FIELD SERVICE WORK ORDER OPTIMIZATION

By Kovuri Sai Tejaswini
21bq1a05b6@vvit.net

ABSTRACT

The Field Service Work Order Optimization System aims to enhance the efficiency of a company's installation and repair services. It uses a centralized database to assign tasks to the most appropriate technicians based on their skills, location, and availability. By using a task prioritization algorithm, the system ensures that technicians are matched with the right jobs. Automated notifications keep technicians updated, while analytical insights help improve service over time. This system increases operational efficiency, reduces costs, and boosts customer satisfaction in the field service industry.

Key Technologies:
1. Salesforce Field Service: A platform that provides tools for scheduling, dispatching, and real-time communication between technicians and managers.
2. Artificial Intelligence (AI) & Machine Learning (ML): These technologies predict service demand, optimize technician schedules, and match technicians to jobs based on key factors like skill and proximity.
3.Predictive Analytics: Analyzes historical data to predict future service needs and prevent potential problems before they arise.
4. Internet of Things (IoT): IoT devices collect real-time data from equipment in the field, helping with timely maintenance and quick issue resolution.

Implementation Phases:
1. Salesforce Field Service Setup: Implementing scheduling, dispatching, and communication tools.
2. AI & ML Integration: Developing algorithms for smarter technician scheduling and task matching.
3. Predictive Analytics: Building models to predict service needs based on past data.
4. IoT Integration: Bringing in data from connected field devices to improve response times and maintenance.

Potential Challenges:
1. Data Integration: Combining data from multiple sources and older systems can be challenging.
2. Adoption by Stakeholders: Ensuring everyone is on board and comfortable with the new system.
3. Scalability: Making sure the system can grow and handle larger workloads in the future.
4. Data Security: Keeping customer and business data safe from breaches.

Measurable Outcomes:

1. Improved Efficiency
2. Higher Customer Satisfaction
3. Optimized Operations

Functional Requirements:

1. Managing Work Orders
2. Scheduling and Dispatching Technicians
3. Resource Management
4. Mobile Access for Technicians
5. Customer Communication Tools
6. Reporting and Analytics
7. Integration with Other Systems
8. User Access and Security Controls
9. Ongoing Maintenance and Support

By fulfilling these requirements, the system will streamline field operations, enhance customer s

INDEX PAGE

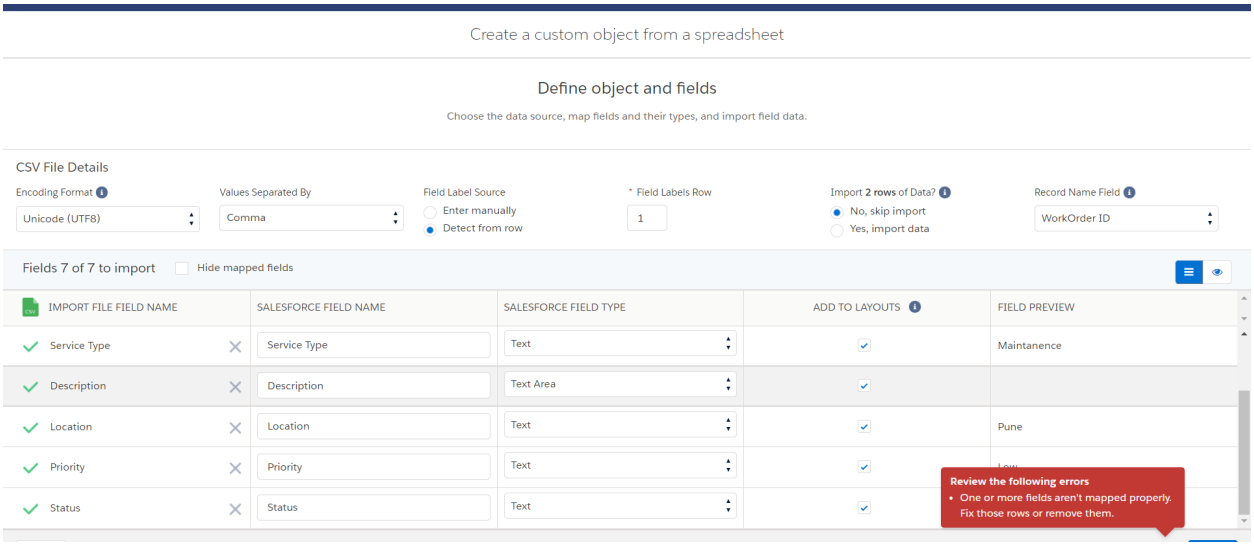
INTRODUCTION

The Field Service Work Order Optimization System streamlines operations for a company providing installations and repairs. Utilizing a robust database, the system efficiently matches work orders with skilled technicians based on technicians' location, availability, and skills. The system employs a prioritization algorithm, focusing on assigning tasks to technicians. Automated communication keeps technicians informed, while analytics offer insights for continuous improvement. Overall, this solution maximizes efficiency, reduces operational costs, and improves customer satisfaction in the dynamic realm of field service operations.

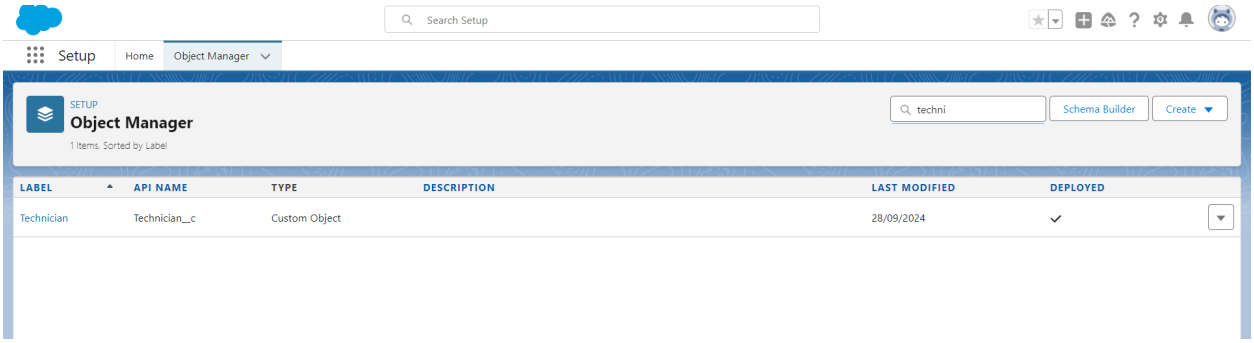
Task 1:

1.1 Create Technician Object:

An entity representing field technicians, capturing details like skills, name, location, availability, and contact information for optimized service dispatch.

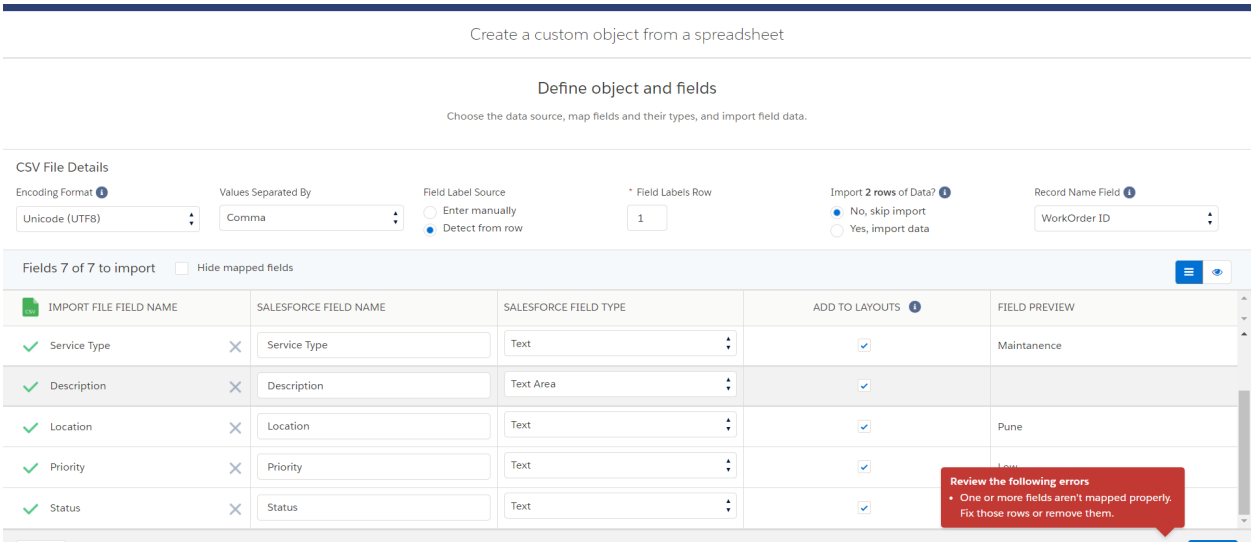


After creating technician details, the Quick box looks like the below



1.2 Create WorkOrder Object:

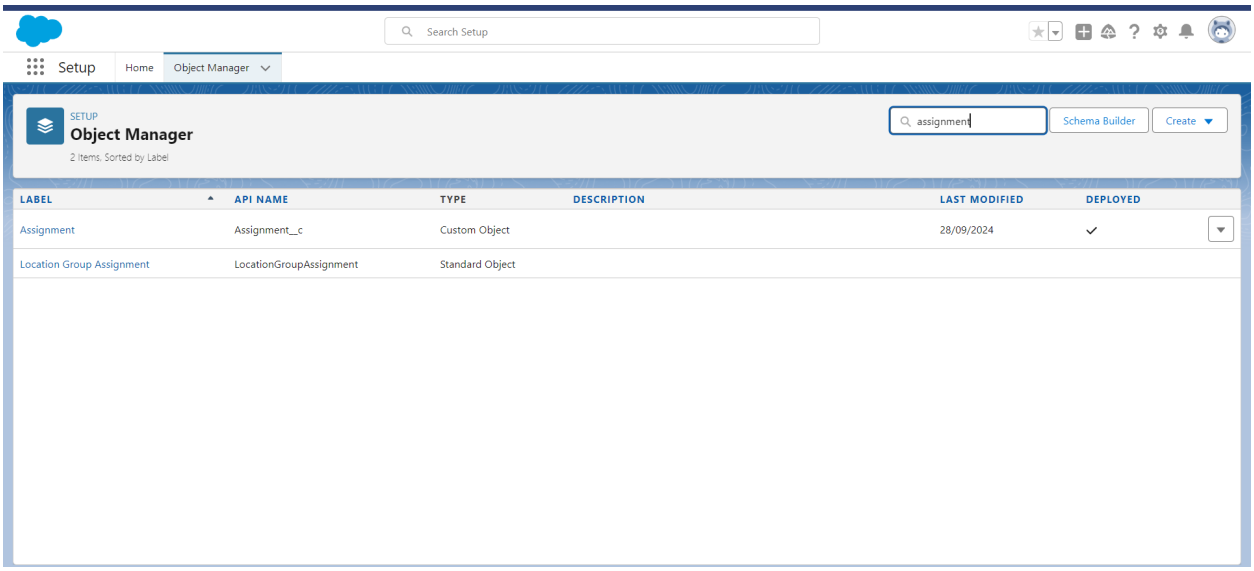
An entity tracking service tasks, detailing job requirements, status, assigned technician, and customer information for efficient field operations.



