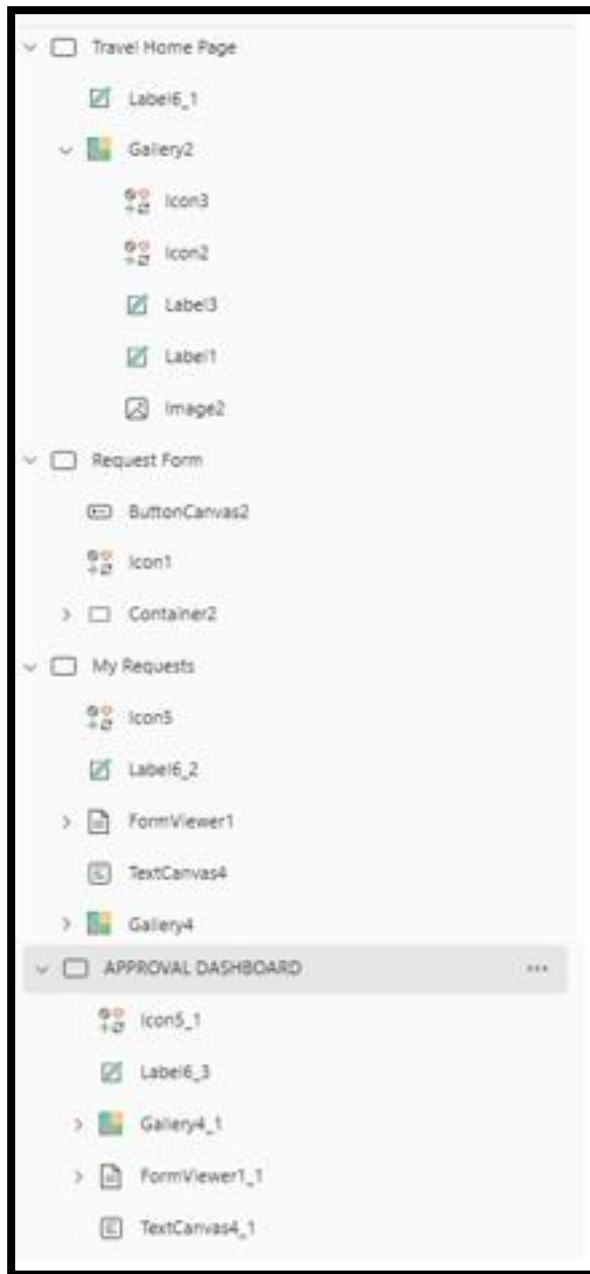
**environment** rather than a production environment, which helps mitigate risks and prevents unintentional disruptions during testing.

- **UI/UX Design:** The UI is designed with security in mind, ensuring that only users with certain roles (e.g., admin, team lead) can access certain functionalities. This enhances the user experience by preventing unauthorized access and keeps the interface clean and focused based on roles.

### 3. Reconnecting Data Sources

- **Reconnect data sources** and troubleshoot potential issues that arise during app development. The app pulls data from **SharePoint groups**, which allows for **item-level permissions**. This ensures that the correct user has access to the relevant information and functionality.
  - **UI/UX Design:** The data management behind the scenes is key to the user experience. With proper integration of SharePoint, users only see relevant data, ensuring the interface remains uncluttered and secure. This is vital for making sure users don't encounter irrelevant or restricted content.
4. The app holds three screens namely: **Travel Home Page, Request Form, My Requests** and **Approval Dashboard**.
- Travel Home Page implements conditional visibility to Admin User versus the regular User.
  - Create a Request Form to submit a form for the user.
  - Create My Requests to see the request status.
  - Create an Approval Dashboard for the approver to see the approvals.

Figure 7. Tree view of the App



It was created using:

- Label
- Horizontal and Vertical Gallery
- Horizontal and Vertical Containers
- Icon
- Images
- Buttons
- Forms
- Display Forms
- Shapes

## 5. Implementing Conditional Visibility for Home Page.

- **Implement conditional visibility** for Home Page. This is crucial for tailoring the interface to the user's needs.
- **UI/UX Design: Conditional visibility** is a core part of dynamic UI design, allowing the interface to adapt to the user's role and situation. For example, an admin user might see an **approval page**, while a regular user will only see a **New Request** and **My Request page**. This approach ensures that the interface is always relevant and functional, providing users with the tools they need without unnecessary clutter. **Role-based access control** ensures

that users only interact with fields and buttons that are pertinent to their tasks, improving the application's usability and security.

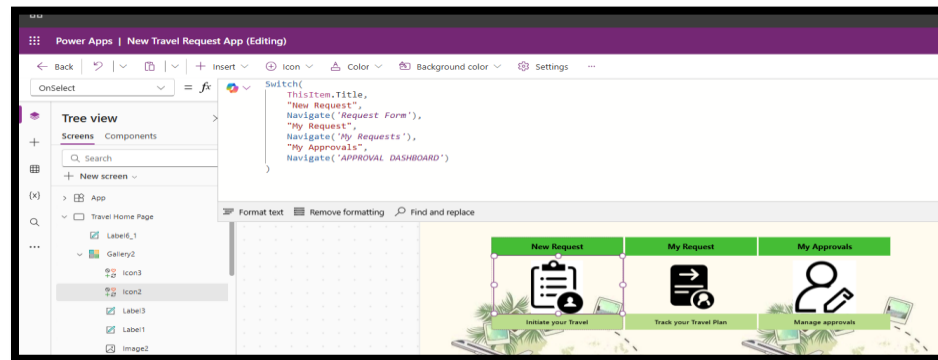


Figure 8. Home Page of the App

## 6. Creating Forms and UI Design for Approval Section

- Set up a user interface for the **travel request approval** process, with a special focus on **admin roles**. The goal is to show certain forms and fields to the admin while limiting visibility for regular users. The design is **refined** for a better user experience.
- **UI/UX Design:** The **approval interface** is designed to be intuitive. Admin users have access to approve or deny requests, while regular users can only submit requests. The UI is kept simple and intuitive, showing only relevant options to the user based on their role. This improves efficiency and ensures users don't get confused or frustrated with irrelevant options.

Figure 9. Travel Request Form



## 7. Designing Dynamic Tabbed Forms for Better Navigation

- Introduce **tabbed forms** to simplify form navigation. Two example tabs are created: one for **trip details** and another for **financial and accommodation details**. Tabs allow users to focus on one section at a time, reducing the need for excessive scrolling.
- **UI/UX Design:** The **tabbed navigation** enhances usability by organizing information into clear, manageable sections. Instead of having one long, overwhelming form, the content is split logically, allowing users to easily navigate between different sections without feeling overwhelmed. This improves the overall **user experience** and **reduces cognitive load**.

