

AeroSense: Phase 3 Documentation

Phase Title: Data Modeling & Relationships

Objective: To design and implement the data model of the AeroSense application, including custom objects, fields, and relationships that support real-time air quality monitoring.

1. Custom Objects

- **Sensor__c:** Represents physical air quality sensors deployed in the field.
- **Reading__c:** Stores air quality measurements (PM2.5, PM10, AQI, etc.) linked to a Sensor.
- **Alert__c:** Created when a Reading exceeds defined AQI thresholds.
- **DailyAggregate__c:** Stores summarized AQI values (average, max, min) for each sensor per day.
- **Calibration__c:** Records calibration activities to ensure sensor accuracy.

2. Fields on Sensor__c

- Device_Serial__c (Text, External ID, Unique)
- Location__Latitude__s and Location__Longitude__s (Geolocation)
- Status__c (Picklist: Active, Inactive, Needs_Calibration)
- Trust_Score__c (Number, 0–100)
- Last_Seen__c (Date/Time)

SETUP > OBJECT MANAGER

Sensor

Details	Fields & Relationships			Q, Quick Find	New	Deleted Fields	Field Dependencies	Set History Tracking
Fields & Relationships	11 Items, Sorted by Field Label							
Page Layouts	Device Serial	Device_Serial__c	Text(60) (External ID) (Unique Case Insensitive)	✓				
Lightning Record Pages	Last Modified By	LastModifiedById	Lookup(User)					
Buttons, Links, and Actions	Last Seen	Last_Seen__c	Date/Time					
Compact Layouts	Latitude	Latitude__c	Number(9, 6)					
Field Sets	Location	Location__c	Geolocation					
Object Limits	Longitude	Longitude__c	Number(9, 6)					
Record Types	Owner	OwnerId	Lookup(User,Group)	✓				
Related Lookup Filters	Sensor Name	Name	Text(80)	✓				
Search Layouts	Status	Status__c	Picklist					
List View Button Layout	Trust Score	Trust_Score__c	Number(3, 0)					
Restriction Rules								
Scoping Rules								

3. Fields on Reading__c

- PM25__c (Number, 3,1)
- PM10__c (Number, 3,1)
- AQI__c (Number, calculated via Apex/Flow)
- Timestamp__c (Date/Time)
- Source__c (Picklist: Device, API, Manual)
- Sensor__c (Master-Detail to Sensor__c)

5. Fields on DailyAggregate__c

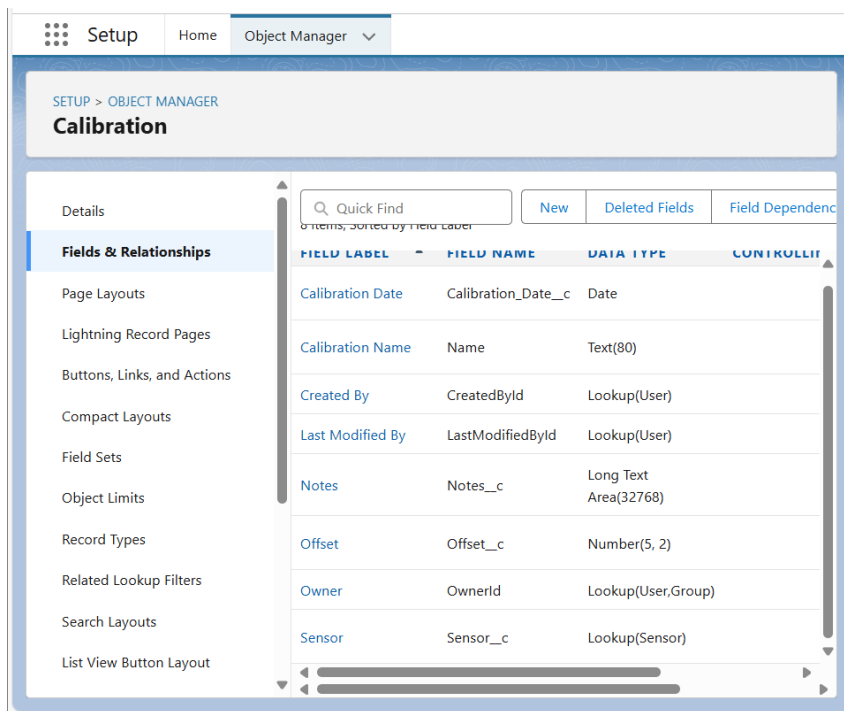
- Sensor__c (Lookup to Sensor__c)
- Date__c (Date)
- Avg_AQI__c (Number)
- Max_AQI__c (Number)
- Min_AQI__c (Number)

The screenshot shows the Salesforce Object Manager interface for the 'DailyAggregate' object. The left sidebar contains a navigation menu with options: Details, Fields & Relationships (selected), Page Layouts, Lightning Record Pages, Buttons, Links, and Actions, Compact Layouts, Field Sets, Object Limits, Record Types, Related Lookup Filters, Search Layouts, List View Button Layout, and Restriction Rules. The main content area is titled 'Fields & Relationships' and shows '9 Items, Sorted by Field Label'. A table lists the fields with their labels, names, and data types.

