ASIAN

College of Engineering and Technology

Asian College Road, Kondayampalayam, Near Saravanampatti,Coimbatore 641 110

Department of

Computer science and Engineering

LABORATORY RECORD

Name : _____ University Reg.No : _____

Class : _____ Branch/Sem : _____

Certified bonafide Record of work done by _____

in _____ Laboratory.

Place : ***Staff Incharge*** ***Head of the department***

Date:

Submitted for the University Practical Examination held on

_____

Internal Examiner ***External Examiner***

Abstract:

The Customer Relationship Management (CRM) application for mall management is designed to enhance the overall operational efficiency and customer experience within a shopping mall environment.

The primary objective of this CRM system is to streamline communication, improve customer engagement, and optimize business operations by providing a centralized platform for managing customer data, store activities, and mall-specific services.

The system integrates key functionalities such as customer profiling, targeted marketing campaigns, real-time feedback collection, loyalty program management, and analytics for decision-making. It also provides mall management with tools to monitor store performance,

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track sales trends, and identify opportunities for improvement.

Introduction :

The Management App is a comprehensive solution built on the Salesforce platform to streamline and enhance the management of commercial malls. This innovative app offers a suite of features designed to optimize the lease tracking process, improve tenant interactions, and provide actionable insights for effective decision-making.

Why are we using Salesforce Platform for this project

We're using Salesforce for the Mall Management App because it lets us build the app quickly without a lot of complicated coding. It's flexible, so we can easily customize it to fit the specific needs of managing a mall. Salesforce keeps everything organized in one place, making it easy to handle tenant info, leases, and maintenance issues. It's also secure, ensuring that sensitive data is protected. With automation features, tasks can be done automatically, saving time. The user-friendly interface makes it easy for everyone to use, and the analytics tools help us make smart decisions based on data. Plus, Salesforce has a helpful community for support and additional resources, making it a great overall choice for our project.

System Requirements for CRM Application to Manage the Mall

To implement an effective CRM application for managing a mall, it's important to define the necessary hardware, software, and network infrastructure. Below are the functional and non-functional system requirements that ensure the CRM application runs smoothly, provides high performance, and integrates effectively with other mall systems.

1. Hardware Requirements

1.1 Server Requirements (For On-Premise Deployment)

- Processor: Multi-core processor (e.g., Intel Xeon, AMD EPYC) with at least 4 cores (8 preferred) and a clock speed of 2.5 GHz or higher.
- RAM: Minimum of 16 GB RAM (32 GB or more for larger malls with multiple stores and heavy data load).
- Storage:
    - Minimum of 500 GB SSD for fast access and storage.
    - Backup storage (e.g., NAS or cloud-based backup) for disaster recovery, with at least 1 TB capacity.
- Network Interface: Gigabit Ethernet or higher for fast internal network connectivity.

1.2 Client Requirements (Retailers and Admin)

- Desktop Computers/Laptops:
    - Minimum: Intel Core i3 or equivalent.
    - Recommended: Intel Core i5 or higher with 8 GB RAM.
- Operating System: Windows 10/11 or macOS 10.15 and above.
- Web Browser: Latest versions of Google Chrome, Firefox, or Microsoft Edge.
- Internet Connectivity: Broadband or fiber internet with at least 10 Mbps download/upload speed.

1.3 Mobile Devices (For Customer Mobile App)

- Operating System:
    - iOS 12.0 or higher
    - Android 8.0 (Oreo) or higher
- Screen Resolution: 720x1280 pixels or higher
- Memory: Minimum 2 GB RAM (4 GB preferred for optimal performance)

2. Software Requirements

2.1 CRM Application Software

- CRM Software Platform: A web-based CRM framework (e.g., Salesforce, Zoho CRM, or custom-built using technologies like Node.js or Java) that supports multi-user access, role-based permissions, and integration with various external systems.
- Database Management System:
    - Relational Database: MySQL, PostgreSQL, or Microsoft SQL Server for structured data storage.
    - NoSQL Database: MongoDB or Cassandra for handling unstructured data such as customer reviews, preferences, and event logs.
- Web Server: Apache or Nginx to serve web-based CRM interfaces.
- Application Framework:
    - Front-end: React.js, Angular, or Vue.js for a responsive and interactive user interface.
    - Back-end: Node.js, Python (Django/Flask), or Java (Spring Boot) for handling business logic.
- APIs & Integrations:
    - RESTful or GraphQL APIs for integration with external systems (POS, payment gateways, mall websites, social media).
    - Integration with third-party platforms such as email marketing tools (MailChimp, SendGrid) and SMS gateways for promotional campaigns.

2.2 Security and Privacy Software

- Encryption: SSL/TLS for securing data transmission between client and server.
- Authentication: OAuth, OpenID, or SAML for secure user authentication (e.g., mall staff, retailers, and customers).
- Data Backup Software: Automated backup tools for data recovery, e.g., Veeam, Acronis, or cloud-based backup (e.g., AWS S3, Google Cloud Storage).

2.3 Analytics and Reporting

- BI Tools:
    - Integration with business intelligence tools such as Tableau, Power BI, or Google Data Studio for visualizing customer behavior, sales trends, and marketing effectiveness.
- Data Warehouse: Amazon Redshift, Google BigQuery, or Azure Synapse for large-scale data analytics.
- Real-time Analytics Engine: Apache Kafka or Apache Spark for processing high-velocity data in real time.

3. Network Requirements

3.1 Internet and Connectivity

- Internet Speed: Minimum 10 Mbps upload/download for efficient use of the CRM by users (admin, retailers, and customers).
- VPN: Virtual Private Network (VPN) or secure tunneling for remote access to CRM for admin and store managers, if required.
- Firewall: Properly configured firewall to protect internal CRM systems and ensure secure external communication.

3.2 Network Infrastructure

- Internal Network: Gigabit Ethernet network for fast communication between CRM application servers and client devices (desktops, laptops).
- Load Balancer: For distributed load handling across multiple servers, ensuring smooth user access during peak hours.

4. Functional Requirements

4.1 Customer Relationship Management

- Customer Data Management: Ability to store and manage detailed customer profiles, including demographics, shopping behavior, preferences, feedback, and loyalty status.
- Customer Segmentation: Tools for grouping customers based on their shopping behavior, preferences, and purchase history for targeted marketing.
- Customer Interaction History: Comprehensive tracking of customer interactions through various channels (email, SMS, social media, in-store visits).
- Multi-Channel Integration: Ability to manage customer relationships across physical stores, mobile apps, website, social media, and email.

4.2 Marketing & Promotions

- Campaign Management: Tools to create and track marketing campaigns (email, SMS, in-app promotions) and analyze their performance.
- Loyalty Program: Integration with a points-based or tiered loyalty program to encourage repeat visits and purchases.
- Event Management: Capability to schedule and send invitations to in-store events, sales, or promotions.
- Targeted Offers: Tools for delivering personalized offers based on customer preferences, shopping history, and behavior.

4.3 Reporting & Analytics

- Real-Time Analytics: Dashboards to monitor key performance indicators (KPIs) such as foot traffic, sales per store, customer satisfaction, and marketing ROI.
- Sales and Inventory Tracking: Integration with store POS systems to track product sales, inventory levels, and identify top-performing stores or product categories.
- Customer Sentiment Analysis: Ability to gather and analyze customer feedback from surveys, social media, and review platforms.

4.4 Integration with Mall Systems

- Point of Sale (POS): Integration with existing store POS systems for unified customer data management and sales reporting.
- Facility Management Systems: Integration with systems managing the mall's physical infrastructure (e.g., HVAC, lighting, security).
- Payment Gateways: Integration with payment systems (e.g., PayPal, Stripe) for secure transactions, particularly in loyalty programs or promotions.

5. Non-Functional Requirements

5.1 Scalability

- Vertical Scaling: Ability to scale the application's hardware resources (RAM, CPU) as customer and data load increases.
- Horizontal Scaling: Capability to add more servers to distribute the load as the number of users (both retailers and customers) increases.

5.2 Availability & Reliability

- Uptime: The CRM application should aim for 99.9% uptime to ensure continuous operations during business hours.
- Disaster Recovery: A well-defined disaster recovery plan in place, with automated backup and failover strategies for uninterrupted service.

5.3 Performance

- Response Time: The CRM should respond to user requests within 2 seconds for normal operations and 5 seconds during peak hours.
- Load Handling: Ability to handle multiple concurrent users (e.g., 500+ admin and retail users, and 1000+ customer interactions simultaneously).

5.4 Security

- Data Encryption: End-to-end encryption for sensitive customer data both at rest and in transit.
- Access Control: Role-based access control (RBAC) for admins, retailers, and customers to limit permissions to only necessary features.
- Compliance: Compliance with data privacy regulations like GDPR, CCPA, and PCI-DSS for handling personal and payment data.

5.5 Usability

- User Interface: Easy-to-use, intuitive interface for mall managers, retailers, and customers.
- Mobile Optimization: A fully responsive mobile interface or a dedicated mobile app for customers to access deals, promotions, and navigate the mall.

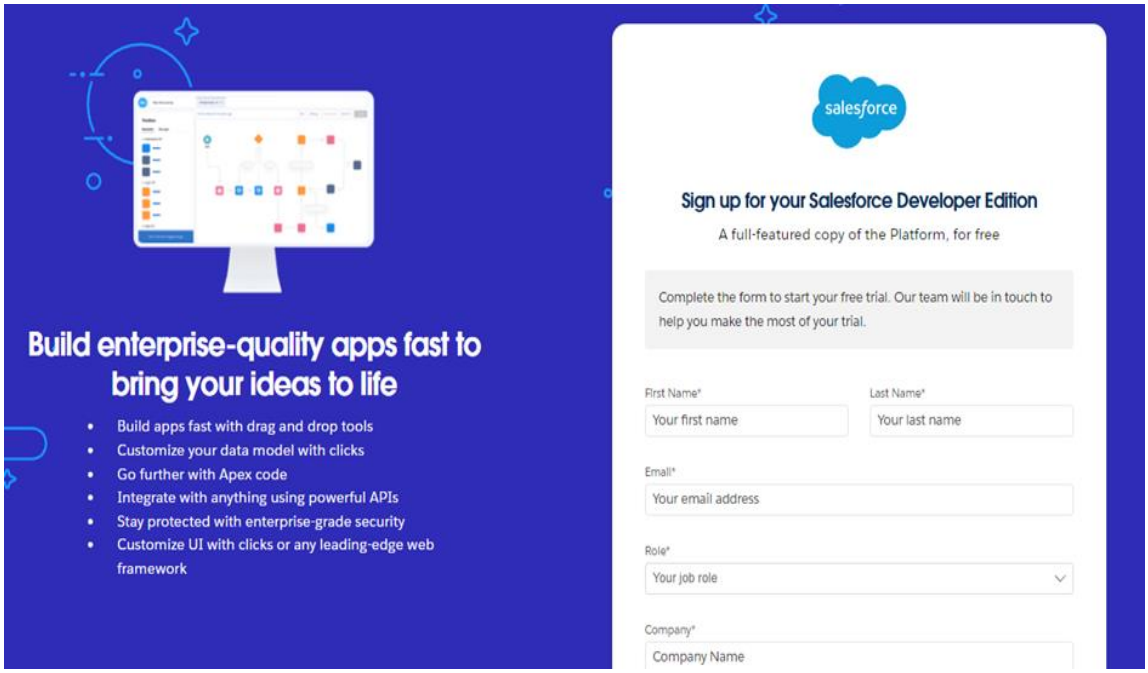
6. Optional Features (Future Enhancements)

- AI Integration: Integration with AI-powered tools for predictive analytics, personalized customer recommendations, and automated customer support via chatbots.
- Augmented Reality (AR): Integration with AR features to enhance the shopping experience for customers, such as virtual product try-ons or wayfinding inside the mall.

Creating Developer Account

1. Go to https://developer.salesforce.com/signup

2. On the sign up form, enter the following details :



1) First name & Last name

2) Email

3) Role : Developer

4) Company : College Name

5) County : India

6) Postal Code : pin code

7) Username : should be a combination of your name and company

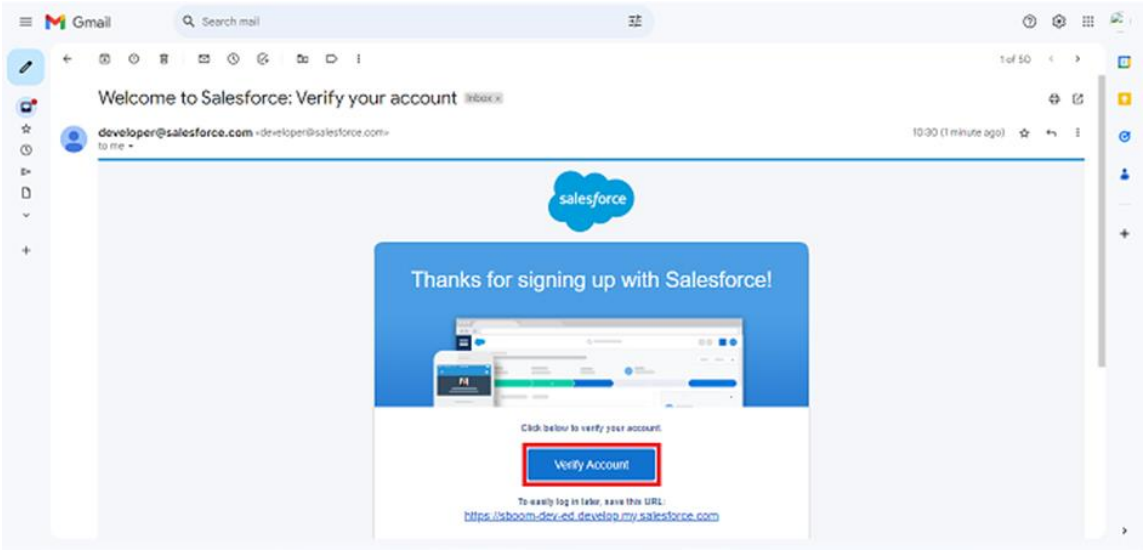
This need not be an actual email id, you can give anything in the format : username@organization.com

Click on sign me up after filling these.