After creating the WorkOrder Custom object it looks like the below

1.3 Create Assignment Object :

An entity linking technicians to work orders, detailing assignment dates, priority, status, and specific tasks for optimized field service. After creating the Assignment custom object, the object manager bar looks the below



Task 2:

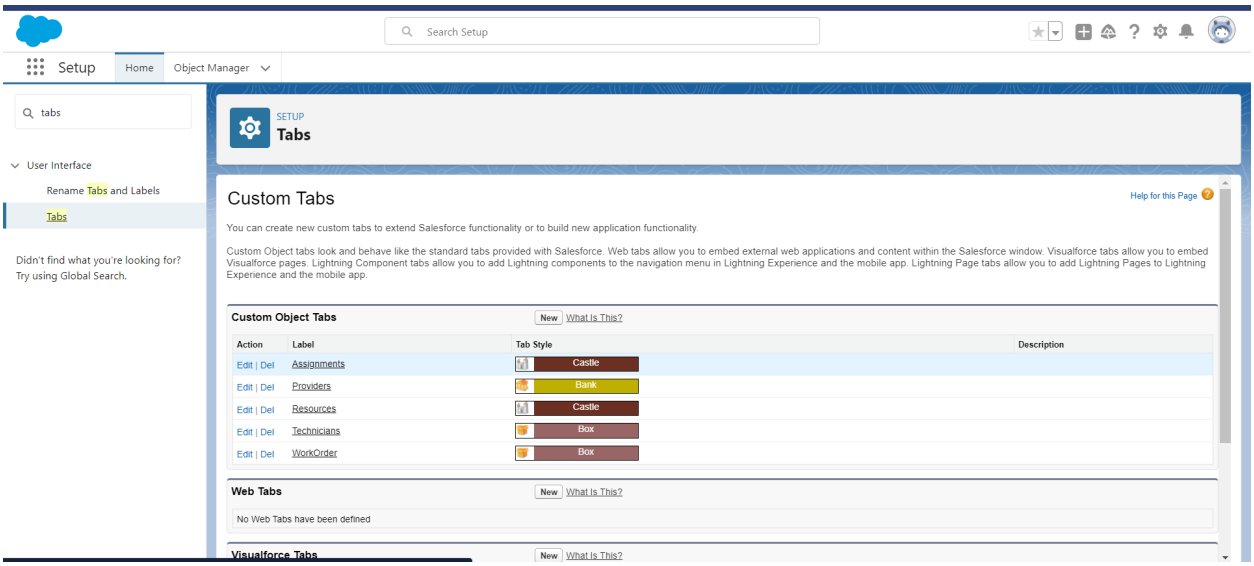
Creating a Custom Tab

A user interface element in Salesforce that provides access to custom objects, records, or web content, enhancing navigation and organization of data within the Salesforce environment.

To create a Tab:(Assignment)

1. Go to the setup page --> type Tabs in the Quick Find bar --> click on tabs --> New (under the custom object tab)
2. Select Object(Assignment) --> Select any tab style --> Next (Add to profiles page) keep it as default --> Next (Add to Custom App) keep it as default --> Save. Note: Tabs for WorkOrder & Technician objects do get created automatically. We do not need to create tabs for those objects.

After following the above steps, the output looks like this:



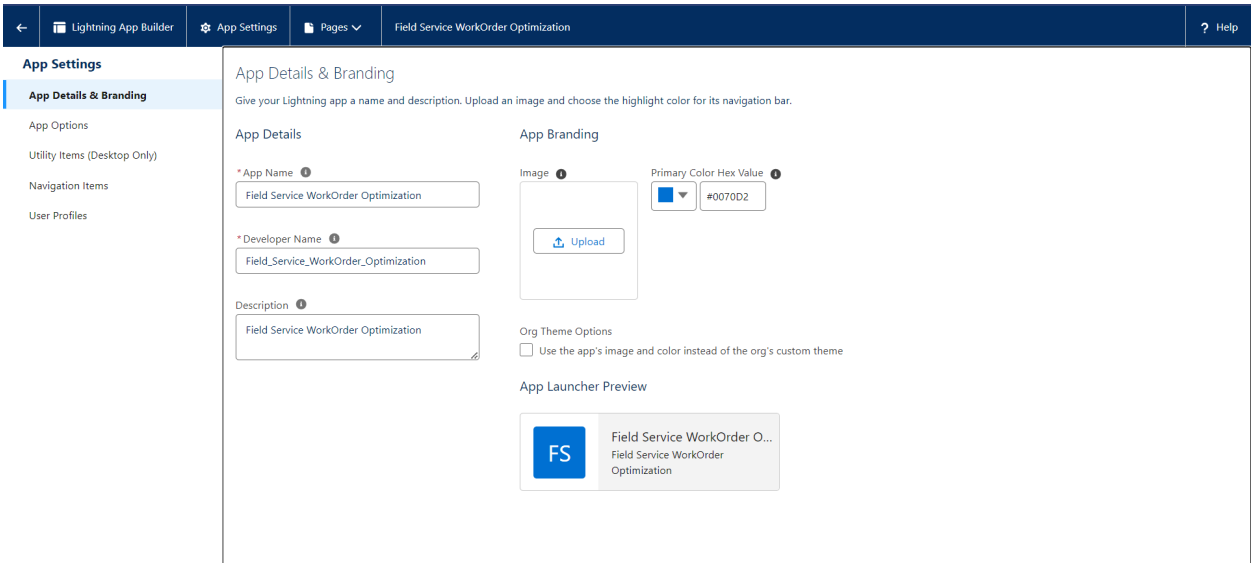
Task 3 :

Create a Lightning App

To create a lightning app page:

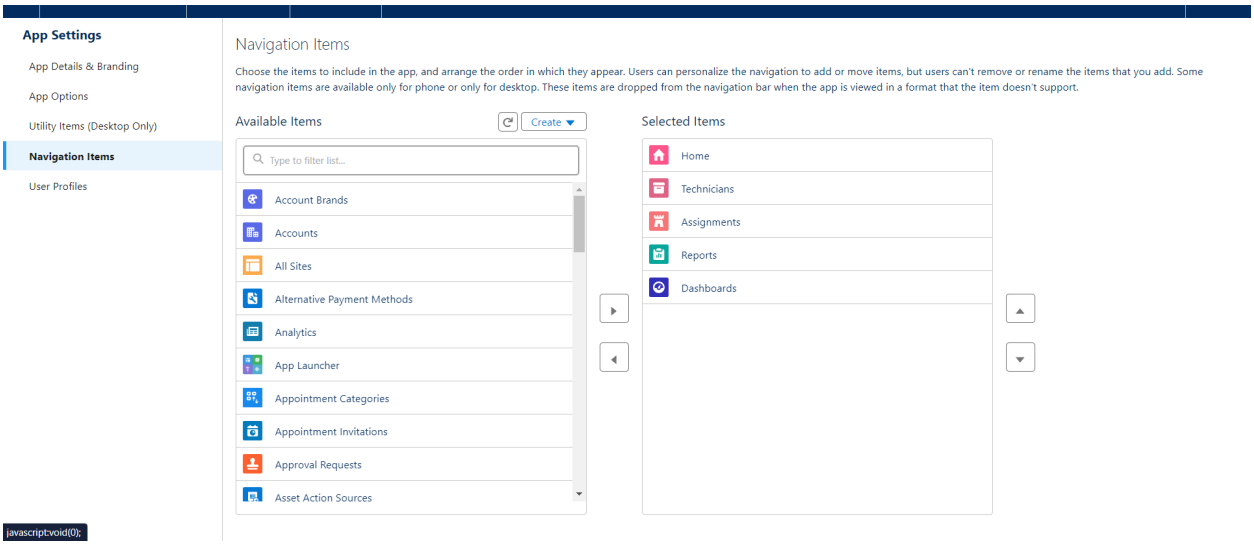
1. Go to the setup page --> search “app manager” in quick find --> select “app manager” --> click on New lightning App.

2. Fill the app name in app details and branding as follow App Name : Field Service WorkOrder Optimization Developer Name : this will be auto populated Description : Give a meaningful description Image : optional (if you want to give any image you can, otherwise not mandatory) Primary color hex value : keep this default



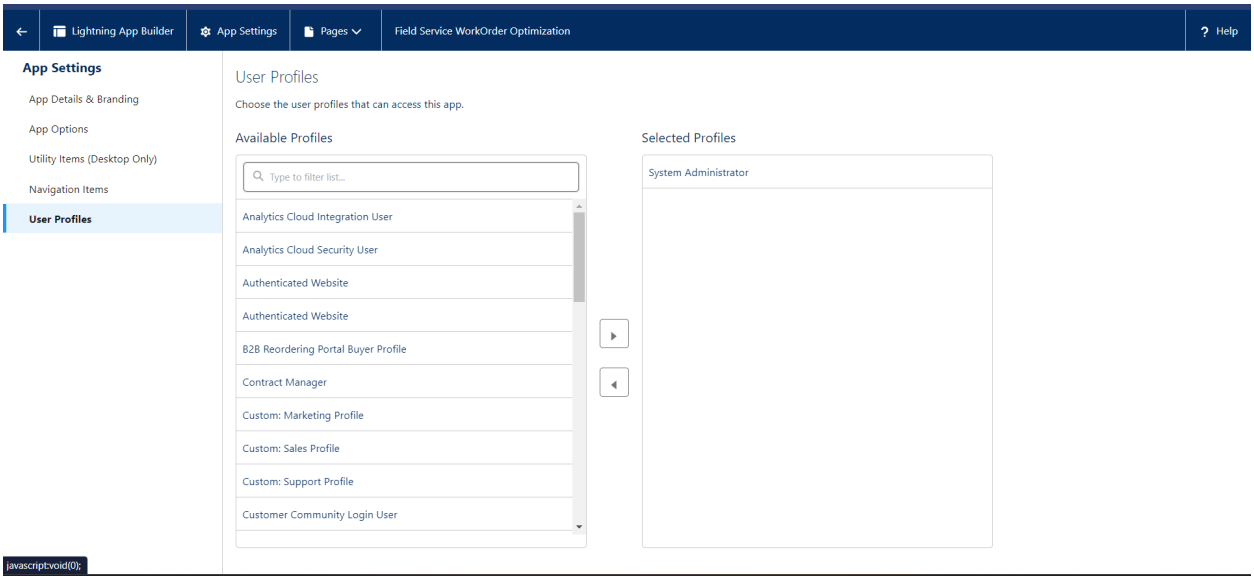
3. Then click Next --> (App option page) keep it as default --> Next --> (Utility Items) keep it as default --> Next

4. To Add Navigation Items:



Search the items in the search bar(Home, WorkOrder, Technician, Assignment, Reports, Dashboard) from the search move it using the arrow button ? Next. Note: select asset the custom object which we have created in the previous activity.

