



FIELD SERVICE WORKORDER OPTIMIZATION

Report

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PROJECT ABSTRACT

The Field Service Workorder Optimization project aims to enhance the efficiency and effectiveness of managing field service operations. By implementing automated scheduling systems, the project ensures work orders are prioritized and assigned based on technician availability, skills, and proximity, thereby reducing downtime and travel time. Real-time data integration and GPS tracking provide technicians with up-to-date information and directions, facilitating seamless communication with the back office. An intuitive user interface allows technicians to easily access and update job details, while managers benefit from dashboards displaying key performance metrics. This optimization not only increases operational efficiency and reduces costs but also improves customer satisfaction by ensuring timely and high-quality service delivery. Overall, the project leverages technology and data analytics to streamline field service management, resulting in significant improvements in resource utilization and service outcomes.

INTRODUCTION

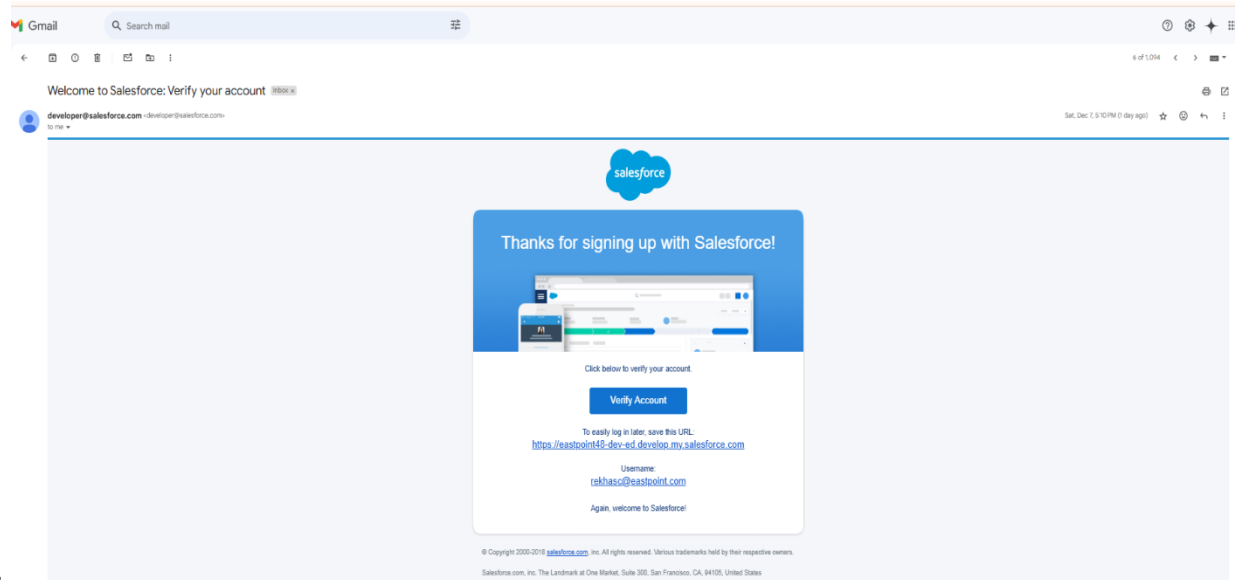
Efficient management of field service operations is crucial for organizations aiming to provide timely and high-quality service to their customers. The Field Service Workorder Optimization project addresses this need by leveraging advanced scheduling algorithms, real-time data integration, and intelligent resource allocation. In an industry where minimizing downtime, reducing travel time, and enhancing customer satisfaction are paramount, this project seeks to streamline the process of managing and executing work orders. By incorporating technology and data-driven strategies, the project aims to transform traditional field service management, ensuring optimal use of resources and improved service outcomes.

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1. Salesforce

- **Creating Developer Account** : Created a developer organization in salesforce platform by filling all the relevant details.



- **Account Activation** : Then I have got the mail, verified my account, and set up a password.

2. Object

- **Create Technician Object** : After downloading the given Technician spreadsheet, create custom object from spreadsheet, upload the technician.csv file and import the data as shown.
- **Create WorkOrder Object** : Same steps to be followed for work order object, here we no need to import the data as shown in the steps.
- **Create Assignment Object** : Creating a custom object with the label name as Assignment and enter the details, then save.

Create a custom object from a spreadsheet

Define object and fields

Choose the data source, map fields and their types, and import field data.