Account Activation :

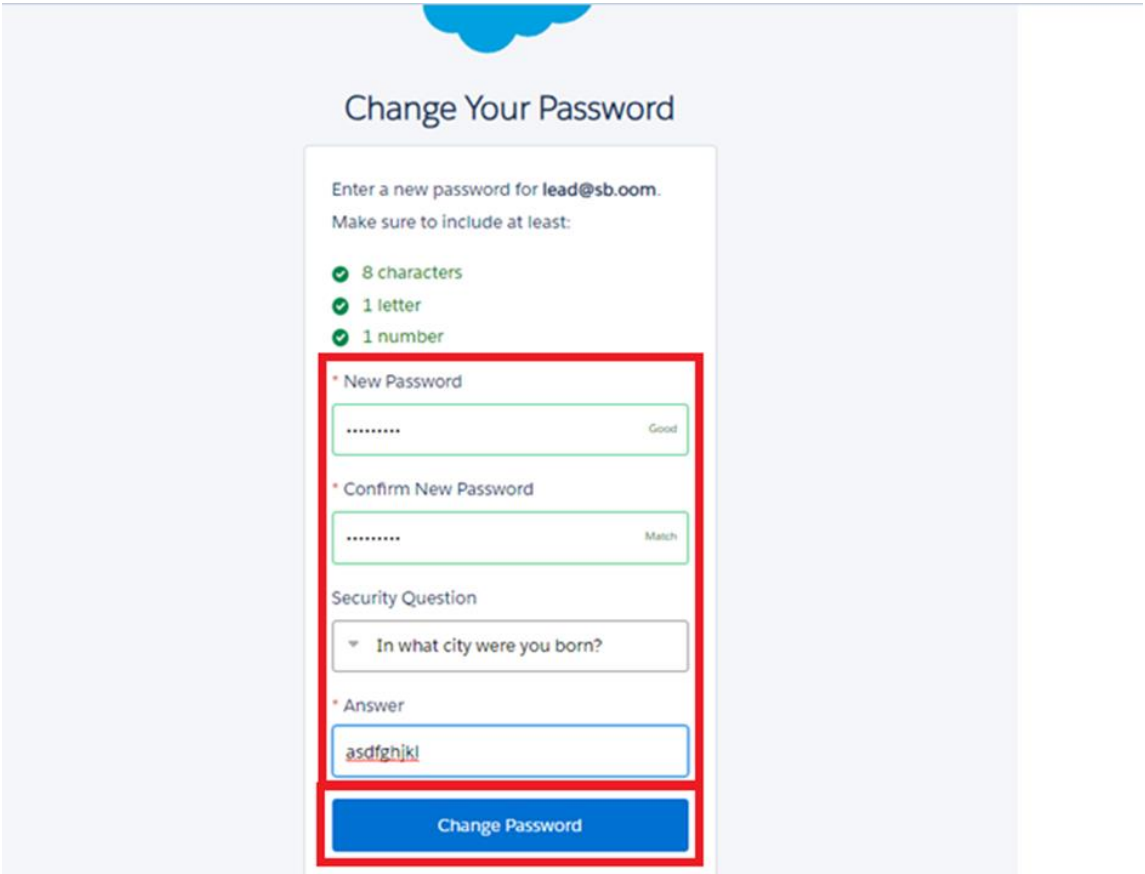
1. Go to the inbox of the email that you used while signing up. Click on the verify

account to activate your account. The email may take 5-10mins.

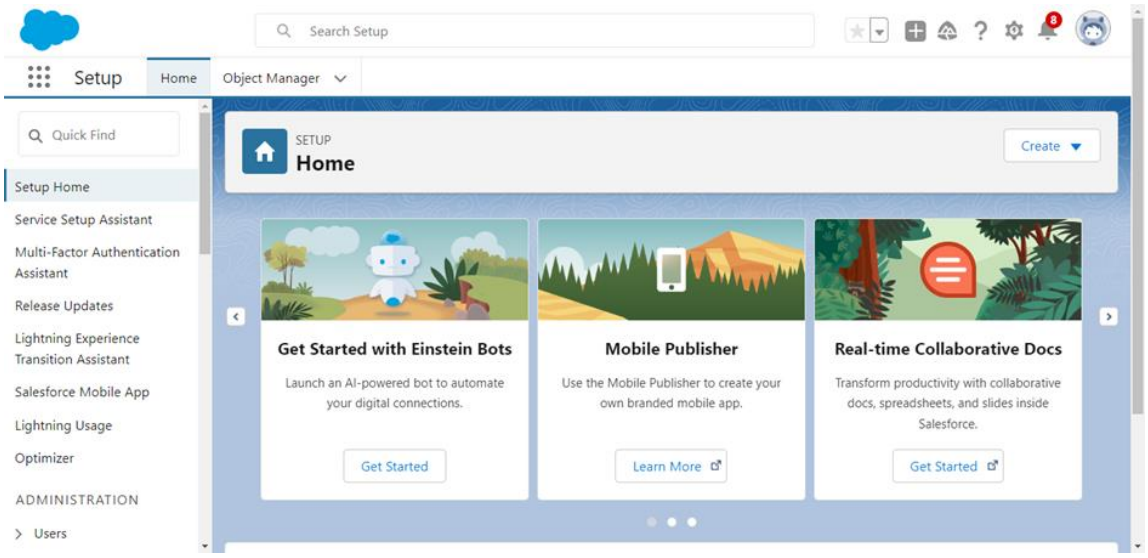


2. Click on Verify Account.

3. Give a password and answer a security question and click on change password.



4. Then you will redirect to your salesforce setup page.



Create Custom Objects

To store the data as per business requirement.

Create Tenant Object

1. From the setup page ==> Click on Object Manager ==> Click on Create ==> Click on Custom Object.

1. Enter the label name: Tenant

2. Plural label name: Tenants

3. Enter Record Name Label and Format
   - Record Name : Tenant Name
   - Data Type: Text
4. Click on Allow reports.

5. Allow search and Save

Create Lease Tracking Object

1. Enter the label name ==>Lease Tracking

2. Plural label name ==> Leases Tracking

3. Enter Record Name Label and Format

- Record Name : Lease Tracking No
- Data Type : Auto Number
- Display Format - TT - {000000}

4. Click on Allow reports.

5. Allow search and Save

Create Tenant Issues Object

1. Enter the label name ==> Tenant Issue

2. Plural label name ==> Tenant Issues

3. Enter Record Name Label and Format

- Record Name : Issues
- Data Type : Auto number

4. Click on Allow reports.

5. Allow search and Save

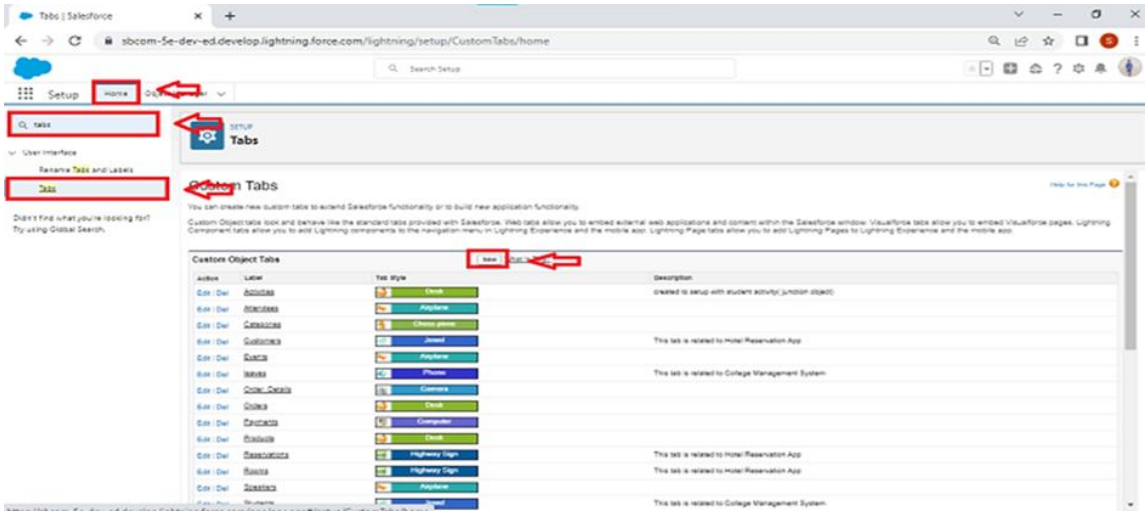
Tabs

What is tab and Types of tabs :

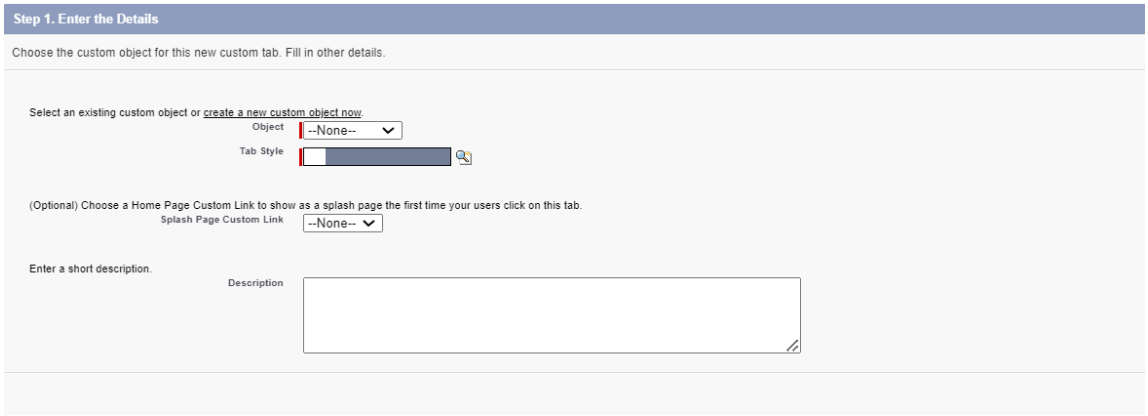
What is Tab: A tab is like a user interface that is used to build records for objects and to view the records in the objects.

Create a custom tab for tenant object

1. Go to setup page ==> type Tabs in Quick Find bar ?==>click on tabs ==> New (under custom object tab)



1. Select Object(Tenant) ==> Select the tab style ==> Next (Add to profiles page) keep it as default ==> Next (Add to Custom App) uncheck the include tab ==> Save.
2. Make sure to append tab to users' existing personal customizations is checked.



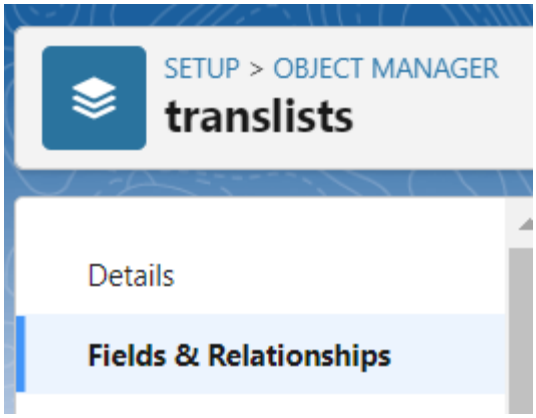
Note : Similarly, create tabs for Lease Tracking and Tenant issues.

Create Fields and Relationships

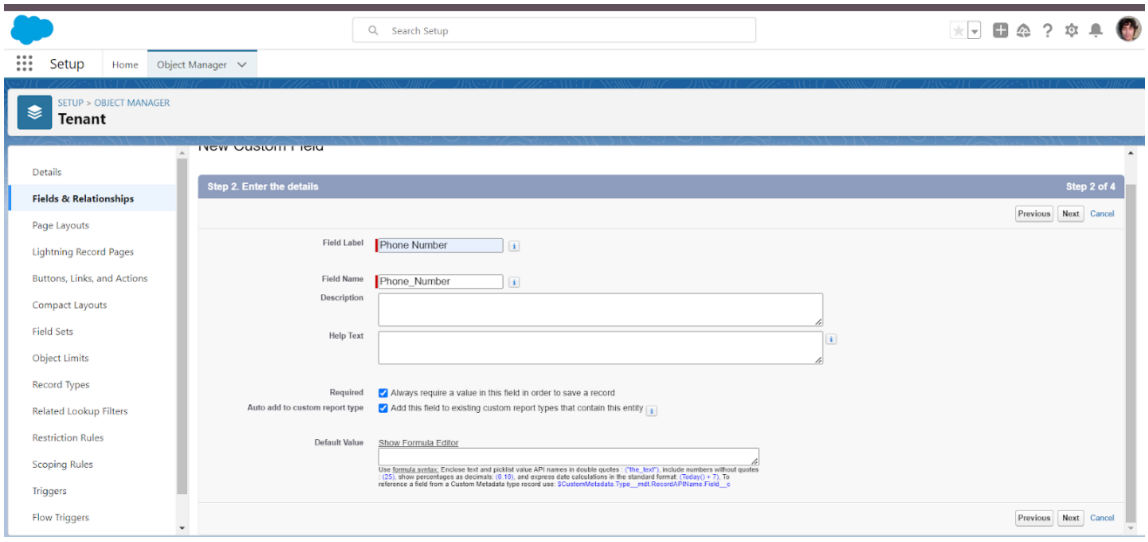
Now it's time for you to think out of the box for your organization. You have successfully created the database objects for the organization but now all eyes turn on you as you have to define what sort of information the objects store which you have created. As a life saver of your organization you come up with the idea of creating fields to store different types of data.

Create Fields on Tenant object

1. While still on your salesforce account, navigate to the gear icon present in the top right corner. You will notice Setup and click on setup.
2. You will now be navigated to the setup page, and click on object manager and search for object "Tenant".
3. Click on "Fields & Relationships" in the left panel.



1. Click on New and choose the data type Phone and first name : Phone Number.
2. Click next and fill the following details in the mentioned.



Click Next, Next and click on “Save and New”.

- Note : Repeat the same steps to create the fields :

S No	Field Label	Data Type
1	Address	Text Area(255)
2	PAN Card	Text
3	Date of Reg	Date
4	Email	Email
5	GST No	Text
6	Registered License No	Text
7	Shop Act license No	Text
8	Status of possession	Pick List Pending Hand Overed Renewal Needed Closed

Create Validation Rules for Tenant Object :

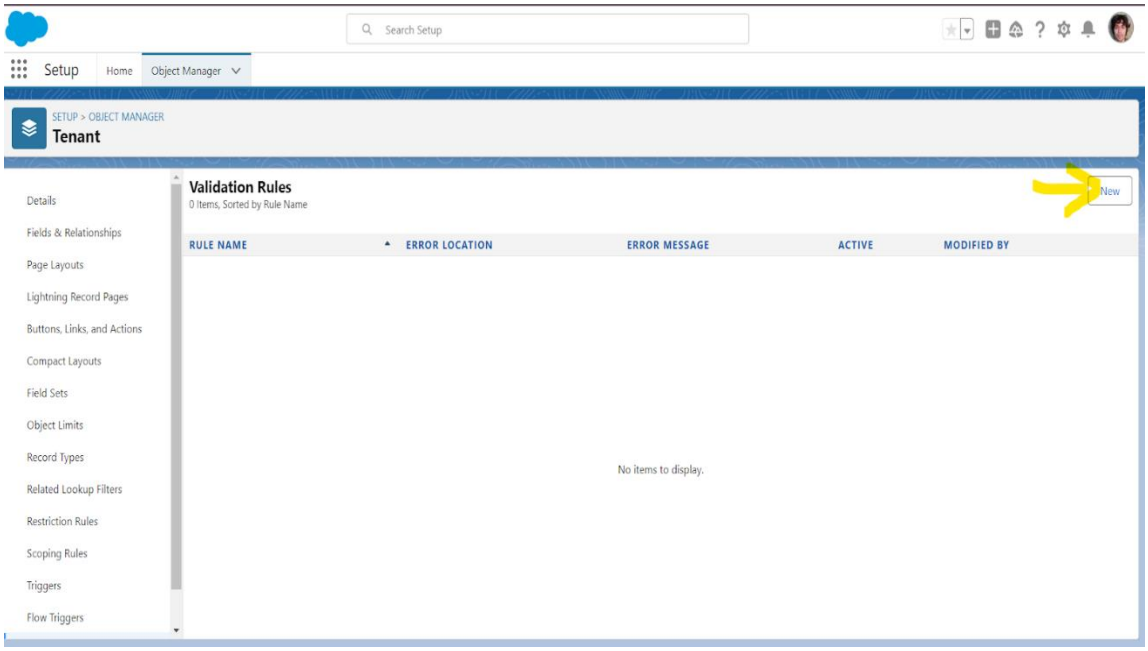
A) Create validation rule for Phone Number -

Note:- check if the Phone Number is valid having 10 digits if not then show error.

1] Go to setup ==> click on Object Manager ==> type object name(Tenant) in quick find bar==>click on the object.