5. To Add User Profiles: Search profiles (System administrator) in the search bar --> click on the arrow button --> save & finish.

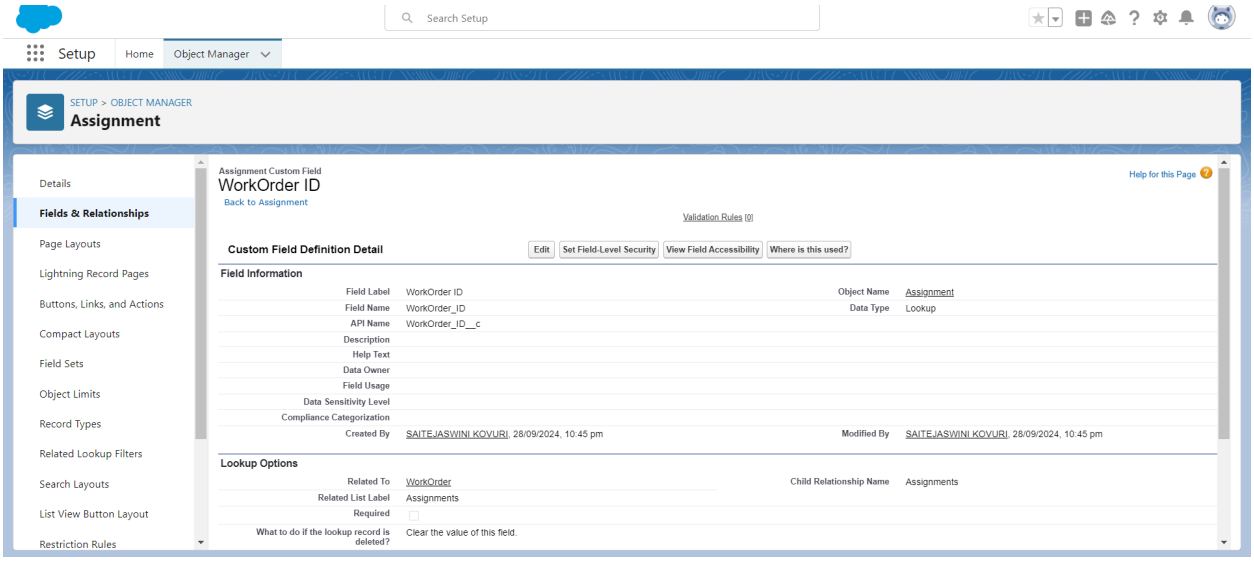


This is the output after completion of following the above procedure.

Task 4 :

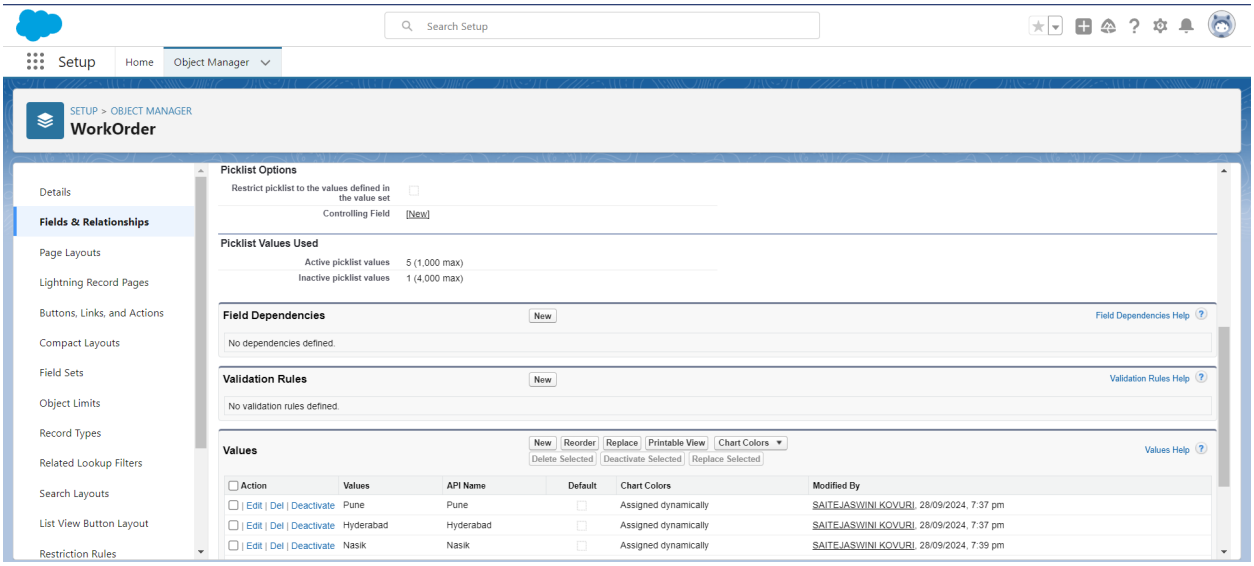
4.1 Creating Lookup Field in Assignment Object

A lookup field in the Assignment Object establishes a relationship with another object, such as Technicians or Work Orders, enabling users to link and reference related records for improved data organization and relational tracking.



4.2 Manage your picklist values

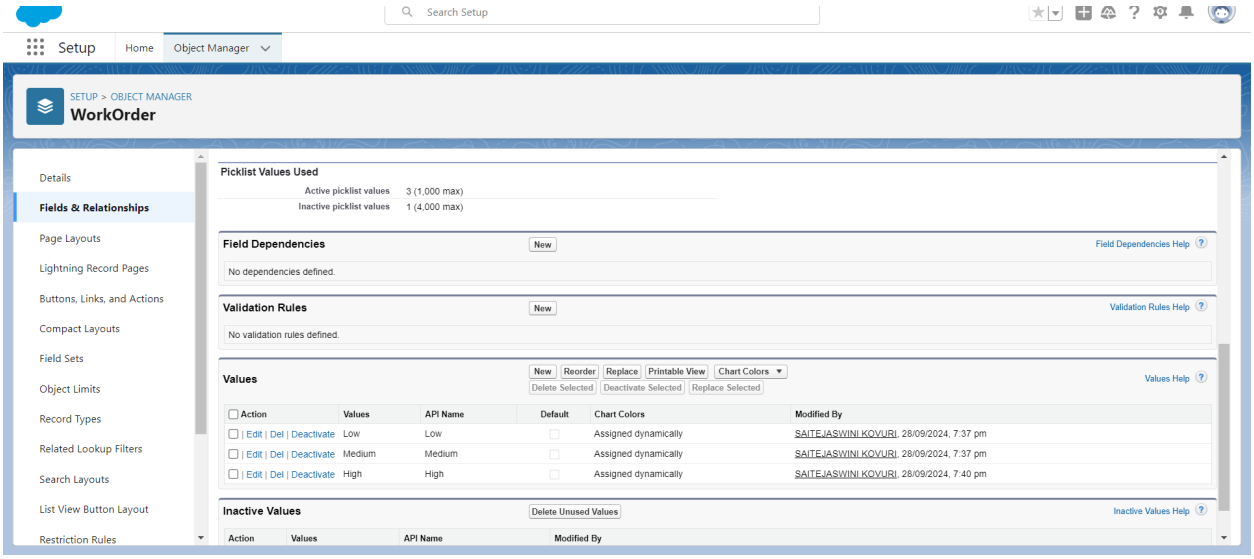
4.3 Manage your picklist values : Add following values to the respective fields in WorkOrder object:

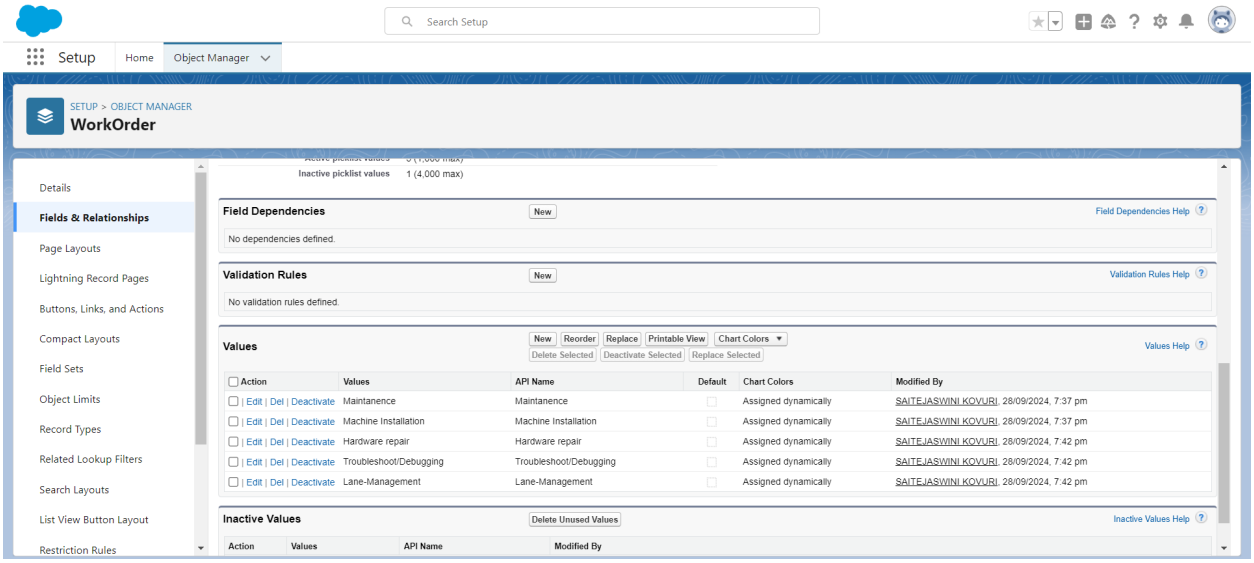


4.3 Manage your picklist values :

Add following values to the respective fields in WorkOrder object:

Field	Values
Priority	High
Service Type	Hardware repair Troubleshoot/Debugging Lane-Management





4.4 Creating Formula Field in WorkOrder Object

A formula field in the Work Order Object automatically calculates and displays data based on other fields or custom logic. This feature streamlines data entry, ensures consistency, and provides real-time insights without manual updates

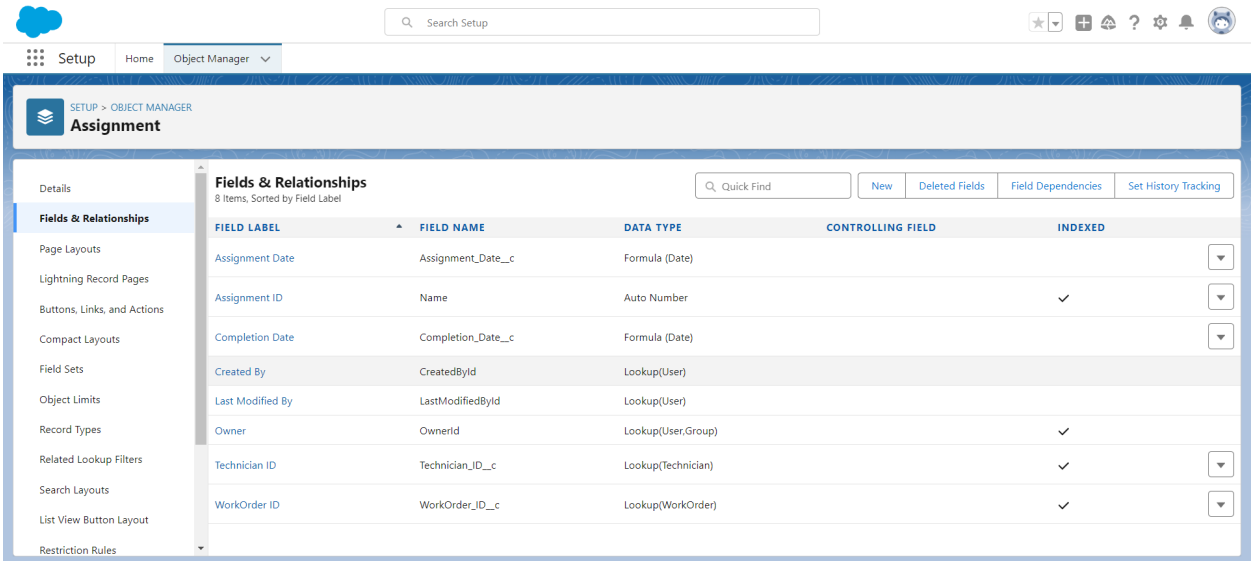
1. Repeat steps 1 and 2 mentioned in activity 1
2. Select Data type as “Formula” and click Next.
3. Give Field Label and Field Name as “Date” and select formula return type as “Date” and click next.
4. Under Advanced Formula, write the formula and click “Check Syntax” Formula: CreatedDate 5. Next--> Next--> Save.

4.5 Creating Remaining fields for the respective objects

Now create the remaining fields using the data types mentioned in the table.

<table>
<tr><th>Sl</th><th>Object</th><th>Field</th></tr>
<tr><td>1</td><td>Assignment</td><td>
<table>
<tr><th>Field Name</th><th>Datatype</th></tr>
<tr><td>• Technician ID
• Assignment Date
• Completion Date</td><td>Lookup(Technician)
Formula: return type : Date
(WorkOrder_ID__r.Date__c)
Formula: return type : Date
IF(ISPICKVAL(
WorkOrder_ID__r.Status__c ,
'Resolved'),</td></tr>
</table>
</td></tr>
</table>

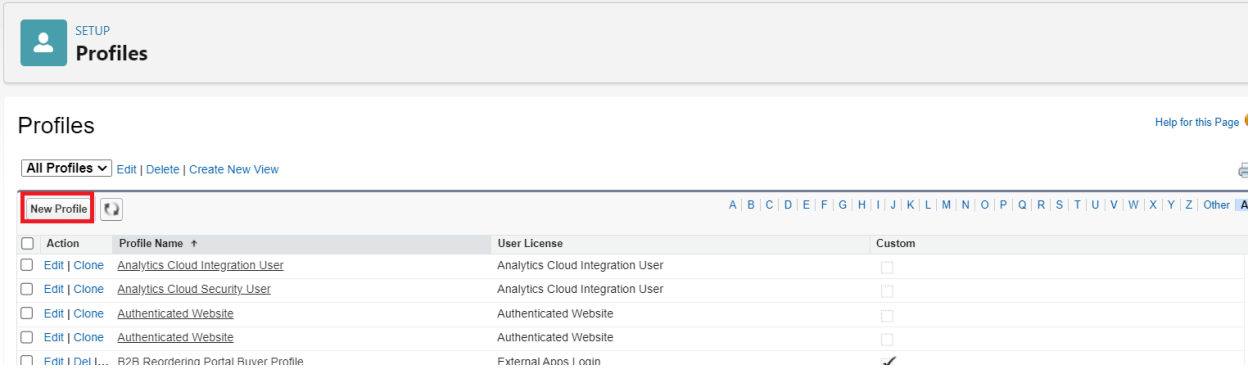
		WorkOrder_ID__r.LastModifiedDate , NULL)

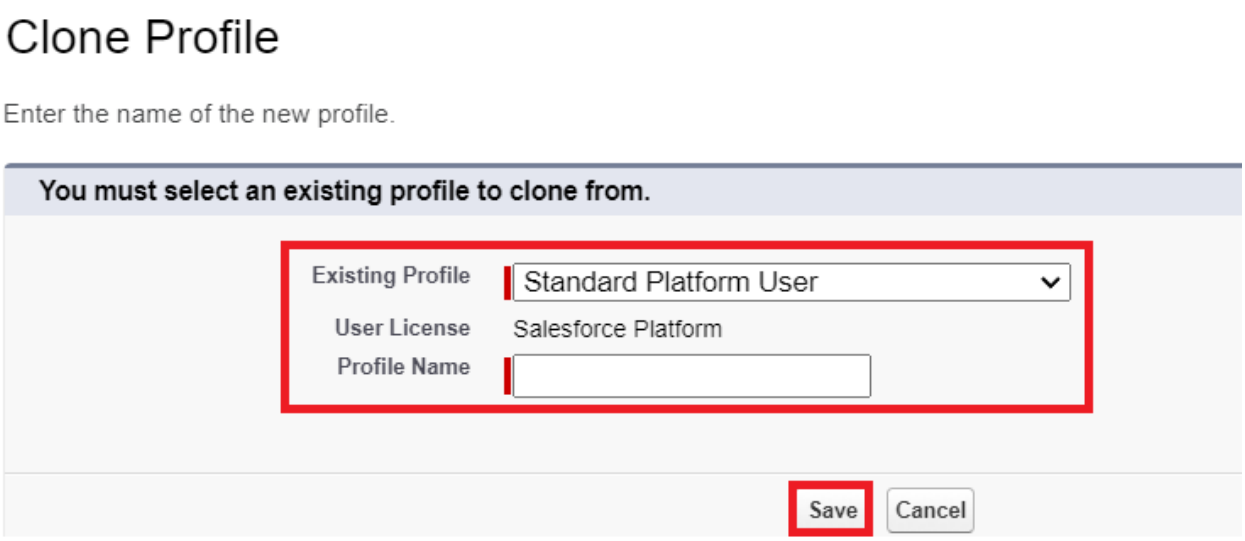


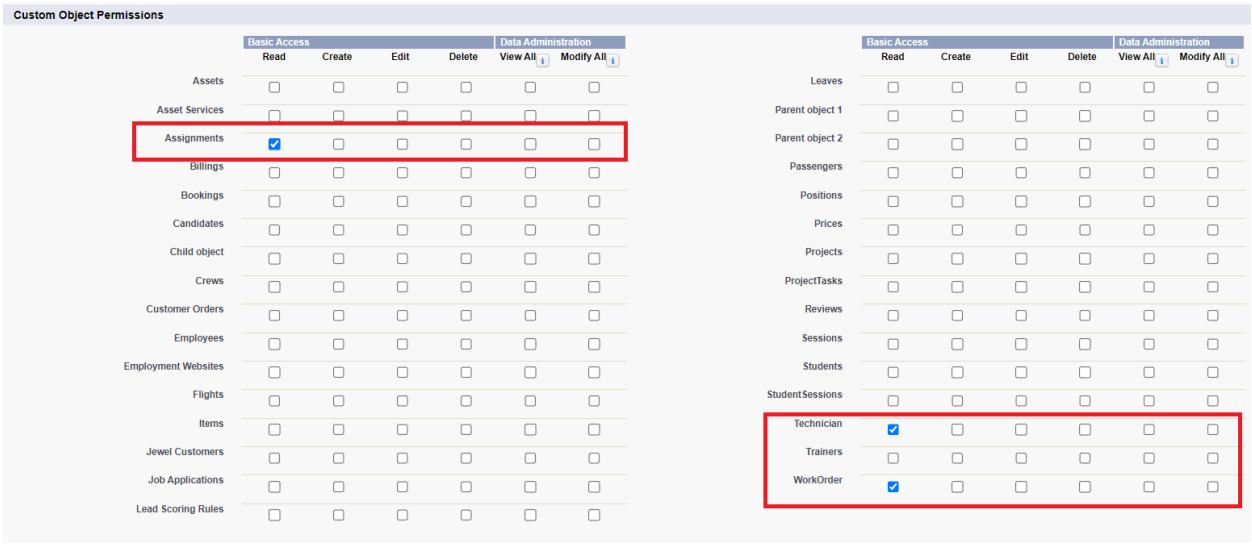
Task 5 :

Technician Profile

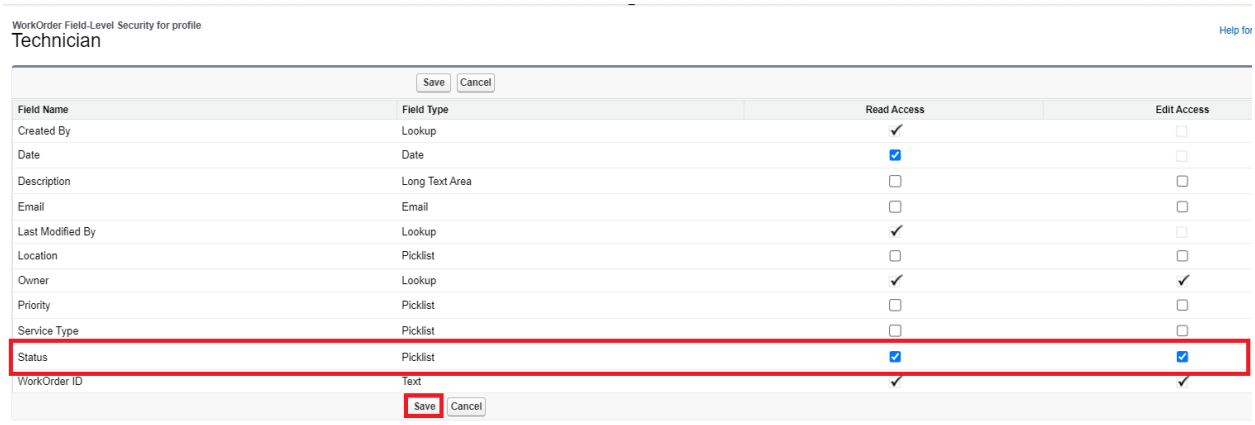
1. Go to setup --> type profiles in the quick find box --> click on profiles --> click on new profile.
2. Select ‘Standard Platform User’ for existing profile and give ‘Technician’ for Profile Name and click on Save.
3. While still on the profile page, then click Edit.
4. While still on the profile page, then click Edit.
5. Scroll down and Click on Save.
6. Now from the profile detail page scroll down to custom field level security click on view next to WorkOrder object.
7. Click on Edit, enable the check box for the status field.
8. Click on Save.