FIELD LABEL	FIELD NAME	DATA TYPE
Avg AQI	Avg_AQI__c	Number(5, 1)
Created By	CreatedById	Lookup(User)
DailyAggregate Name	Name	Auto Number
Date	Date__c	Date
Last Modified By	LastModifiedById	Lookup(User)
Max AQI	Max_AQI__c	Number(5, 2)
Min AQI	Min_AQI__c	Number(5, 1)
Owner	OwnerId	Lookup(User,Group)
Sensor	Sensor__c	Lookup(Sensor)

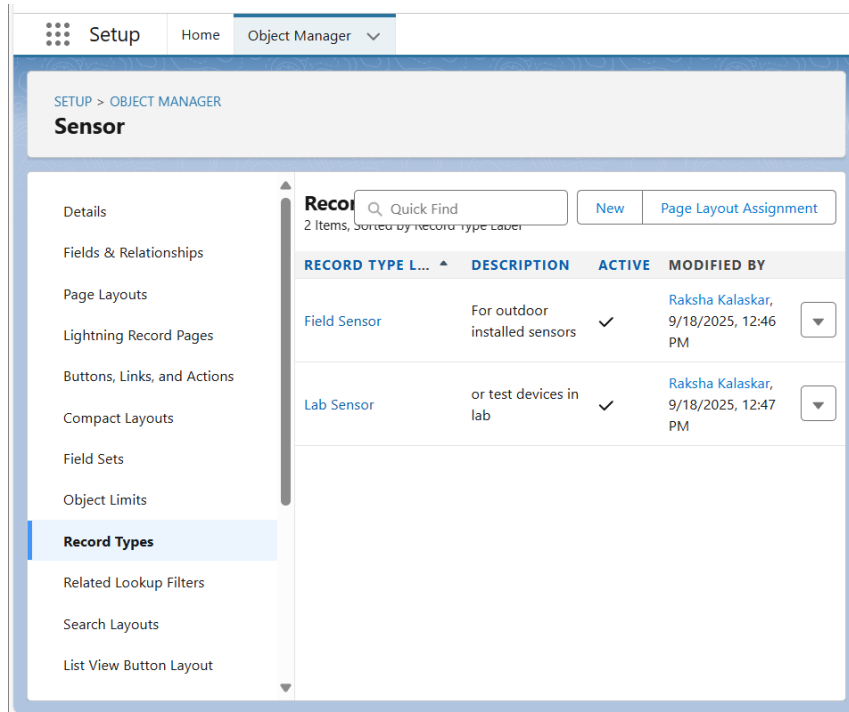
6. Fields on Calibration__c

- Sensor__c (Lookup to Sensor__c)
- CalibrationDate__c (Date)
- Offset__c (Number)
- Notes__c (Long Text Area)