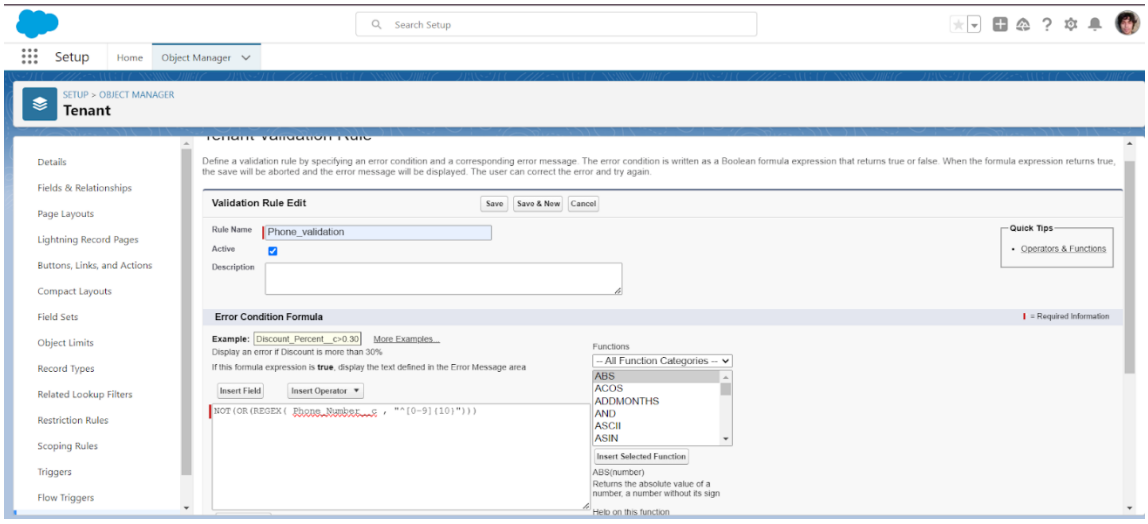
2] Click on the validation rule ==> click New.

3] Enter the Rule name as “Phone Validation “.

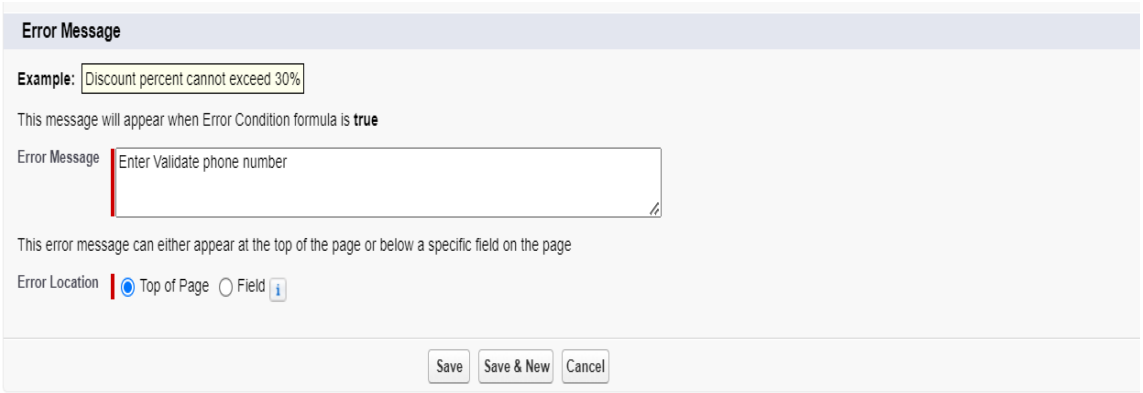


4] Insert the Error Condition Formula as : -

NOT(OR(REGEX(Phone_Number__c , "^[0-9]{10}")))



5] Enter the Error Message as “Enter Valid 10 digit Phone number”, select the Error location as Field and select the field as “Phone Number”, and click Save



B) Create Validation rule for Date of Reg :

Note:- check if the DateofReg is valid and is not a Date in the past.

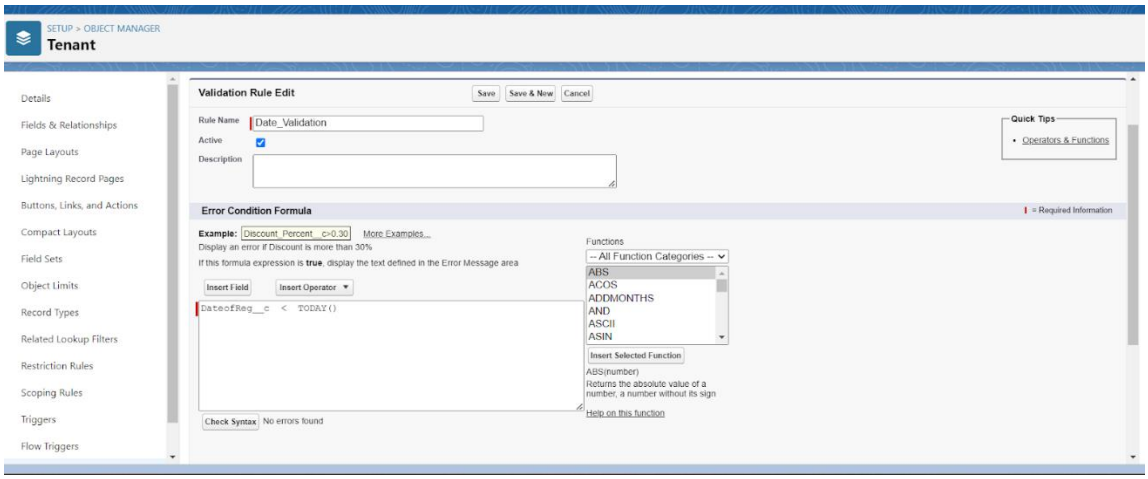
1] Go to setup ==> click on Object Manager ==> type object name(Tenant) in quick find bar==> click on the object.

2] Click on the validation rule==> click New.

3] Enter the Rule name as “Date Validation “.

4] Insert the Error Condition Formula as : -

5] Formula : DateofReg__c < TODAY()



6] Enter the Error Message as “Enter Valid Date”, select the Error location as Field and select the field as “DateOfReg”, and click Save.

Create fields on Lease Tracking Object -

NOTE : - Fields in lease Tracking objects are as follow below data types:

S No	Field Label	Data Type
1	Related Tenant	Master Detail Relationship (Related to - Tenant)
2	Date of Possession	Date
3	End Date of Possession	Date
4	Total Year of Contract	Number
5	Total rent(Yearly)	Number
6	Amount Paid	Number
7	Amount to be paid	Formula field (Total Rent - Amount Paid) Return Data Type- Number

Create Validation Rule For Lease Tracking Object :

A) Create Validation rule on Date of Possession-

Note:- check if the Date of Possession is after 60 days from today or not if not then show error.

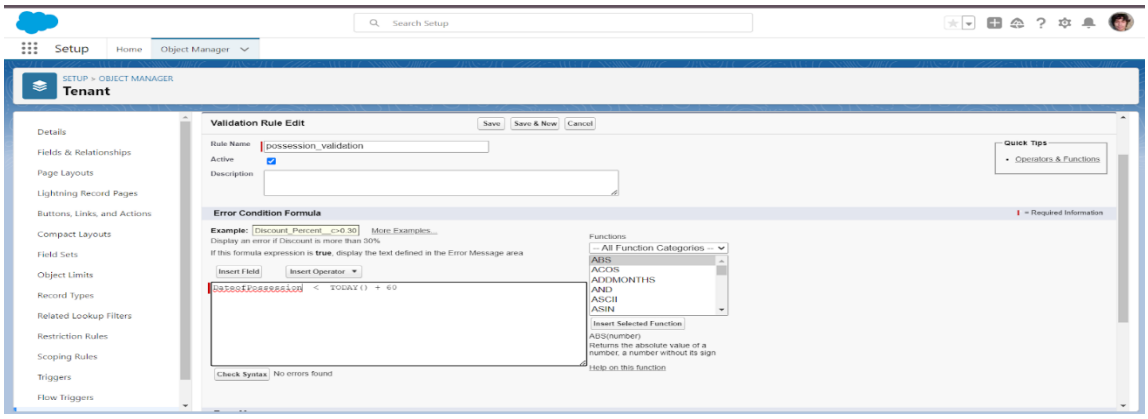
1] Go to setup ==> click on Object Manager ==> type object name(Lease tracking) in quick find bar==>click on the object.

2] Click on the validation rule ==> click New.

3] Enter the Rule name as “Possession Validation“.

4] Insert the Error Condition Formula as : -

5] Formula : Date of Possession < TODAY() + 60



6] Enter the Error Message as “Enter a date after 60 days ”, select the Error location as Field and select the field as “DateofPossession”, and click Save.

Create fields on Tenant Issues

NOTE : Fields in lease Tenant Issues are as follow below data types-

S No	Field Label	Data Type
1	Related tenant	Master Detail Relationship (Related to - Tenant)
2	Issue Related to	Multi Select Picklist 1) ELECTRICITY 2) INFRASTRUCTURE 3) PLUMBING 4) RENT 5) OTHER
3	Subject	Text Are (long)
4	Phone Number	Number
5	Status	Pick List 1. Not contacted 2. Open 3. In progress 4. Working 5. closed
6	Priority	Picklist 1. Low 2. Medium 3. High

7	Origin	Picklist 1. Phone 2. Mail 3. Web
8	Email id	Email
9	Date	Date (Default Value - Today())

Create the Lightning App :

An app is a collection of items that work together to serve a particular function. In Lightning Experience, Lightning apps gives users access to sets of objects, tabs, anitems all in one convenient bundle in the navigation bar.

Lightning apps let you brand your apps with a custom color and logo. You can even include a utility bar and Lightning page tabs in your Lightning app. Members of your org can work more efficiently by easily switching between apps.

There are two types of Salesforce Applications:

- Standard Apps
- Custom Apps

Standard Apps:

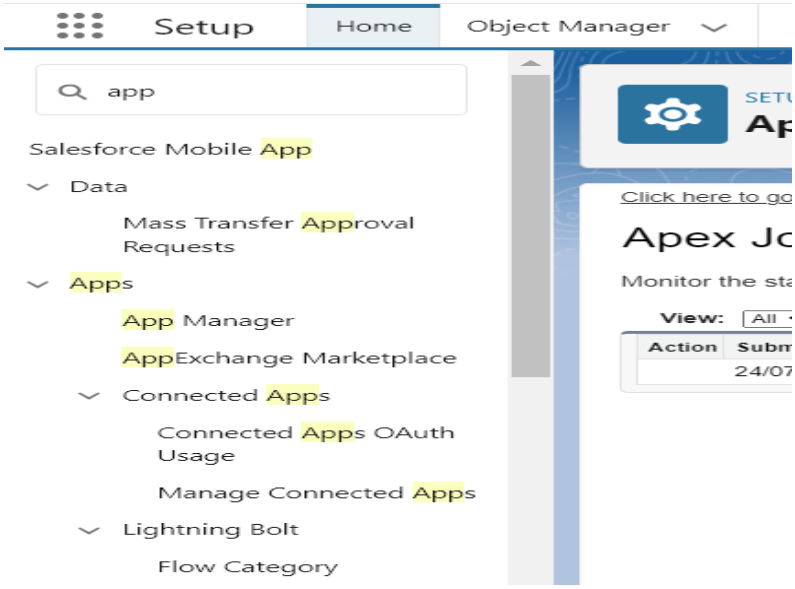
Standard apps come with every occurrence of Salesforce as default. Community, Call Center, Content, Sales, Marketing, Salesforce Chatter, Site.com, and App Launcher are included in these apps. The description, logo, and label of a standard app cannot be altered.

Custom Apps:

Custom apps are created according to the needs of a company. They can be made by putting custom and standard tabs together. Logos for custom apps can be changed.

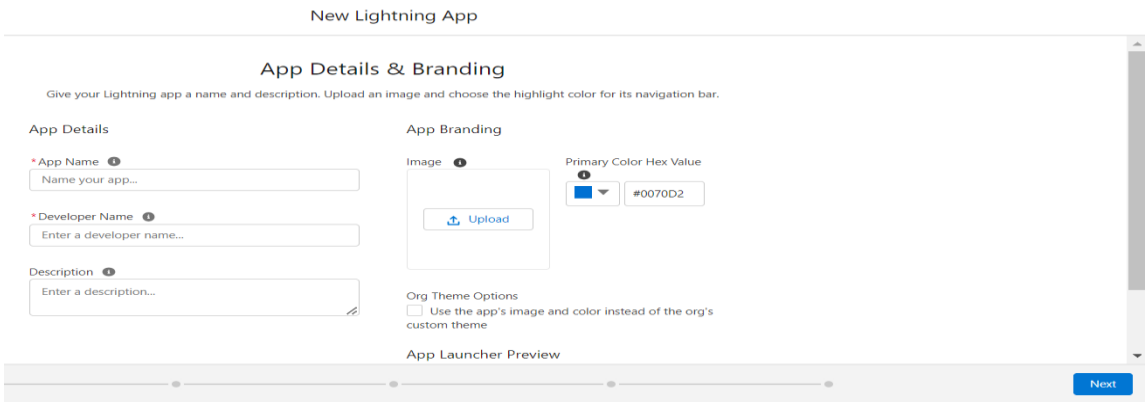
Steps to create custom app in salesforce

1. Go to setup, by clicking the gear icon present in the top right corner.
2. Navigate to the Home bar and in the quick find box, search for App.



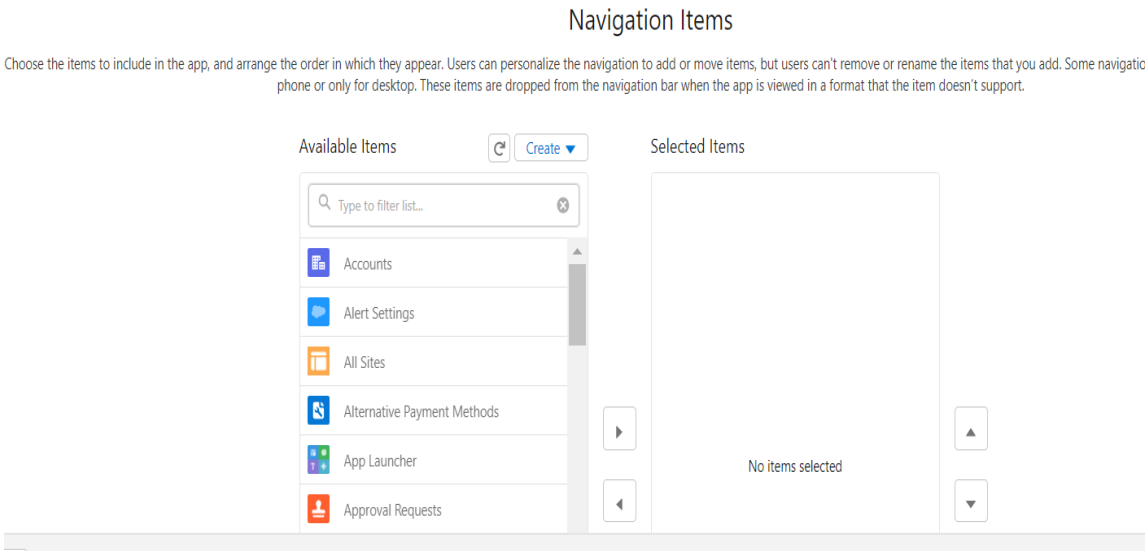
3. Click on APP MANAGER.