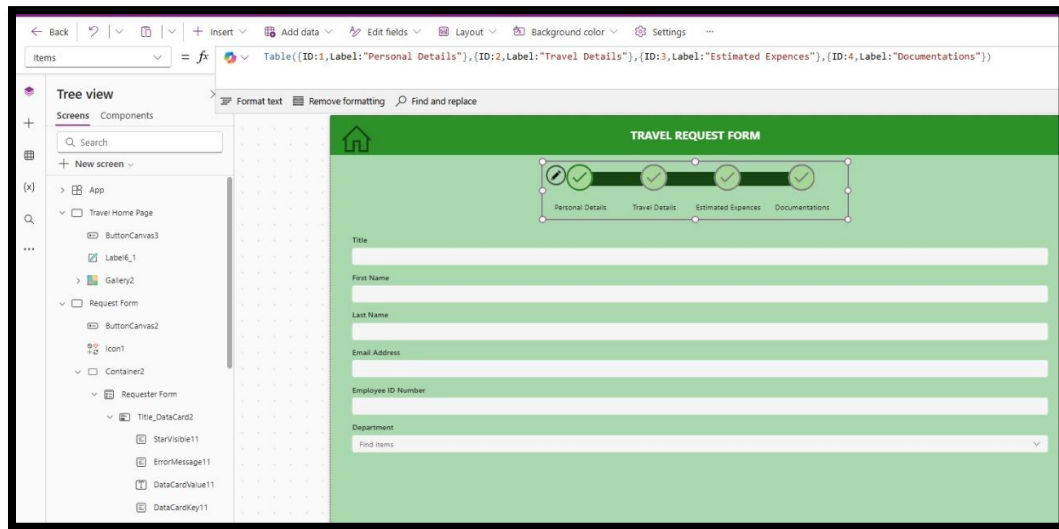


Figure 10. Tabbed Forms

8. Use **progress indicators** to help users understand where they are within the app.

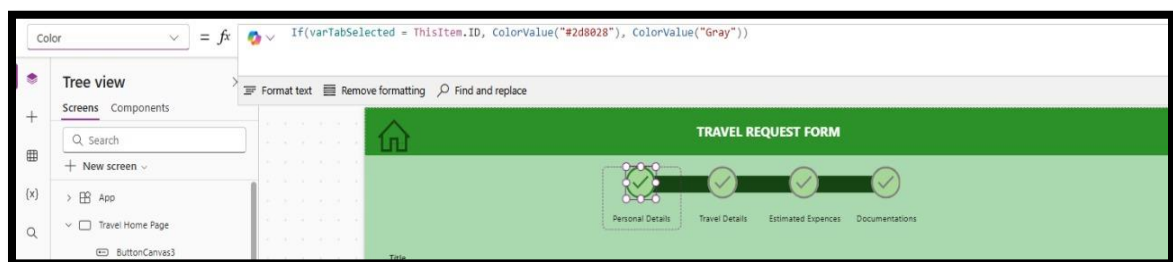


Figure 11. Depicts Progress Indicators and PowerFx Formula

9. Use **Home Tab** to navigate back to the home page if necessary.

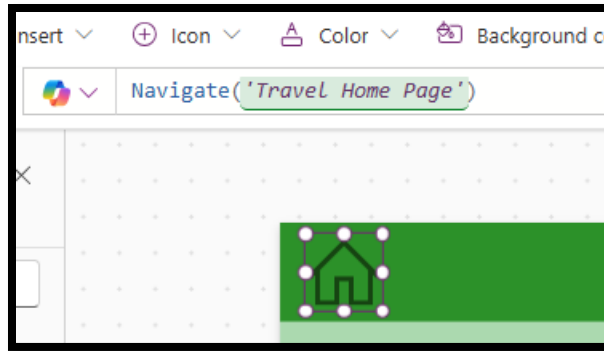


Figure 12. Home Page of the App

10. When a form is submitted, the user will be redirected to the homepage and a notification will be shown from the above page.

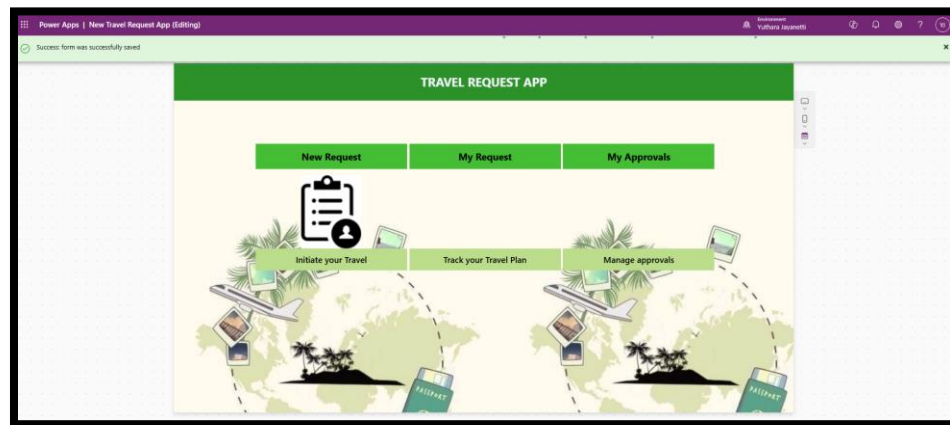


Figure 13. Depicts notification when a form is submitted

```

Set(
    isSuccess,
    false
);
IfError(
    Patch(
        'Tra.Request Log History',
        Defaults('Tra.Request Log History'),
        {Title: "First Request Entry ",
        Log: User().FullName&" has submitted a request",
        'Log ID': 38
        }
    ),
    Set(
        isSuccess,
        false
    ),
    Set(
        isSuccess,
        true
    )
);
If(isSuccess,Notify("It's Success", NotificationType.Success),Notify("It's failed"));

SubmitForm('Requester Form')

```

Figure 14. PowerFx formula for Successfully Submitting a Form

11. The figure below depicts the **My Requests** page in which the user can see the request status.

The 'MY REQUESTS' page features a green header with a home icon and the title 'MY REQUESTS'. The main content area is divided into two columns. The left column contains three request cards: a 'Conference' to the UK (1/1/2025-1/31/2024) with an 'Accepted' status, a 'Business Trip' to Singapore (1/1/2025-1/17/2025) with a 'Pending' status, and another 'Conference' to the USA (1/1/2025-1/31/2025) with a 'Pending' status. The right column contains two request cards: a 'Business Meeting' to the USA (1/1/2025-1/10/2024) with an 'Accepted' status and an 'Annual Trip' to Thailand (12/20/2024-12/27/2024) with a 'Pending' status. A 'Request Details' sidebar on the right provides information for the selected 'Business Meeting' request, including travel destination (Singapore), reason for travel (2025 Annual Conference), airline (Cathay Pacific), and estimated costs for airfare (\$500), hotel (\$1500), and other activities (\$700).