Custom Object Permissions
Basic Access
Data Administration
Read
Create
Edit
Delete
View All
Modify All
Assets
Asset Services
Assignments
Billings
Bookings
Candidates
Child object
Crews
Customer Orders
Employees
Employment Websites
Flights
Items
Jewel Customers
Job Applications
Lead Scoring Rules
Leaves
Parent object 1
Parent object 2
Passengers
Positions
Prices
Projects
ProjectTasks
Reviews
Sessions
Students
StudentSessions
Technician
Trainers
WorkOrder


Custom Field-Level Security
Asset [View]
Asset Service [View]
Assignment [View]
Billing [View]
Booking [View]
Candidate [View]
Child object [View]
Crew [View]
Customer Order [View]
Employee [View]
Employment Website [View]
Flight [View]
Item [View]
Jewel Customer [View]
Job Application [View]
Knowledge [View]
Lead Scoring Rule [View]
Leave [View]
Parent object 1 [View]
Parent object 2 [View]
Passenger [View]
Position [View]
Price [View]
Project [View]
ProjectTask [View]
Review [View]
Sessions [View]
Student [View]
StudentSession [View]
Technician [View]
Trainer [View]
WorkOrder [View]

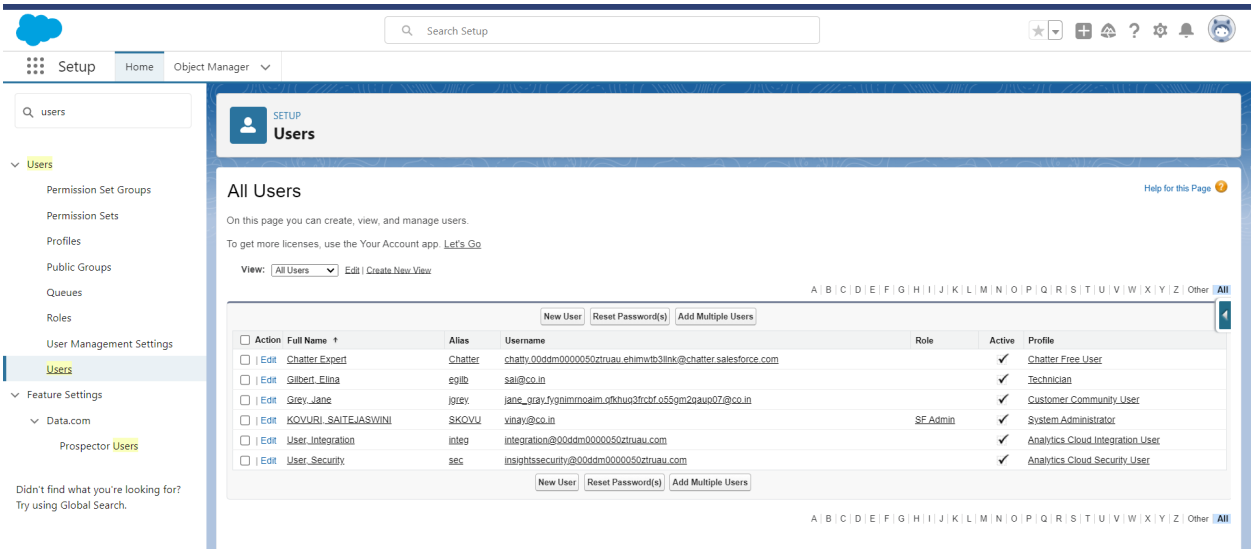

WorkOrder Field-Level Security for profile
Technician
Help for
Save
Cancel
Field Name
Field Type
Read Access
Edit Access
Created By
Lookup
Date
Date
Description
Long Text Area
Email
Email
Last Modified By
Lookup
Location
Picklist
Owner
Lookup
Priority
Picklist
Service Type
Picklist
Status
Picklist
WorkOrder ID
Text
Save
Cancel

Task 6 :

Create User

User is engaged in the Field Service Workforce Optimization Project, utilizing Salesforce to optimize field operations, improve resource management, and enhance customer service through efficient scheduling, real time tracking, and comprehensive analytics.

1. Go to setup --> type users in the quick find box --> select users --> click New user.
2. Fill in the fields 1. First Name : Elina 2. Last Name : Gilbert
3. Alias : Give an Alias Name
4. Email id : Give your Personal Email id
5. Username : Username should be in this form: text@text.text
6. Nick Name : Give a Nickname
7. Role :
8. User license : Salesforce Platform
9. Profiles : Technician



Task 7 :

7.1 Create an Apex Class

1. Go to Setup --> Click on the gear icon --> Select Developer Console.
2. Then we can see the Developer console. Click on the developer console and you will navigate to a new console window.
3. To create a new Apex Class follow the below steps: Click on the file --> New --> Apex Class.
4. Give the Apex Class name as “WorkOrderClass”.
5. Click ok.
6. Now write the code logic here

7. Source Code:

```
public class WorkOrderClass {
   public static void workOrder(List<WorkOrder__C> newListWorkOrder){
      Map<Integer, List<String>> maptotech = new map<Integer,List<String>>();
      integer num = 0;
      List<WorkOrder__c> properWo = new List<WorkOrder__c>();
      List<Assignment__c> lstAssignment = new List<Assignment__c>();
      List<Technician__c> techniciantoAssignment = new List<Technician__c>();
      for(WorkOrder__c iter : newListWorkOrder){
         List<String> lststring = new List<string>();
         If(iter.Service_Type__c != null && iter.Location__c != null ){
            num = num+1;
            properWo.add(iter);
            lststring.add(iter.Service_Type__c);
            lststring.add(iter.Location__c);

            maptotech.put(num,lststring);
         }
      }
      Map<integer,Id> techId = new Map<integer,Id>();
      Map<Id,Technician__c> allTechnician = new Map<Id,Technician__c>([SELECT Id, Name, Phone__c,
Location__c, Skills__c, Availibility__c, Name__c, Email__c FROM Technician__c]);
      integer num2 = 0;
      For(Technician__c T : allTechnician.values()){
         num2 = num2+1;
         if(maptotech.get(num2) != null){
            List<string> valofmap = maptotech.get(num2);
         system.debug('error 1 ----> the maptotech is empty ---> ' + maptotech.get(num2));
         if(valofMap.contains(t.Skills__c) && ValofMap.contains(t.Location__c) && t.Availibility__c ==
'Available'){
            techid.put(num2,t.Id);
         }
```

```
        }

    }
    integer num3 = 0;
    For(WorkOrder__c W : properWo){
        num3 = num3 + 1;
        Assignment__c A = new Assignment__c();
        A.WorkOrder_ID__c = W.Id;
        A.Technician_ID__c = techid.get(num3);
        lstAssignment.add(A);
    }
    If(!lstAssignment.IsEmpty()){
        insert lstAssignment;
    }
  }
}
```

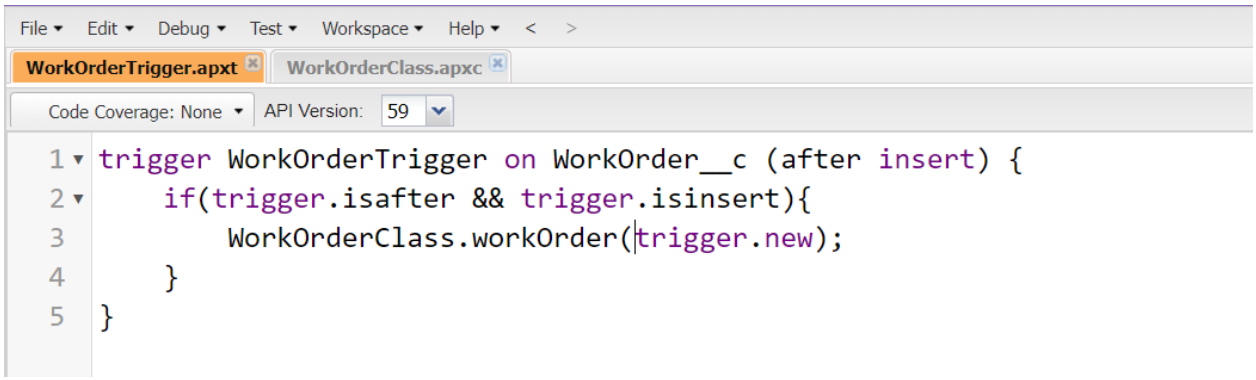
8. Save the code.(click on file --> Save)

```
public class WorkOrderClass {
    public static void workOrder(List<WorkOrder__c> newListWorkOrder){
        Map<Integer, List<String>> maptotech = new map<Integer,List<String>>();
        integer num = 0;
        List<WorkOrder__c> properWo = new List<WorkOrder__c>();
        List<Assignment__c> lstAssignment = new List<Assignment__c>();
        List<Technician__c> techniciantoAssignment = new List<Technician__c>();
        for(WorkOrder__c iter : newListWorkOrder){
            List<String> lststring = new List<string>();
            If(iter.Service_Type__c != null && iter.Location__c != null ){
                num = num+1;
                properWo.add(iter);
                lststring.add(iter.Service_Type__c);
                lststring.add(iter.Location__c);

                 maptotech.put(num,lststring);
            }
        }
        Map<integer,Id> techId = new Map<integer,Id>();
        Map<Id,Technician__c> allTechnician = new Map<Id,Technician__c>([SELECT Id, Name, Phone__c, Location__c, Skills__c, Availibility__c, Name__c, Email__c FROM Technician__c]);
        integer num2 = 0;
        For(Technician__c T : allTechnician.values()){
            num2 = num2+1;
            if(maptotech.get(num2) != null){
                List<string> valofmap = maptotech.get(num2);
            system.debug('error 1 ----> the maptotech is empty ---> ' + maptotech.get(num2));
            if(valofMap.contains(t.Skills__c) && ValofMap.contains(t.Location__c) && t.Availibility__c == 'Available'){
                techid.put(num2,t.Id);
            }
            }

        }
        integer num3 = 0;
        For(WorkOrder__c W : properWo){
```