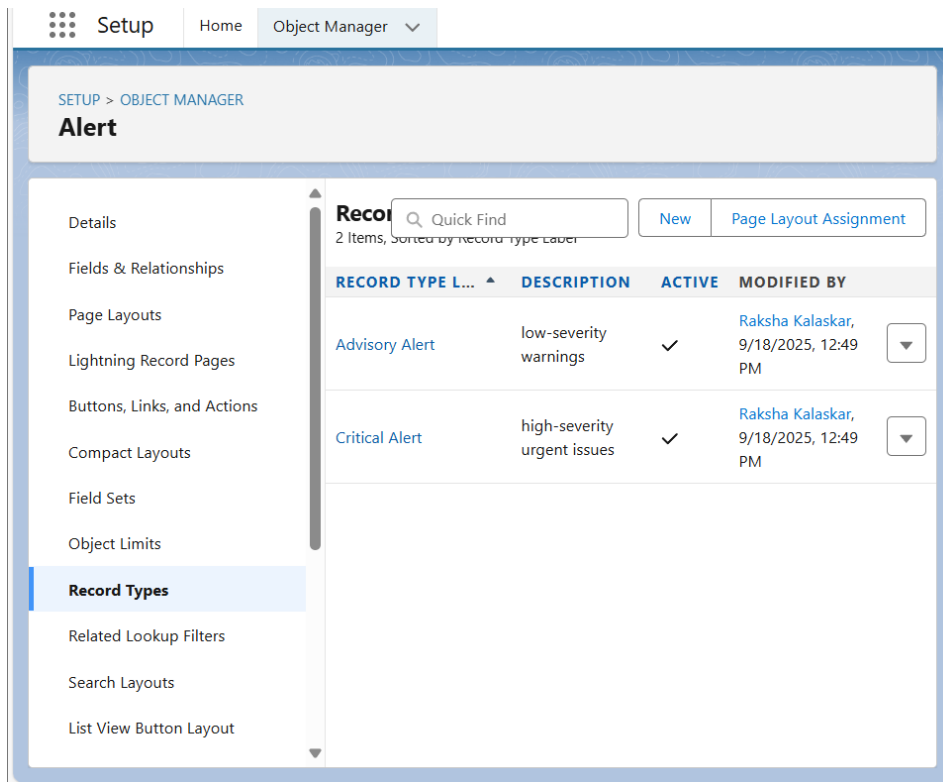


7. Record Types

- **Sensor__c**: Field vs. Lab sensors (optional).

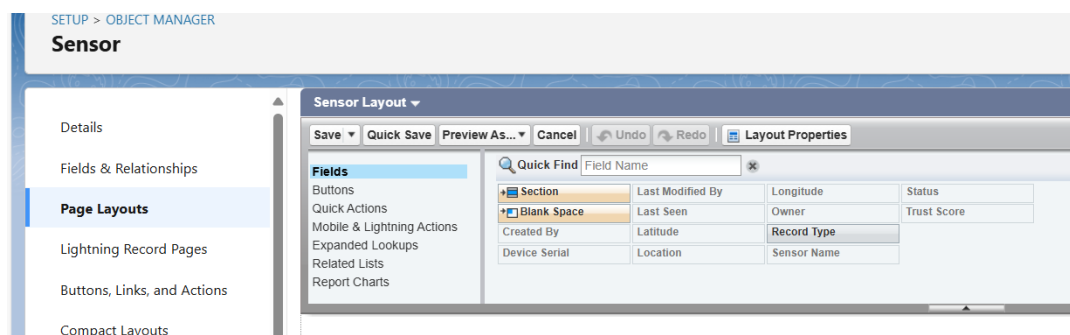


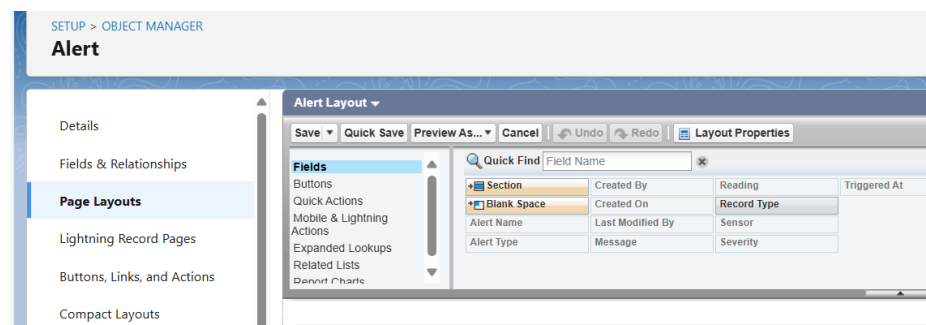
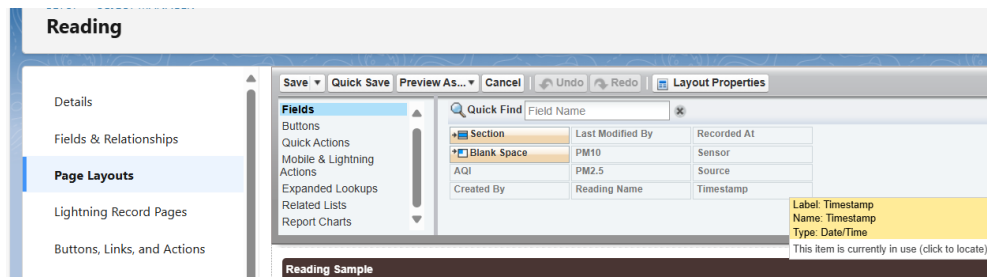
- **Alert__c**: Advisory vs. Critical alerts.