Request Type	Destination	Dates	Status
Conference	UK	1/1/2025-1/31/2024	Accepted
Business Meeting	USA	1/1/2025-1/10/2024	Accepted
Business Trip	Singapore	1/1/2025-1/17/2025	Pending
Annual Trip	Thailand	12/20/2024-12/27/2024	Pending
Conference	USA	1/1/2025-1/31/2025	Pending

Request Details	
Travel Destination	Singapore
Reason for travel	2025 Annual Conference
Airline	Cathay Pacific
Estimated airfare(\$)	500
Estimated hotel cost	1500
Estimated Cost For Other Activities	700

Figure 15. My Requests Page

12. The figure below depicts the **My Approvals** page in which only the admin user can see the approval status.

The 'MY APPROVALS' page features a green header with a home icon and the title 'MY APPROVALS'. The main content area is divided into two columns. The left column contains three request cards for different users: Yuthara Jayanetti (Conference to UK, 1/1/2025-1/31/2024, Accepted), Peter (Business Trip to Singapore, 1/1/2025-1/17/2025, Pending), and James (Conference to USA, 1/1/2025-1/31/2025, Pending). The right column contains two request cards: Jayami (Business Meeting to USA, 1/1/2025-1/10/2024, Accepted) and James (Annual Trip to Thailand, 12/20/2024-12/27/2024, Pending). A 'Request Details' sidebar on the right provides information for the selected 'Business Meeting' request by Jayami, including travel destination (UK), reason for travel (Microsoft Conference 2025), airline (Emirates), and estimated costs for airfare (\$1500), hotel (\$500), and other activities (\$1450), along with a travel duration of 1280 days.

User	Request Type	Destination	Dates	Status
Yuthara Jayanetti	Conference	UK	1/1/2025-1/31/2024	Accepted
Jayami	Business Meeting	USA	1/1/2025-1/10/2024	Accepted
Peter	Business Trip	Singapore	1/1/2025-1/17/2025	Pending
James	Annual Trip	Thailand	12/20/2024-12/27/2024	Pending
James	Conference	USA	1/1/2025-1/31/2025	Pending

Request Details	
Travel Destination	UK
Reason for travel	Microsoft Conference 2025
Airline	Emirates
Estimated airfare(\$)	1500
Estimated hotel cost(\$)	500
Estimated Cost For Other Activities(\$)	1450
Travel duration (days)	1280

Figure 16. My Approvals Page

### 13. Responsive App

**Challenges Faced: Could not create a Responsive App with UI/UX design and user experience. Created Responsive App resulted with an interface as shown below.**



Figure 17. Phone and Tablet View of Responsive App

- The Responsive App could be displayed both in horizontal and vertical landscapes.

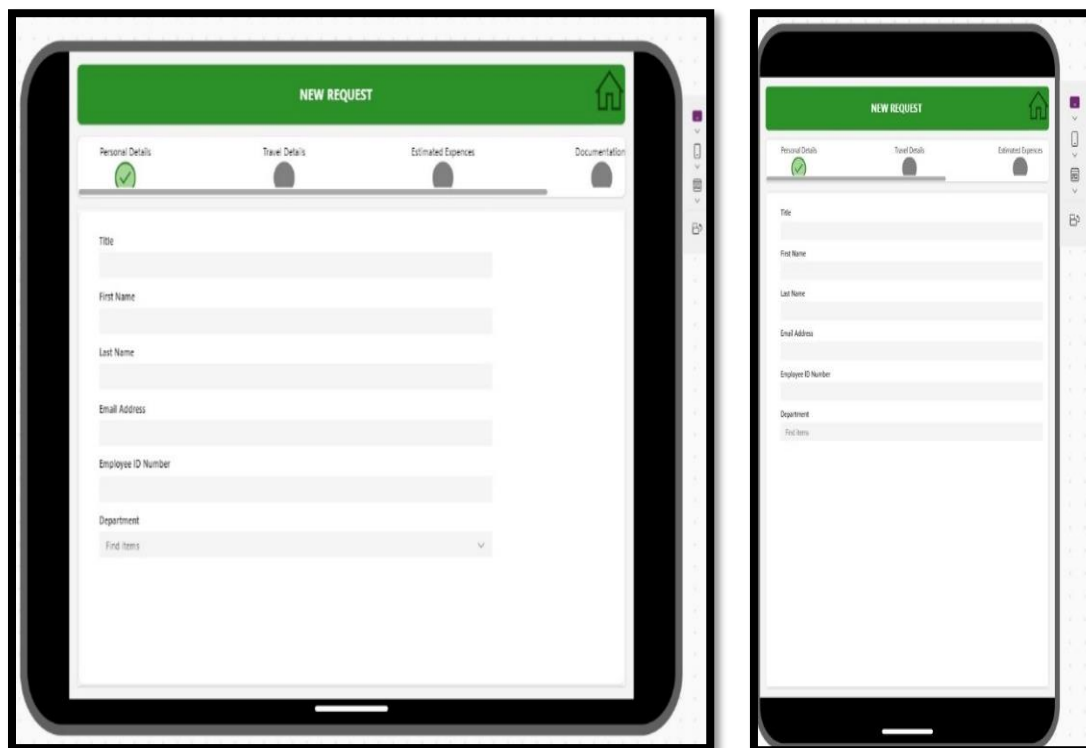
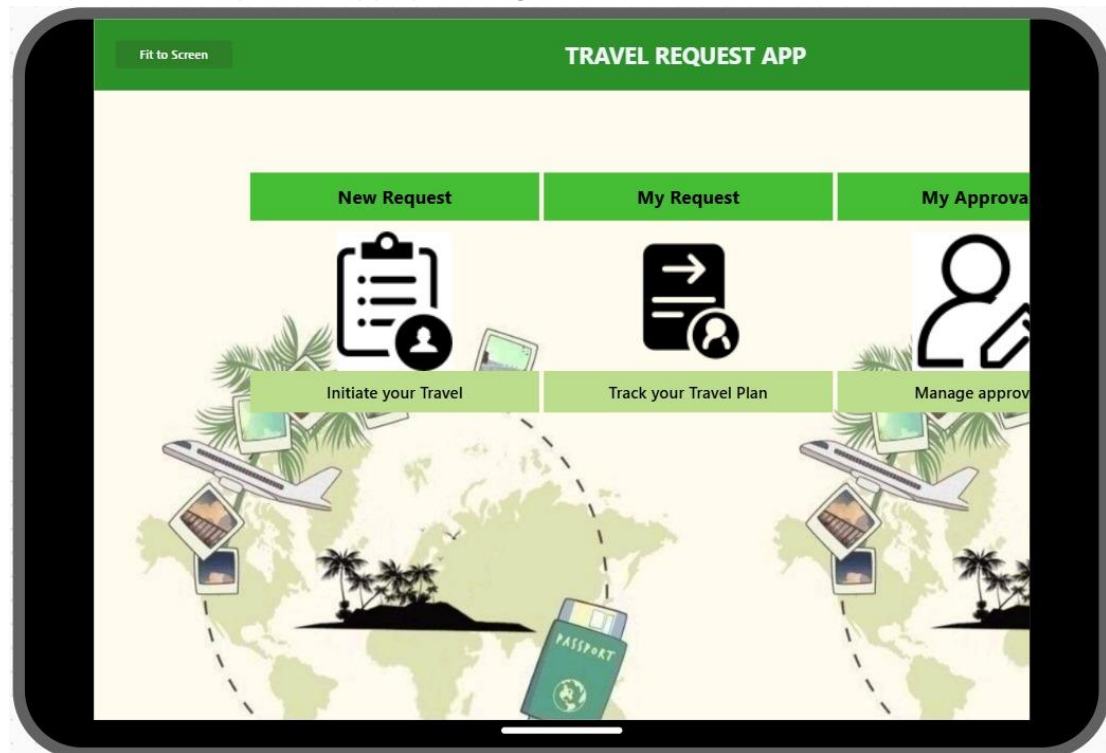