7.2 Create an Apex Trigger

1. To create new Apex Class follow the below a Click on the file --> New --> Apex Class
2. Give the Apex Trigger name as “WorkOrderTrigger”, and select “WorkOrder c” from the dropdown for sObject.
3. Click Submit. steps
4. Now write the code logic here Source

```
trigger WorkOrderTrigger on WorkOrder__c (after insert) {
    if(trigger.isafter && trigger.isinsert){
        WorkOrderClass.workOrder(trigger.new);
    }
}
```

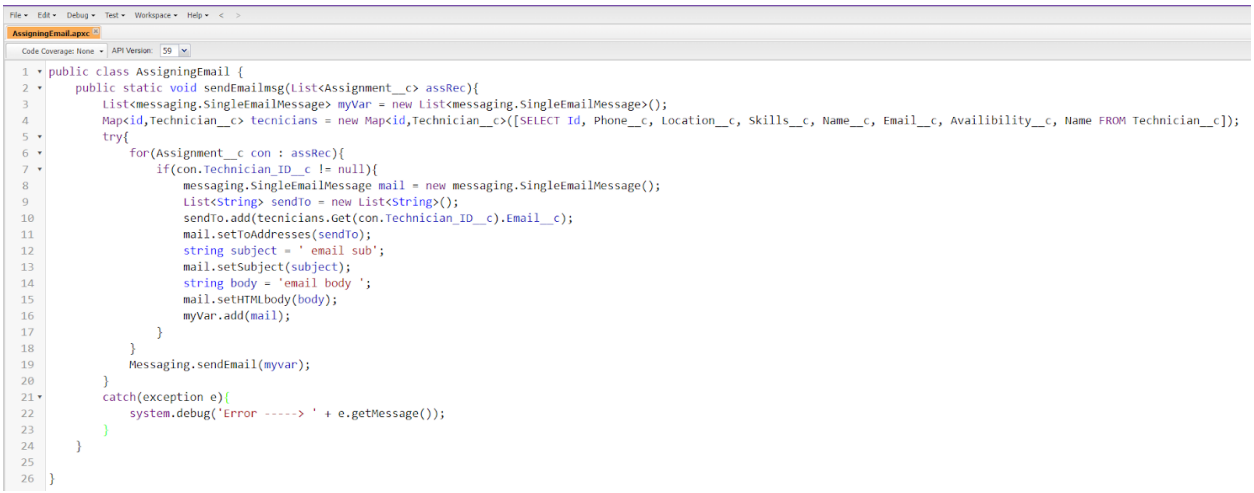


7.3 Create an Apex Class

1. Go to Setup --> Click on the gear icon --> Select Developer Console.
2. Then we can see the Developer console. Click on the developer console and you will navigate to a new console window.
3. To create a new Apex Class follow the below steps: Click on the file --> New --> Apex Class.
4. Give the Apex Class name as “AssigningEmail”.
5. Click ok.
6. Now write the code logic here

```
public class AssigningEmail {
    public static void sendEmailmsg(List<Assignment__c> assRec){
        List<messaging.SingleEmailMessage> myVar = new
List<messaging.SingleEmailMessage>();
        Map<id,Technician__c> tecnicians = new Map<id,Technician__c>([SELECT Id, Phone__c,
Location__c, Skills__c, Name__c, Email__c, Availibility__c, Name FROM Technician__c]);
        try{
            for(Assignment__c con : assRec){
                if(con.Technician_ID__c != null){
                    messaging.SingleEmailMessage mail = new messaging.SingleEmailMessage();
                    List<String> sendTo = new List<String>();
                    sendTo.add(tecnicians.Get(con.Technician_ID__c).Email__c);
                    mail.setToAddresses(sendTo);
                    string subject = 'WorkOrder Assignment ';
                    mail.setSubject(subject);
```

```
            string body = 'The following WorkOrder has been assigned to you ';
            mail.setHTMLbody(body);
            myVar.add(mail);
          }
        }
        Messaging.sendEmail(myvar);
      }
      catch(exception e){
        system.debug('Error -----> ' + e.getMessage());
      }
    }
}
```



```
public class AssigningEmail {
    public static void sendEmailmsg(List<Assignment__c> assRec){
        List<messaging.SingleEmailMessage> myVar = new List<messaging.SingleEmailMessage>();
        Map<id,Technician__c> tecnicians = new Map<id,Technician__c>([SELECT Id, Phone__c, Location__c, Skills__c, Name__c, Email__c, Availibility__c, Name FROM Technician__c]);
        try{
            for(Assignment__c con : assRec){
                if(con.Technician_ID__c != null){
                    messaging.SingleEmailMessage mail = new messaging.SingleEmailMessage();
                    List<String> sendTo = new List<String>();
                    sendTo.add(tecnicians.Get(con.Technician_ID__c).Email__c);
                    mail.setToAddresses(sendTo);
                    string subject = ' email sub';
                    mail.setSubject(subject);
                    string body = 'email body ';
                    mail.setHTMLbody(body);
                    myVar.add(mail);
                }
            }
            Messaging.sendEmail(myvar);
        }
        catch(exception e){
            system.debug('Error -----> ' + e.getMessage());
        }
    }
}
```

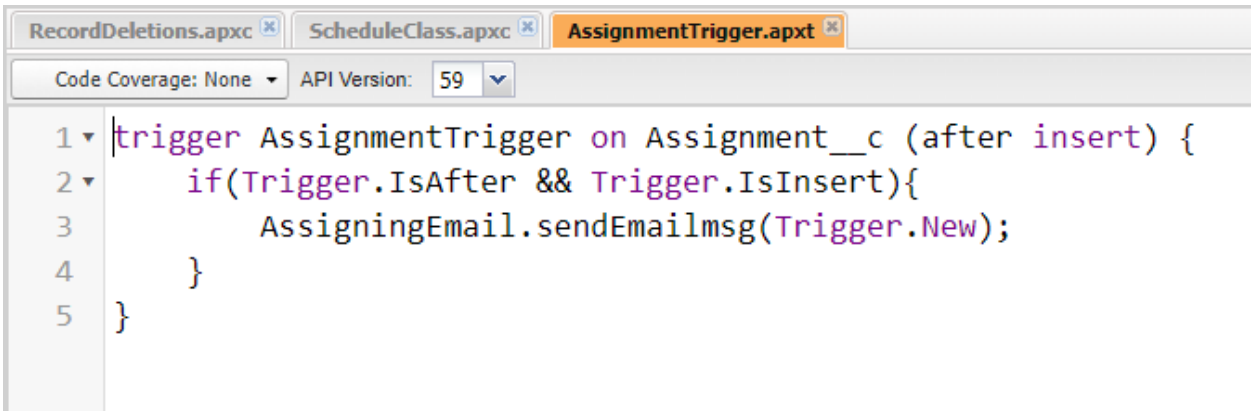
7.4 Create an Apex Trigger

To create a new Apex Class follow the below steps:

1. Click on the file --> New --> Apex Class.
2. Give the Apex Trigger name as “AssignmentTrigger”, and select “Assignment c” from the dropdown for sObject.
3. Click Submit.
4. Now write the code logic here

Source Code:

```
trigger AssignmentTrigger on Assignment__c (after insert) {
    if(Trigger.IsAfter && Trigger.IsInsert){
        AssigningEmail.sendEmailmsg(Trigger.New);
    }
}
```



7.5 Create an Apex Class

1. Go to Setup --> Click on the gear icon --> Select Developer Console.
2. Then we can see the Developer console. Click on the developer console and you will navigate to a new console window
3. To create a new Apex Class follow the below steps: Click on the file --> New --> Apex Class.
4. Give the Apex Class name as “CompletionMail”.
5. Click ok.
6. Now write the code logic here

Source Code:

```
public class CompletionMail {
   public static void sendEmailMsg(List<WorkOrder__c> workOrderList){
      List<messaging.SingleEmailMessage> myVar = new
List<messaging.SingleEmailMessage>();
      for(WorkOrder__c con : workOrderList){
         if(con.Status__c == 'Resolved'){
            messaging.SingleEmailMessage mail = new
messaging.SingleEmailMessage();
            List<String> sendTo = new List<String>();
            sendTo.add(con.Email__c);
            mail.setToAddresses(sendTo);
            string subject = 'Status Updated';
            mail.setSubject(subject);
            string body = 'email body ';
            mail.setHTMLbody(body);
            myVar.add(mail);
         }
      }
```

```
        Messaging.sendEmail(myvar);
    }
}
```

RecordDeletions.apxc | ScheduleClass.apxc | CompletionMail.apxc

Code Coverage: None | API Version: 59

```
public class CompletionMail {
    public static void sendEmailMsg(List<WorkOrder__c> workOrderList){
        List<messaging.SingleEmailMessage> myVar = new List<messaging.SingleEmailMessage>();
        for(WorkOrder__c con : workOrderList){
            if(con.Status__c == 'Resolved'){
                messaging.SingleEmailMessage mail = new messaging.SingleEmailMessage();
                List<String> sendTo = new List<String>();
                sendTo.add(con.Email__c);
                mail.setToAddresses(sendTo);
                string subject = 'Status Updated';
                mail.setSubject(subject);
                string body = 'email body ';
                mail.setHTMLbody(body);
                myVar.add(mail);
            }
        }
        Messaging.sendEmail(myvar);
    }
}
```

7.6 Create an Apex Trigger

1. Click on the file --> Open.
2. A pop up window opens click on Triggers, then select “WorkOrderTrigger” and click on “Open”
3. Now write the code logic here.