CSV File Details

Encoding Format: Unicode (UTF8) Values Separated By: Comma Field Label Source: Detect from row * Field Labels Row: 1 Import 5 rows of Data?: Yes, Import data Record Name Field: Let Salesforce Create a Default Record

Fields 7 of 7 to import Hide mapped fields

IMPORT FILE FIELD NAME	SALESFORCE FIELD NAME	SALESFORCE FIELD TYPE	ADD TO LAYOUTS	FIELD PREVIEW
Technician ID	Technician ID	Text	<input checked="" type="checkbox"/>	T-0001
Name	Name	Text	<input checked="" type="checkbox"/>	Raghu
Phone	Phone	Phone	<input checked="" type="checkbox"/>	7892341560
Email	Email	Email	<input checked="" type="checkbox"/>	raghu@gmail.com
Location	Location	Picklist	<input checked="" type="checkbox"/>	Hyderabad
Availability	Availability	Picklist	<input checked="" type="checkbox"/>	Available
Skills	Skills	Picklist	<input checked="" type="checkbox"/>	Machine Installation

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FIG 2.1: Create Technician Object

Create a custom object from a spreadsheet

Define object and fields

Choose the data source, map fields and their types, and import field data.

CSV File Details

Encoding Format: Unicode (UTF8) Values Separated By: Comma Field Label Source: Detect from row * Field Labels Row: 1 Import 2 rows of Data?: No, skip Import Record Name Field: WorkOrder ID

Fields 7 of 7 to import Hide mapped fields

IMPORT FILE FIELD NAME	SALESFORCE FIELD NAME	SALESFORCE FIELD TYPE	ADD TO LAYOUTS	FIELD PREVIEW
WorkOrder ID	WorkOrder ID	Text	<input checked="" type="checkbox"/>	WO-[0001]
Email	Email	Email	<input checked="" type="checkbox"/>	example1@workorder.com
Service Type	Service Type	Text	<input checked="" type="checkbox"/>	Maintenance
Description	Description	Text	<input checked="" type="checkbox"/>	
Location	Location	Picklist	<input checked="" type="checkbox"/>	Pune
Priority	Priority	Picklist	<input checked="" type="checkbox"/>	Low
Status	Status	Picklist	<input checked="" type="checkbox"/>	Submitted

Back Next

FIG 2.2 : Create WorkOrder Object

Assignment

Custom Object Definition Edit

Save Save & New Cancel

Custom Object Information

The singular and plural labels are used in tabs, page layouts, and reports. Be careful when changing the name or label as it may affect existing integrations and merge templates.

Label: Assignment Example: Account

Plural Label: Assignments Example: Accounts

Starts with vowel sound: ☐

The Object Name is used when referencing the object via the API.

Object Name: Assignment Example: Account

Description:

Context-Sensitive Help Setting: ☒ Open the standard Salesforce.com Help & Training window ☐ Open a window using a Visualforce page

Content Name: --None--

Enter Record Name Label and Format

The Record Name appears in page layouts, key lists, related lists, lookups, and search results. For example, the Record Name for Account is "Account Name" and for Case it is "Case Number". Note that the Record Name field is always called "Name" when referenced via the API.

Record Name: Assignment ID Example: Account Name

Data Type: Auto Number Warning: If you plan to insert a high volume of records in this object, via the API for example, use the Text data type.

Display Format: A-0000 Example: A-0000 What is This?

FIG 2.3 : Create Assignment Object

3. Tabs

- **Creating a Custom Tab** : Select the Tabs option in Quick find box and create new tab named Assignment.

SETUP
Tabs

Edit Custom Object Tab
Assignments

Fill in the fields below to define the custom tab.

Custom Tab Definition Edit

Custom Object Tab Information Required Information

Tab Label: Assignments
Object: Assignment
Tab Style: Cell phone

(Optional) Choose a Home Page Custom Link to show as a splash page the first time your users click on this tab.
Splash Page Custom Link: --None--

Enter a short description.
Description:

eastpoint48-dev-ed.develop.lightning.force.com/lightning/setup/CustomTabs/home

Setup Home Object Manager

Search Setup

tabs

User Interface
Rename Tabs and Labels
Tabs

Didn't find what you're looking for?
Try using Global Search.

Custom Tabs

You can create new custom tabs to extend Salesforce functionality or to build new application functionality.
Custom Object tabs look and behave like the standard tabs provided with Salesforce. Web tabs allow you to embed external web applications and content within the Salesforce window. Visualforce tabs allow you to embed Visualforce pages. Lightning Component tabs allow you to add Lightning components to the navigation menu in Lightning Experience and the mobile app.

Custom Object Tabs New | What's This?

Action	Label	Tab Style	Description
Edit Del	Assignments	Airplane	
Edit Del	Technician - Technician	Box	
Edit Del	Work Order ID	Box	

Web Tabs New | What's This?

No Web tabs have been defined

- By default, Technician and WorkOrder tabs will be created once the custom object is created.