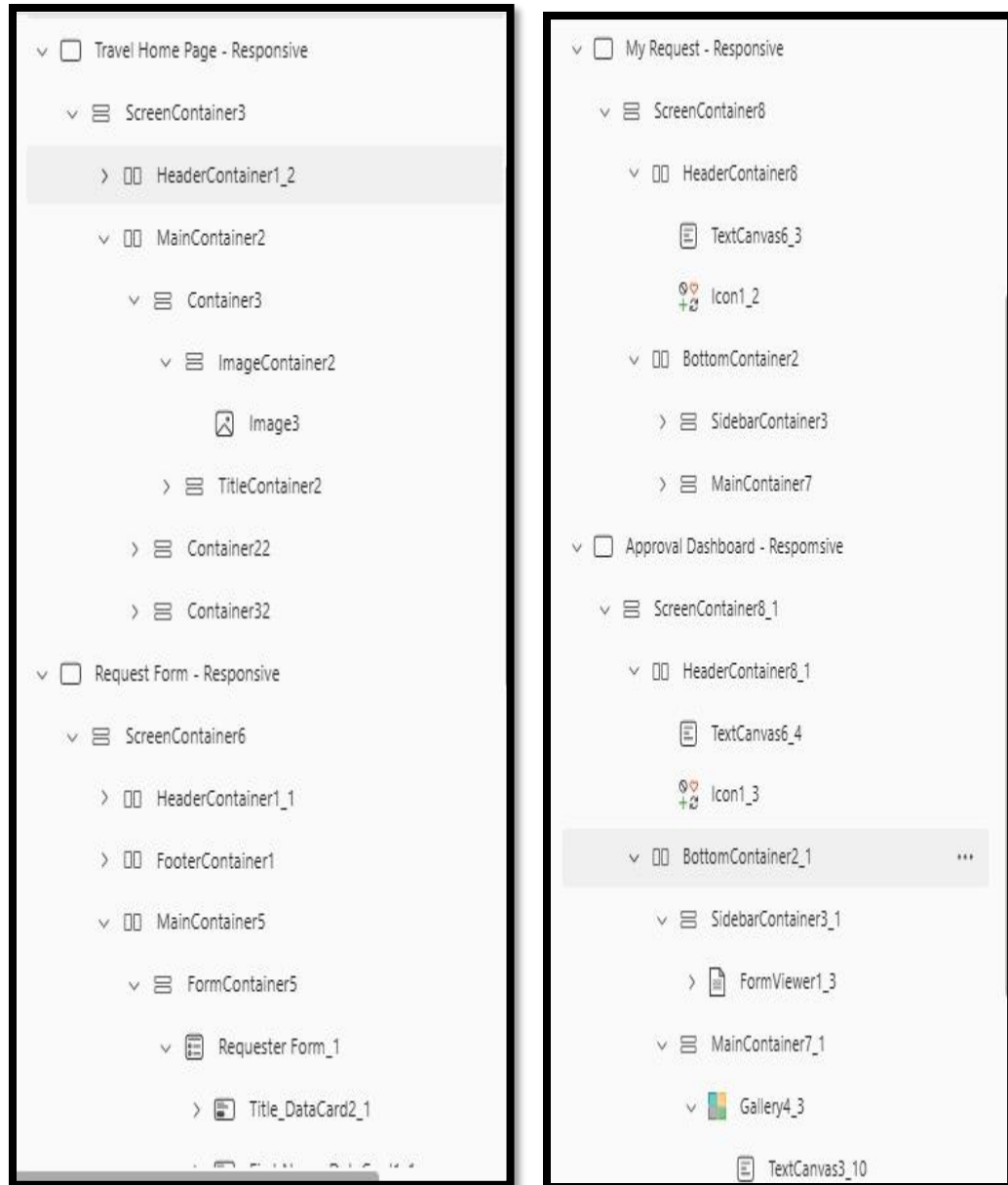
Figure 18. Horizontal and vertical view of Responsive App

- Directly view the responsive app by clicking **Fit to Screen**.



**Figure 19. Navigate to Responsive App**

- The responsive app involved creation of completely different structure including multiple containers than a regular app except for the PowerFx formula.



**Figure 20. Tree view of Responsive App**

This app showcases an intuitive, user-centric application using Power Apps, integrating role-based security and a well-structured form layout. The goal is to improve usability, enhance security, and streamline the workflow for users in different roles.

# References

1. <https://learn.microsoft.com/en-us/power-apps/maker/canvas-apps/build-responsive-apps>
2. <https://www.youtube.com/watch?v=0U5jax-zMlc>
3. <https://www.youtube.com/watch?v=d4e1whKVJU4>
4. <https://techcommunity.microsoft.com/blog/educatordeveloperblog/build-a-booking-requests-app-with-powerapps/3765384>
5. <https://www.ais.com/build-a-leave-request-app-with-power-apps/>
6. <https://www.matthewdevaney.com/make-a-power-apps-approvals-form/>

# Task 2: Streamlining Travel Approval Process Using Power Automate

## 1. Problem Statement

The current travel approval process within the organization is inefficient and manual, leading to delays, miscommunication, and a lack of transparency. Employees from different departments submit travel requests, which require dual approval before final confirmation. The manual process results in:

- Delayed responses.
- Difficulty tracking approval status.
- No centralized system for documentation.