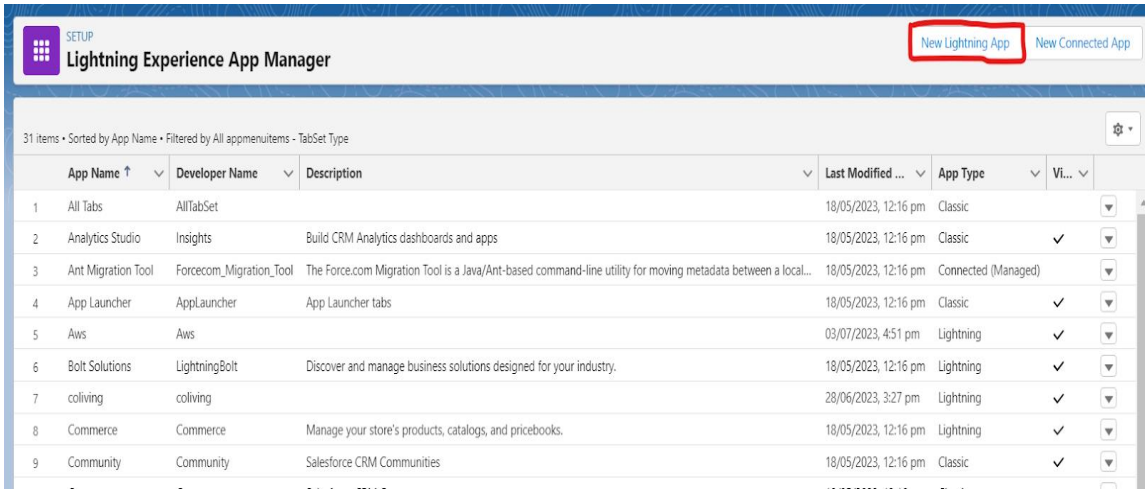
4. You can notice the screen like this. Now click on New Lightning App.You will find like this below.



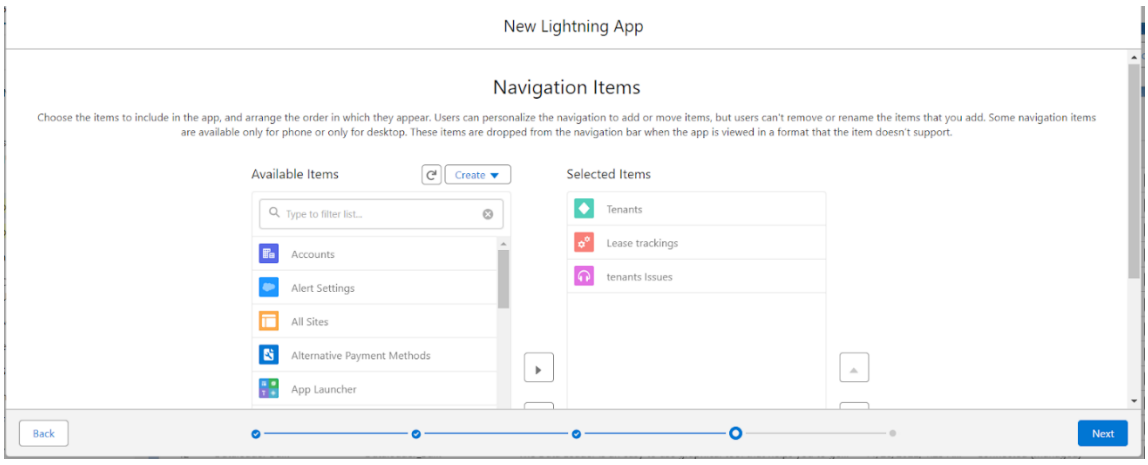
5. Enter the App name(Here we entered ‘SmartMall’),the developer name gets automatically populated. If an image is required, you can browse the image and upload it.

6. Click Next, Next and you can see a Navigation Items window like this:



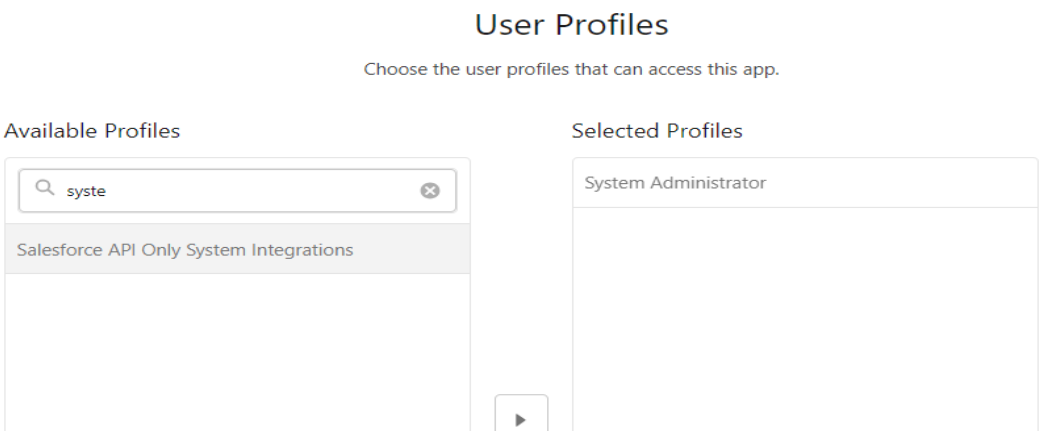


7. In the filter list, enter Tenant , Lease Tracking, Tenant issues and move them in the Selected items from Available items.



1. Click on Next , and you can see User Profiles. This option is used when we want only certain profiles to access them.
2. Enter System Administrator in the filter box and add the system Administrator to the

selected profile list.



3. Click on Save and Finish.

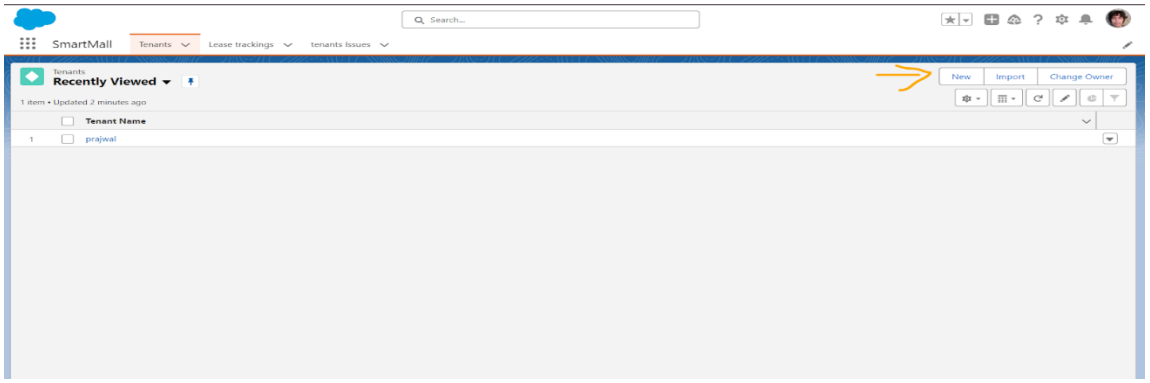
4. Now navigate to the App launcher and search for SmartMall and you can find the SmartMall app.

Record Insertion

Creating records in Salesforce is a fundamental and essential activity that serves multiple purposes, contributing to the effective management of data, streamlined processes, and overall success of an organization.

Inserting Records in Tenant Object

1) Click on the App Launcher and search Tenant Object then click New in the right corner to create a record.

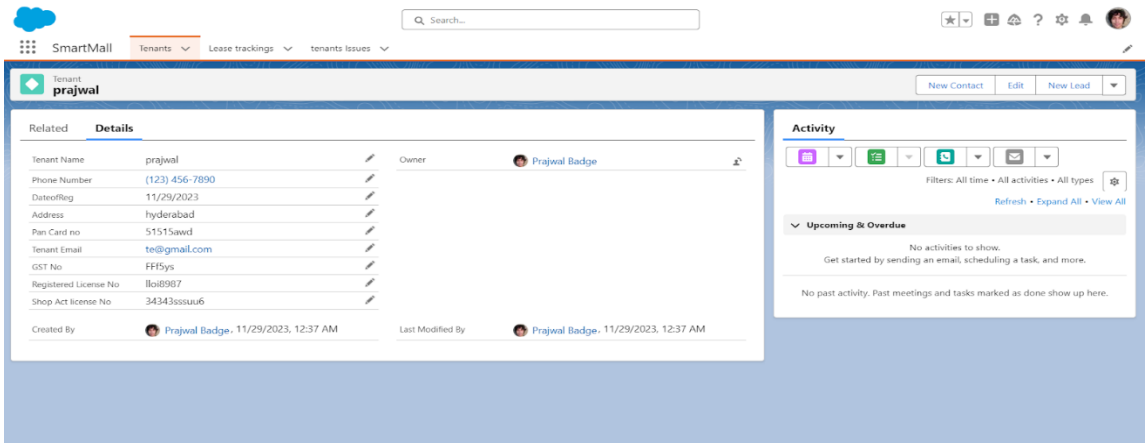


2) Fill every field with valid data, especially the fields on which you have created a validation rule.

3) If you Enter Phone Number more or less than 10 digits it will show an error.

4) Similarly, if you enter DateofReg a Past date it will show an error.

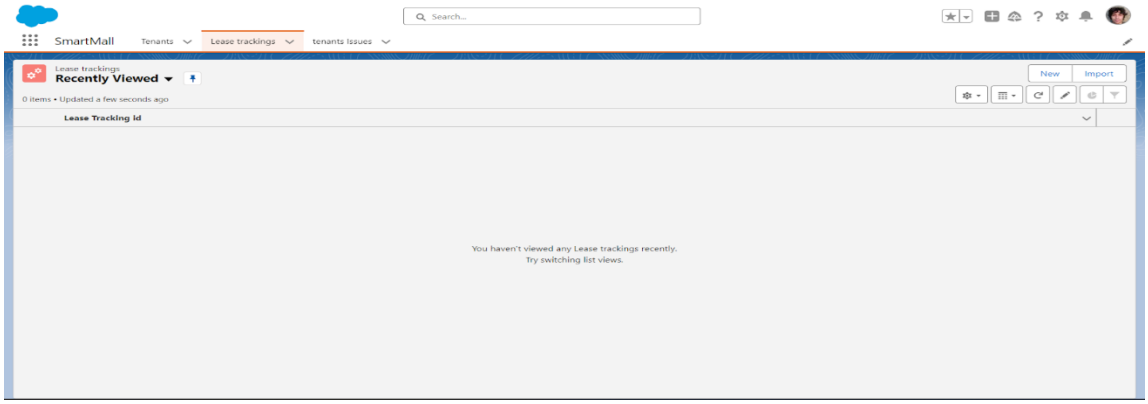
5) After creating a record the page will look like this



[Note]: Create at least 10 records in the tenant object.

Inserting Records in Lease Tracking Object

1) Click on the App Launcher and search Lease Tracking Object then click New in the right corner to create a record.

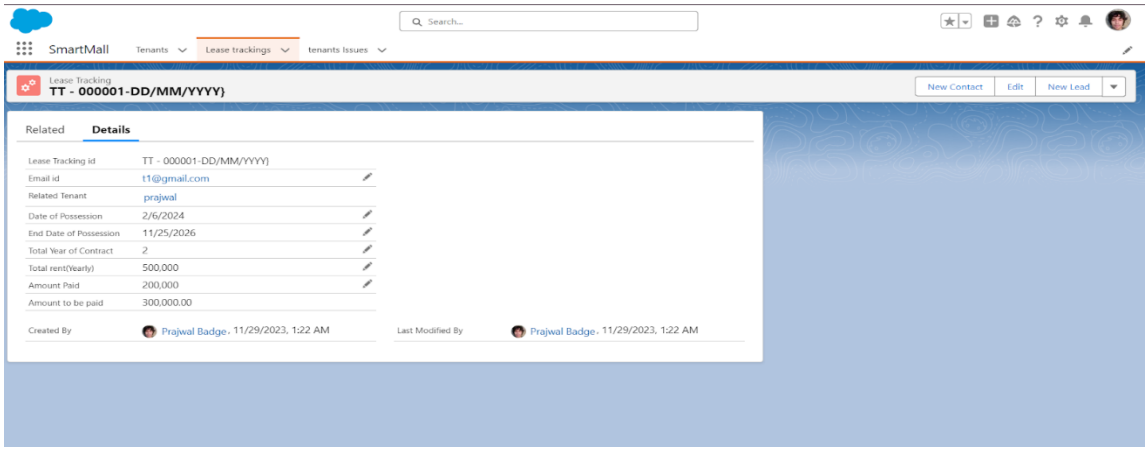


2) Fill every field with valid data, especially the fields on which you have created a validation rule and Give each tenant related to each lease tracking.

3) If you Enter Date before the next 60 days it will show an error.

4) Similarly, if you enter Total rent and Amount Paid the Amount to be paid formula field will be added directly.

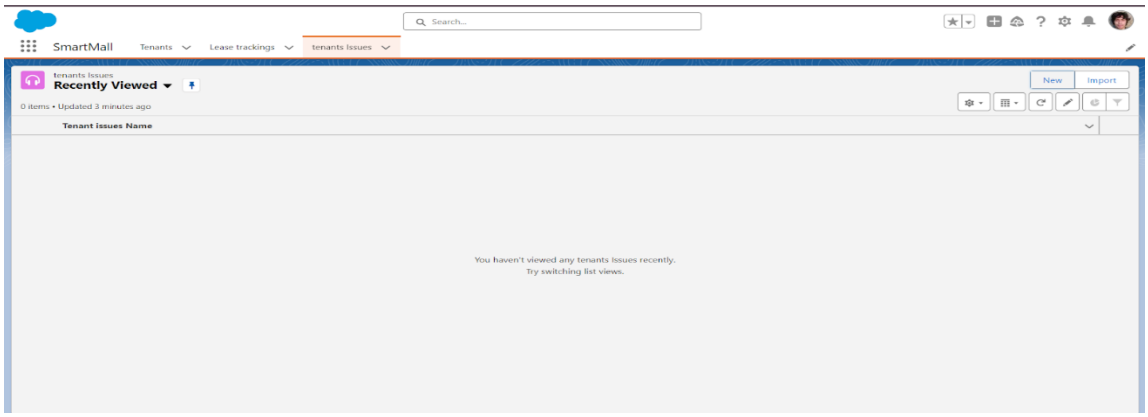
5) After creating a record the page will look like this



[Note]: Create at least 10 records in the Lease Tracking object.

Inserting Records in Tenants Issues object

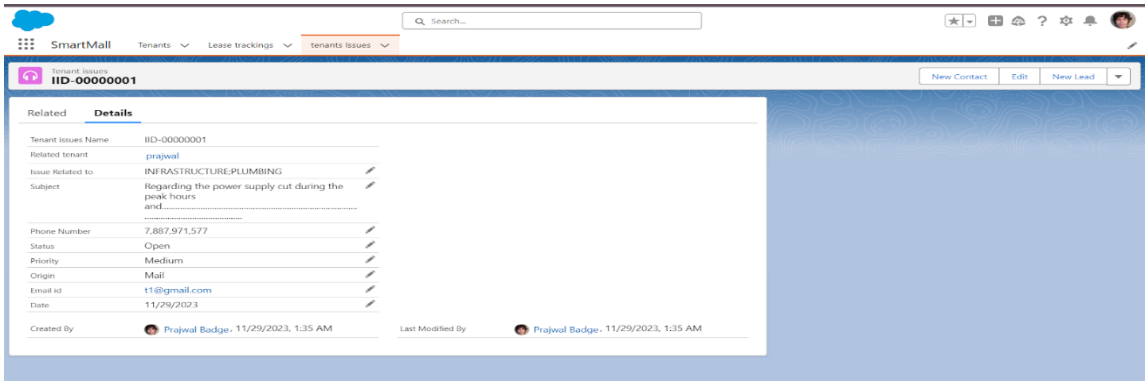
1) Click on the App Launcher and search Tenant Issues Object then click New in the right corner to create a record.