4. The Lightning App

- **Create a Lightning App** : Again, in quick find box, go to app manager and create new lightning app with the name of project and some further details.

- Add Navigation Items (i.e, Home, WorkOrder, Assignments, Technician, Reports and Dashboards)
- Add User Profile (i.e, System Administrator)
- Then click save and finish

App Details & Branding

Give your Lightning app a name and description. Upload an image and choose the highlight color for its navigation bar.

App Details

*App Name ⓘ
Field Service WorkOrder Optimization

*Developer Name ⓘ
Field_Service_WorkOrder_Optimization

Description ⓘ
Give a meaningful description
Image

App Branding

Image ⓘ
Upload

Primary Color Hex Value ⓘ
#0070D2

Org Theme Options
☐ Use the app's image and color instead of the org's custom theme

FIG 4.1: Create Lightning App

Navigation Items

Choose the items to include in the app, and arrange the order in which they appear. Users can personalize the navigation to add or move items, but users can't remove or rename the items that you add. Some navigation items are available only for phone or only for desktop. These items are dropped from the navigation bar when the app is viewed in a format that the item doesn't support.

Available Items ⓘ Create ▾

Type to filter list...

- Accounts
- All Sites
- Alternative Payment Methods
- Analytics
- App Launcher
- Appointment Categories
- Appointment Invitations
- Annual Reviews

Selected Items

- Home
- WorkOrder
- Assignments
- Technician
- Reports
- Dashboards

FIG 4.2 : Add Navigation Items

User Profiles

Choose the user profiles that can access this app.

Available Profiles

Type to filter list...

- Analytics Cloud Integration User
- Analytics Cloud Security User
- Authenticated Website