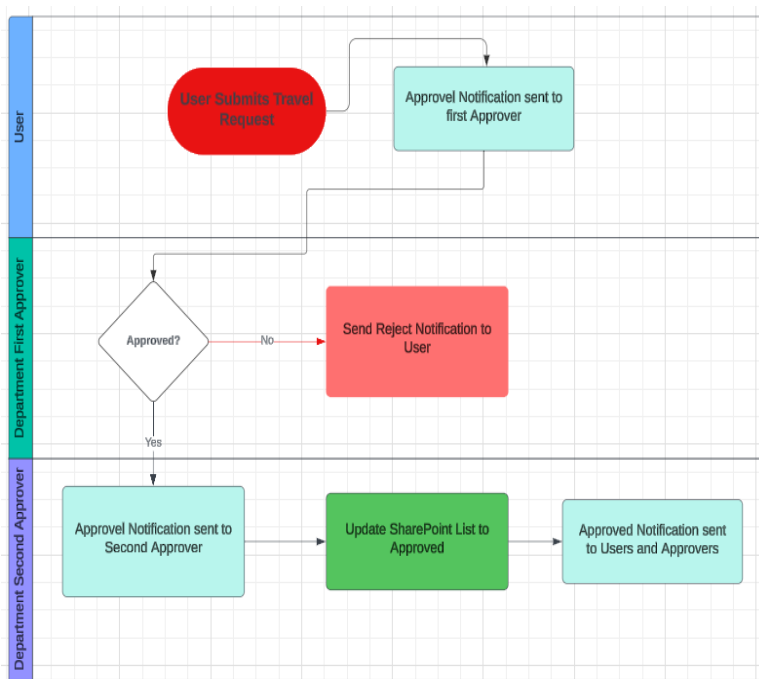
## 2. Solution: Power Automate Workflow

To address the inefficiencies, a Power Automate-based workflow automates the entire travel approval process. This ensures timely approvals, centralized communication, and real-time visibility.

## 3. Scenario Overview

The workflow automates the travel approval process as follows:

**Figure 1. Travel Approval Flow Chart**



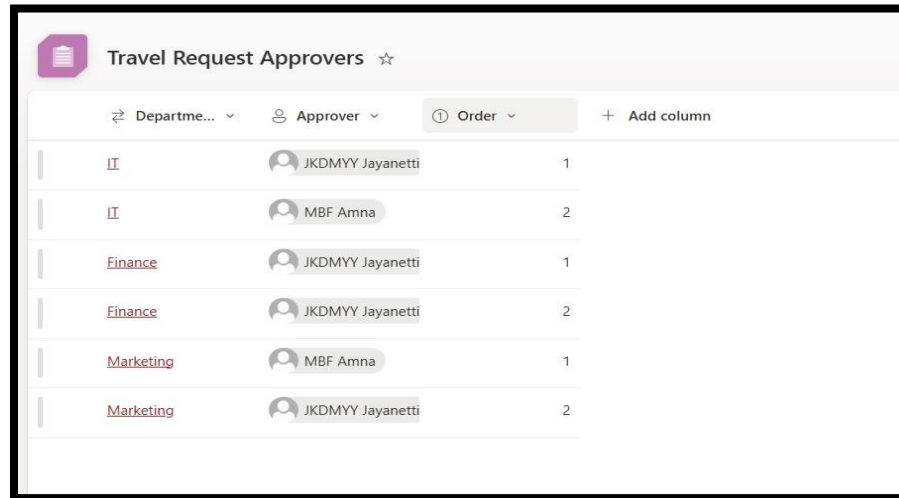
1. A travel request is created.
2. The request is automatically sent to two approvers.
3. If both approvers approve, the request is marked as "Approved."
4. If any approver rejects, the request is marked as "Rejected."
5. Notifications are sent to the requester and the approvers at every stage.
6. Approval tracking is visible in Outlook and Teams.



**The automation flow is created for the Travel Request Application. The data source integrated into the flow is the same data source created for the application in SharePoint.**

**NOTE:** When a user's email is similar to approvers email, he is called "User Admin". The rest of the users are called "Regular Users".

There are two approvers for each department. More departments can be added as per the requirements of the organization.



Departme...	Approver	Order	
IT	JKDMYY Jayanetti	1	
IT	MBF Amna	2	
Finance	JKDMYY Jayanetti	1	
Finance	JKDMYY Jayanetti	2	
Marketing	MBF Amna	1	
Marketing	JKDMYY Jayanetti	2	

Figure 2. SharePoint Approvers List

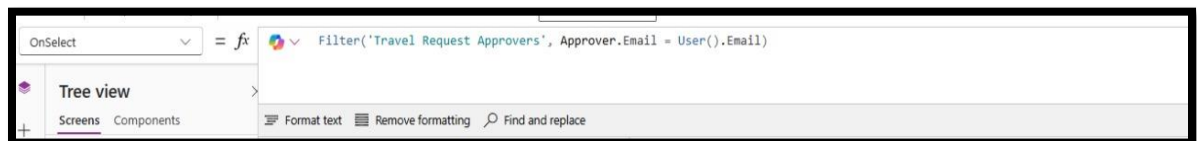


Figure 3. Approvers PowerFx Formula

# Workflow Design

## 4.1 Trigger

- Trigger: *"When an item is created"*
- Connector: SharePoint (where travel requests are logged).