RecordDeletions.apxc | ScheduleClass.apxc | CompletionMail.apxc | WorkOrderTrigger.apxt

Code Coverage: None | API Version: 59

```
trigger WorkOrderTrigger on WorkOrder__c (after insert, after update) {
    if(Trigger.IsAfter && Trigger.IsInsert){
        WorkOrderClass.workOrder(trigger.new);
    }
    if(Trigger.IsAfter && Trigger.IsUpdate){
        CompletionMail.sendEmailMsg(Trigger.New);
    }
}
```

7.7 Create an Asynchronous Apex Class

Create an Apex Class to Delete all the WorkOrder records which meets the following criteriaL

1. Completed date should be more than 30 days.

2. Status should be ‘Resolved’. Create an Apex Class

1. Go to Setup --> Click on the gear icon --> Select Developer Console

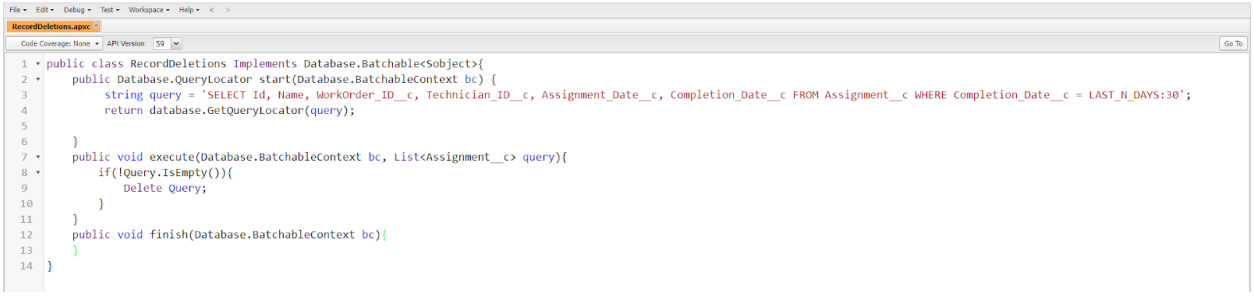
2. Then we can see the Developer console. Click on the developer console and you will navigate to a new console window.

3. To create a new Apex Class follow the below steps: Click on the file --> New --> Apex Class.

4. Give the Apex Class name as “RecordDeletion”.

5. Click ok.

6. Now write the code logic here




```
public class RecordDeletions Implements Database.Batchable<Sobject>{
    public Database.QueryLocator start(Database.BatchableContext bc) {
         string query = 'SELECT Id, Name, WorkOrder_ID__c, Technician_ID__c, Assignment_Date__c, Completion_Date__c FROM Assignment__c WHERE Completion_Date__c = LAST_N_DAYS:30';
         return database.GetQueryLocator(query);

    }
    public void execute(Database.BatchableContext bc, List<Assignment__c> query){
        if(!Query.IsEmpty()){
            Delete Query;
        }
    }
    public void finish(Database.BatchableContext bc){
    }
}
```

7.8 Create an Apex Schedule Class

1. Go to Setup --> Click on the gear icon --> Select Developer Console.

2. Then we can see the Developer console. Click on the developer console and you will navigate to a new console window.

3. To create a new Apex Class follow the below steps: Click on the file --> New --> Apex Class.

4. Give the Apex Class name as “ScheduleClass”.

5. Click ok.

6. Now write the code logic here

Source Code:

```
global class ScheduleClass implements Schedulable {
  global void execute(SchedulableContext SC) {
      RecordDeletions delrec = new RecordDeletions();
      database.executeBatch(delrec, 200);
  }
}
```

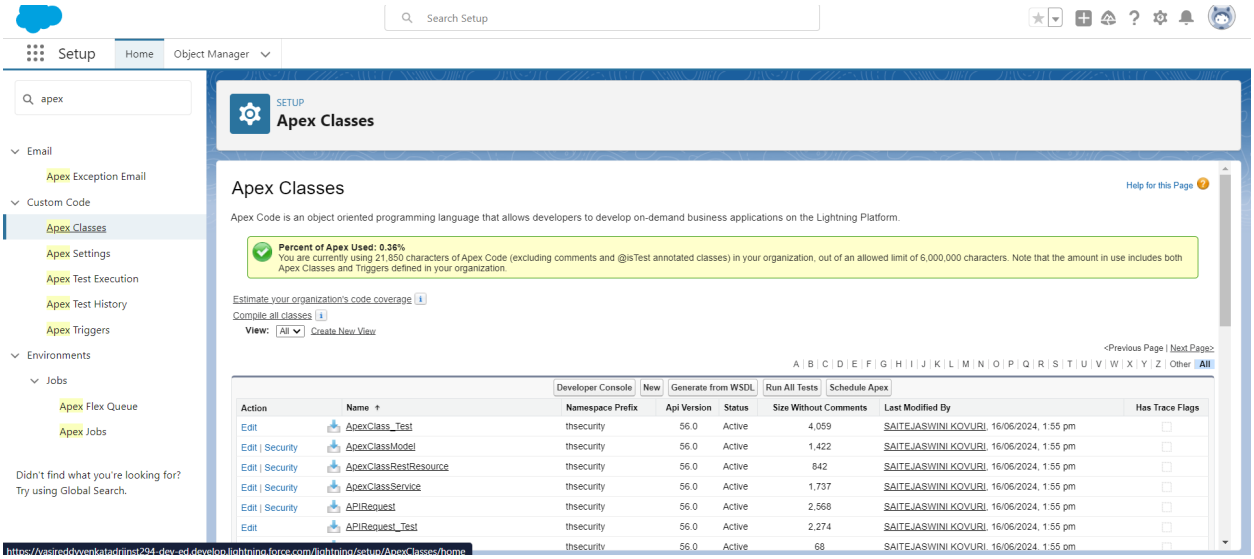
RecordDeletions.apxc | ScheduleClass.apxt

Code Coverage: None | API Version: 59

```
global class ScheduleClass implements Schedulable {
    global void execute(SchedulableContext SC) {
        RecordDeletions delrec = new RecordDeletions();
        database.executeBatch(delrec, 200);
    }
}
```

7.9 Create a Schedule Apex Schedule the Apex class:

1. From the Setup page search for “Apex Classes” in quick search.
2. Click on “Schedule Apex” as shown below.
3. Click on Schedule Apex and enter the Job name.
4. Job Name : DeleteAssignmentSchedule
5. Apex Class : ScheduleClass (from clicking on lookup icon)
6. Frequency : Monthly
7. Preferred Start Time : Select any time
8. Click Save.

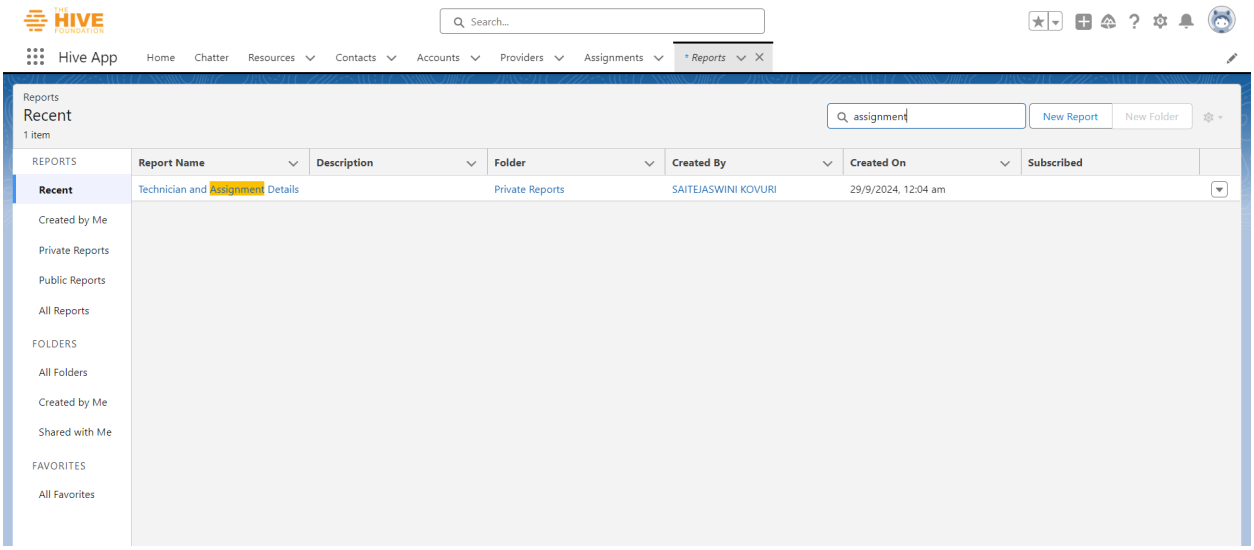


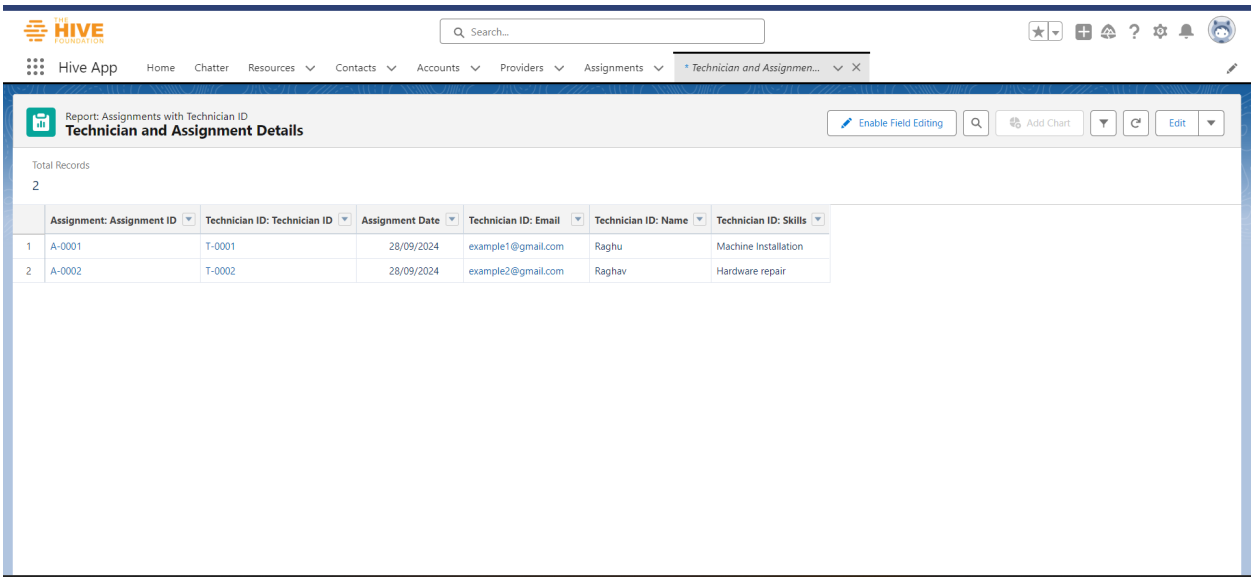
Task 8 :

8.1 Report

1. Go to the app --> click on the reports tab
2. Click New Report.
3. Select report type from category or from report type panel or from search panel --> click on start report.
4. Customize your report
5. Add fields from left pane as shown below
6. Grouped by workorder ID Save or run it.