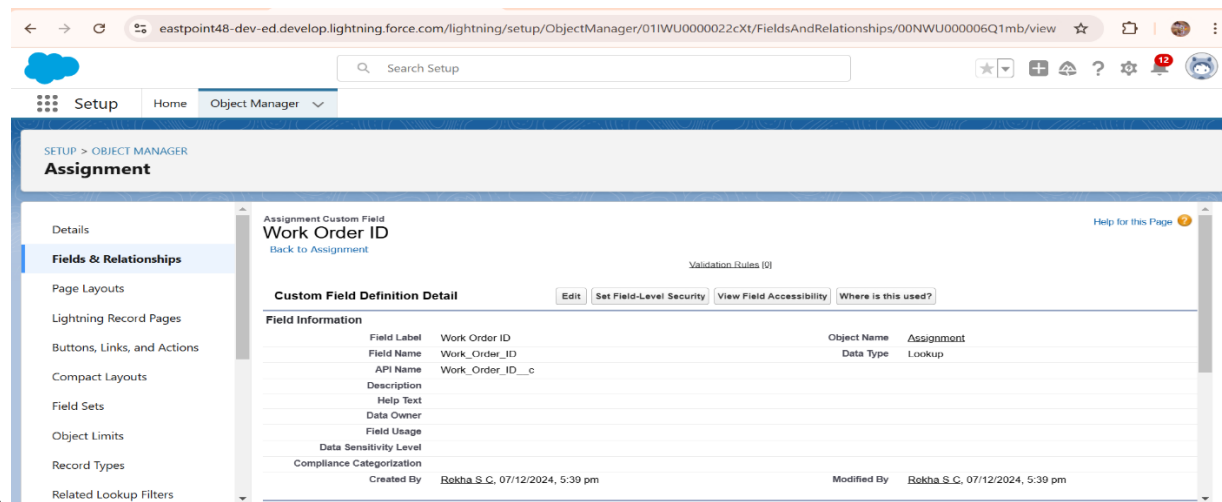
Selected Profiles

- System Administrator

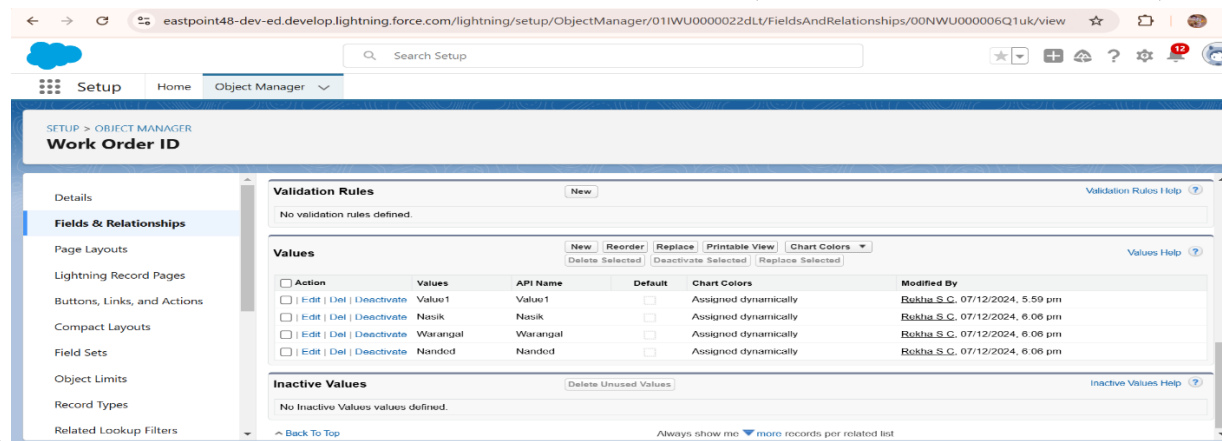
FIG 4.3 Add User Profile

5) Fields & Relationships

Creating Lookup Field In Assignment Object : In Assignment go to Fields & Relationships and create a new field labeled as WorkOrder and datatype as Lookup.



- Manage your Picklist Values : In Object Manager select WorkOrder object go to fields & relationships. In that location field add new values (i.e, Nasik, Warangal, Nanded).



- Add more values in the fields of priority(i.e, High) and Service type(i.e, Hardware repair, Troubleshoot/Debugging, Lane-Management).

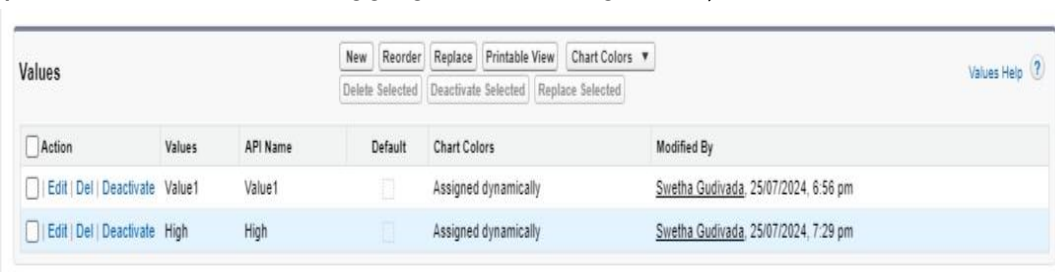


FIG 5.1 Priority Field

Values					
<div> <div>New Reorder Replace Printable View Chart Colors</div> <div>Delete Selected Deactivate Selected Replace Selected</div> </div>					
Action	Values	API Name	Default	Chart Colors	Modified By
<input type="checkbox"/> Edit <input type="checkbox"/> Del <input type="checkbox"/> Deactivate	Value1	Value1	<input type="checkbox"/>	Assigned dynamically	Swetha Gudivada, 25/07/2024, 6:56 pm
<input type="checkbox"/> Edit <input type="checkbox"/> Del <input type="checkbox"/> Deactivate	Hardware repair	Hardware repair	<input type="checkbox"/>	Assigned dynamically	Swetha Gudivada, 25/07/2024, 7:30 pm
<input type="checkbox"/> Edit <input type="checkbox"/> Del <input type="checkbox"/> Deactivate	Troubleshoot/Debugging	Troubleshoot/Debugging	<input type="checkbox"/>	Assigned dynamically	Swetha Gudivada, 25/07/2024, 7:30 pm
<input type="checkbox"/> Edit <input type="checkbox"/> Del <input type="checkbox"/> Deactivate	Lane-Management	Lane-Management	<input type="checkbox"/>	Assigned dynamically	Swetha Gudivada, 25/07/2024, 7:30 pm

FIG 5.2 Service Type Field

- **Creating Formula Field in WorkOrder Object:** Now create a Formula Datatype and give the field label as "date". The formula is "CreateDate".

Setup > OBJECT MANAGER
Assignment

Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types
Related Lookup Filters

Custom Field Definition Detail

Field Information

Field Label	Date	Object Name	Assignment
Field Name	Date		
API Name	Date__c		
Description			
Help Text			
Data Owner			
Field Usage			
Data Sensitivity Level			
Compliance Categorization			
Created By	Rekha S.C, 07/12/2024, 6:20 pm	Modified By	Rekha S.C, 07/12/2024, 6:20 pm

Formula Options

Data Type	Formula
CreateDate	

- Now, in the Assignment object, create a Formula Datatype in Fields & relationships. Add Technician ID with return type Date.

Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types
Related Lookup Filters
Search Layouts

Field Information

Field Label	Technician ID	Object Name	Assignment
Field Name	Technician_ID	Data Type	Lookup
API Name	Technician_ID__c		
Description			
Help Text			
Data Owner			
Field Usage			
Data Sensitivity Level			
Compliance Categorization			
Created By	Swetha Gudivada, 25/07/2024, 7:49 pm	Modified By	Swetha Gudivada, 25/07/2024, 8:30 pm

Lookup Options

Related To	Technician	Child Relationship Name	Assignments
Related List Label	Assignments		
Required	<input type="checkbox"/>		
What to do if the lookup record is deleted?	Clear the value of this field.		

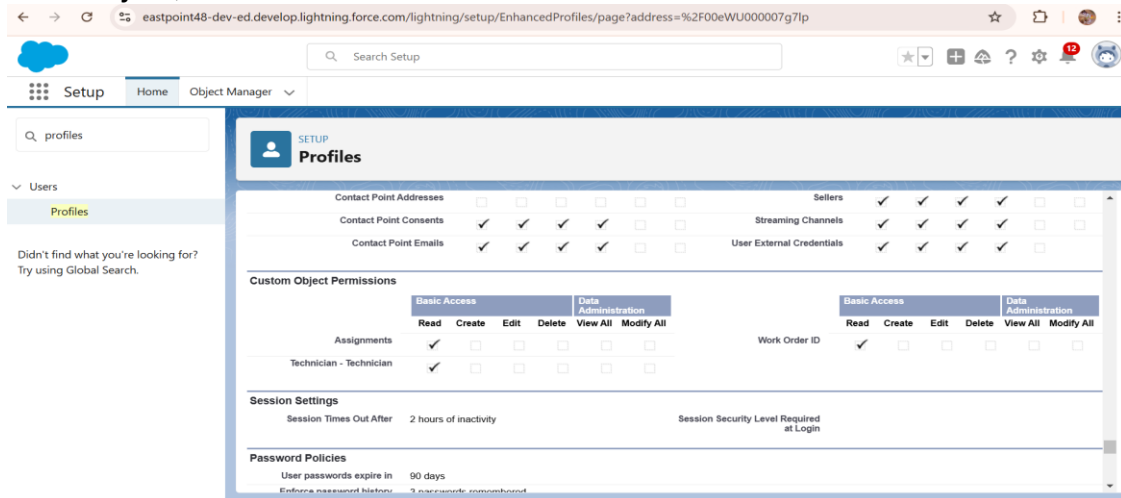
Lookup Filter

No lookup filters defined.

- Add Assignment Date with Formula with return type date (WorkOrder_ID_r.Date_c).
- Add Completion Date with Formula with return type date " IF(ISPICKVAL(WorkOrder_ID_r.Status_c , 'Resolved'), WorkOrder_ID_r.LastModifiedDate , NULL)"

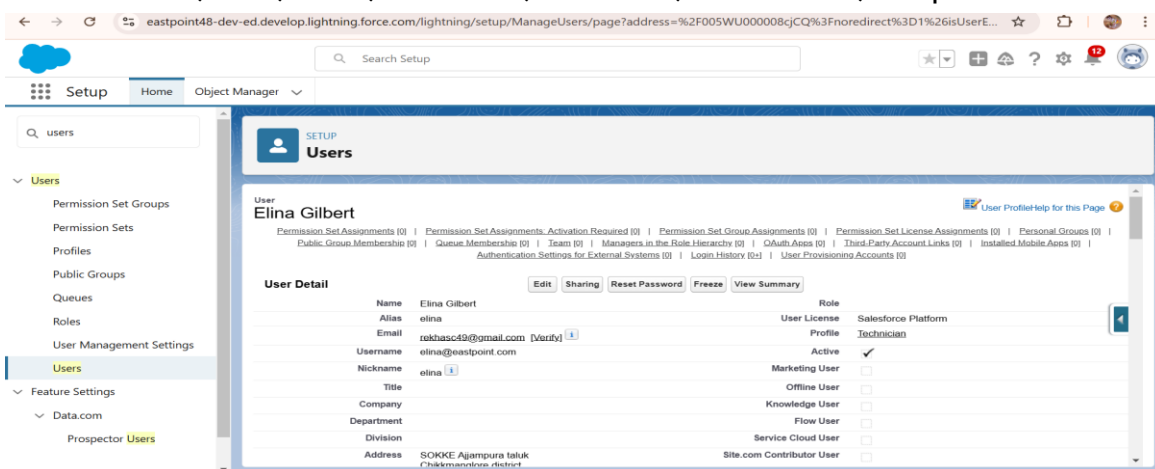
6. Profiles

- **Technician Profile** : To create a new profile in Salesforce, navigate to Setup, type "Profiles" in the Quick Find box, and select "Profiles." Click "New Profile," choose "Standard Platform User" as the existing profile, name it "Technician," and click "Save." On the profile page, click "Edit." Scroll to Custom Object Permissions and grant Read- only access for Technician, WorkOrder, and Assignment objects, then click "Save." On the profile detail page, scroll to Custom Field-Level Security, click "View" next to the WorkOrder object, then "Edit." Enable the checkbox for the Status field and click "Save."