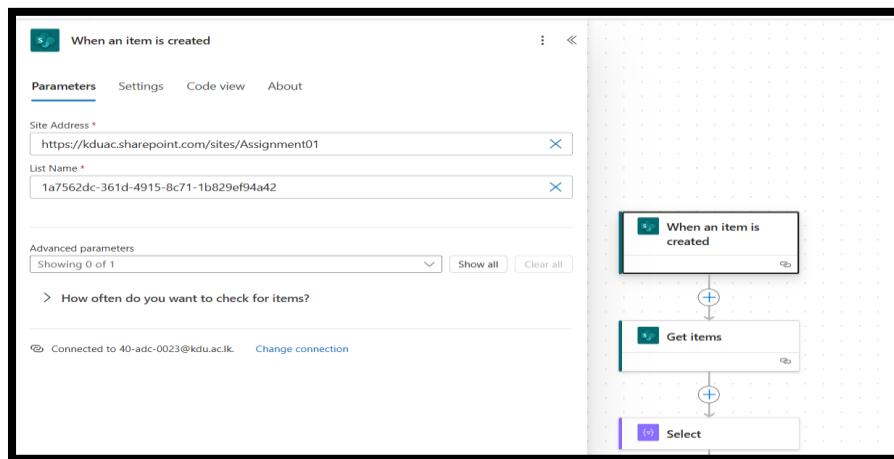


Figure 4. Action flow

## 4.2 Actions

1. Get Items
  - Retrieves all existing travel requests for further processing.

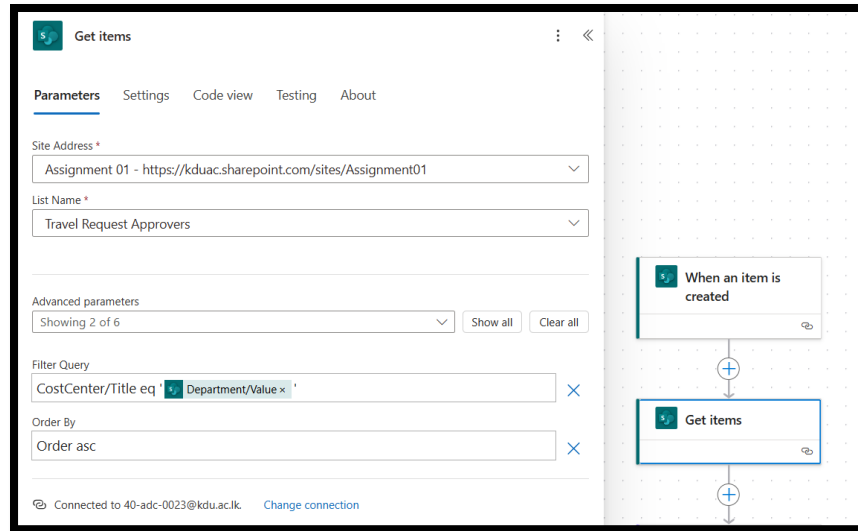


Figure 5. Get Items Flow

## 2. Select

- Filters the relevant details such as department, requestor, and approvers.

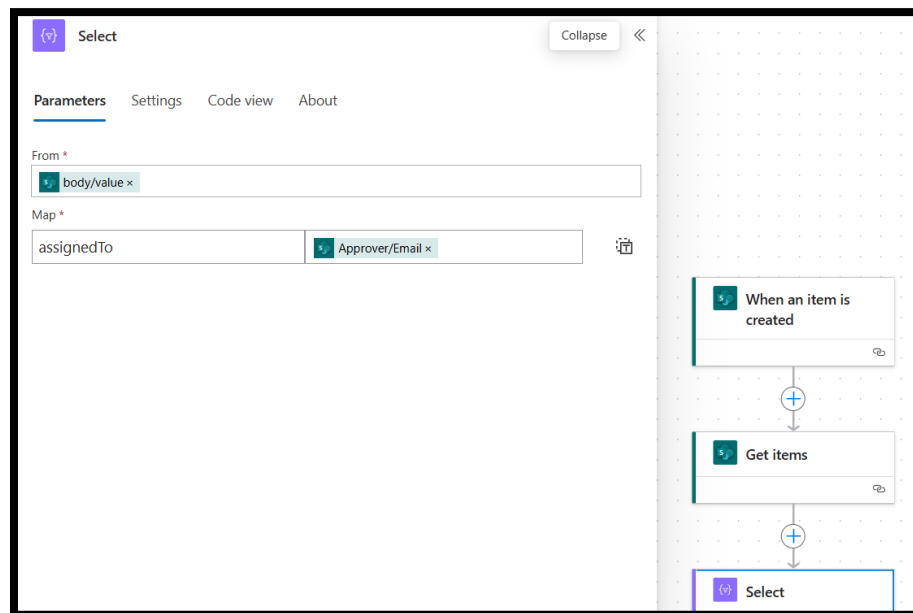


Figure 6. Select Flow

## 3. Start and Wait for Approval

- Sends approval requests to two approvers via Outlook.
- Approval process type: Parallel Approvals (both must approve).

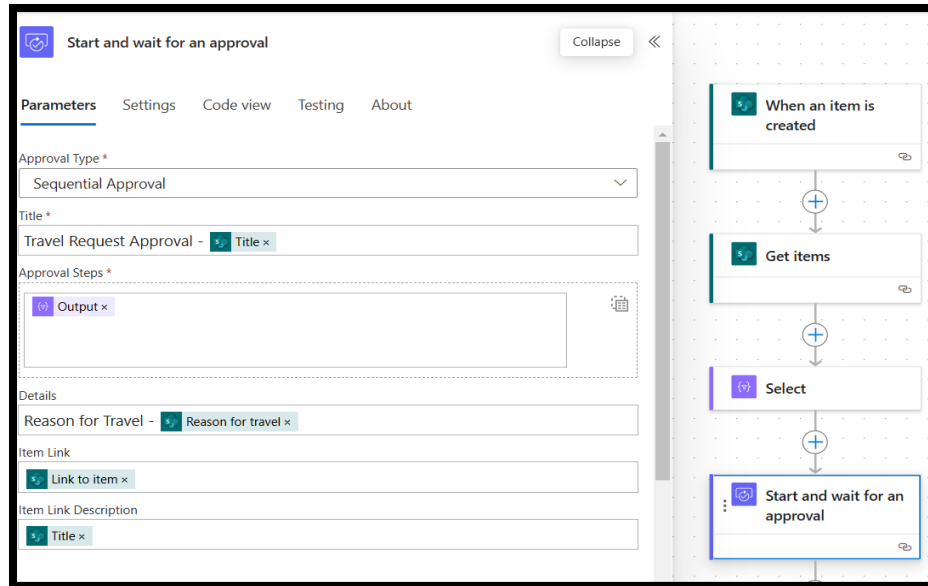


Figure 7. Start and Wait for Approval Flow

#### 4. Condition

- True (Approved): Updates the status to "Approved" in SharePoint.
- False (Rejected): Updates the status to "Rejected" in SharePoint.