2) Fill every field with valid data.

3) Give each tenant related to each issue.

5) After creating a record the page will look like this



Note]: Create at least 10 records in the tenants issues object.

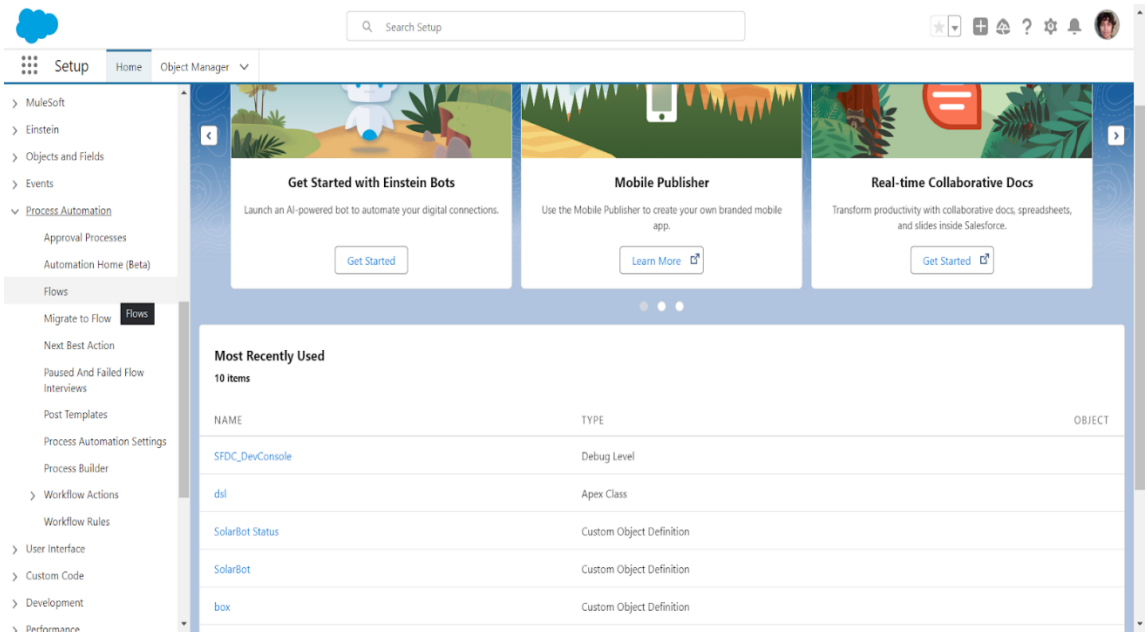
Create Flows :

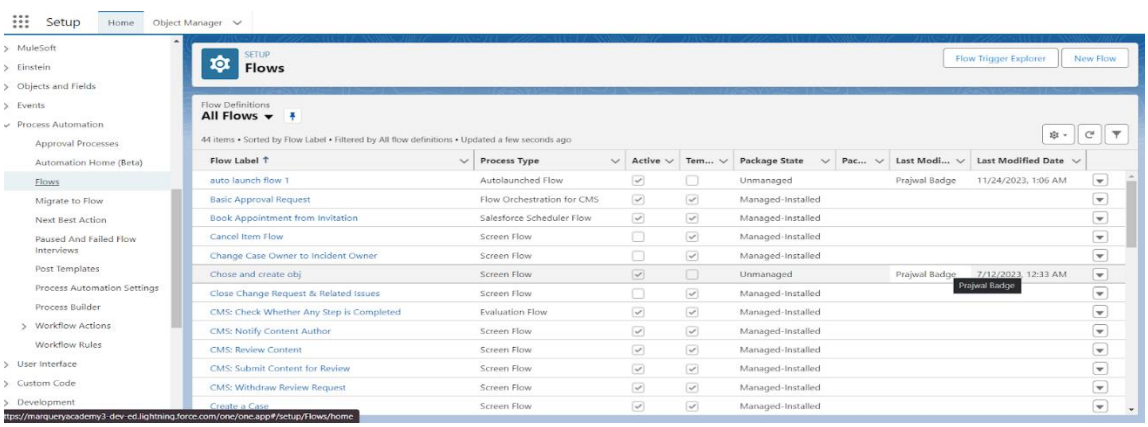
In Salesforce, a Flow is a powerful tool that allows users to automate complex business processes by orchestrating and automating sequences of tasks, data manipulations, and user interactions. Flows are designed through a visual interface, making them accessible to users with varying technical expertise.

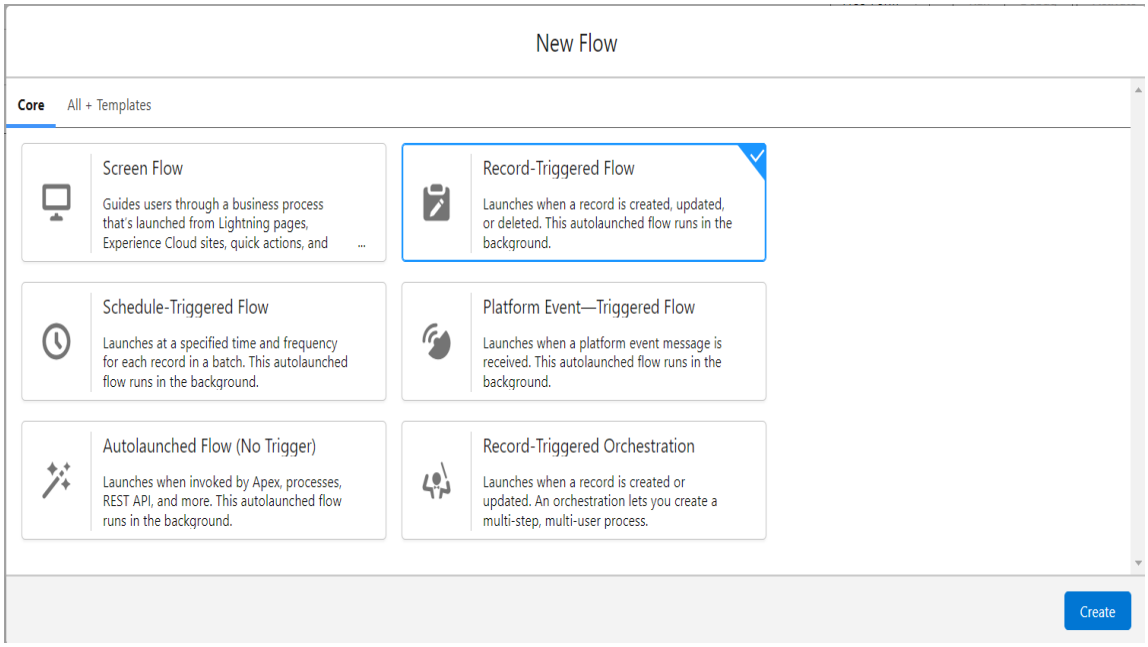
Create a Record Triggered flow on tenant Object :

Whenever tenant record is created and the GST No field in tenant Object is empty a mail should be sent to the tenant requesting the GST No.

1) To create a flow click on setup==> Flow ==> Click on New Flow==> Select Record Triggered Flow


Search Setup
Setup
Home
Object Manager
MuleSoft
Einstein
Objects and Fields
Events
Process Automation
Approval Processes
Automation Home (Beta)
Flows
Migrate to Flow
Next Best Action
Paused And Failed Flow Interviews
Post Templates
Process Automation Settings
Process Builder
Workflow Actions
Workflow Rules
User Interface
Custom Code
Development
Get Started with Einstein Bots
Launch an AI-powered bot to automate your digital connections.
Get Started
Mobile Publisher
Use the Mobile Publisher to create your own branded mobile app.
Learn More
Real-time Collaborative Docs
Transform productivity with collaborative docs, spreadsheets, and slides inside Salesforce.
Get Started
Most Recently Used
10 items
NAME
TYPE
OBJECT
SFDC_DevConsole
Debug Level
dsl
Apex Class
SolarBot Status
Custom Object Definition
SolarBot
Custom Object Definition
box
Custom Object Definition


Setup
Home
Object Manager
SETUP
Flows
Flow Trigger Explorer
New Flow
Flow Definitions
All Flows
44 items • Sorted by Flow Label • Filtered by All flow definitions • Updated a few seconds ago
Flow Label
Process Type
Active
Package State
Last Modified Date
auto launch flow 1
Autolaunched Flow
Unmanaged
11/24/2023, 1:06 AM
Basic Approval Request
Flow Orchestration for CMS
Managed-Installed
Book Appointment from Invitation
Salesforce Scheduler Flow
Cancel Item Flow
Screen Flow
Change Case Owner to Incident Owner
Chose and create obj
Close Change Request & Related Issues
CMS: Check Whether Any Step is Completed
Evaluation Flow
CMS: Notify Content Author
CMS: Review Content
CMS: Submit Content for Review
CMS: Withdraw Review Request
Create a Case
Prajwal Badge

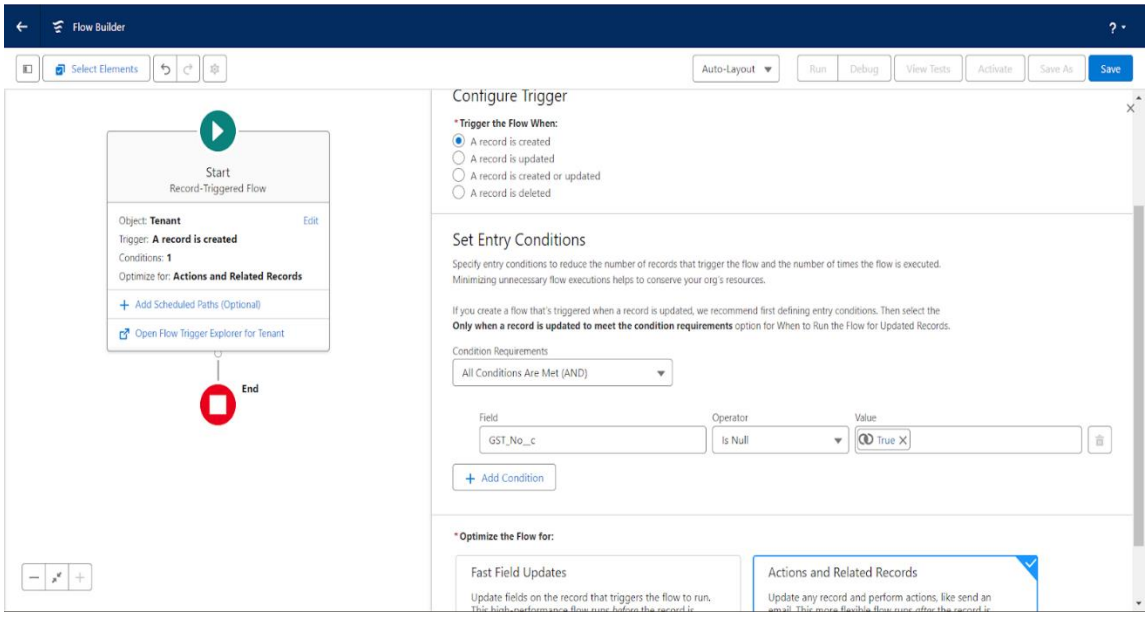

New Flow
Core
All + Templates
Screen Flow
Guides users through a business process that's launched from Lightning pages, Experience Cloud sites, quick actions, and ...
Record-Triggered Flow
Launches when a record is created, updated, or deleted. This autolaunched flow runs in the background.
Schedule-Triggered Flow
Launches at a specified time and frequency for each record in a batch. This autolaunched flow runs in the background.
Platform Event—Triggered Flow
Launches when a platform event message is received. This autolaunched flow runs in the background.
Autolaunched Flow (No Trigger)
Launches when invoked by Apex, processes, REST API, and more. This autolaunched flow runs in the background.
Record-Triggered Orchestration
Launches when a record is created or updated. An orchestration lets you create a multi-step, multi-user process.
Create

2) In Trigger the flow when Select A record is created

3) Select Condition required All Conditions are met (AND)

4) Select Field - GST_No__c , Operator - Is Null , Value - True.

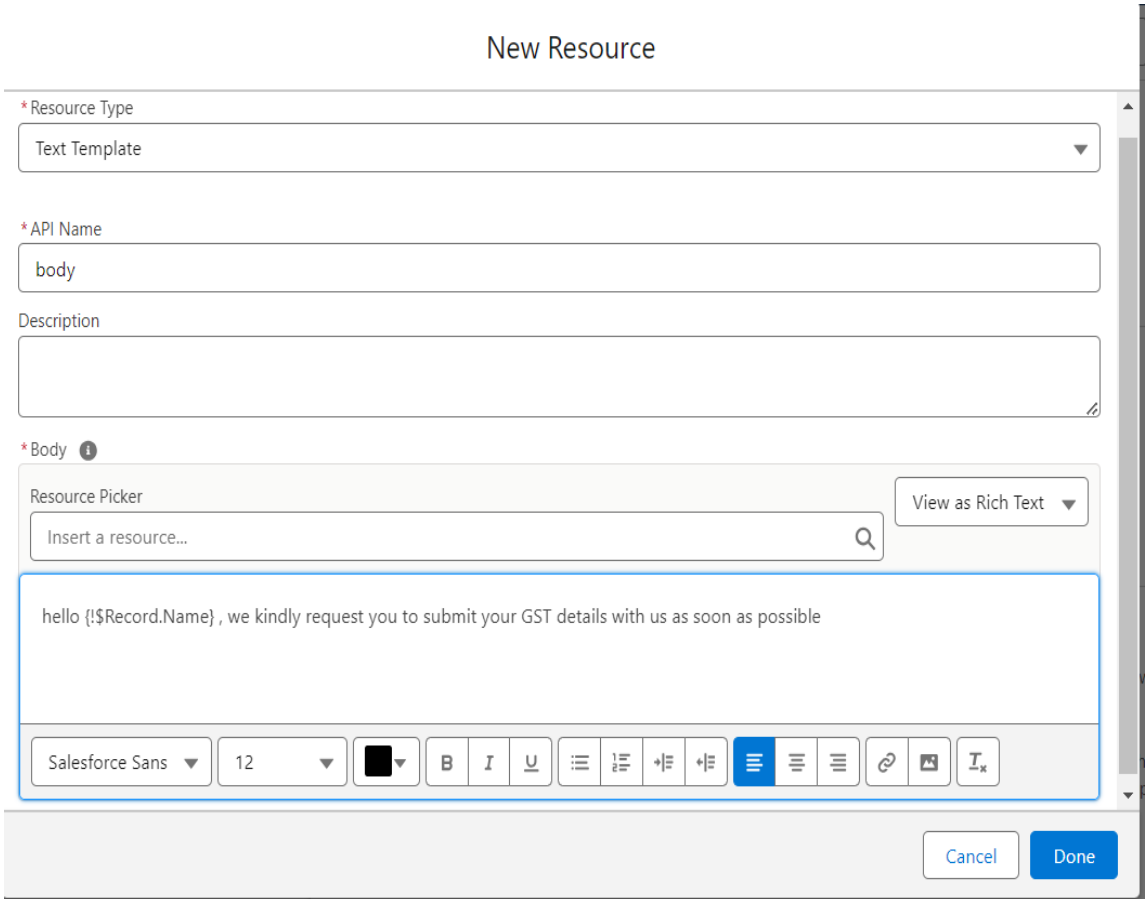
5) Optimize the Flow for: Actions and Related Records



6)Add Element and choose ACTION in the search bar Search Send Email.

7) Label Name - Send email for Gst no, Description - This email is to alert the tenant that he or she has not submitted the GST NO yet.