7. Users

- **Create User** : Go to User and create a new one with new name and other details such as last-name, alias, email, username, nickname, user license, and profiles.



8. Apex Trigger

- **Create Apex Class** : To create a new Apex Class in Salesforce, go to Setup, click the gear icon, and select "Developer Console." The Developer Console will open in a new window. Click on "File," then "New," and select "Apex Class." Name the class "WorkOrderClass" and click "OK."

- **Create Apex Trigger** : To create a new Apex Trigger in Salesforce, open the Developer Console, click on "File," then "New," and select "Apex Trigger." Name the trigger "WorkOrderTrigger" and select "WorkOrder_c" from the sObject dropdown. Click "Submit" to create the trigger.

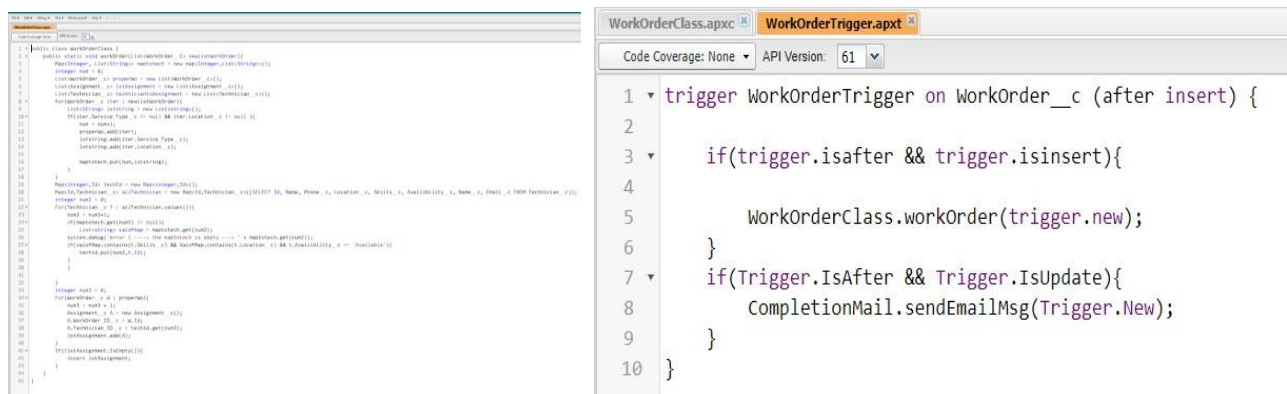


FIG 8.1 WorkOrder Apex Class and Trigger Code

- **Create Apex Class** : To create a new Apex Class in Salesforce, go to Setup, click the gear icon, and select "Developer Console." The Developer Console will open in a new window. Click on "File," then "New," and select "Apex Class." Name the class "AssigningEmail" and click "OK."

- **Create Apex Trigger** : To create a new Apex Trigger in Salesforce, open the Developer Console, click on "File," then "New," and select "Apex Trigger." Name the trigger "AssignmentTrigger" and select "WorkOrder_c" from the sObject dropdown. Click "Submit" to create the trigger.

```

1 public class AssigningEmail {
2     public static void sendEmailMsg(List<Assignment__c> asRe){
3         List<messaging.SingleEmailMessage> myVar = new List<messaging.SingleEmailMessage>();
4         Map<Id, Technician__c> technicians = new Map<Id, Technician__c>((SELECT Id, Phone__c, Location__c, Skills__c, Name__c, Email__c, Availability__c, Name FROM Technician__c));
5         try{
6             for(Assignment__c con : asRe){
7                 if(con.Technician_ID__c != null){
8                     messaging.SingleEmailMessage mail = new messaging.SingleEmailMessage();
9                     List<String> sendTo = new List<String>();
10                    sendTo.add(technicians.Get(con.Technician_ID__c).Email__c);
11                    mail.setToAddresses(sendTo);
12                    string subject = 'WorkOrder Assignment';
13                    mail.setSubject(subject);
14                    string body = 'The following WorkOrder has been assigned to you';
15                    mail.setHtmlBody(body);
16                    myVar.add(mail);
17                }
18            }
19            Messaging.sendEmail(myVar);
20        }
21        catch(exception e){
22            system.debug('Error ----- ' + e.getMessage());
23        }
24    }
25 }