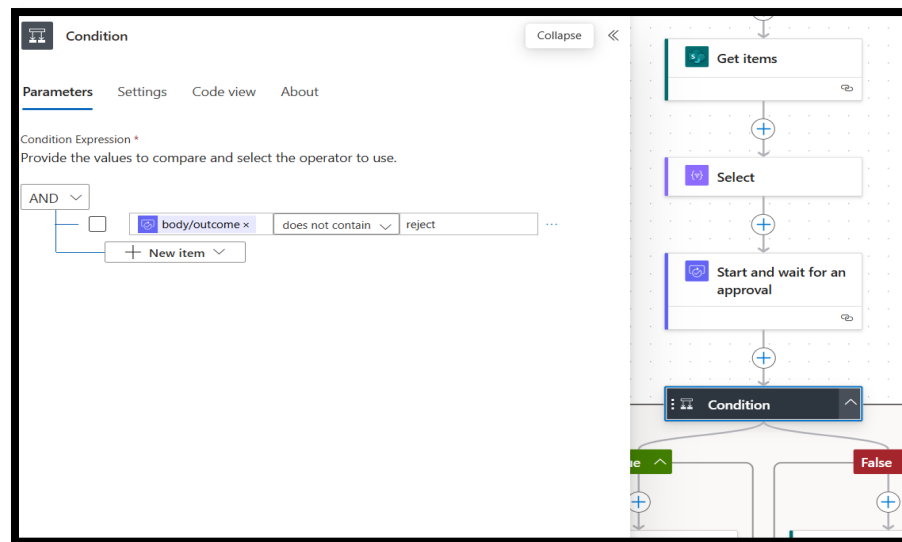


Figure 8. Condition Flow

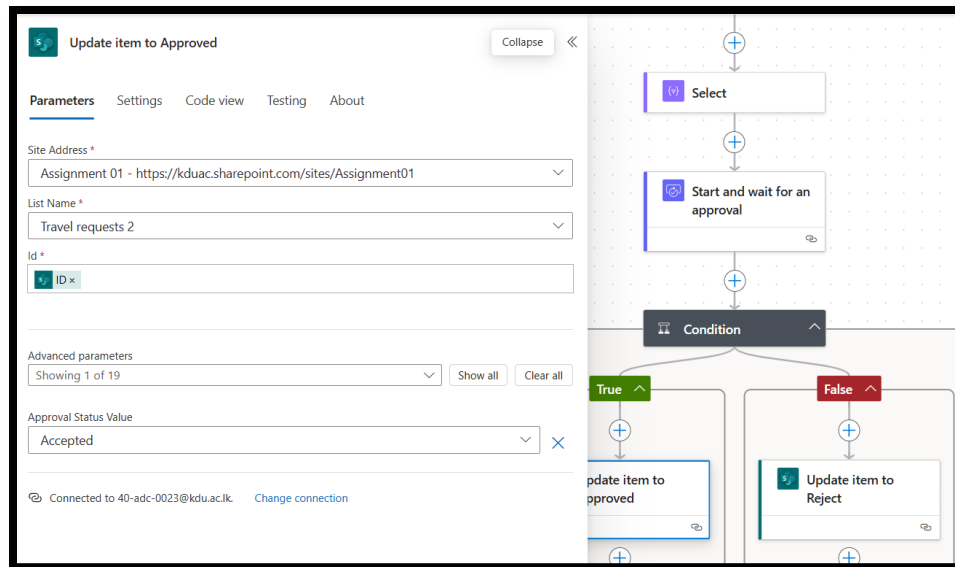


Figure 9. Approved Item Flow

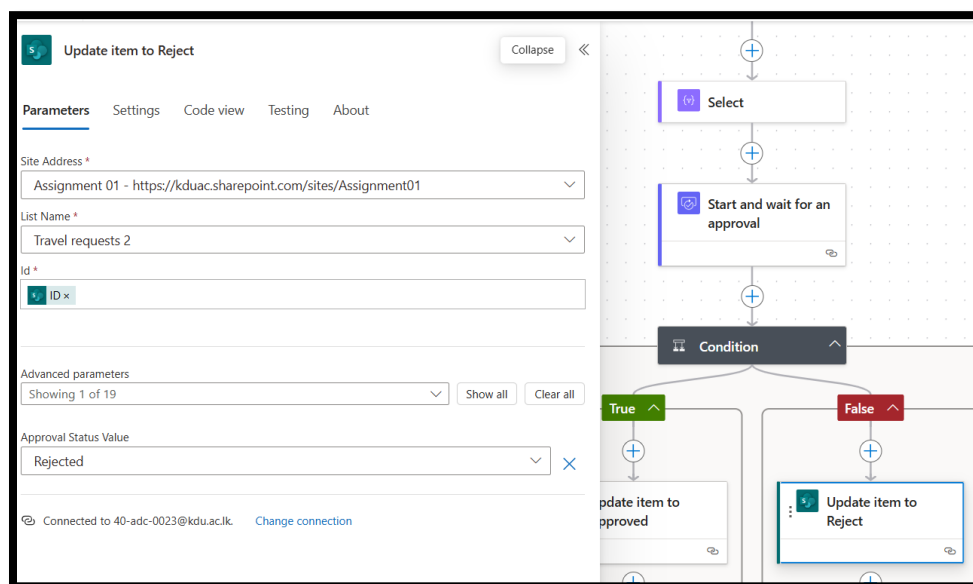


Figure 10. Reject Item Flow

## 5. Notifications:

- Emails are sent at each stage to both the requester and approvers.
- Approval updates are also visible in Microsoft Teams.

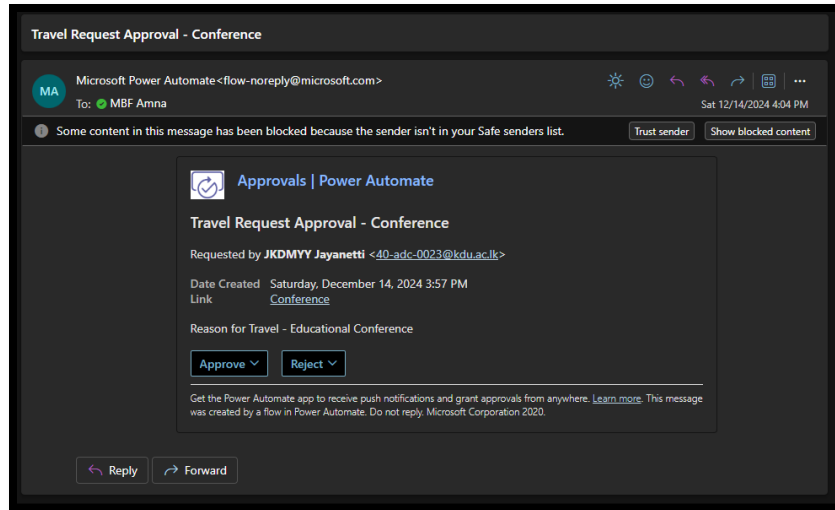


Figure 11. Approval Email

The figure above depicts the emails sent to the approver after submitting the forms.