8) Include Body And Create a Resource - Text Template As below-



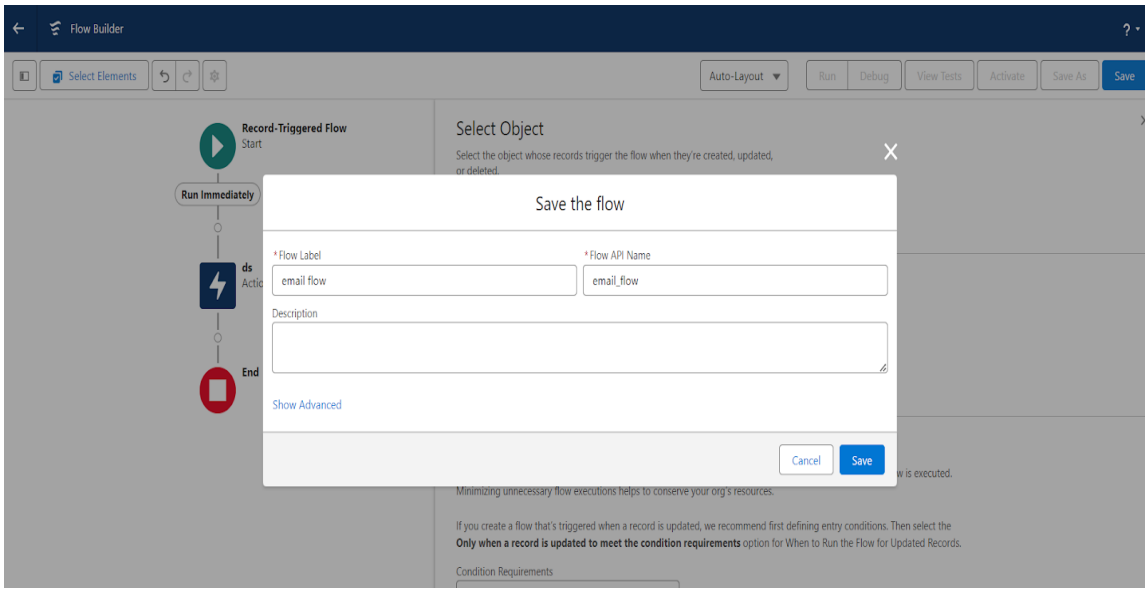
9) Include Recipient ID and from profile select tenant Email id.

10) Include Subject and enter - Regarding your GST Details

11) Click on Save and Name the Flow as Email Flow for tenant and Save.

12) Activate the flow.

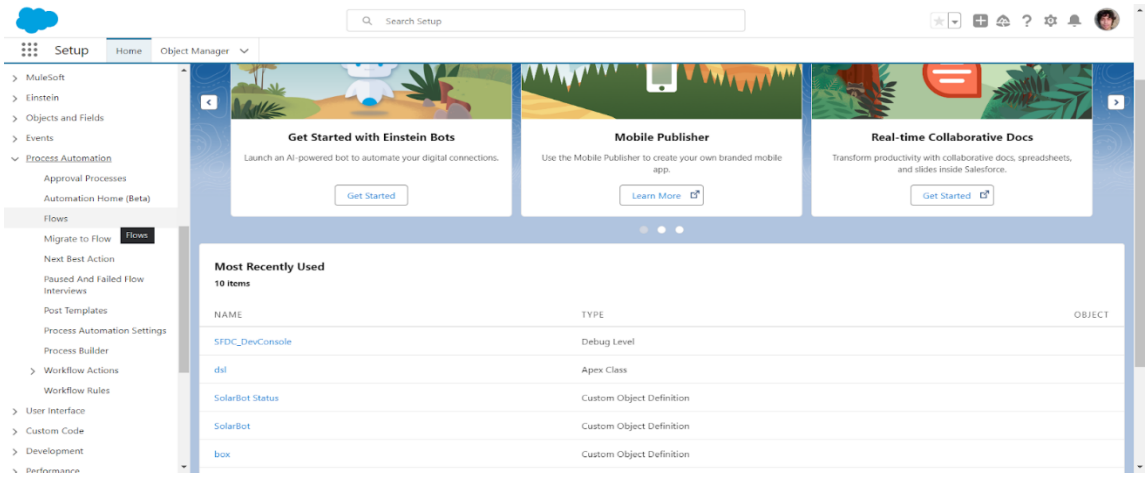

Record-Triggered Flow
Start
Run Immediately
Send email for gst no
Action
End

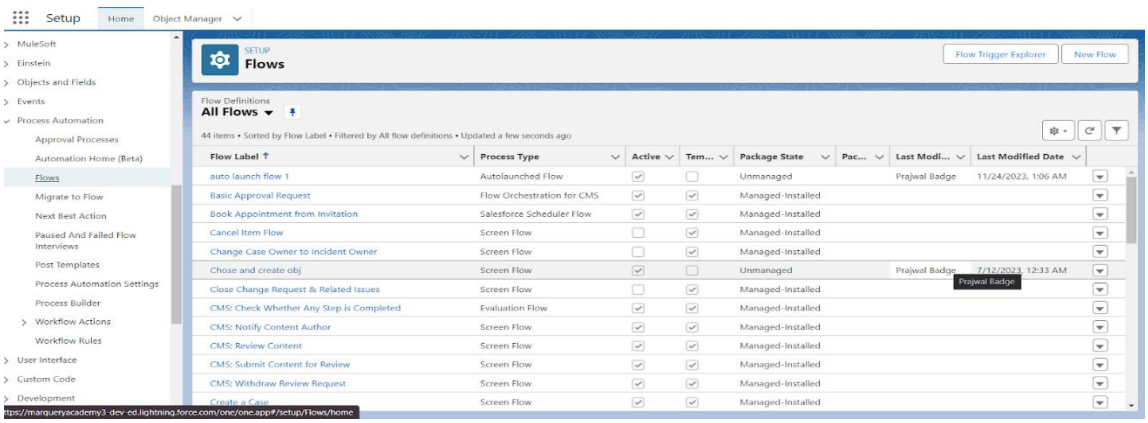

Flow Builder
Select Elements
Auto-Layout
Run
Debug
View Tests
Activate
Save As
Save
Record-Triggered Flow
Start
Run Immediately
End
Select Object
Select the object whose records trigger the flow when they're created, updated, or deleted.
Save the flow
* Flow Label
email flow
* Flow API Name
email_flow
Description
Show Advanced
Cancel
Save
Minimizing unnecessary flow executions helps to conserve your org's resources.
If you create a flow that's triggered when a record is updated, we recommend first defining entry conditions. Then select the
Only when a record is updated to meet the condition requirements option for When to Run the Flow for Updated Records.
Condition Requirements

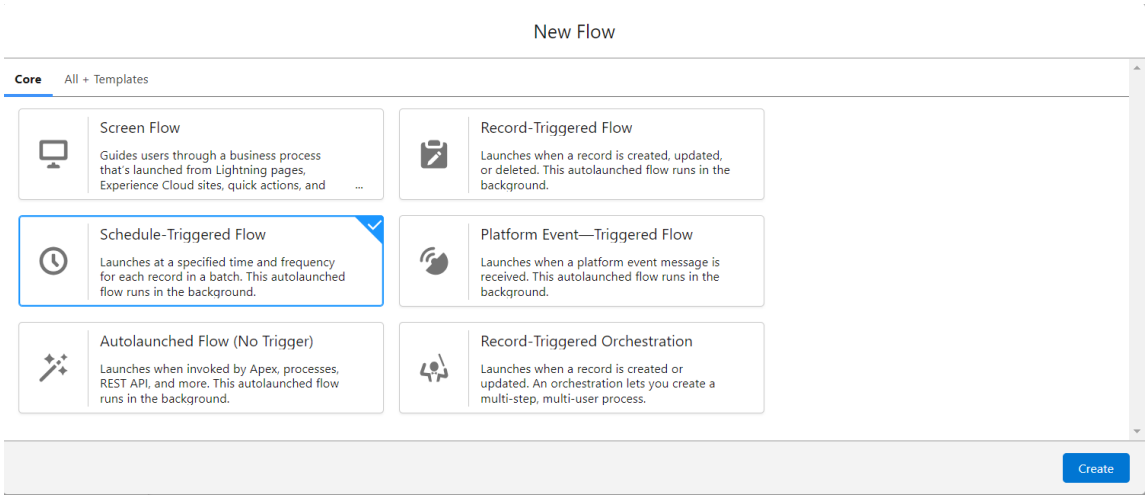
Create a Schedule Flow on Lease Management Object :

If the End Date is within Next 1 year create a task to the Lease tracking weekly on every Monday.

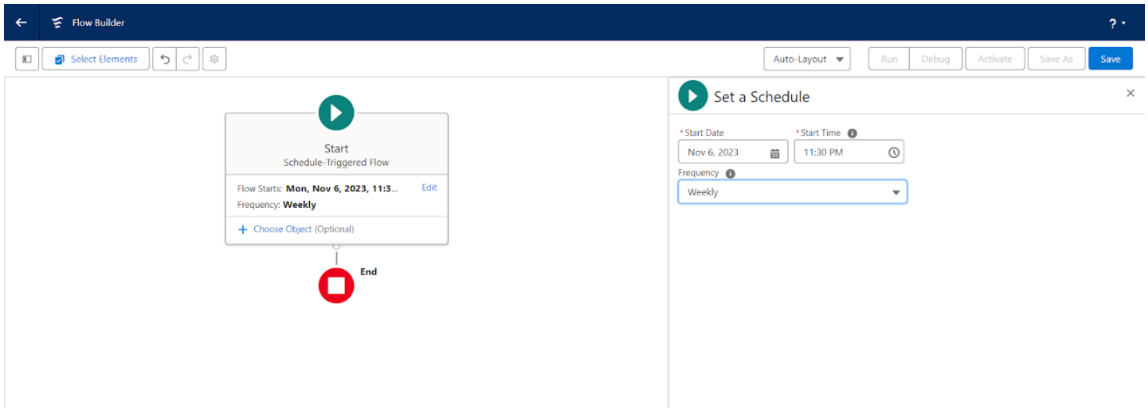
1) To create a flow click on setup ==> Flow ==> Click on New Flow==> Select Schedule-Triggered Flow







2) Set the Schedule Date - Any Monday , Time - 11.30, Frequency - Weekly.

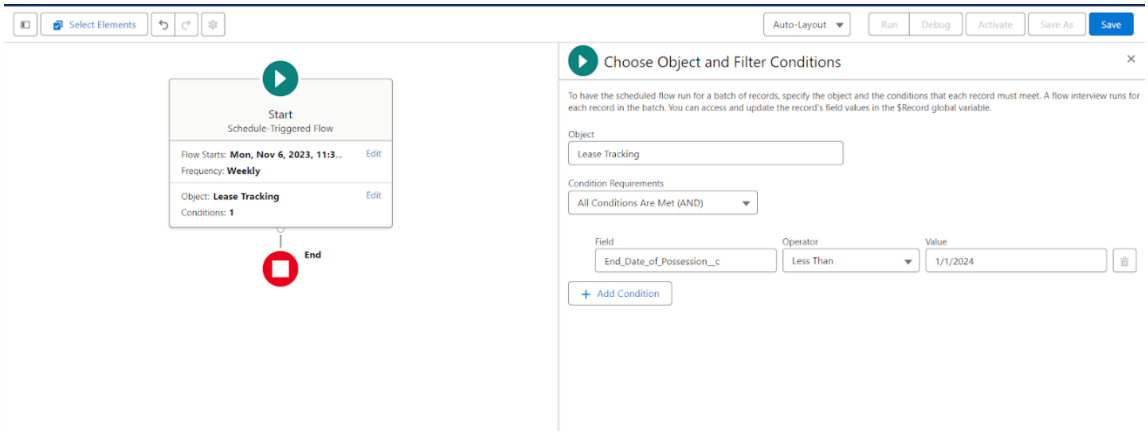


3) Choose Object as Lease Tracking , Condition Requirements - All Conditions are met(AND)

4) Enter field as End_Date_of_Possession__c

5) Operator - Less than

6) Value - 1/1/2024

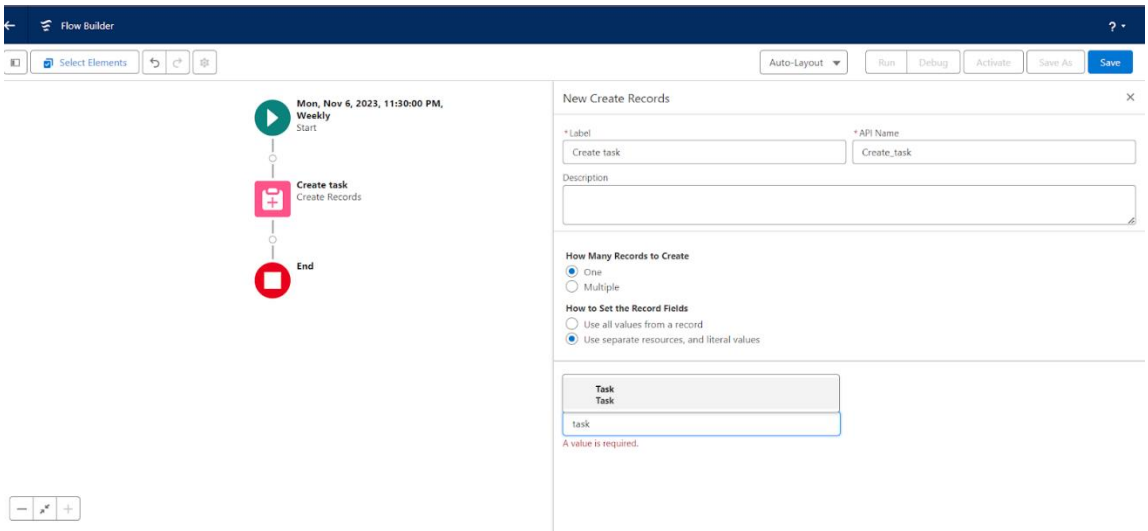


7) Create a Record give labe as Create task

8) How many Records to create - one

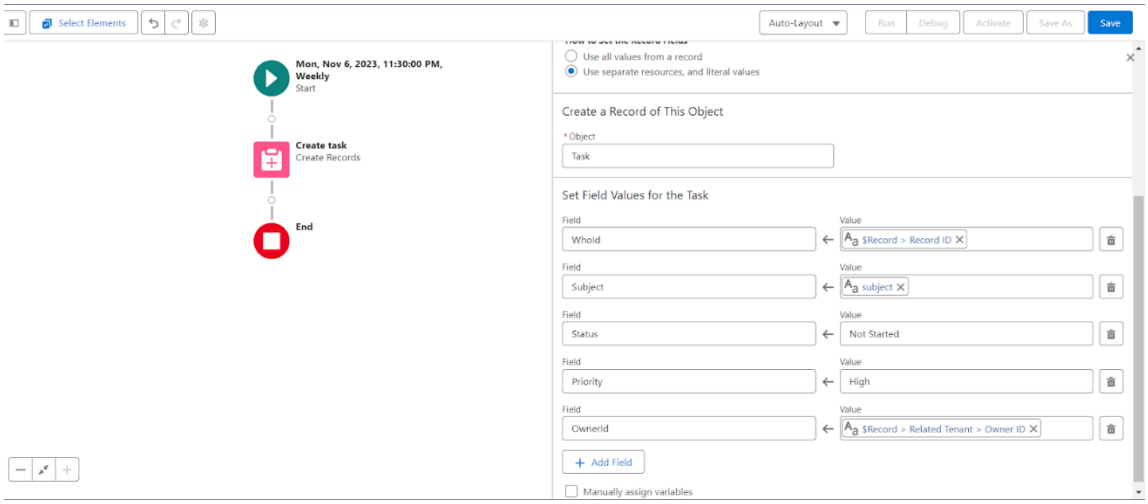
9) How to Set the Record Fields - Use Separate Values