```

```

File Edit Debug Test Workspace Help < >
WorkOrderClass.apxc WorkOrderTrigger.apxt AssigningEmail.apxc AssignmentTrigger.apxt
Code Coverage: None API Version: 61
1 trigger AssignmentTrigger on Assignment__c (after insert) {
2     if(Trigger.IsAfter && Trigger.IsInsert){
3         AssigningEmail.sendEmailMsg(Trigger.New);
4     }
5 }

```

FIG 8.2 Assignment Apex Class and Trigger Code

- Create Apex Class : To create a new Apex Class in Salesforce, go to Setup, click the gear icon, and select "Developer Console." The Developer Console will open in a new window. Click on "File," then "New," and select "Apex Class." Name the class "CompletionMail" and click "OK."

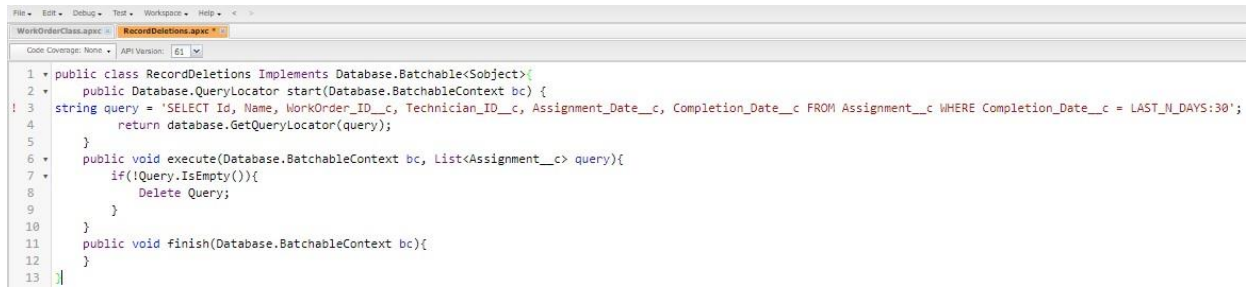
```

File Edit Debug Test Workspace Help < >
WorkOrderClass.apxc WorkOrderTrigger.apxt AssigningEmail.apxc AssignmentTrigger.apxt CompletionMail.apxc
Code Coverage: None API Version: 61
1 public class CompletionMail {
2     public static void sendEmailMsg(List<WorkOrder__c> workOrderList){
3         List<messaging.SingleEmailMessage> myVar = new List<messaging.SingleEmailMessage>();
4         for(WorkOrder__c con : workOrderList){
5             if(con.Status__c == 'Resolved'){
6                 messaging.SingleEmailMessage mail = new messaging.SingleEmailMessage();
7                 List<String> sendTo = new List<String>();
8                 sendTo.add(con.Email__c);
9                 mail.setToAddresses(sendTo);
10                string subject = 'Status Updated';
11                mail.setSubject(subject);
12                string body = 'email body';
13                mail.setHTMLBody(body);
14                myVar.add(mail);
15            }
16        }
17        Messaging.sendEmail(myVar);
18    }
19 }

```

FIG 8.3 Completion Apex Class Code

- Create an Asynchronous Apex Class : To create a new Apex Class in Salesforce, go to Setup, click the gear icon, and select "Developer Console." The Developer Console will open in a new window. Click on "File," then "New," and select "Apex Class." Name the class "Record Deletion" and click "OK."



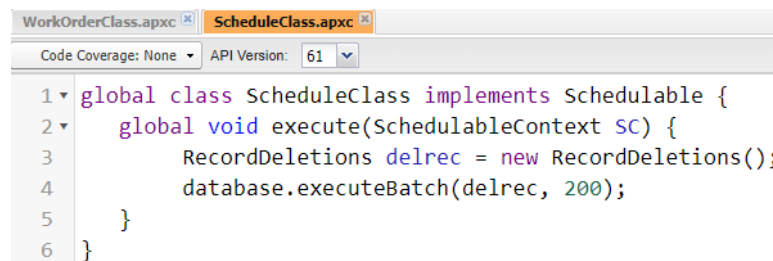
```

1 public class RecordDeletions implements Database.Batchable<Sobject> {
2     public Database.QueryLocator start(Database.BatchableContext bc) {
3         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';
4         return database.GetQueryLocator(query);
5     }
6     public void execute(Database.BatchableContext bc, List<Assignment__c> query){
7         if(!Query.IsEmpty()){
8             Delete Query;
9         }
10    }
11    public void finish(Database.BatchableContext bc){
12    }
13 }