8. Page Layouts & Compact Layouts

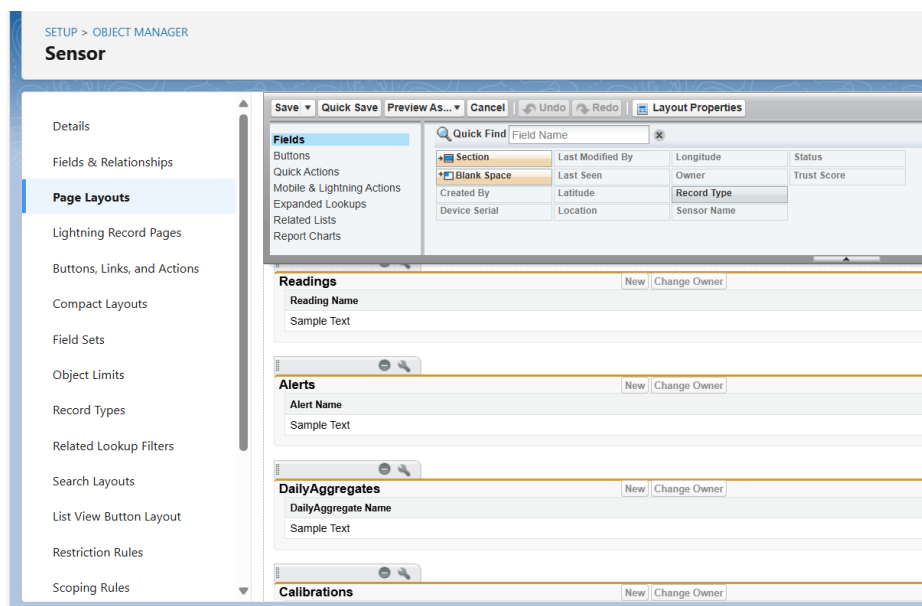
- **Sensor Layout:** Device details, trust score, related list of Readings & Alerts.
- **Reading Layout:** Measurement values, AQI, related Sensor.
- **Alert Layout:** Severity, Message, Related Reading & Sensor.
- **Compact Layouts:** Show Sensor Name, Status, Trust Score in highlights panel.





9. Relationships

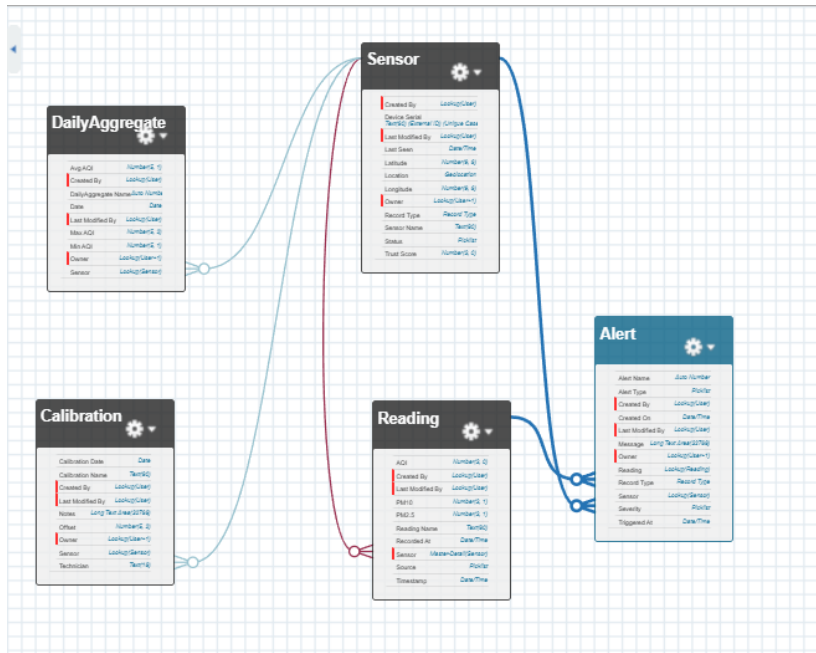
- Sensor__c (Parent) → Reading__c (Child, Master-Detail)
- Sensor__c (Parent) → Alert__c (Child, Lookup)
- Sensor__c (Parent) → DailyAggregate__c (Child, Lookup)
- Sensor__c (Parent) → Calibration__c (Child, Lookup)



10. Schema Builder

- Use **Setup → Schema Builder** to visualize objects and confirm relationships.

- Ensure relationships are clearly visible for stakeholders.



11. Example SOQL Query (Developer)

```
List<Sensor__c> sensors = [
    SELECT Id, Name, Trust_Score__c,
        (SELECT PM25__c, PM10__c, AQI__c, Timestamp__c
        FROM Readings__r ORDER BY Timestamp__c DESC LIMIT 1)
    FROM Sensor__c
];
```