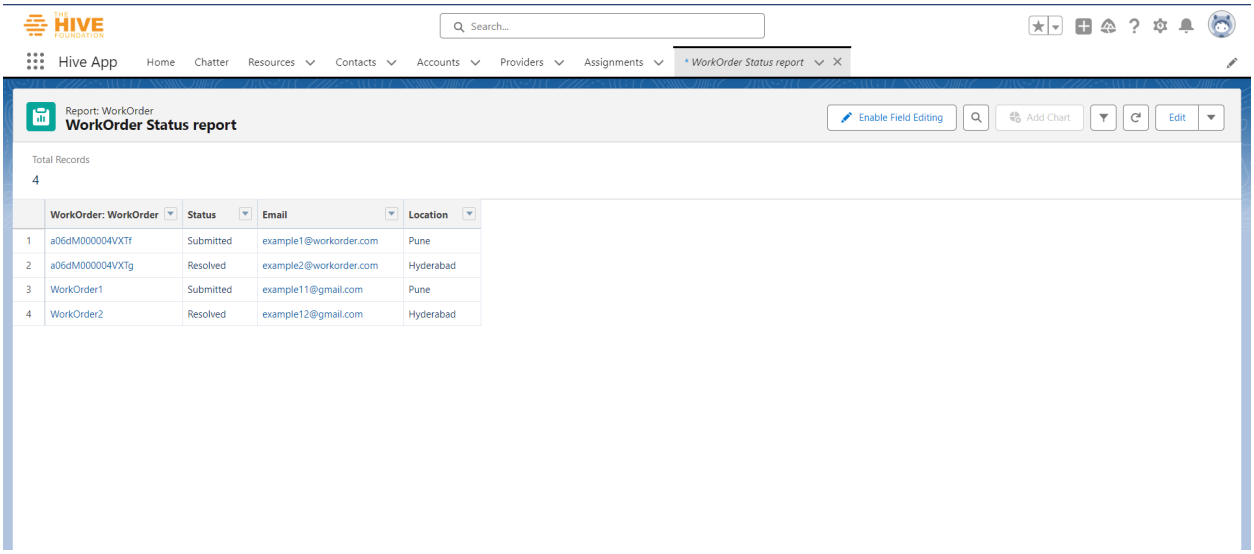
Note: Reports may get varied from the above pictures as the data might be different.





8.2 Create Reports

8.2.1 Create a report with report type: “WorkOrders Status Reports”.



8.2.2 Create a report with report type: “Technician and Assignment Details Reports”.

8.3 Dashboard

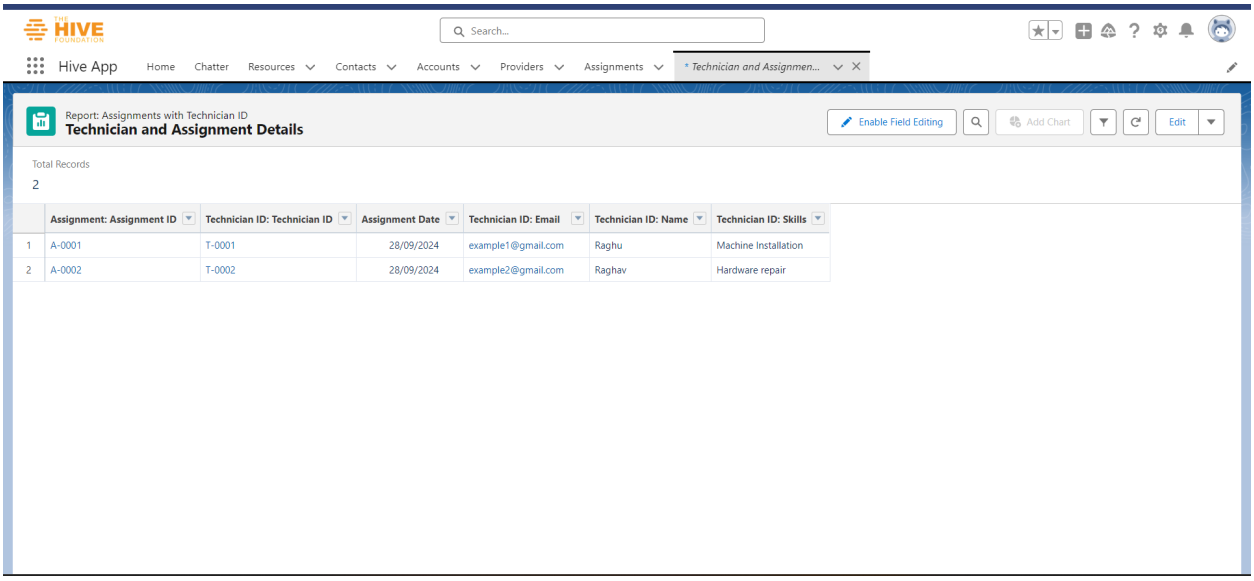
Go to the app --> click on the Dashboards tabs.

Give a Name and click on Create

Select add component.

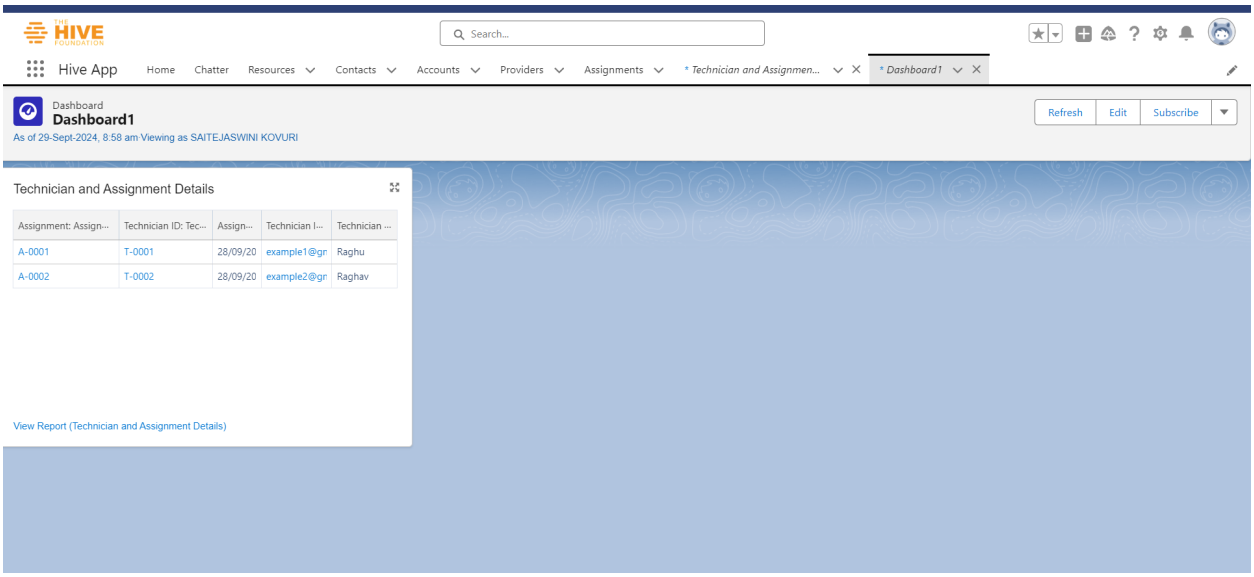
Select a Report which we have created in the previous activities and click on select.

Click Add then click on Save and then click on Done.



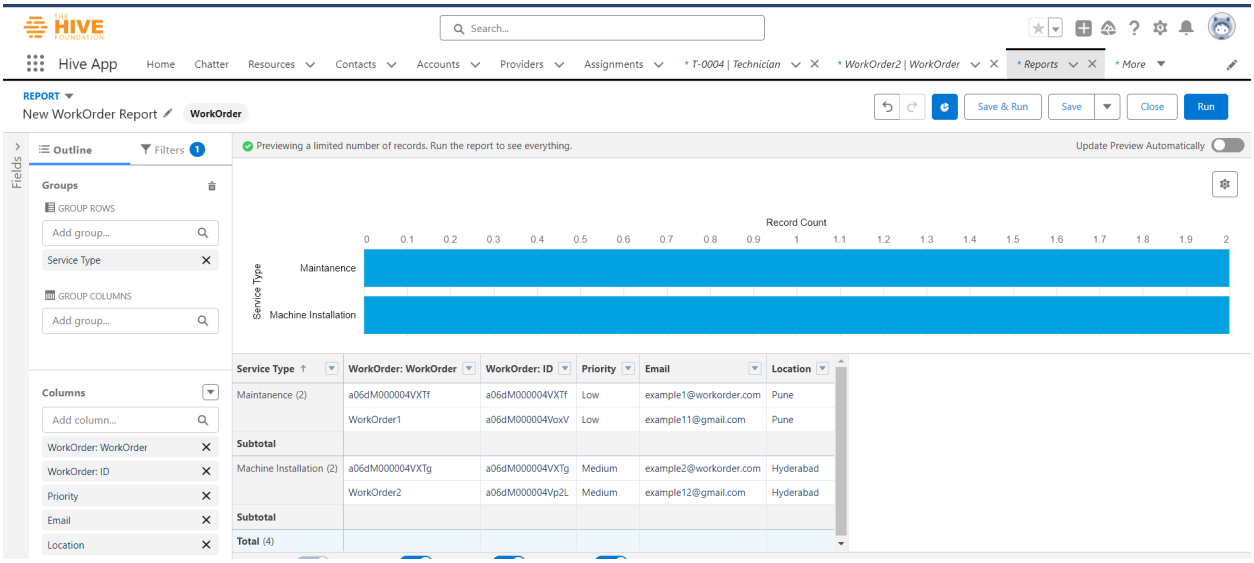
8.3 Dashboard

Go to the app --> click on the Dashboards tabs
Give a Name and click on Create. Select add component.
Select a Report which we have created in the previous activities and click on select.
Click Add then click on Save and then click on Done.



8.4 Create Dashboards

Create another Dashboard as we discussed in activity 3 which shows the details of completed workorder status in a vertical bar graph.



The above figure tells us about the report we used to create the following chart and dashboard.