```

FIG 8.4 RecordDeletion Apex Class Code

- Create an Apex Schedule Class : To create a new Apex Class in Salesforce, go to Setup, click the gear icon, and select "Developer Console." The Developer Console will open in a new window. Click on "File," then "New," and select "Apex Class." Name the class "Schedule" and click "OK."



```

1 global class ScheduleClass implements Schedulable {
2     global void execute(SchedulableContext sc) {
3         RecordDeletions delrec = new RecordDeletions();
4         database.executeBatch(delrec, 200);
5     }
6 }

```

FIG 8.5 Schedule Apex Class Code

- Create A Schedule Apex : To schedule an Apex class in Salesforce, go to Setup and search for "Apex Classes" in the Quick Find box. Click on "Schedule Apex." Enter the Job Name as "DeleteAssignmentSchedule," select "ScheduleClass" using the lookup icon for the Apex Class, set the Frequency to "Monthly," and choose a Preferred Start Time. Save the schedule to automate the Apex class execution.

9. Reports & Dashboards

- Create Reports : To create a new report in Salesforce, go to the app and click on the Reports tab. Click "New Report." Select the report type from the category, report type panel, or search panel, then click "Start Report." Customize your report by adding fields from the left pane. Group the report by Work Order ID for better organization. Save and run the report to view the results.

Field Service WorkO... Home WorkOrder Assignments Technician Reports Dashboards

Reports
Recent
3 items

Search recent reports... New Report New Folder

REPORTS	Report Name	Description	Folder	Created By	Created On	Subscribed
Recent	Work Orders Status Report		Private Reports	Swetha Gudivada	26/7/2024, 6:30 pm	
Created by Me	Technician and Assignment Details Report		Private Reports	Swetha Gudivada	26/7/2024, 7:02 pm	
Private Reports	New Assignments with WorkOrder ID Report		Private Reports	Swetha Gudivada	25/7/2024, 10:55 pm	
Public Reports						
All Reports						

- Created a report type on "WorkOrders Status Reports", "Technician and Assignment Details Reports", "New Assignment with WorkOrder ID Report".

Report: Technician
Technician and Assignment Details Report

Enable Field Editing Add Chart Edit

Total Records
2

Technician: Technician ID	Name	Phone	Email	Location	Availability	Skills
T-0001 (1)	Raghu	7892341560	raghu@gmail.com	Hyderabad	Available	Machine Installation
Subtotal						
T-0005 (1)	Swetha	8247373154	swetha25@gmail.com	Hyderabad	Available	Lane-Management
Subtotal						
Total (2)						

FIG 9.1 Technician and Assignment Details Report

- Create Dashboards : To create a dashboard in Salesforce, go to the app and click on the Dashboards tab. Click "New Dashboard," give it a name, and click "Create." Select "Add Component," choose the report you created previously, and click "Select." Click "Add," then "Save," and finally, click "Done" to complete the dashboard setup.

Dashboards
Recent
3 items

Search recent dashboards... New Dashboard New Folder

DASHBOARDS	Dashboard Name	Description	Folder	Created By	Created On	Subscribed
Recent	Dashboard1		Private Dashboards	Swetha Gudivada	26/7/2024, 7:05 pm	
Created by Me	Dashboard3		Private Dashboards	Swetha Gudivada	26/7/2024, 7:08 pm	
Private Dashboards	Dashboard2		Private Dashboards	Swetha Gudivada	26/7/2024, 7:07 pm	

- Created all three Dashboards on the above Reports.

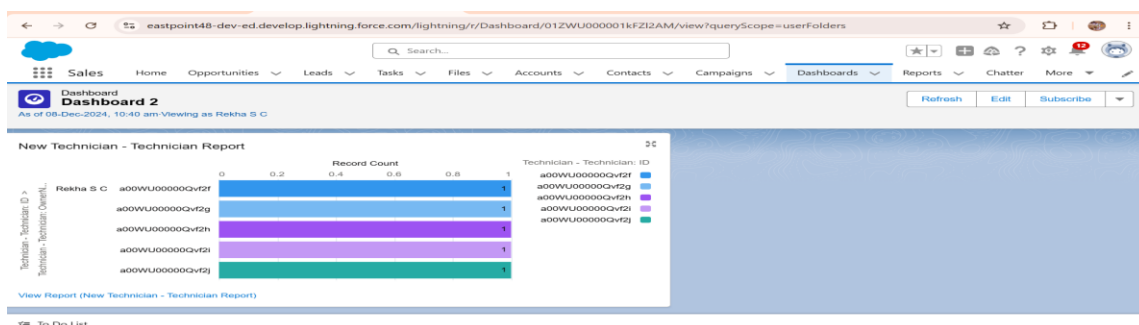


FIG 9.2 Technician and Assignment Details Report Dashboard