10) object - Task



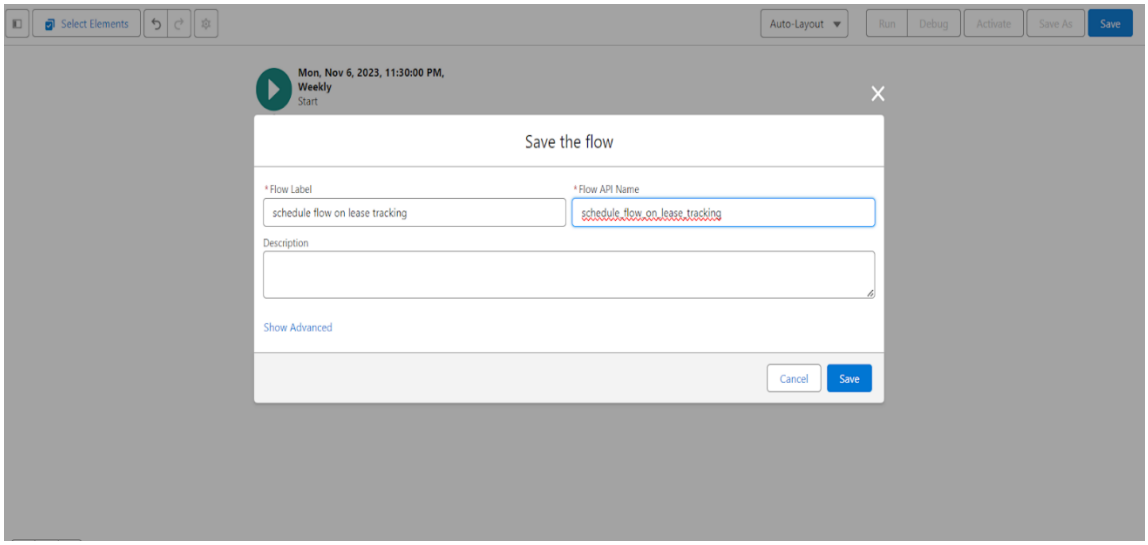
11) Select the field and map them as below : -

12) Subject of the Task - your possession is going to end soon. Please Contact with Manager to renew your Possession or to End the contract.



13) Save the flow and label it as ‘ schedule flow on lease tracking’

14) Activate the flow.



CODING :

Apex Triggers

A trigger is a set of Apex code that runs before or after DML(Data Manipulation Language) events.

A DML event could be a variety of data processing tasks that include the standard insert, update, and delete commands.

With Apex triggers, you can automate tasks that would otherwise be nearly impossible to accomplish using only the Salesforce user interface. Triggers enable you to create custom scripts that you can implement according to your needs, and the only limitation is your coding skills.

There are two Salesforce Apex trigger types:

Before triggers. These are helpful in cases that require a validation process before accepting a change. They run before any database changes. After triggers. These are helpful in cases where you need to modify your database records and when the necessary value is stored in other records. They run after any database changes. Both types will help you perform custom tasks and manage records effectively. They can help you perform bulk actions as they can handle several records simultaneously.

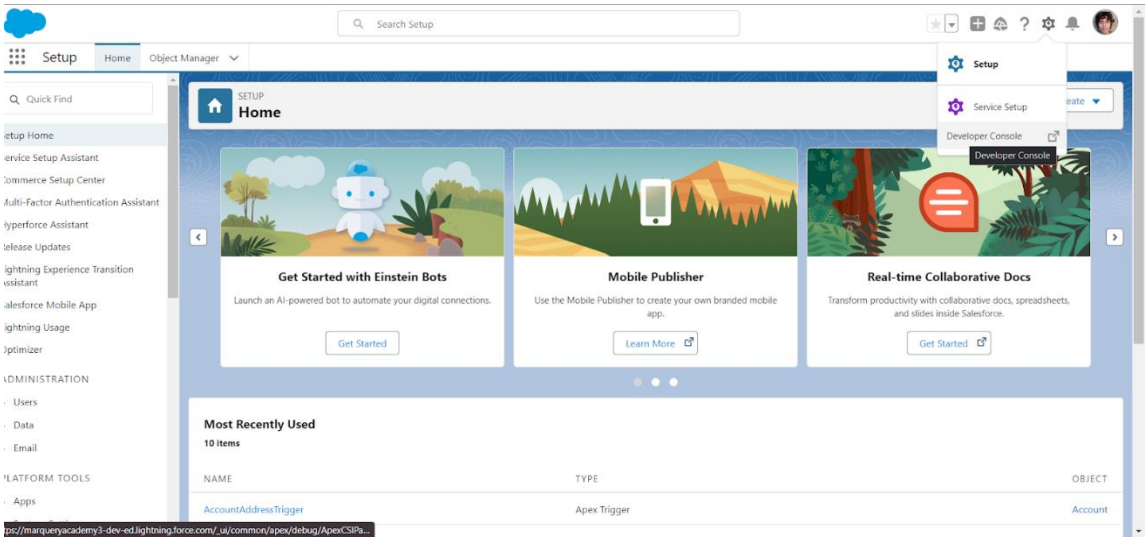
How to create a new trigger :

1. While still in the trailhead account, navigate to the gear icon in the top right corner.
2. Click on developer console and you will be navigated to a new console window.
3. Click on the File menu in the toolbar, and click on new Tigger.

Enter the trigger name and the object to be triggered.

Write an Apex Trigger on Tenant Object to Show error if the pan card is invalid.

1) Click on the gear icon and click on the developer console.



2) Click on file select New Apex Trigger

3) Name- TenantTrigger, Object - Tenant

4) Use Events - Before insert and Trigger context Variable - IsBefore

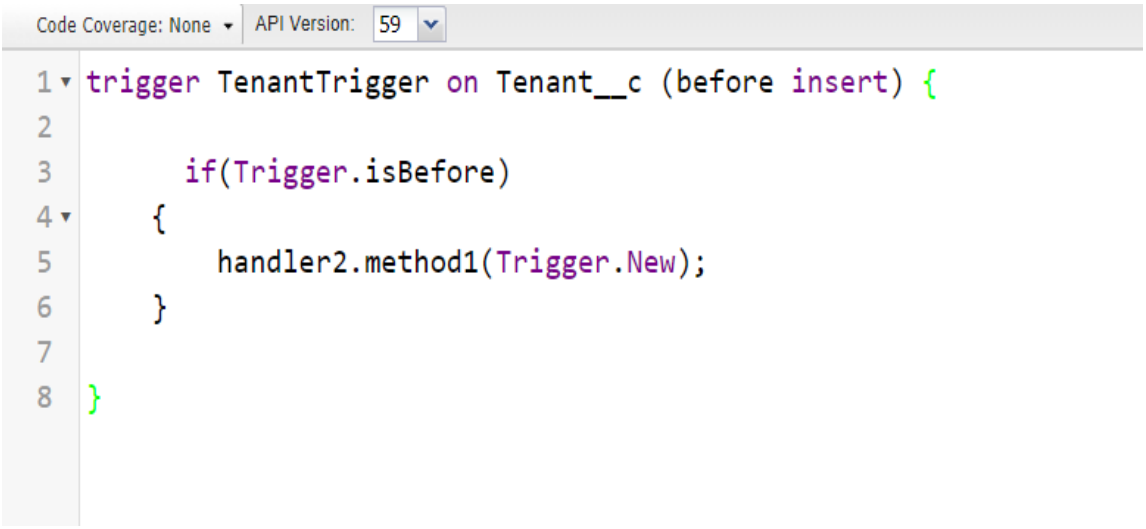
Trigger : -

CODE SNIPPET : -

```
trigger TenantTrigger on Tenant__c (before insert) {

    if(Trigger.isBefore)
  {
     TenantTriggerhandler.method1(Trigger.New);
  }
```

}



Trigger Handler : -

1) Create an apex class and Name it TenantTriggerhandler

CODE SNIPPET: -

```
public class TenantTriggerhandler {

    public static void method1(List<Tenant__c> te)
  {

    for(Tenant__c tenant : te)
    {
      if(tenant.Pan_Card_no__c.length() > 10)
      {
        tenant.addError('This Pan Card number is invalid, Please Enter Valid Pan Card number');
      }
    }
  }
```

}

```
public class TenantTriggerhandler {

        public static void method1(List<Tenant__c> te)
    {

         for(Tenant__c tenant : te)
        {
            if(tenant.Pan_Card_no__c.length() > 10)
            {
               tenant.addError('This Pan Card number is invalid, Please Enter Valid Pan Card number');
            }
        }
    }

}
```

Asynchronous Apex

Asynchronous Apex in Salesforce refers to a programming paradigm where code execution is detached from the immediate context and occurs independently, typically in the background. This approach is designed to handle long-running processes, heavy computations, or tasks that should not block user interactions.

Schedule Apex

Delete the Tenant Records Monthly whose Status Of Possession is closed.

1) Create a class with name tenantschedulable

2) Give extension Schedulable to the class.

3) Open the Anonymous Window.

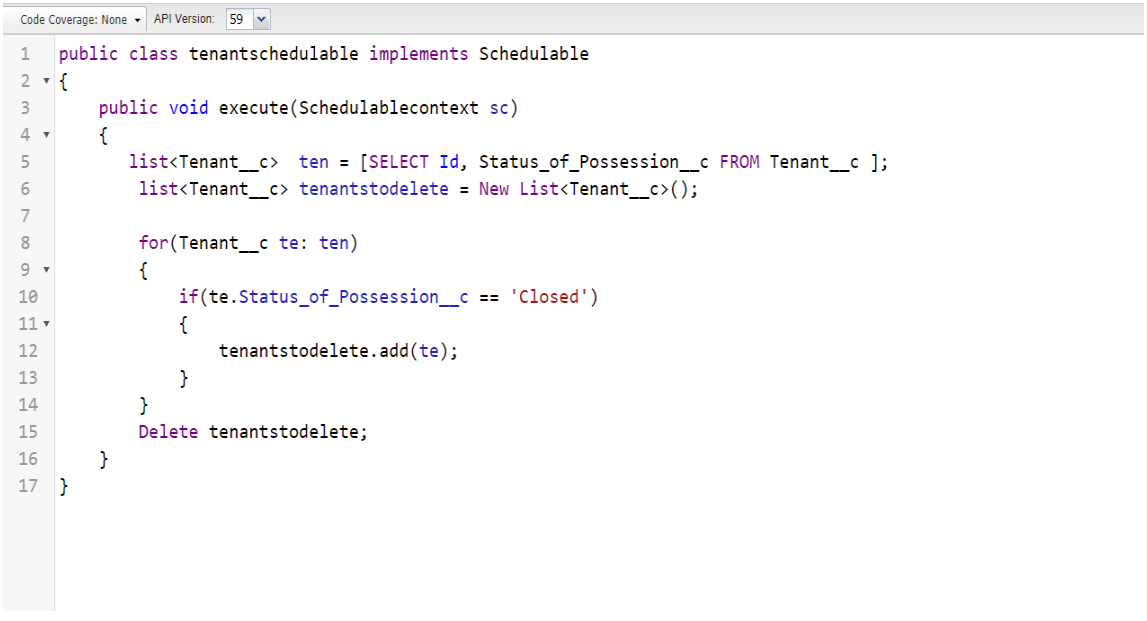
4) Schedule the class-

tenantschedulable a = new tenantschedulable();
string cron = '0 0 0 1 * ? * ';
system.schedule('Delete the records monthly', cron, a);

CODE SNIPPET : -

```
public class tenantschedulable implements Schedulable
{
public void execute(Schedulablecontext sc)
   {
      list<Tenant__c>  ten = [SELECT Id, Status_of_Possession__c FROM Tenant__c ];
       list<Tenant__c> tenantstodelete = New List<Tenant__c>();

       for(Tenant__c te: ten)
       {
          if(te.Status_of_Possession__c == 'Closed')
          {
             tenantstodelete.add(te);
          }
       }
       Delete tenantstodelete;
   }
}
```



Code Coverage: None API Version: 59

```
1  public class tenantschedulable implements Schedulable
2  {
3      public void execute(Schedulablecontext sc)
4      {
5         list<Tenant__c>  ten = [SELECT Id, Status_of_Possession__c FROM Tenant__c ];
6          list<Tenant__c> tenantstodelete = New List<Tenant__c>();
7
8          for(Tenant__c te: ten)
9          {
10             if(te.Status_of_Possession__c == 'Closed')
11             {
12                 tenantstodelete.add(te);
13             }
14         }
15         Delete tenantstodelete;
16     }
17 }
```


Enter Apex Code
1 tenantschedulable a = new tenantschedulable();
2 string cron = '0 0 0 1 * ? *';
3 system.schedule('Delete the records monthly', cron, a);
Open Log
Execute
Execute Highlighted

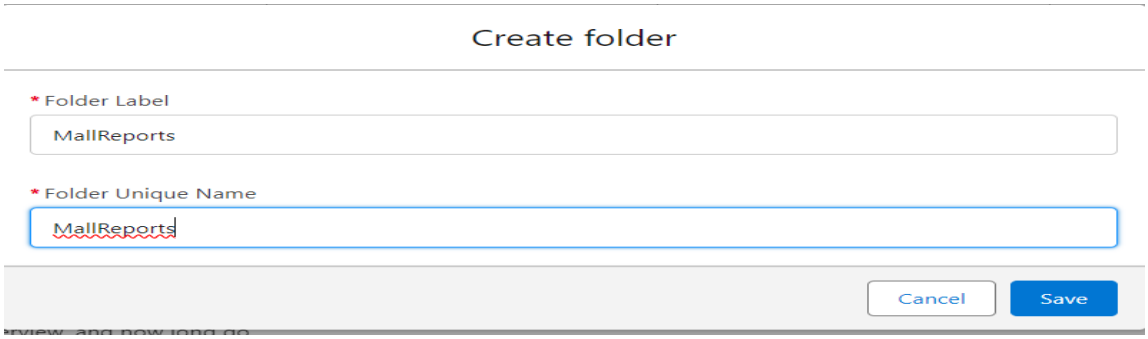
OUTPUT :

Salesforce Reports and Dashboards are powerful tools that empower users to visualize and analyze data within the Salesforce platform. They play a crucial role in providing insights, monitoring performance, and making informed business decisions.