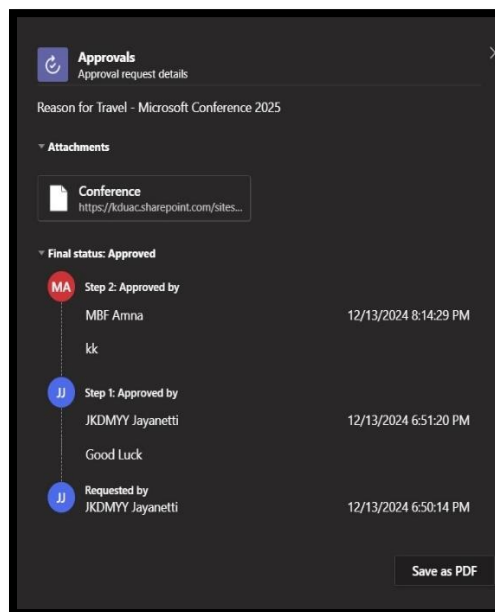


Figure 12. Approval Process Flow in Teams

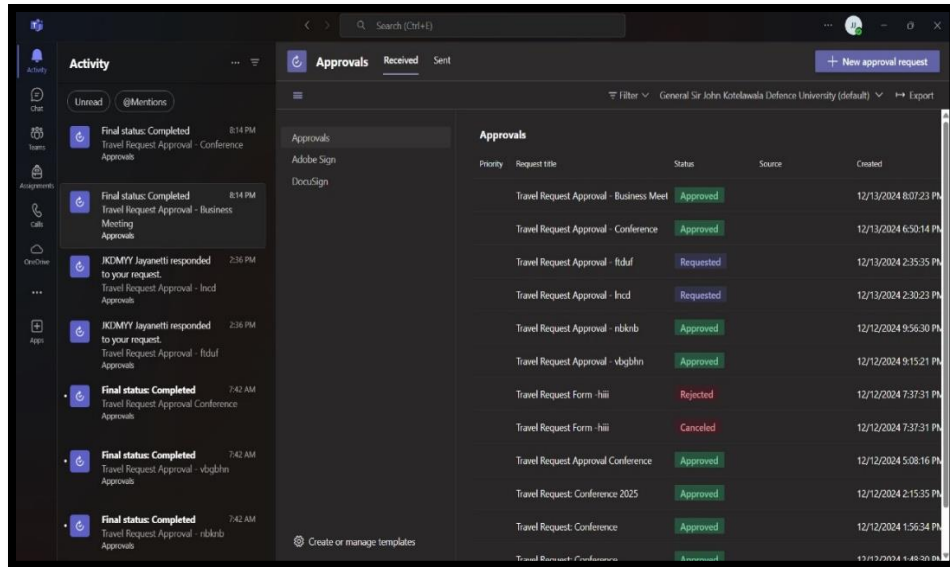


Figure 13. Approvals seen in Teams

## 5. Connectors Used

The workflow integrates with the following Microsoft tools:

1. SharePoint:
  - For storing and managing travel requests.
2. Power Apps:
  - For submitting Travel Request forms
3. Outlook:
  - Sends approval emails to the approvers and requestor.
4. Teams:
  - Displays real-time status updates of approvals.

## 6. Conditions and Logic

- Condition: Both approvers must approve the request for it to be accepted.
- True Branch: Status is updated to "Approved." Notifications are sent.
- False Branch: Status is updated to "Rejected." Notifications are sent.

## 7. Approval Workflow

1. Travel request creation triggers the automated process.
2. Approval requests are sent via Outlook to both approvers.
3. Approvers respond to the request.

4. If both approve:
  - Request is updated to "Approved."
  - Notification emails are sent.
  - Teams reflects the status as "Approved."
5. If any approver rejects:
  - Request is updated to "Rejected."
  - Notification emails are sent.
  - Teams reflects the status as "Rejected."

## 8. Workflow Visualization

The automated workflow is as follows (refer to the diagram provided):

1. Trigger: *"When an item is created"*
2. Actions:
  - Get items → Select details → Start approval.
3. Condition Check:
  - True: Update status to "Approved."
  - False: Update status to "Rejected."
4. Notifications: Updates via Outlook and Teams.

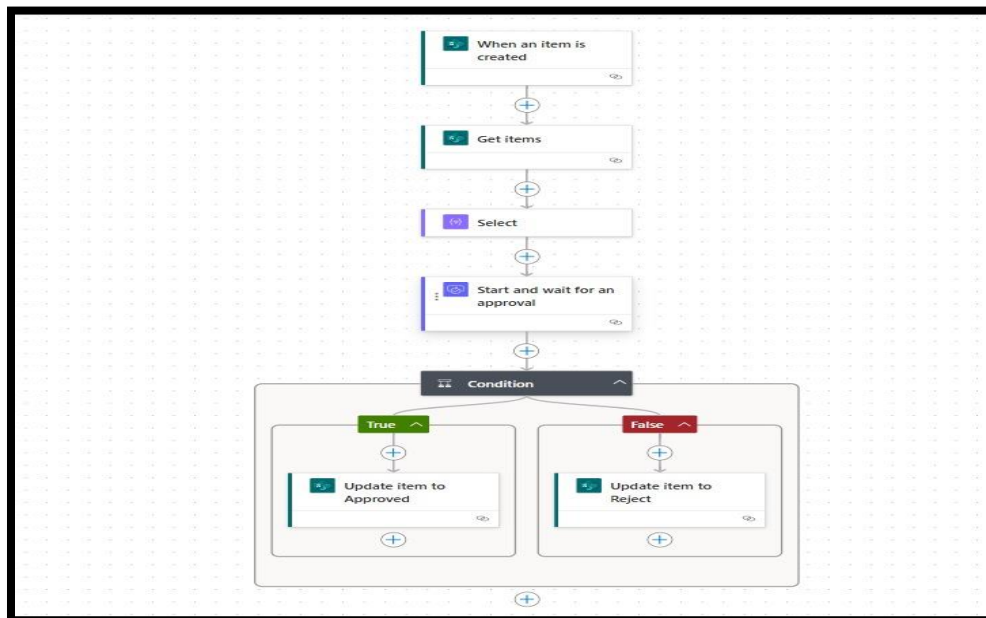


Figure 14. Entire Automation Workflow



## 9. Benefits of Automation

- Efficiency: Faster response times and reduced delays.
- Transparency: Real-time updates visible in Outlook and Teams.
- Centralized Tracking: Travel requests are logged and updated in SharePoint.
- Improved Communication: Notifications ensure all stakeholders are informed.

## 10. Conclusion

The Power Automate solution successfully streamlines the travel approval process, ensuring faster decisions, improved transparency, and better user experience. By automating notifications and approvals, the organization can focus on strategic tasks rather than manual follow-ups.

# References

1. <https://learn.microsoft.com/en-us/training/powerplatform/power-automate>