Create a Report of lease Management Records

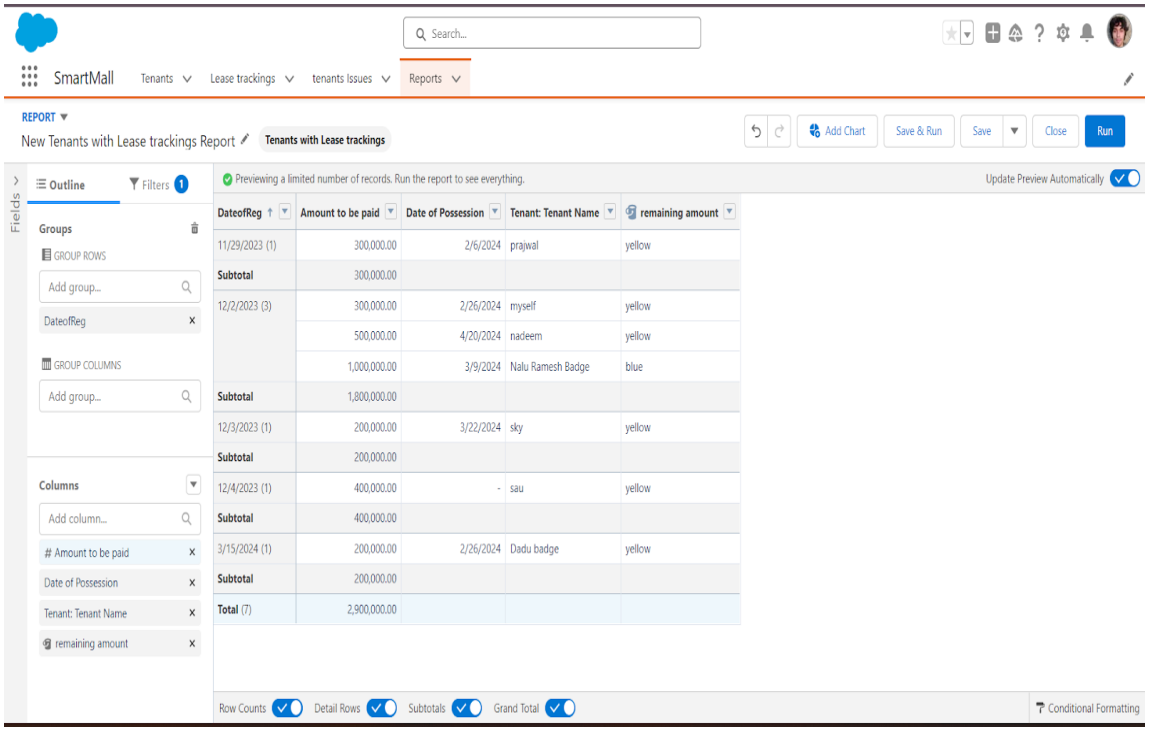
The Manager needs a report which shows the tenant and their joining date and their Remaining payment details and also group this by date of Registration, and make a bucket list of remaining amount as greater than 1000000 as red, less than 1000 and greater than 500000 as blue and less than equal to 500000 as yellow.

1) Create a new Folder and name it as MallReports



2) Click On new report ==> Select object Activities with LeaseTracking ==> Click on start report

3) Click on the Amount to be paid column and click on bucket this list and name it as Remaining amount

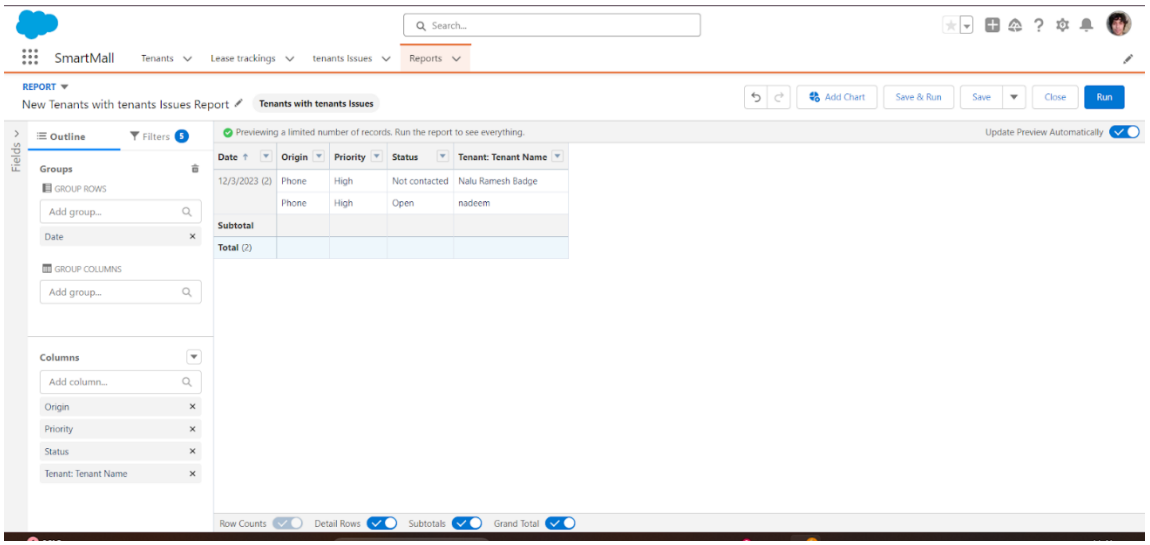


4) Save the report named as lease report and Save it in MallReports.

Create a Report on Tenant issue Records

Now the manager is asking for a report on issues which has not been contacted or Open yet and has high priority which are directly encountered by Phone and Mail and the date of issue is from last 7 days

1) Click On new report ==> Select object Activities with Tenant issue==> Click on start report



2) Click on save, enter Name - Issue Report

3) Choose the folder Mall Reports and save.

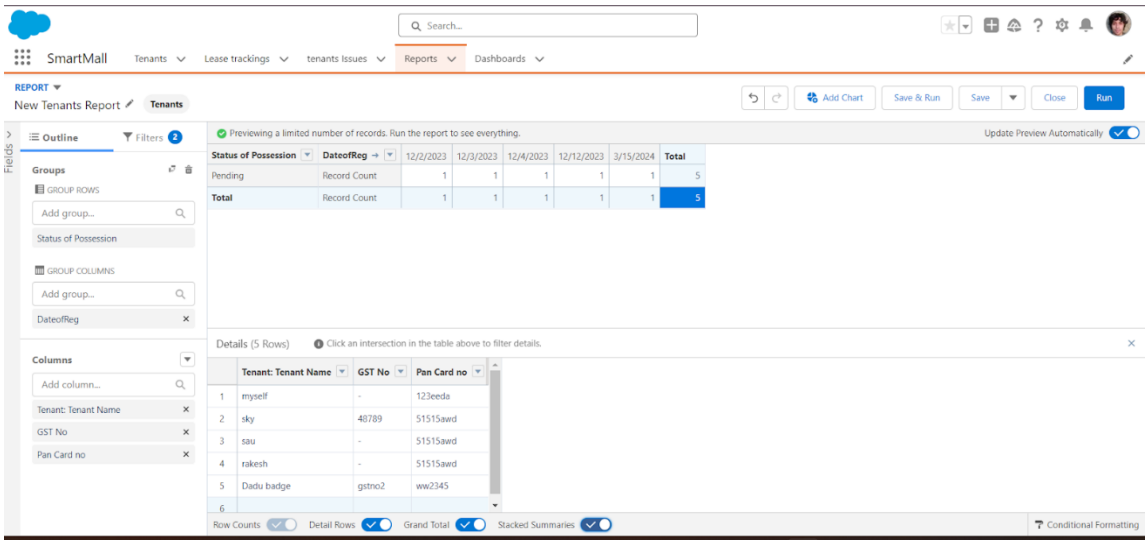
Create a Report on Tenant Records

Now, The Manager wants a Report which shows all the pending possessions and also shows the tenant's Pan Card no and GST NO and group date of reg by column and row by Status of Possession.

1) Click On new report ==> Select object Tenants ==> Click on start report

2) Choose the folder Mall Reports.

3) Save the report and Name it as Tenant Details.



Conclusion :

The implementation of a Customer Relationship Management (CRM) application for managing a mall offers significant advantages in terms of operational efficiency, customer engagement, and business growth. By centralizing customer data, enabling personalized communication, and optimizing mall operations, the CRM system provides mall operators, retailers, and customers with the tools needed to foster meaningful relationships and enhance the shopping experience.

A well-designed CRM application not only helps streamline marketing campaigns, promotions, and loyalty programs but also empowers mall managers to make data-driven decisions through advanced analytics and reporting. The ability to segment customers, track their preferences, and offer personalized experiences creates opportunities for increased foot traffic, higher sales conversions, and improved customer satisfaction. Additionally, by integrating with other mall systems—such as POS, inventory management, and event scheduling—the CRM platform offers a seamless, unified experience across various touchpoints, whether in-store, online, or via mobile devices.

For retailers, the CRM system enables better customer insights, helping them refine their product offerings, enhance customer service, and deliver tailored marketing strategies. For customers, the CRM application enhances convenience, offering personalized deals, event notifications, and a more connected experience across the mall's various stores and services.

However, like any system, the successful deployment of a CRM application requires careful planning, proper training, and ongoing support to ensure effective adoption by all stakeholders. Ensuring the privacy and security of customer data, complying with relevant data protection regulations, and addressing potential challenges in system integration and user adoption are essential to the CRM's success.

Looking ahead, the future of CRM in mall management is likely to see further innovation through the integration of artificial intelligence (AI), machine learning, and IoT technologies, enabling even more personalized and automated experiences. With these advancements, CRM systems will continue to play a critical role in transforming the way malls operate, enhancing both the customer journey and business outcomes.

In conclusion, the CRM application represents a powerful tool for mall management, offering benefits that extend beyond customer retention and sales growth to fostering long-term, mutually beneficial relationships between malls, retailers, and shoppers. It stands as a key enabler of the digital transformation of the retail landscape, helping malls stay competitive in an increasingly dynamic market.

Future of CRM Application to Manage the Mall :

The future of CRM applications in mall management is poised for significant evolution, driven by emerging technologies, changing consumer behaviors, and the increasing need for personalized experiences. As the retail landscape continues to transform, mall operators, retailers, and customers alike will benefit from more sophisticated CRM solutions that leverage the latest innovations. Below are some key trends and technologies that are expected to shape the future of CRM applications for mall management:

1. Artificial Intelligence (AI) and Machine Learning (ML) Integration

- **Predictive Analytics**: AI-powered predictive analytics will play a crucial role in forecasting customer behavior, sales trends, and inventory demands. By analyzing historical data, AI algorithms can predict when customers are likely to visit, what products they might buy, and how to optimize mall traffic flows, which will improve operational efficiency and customer satisfaction.
- **Personalized Experiences**: Machine learning algorithms will refine customer segmentation based on ever-evolving preferences and behaviors. CRM systems will generate hyper-targeted marketing campaigns and personalized product recommendations in real-time, delivering more relevant offers and promotions to customers through various channels (email, SMS, in-app notifications).
- **AI Chatbots and Virtual Assistants**: The use of AI-driven chatbots and virtual assistants within CRM applications will provide automated, instant responses to customer inquiries, from product availability to personalized shopping advice. These AI agents can improve the customer service experience while reducing the workload for mall staff.

2. Omnichannel Integration

- **Seamless Shopping Journeys**: The future of CRM will see even greater integration between online and offline shopping experiences. CRM systems will enable omnichannel strategies where customers can seamlessly transition between browsing on a mall’s website, shopping via a mobile app, and making purchases in-store. Data from all these touchpoints will be integrated into a unified customer profile, enabling a more personalized and cohesive experience.
- **Real-Time Data Synchronization**: Real-time synchronization between a mall's physical stores, e-commerce platforms, and mobile apps will be critical. CRM applications will allow for unified inventory management, instant promotions, and cross-channel loyalty programs that keep customers engaged across every point of interaction.

3. Internet of Things (IoT) and Smart Mall Integration

- **Smart Infrastructure**: The integration of IoT within mall management systems will further enhance CRM capabilities. For example, IoT-enabled devices like beacons, smart carts, and interactive kiosks will provide real-time location data and insights. By tracking foot traffic patterns, dwell times, and customer behaviors, CRM systems can offer personalized, location-based promotions and guide customers to stores or events they might be interested in.
- **Personalized In-Mall Experiences**: Smart malls will use IoT sensors to track customer movement and deliver personalized offers based on proximity to certain stores or products. For example, a customer walking near a clothing store might receive an in-app notification about an ongoing sale or product recommendation.
- **Environmental Adjustments**: IoT-enabled CRM systems could even help optimize the mall's physical environment (e.g., adjusting lighting, temperature, or music) based on customer preferences and behavior patterns, creating a more welcoming and personalized atmosphere.

4. Augmented Reality (AR) and Virtual Reality (VR)

- **Enhanced Shopping Experiences**: AR and VR technologies will further transform how customers interact with malls. CRM systems could integrate AR features to allow customers to visualize products in 3D, try on virtual clothing, or explore interactive store layouts. For instance, AR could enable a customer to point their smartphone at a store window and instantly receive information about promotions or products available inside.
- **Virtual Shopping Assistants**: In the future, VR and AR could be used to create virtual shopping experiences that bridge the gap between online and offline shopping. Customers could virtually walk through a mall from their home, interacting with products and receiving personalized shopping advice from AI-driven virtual assistants.
- **Gamification and Engagement**: AR/VR technologies combined with CRM systems can also be used for gamified experiences that engage customers in loyalty programs or promotions. For example, customers could participate in treasure hunts, reward challenges, or in-store games, earning points and prizes by interacting with specific brands or stores.

5. Enhanced Customer Data Privacy and Security

- **Stronger Data Protection**: As CRM applications collect increasing amounts of customer data, robust data privacy and security measures will become even more critical. The future of CRM will see enhanced encryption protocols, compliance

with stricter data protection laws (such as GDPR and CCPA), and advanced authentication systems (e.g., biometrics or multi-factor authentication) to safeguard sensitive customer information.

- **Privacy-First CRM Systems**: With growing concerns about data privacy, CRM solutions will incorporate features that allow customers to have more control over their data. Customers will have the ability to manage their preferences and opt in or out of data collection, ensuring transparency and trust in the CRM system.

6. Integration with Blockchain Technology

- **Blockchain for Loyalty Programs**: Blockchain could revolutionize how loyalty programs are managed. By integrating blockchain into CRM systems, malls could create secure, transparent, and decentralized loyalty programs that track customer rewards across different stores, ensuring accuracy and preventing fraud.
- **Secure Transactions**: Blockchain could also be used to secure customer transactions, ensuring that purchases, discounts, and rewards are recorded in a tamper-proof manner. This would increase customer confidence in digital transactions and enhance security in loyalty program exchanges.

7. Voice-Activated and Gesture-Based Interaction

- **Voice Commerce**: As voice-activated assistants (like Amazon Alexa, Google Assistant, and Apple Siri) become more widespread, CRM systems may integrate voice commands to offer hands-free shopping experiences. Customers could use voice to check store hours, browse product availability, or receive personalized promotions.
- **Gesture Recognition**: The future could also bring gesture-based interfaces, where customers can interact with mall systems, displays, and kiosks using simple hand gestures or eye movements. This could further enhance the in-mall experience, making it more intuitive and engaging.

8. Sustainability and Green Practices

- **Eco-Friendly CRM Solutions**: As sustainability becomes an increasingly important factor for both consumers and businesses, CRM applications will integrate sustainability features, such as tracking the environmental impact of customer purchases or encouraging eco-friendly shopping behaviors. CRM systems could help promote sustainability campaigns, such as waste reduction or carbon footprint offset programs.
- **Sustainable Loyalty Programs**: Future CRM systems might integrate "green" loyalty rewards, where customers earn points for eco-friendly actions such as recycling, opting for digital receipts, or purchasing sustainable products.

9. Real-Time and Hyper-Local Marketing

- **Geofencing and Location-Based Promotions**: With more advanced GPS and geofencing technology, CRM systems will enable real-time, location-based marketing campaigns. For example, a customer entering the parking lot of the mall could receive a notification about an exclusive deal at a store near them, prompting them to visit specific areas of the mall.
- **Hyper-Personalized Promotions**: Advanced CRM systems will use a combination of location data, purchase history, and social media activity to send hyper-personalized offers to customers based on their immediate surroundings, preferences, and past shopping behavior.

10. Integration with Smart Wearables and Devices

- **Wearable Devices**: As wearables like smartwatches and fitness trackers become more popular, CRM systems will integrate with these devices to track customer behavior, send notifications, and provide personalized experiences based on location, activity, or health data.
- **Interactive Wearables**: Future wearables could provide customers with real-time, personalized experiences while shopping, such as personalized in-store navigation or loyalty rewards based on their activity and engagement in the mall.