# AutoCare Pro - Smart Vehicle Service Management

### **Phase 3 Implementation Documentation**



Project Name: AutoService Manager Phase: 3 - Data Modeling & Relationships Salesforce Edition: Developer Edition Implementation Date: [Current Date] Implemented by: [Your Name]

Organization: Gyan Ganga Institute of Technology and Sciences

## **@** Phase 3 Objectives Completed

- ✓ Custom Object Architecture
- Entity Relationship Design
- **✓** Field Configuration & Data Types
- ✓ Master-Detail & Lookup Relationships
- **✓** Junction Object Implementation
- Record Types Configuration
- **✓** Page Layout Design
- Compact Layout Optimization
- Schema Builder ERD
- **✓** Field-Level Security
- **✓** Data Model Testing & Validation



**Object Creation Summary** 

| Object<br>Name     | API Name         | Record Name<br>Format | Purpose                                 | Status            |
|--------------------|------------------|-----------------------|---|-------------------|
| Vehicle            | Vehiclec         | VEH-{0000000}         | Vehicle information management          | <b>✓</b> Deployed |
| Service<br>History | Service_Historyc | SRV-{0000000}         | Historical service records              | <b>✓</b> Deployed |
| Parts<br>Inventory | Parts_Inventoryc | : Text (Part Number)  | Auto parts stock management             | ✓<br>Deployed     |
| Parts Used         | Parts_Usedc      | PU-{0000000}          | Junction object for work orders & parts | ✓<br>Deployed     |

### **Object Configuration Details**

#### 1. Vehicle Custom Object

**Location:** Setup → Object Manager → Vehicle

#### **Basic Configuration:**

Label: Vehicle

Plural Label: Vehicles
Object Name: Vehicle

Description: Vehicle information for service management

Record Name: Vehicle Number (Auto Number)

Starting Number: 1

#### **Features Enabled:**

- Allow Reports
- Allow Activities
- Track Field History (20 fields)
- Allow in Chatter Groups
- Allow Sharing
- Allow Search
- **W** Bulk API Access
- Streaming API Access

**Custom Tab Created:** Vehicle Tab (Car Icon)

#### 2. Service History Custom Object

**Location:** Setup → Object Manager → Service\_History

#### **Basic Configuration:**

Label: Service History

Plural Label: Service Histories Object Name: Service\_History

Description: Historical record of all vehicle services
Record Name: Service Record Number (Auto Number)

Starting Number: 1

#### **Features Enabled:**

Allow Reports

Allow Activities

Track Field History

Allow Sharing

Allow Search

**Custom Tab Created:** Service History Tab (Wrench Icon)

3. Parts Inventory Custom Object

**Location:** Setup → Object Manager → Parts Inventory

#### **Basic Configuration:**

Label: Parts Inventory

Plural Label: Parts Inventories Object Name: Parts\_Inventory

Description: Auto parts inventory management

Record Name: Part Number (Text)

#### **Features Enabled:**

- Allow Reports
- Track Field History
- Allow Sharing
- Allow Search
- **W** Bulk API Access

**Custom Tab Created:** Parts Inventory Tab (Gear Icon)

4. Parts Used Junction Object

**Location:** Setup → Object Manager → Parts\_Used

#### **Basic Configuration:**

Label: Parts Used

Plural Label: Parts Used
Object Name: Parts\_Used

Description: Junction object linking work orders to parts

Record Name: Parts Used Number (Auto Number)

Starting Number: 1

#### **Features Enabled:**

• Allow Reports

Allow Sharing

### **Ⅲ** Field Configuration Matrix

### **Vehicle Object Fields**

| Field<br>Label | API Name | Data Type | Length | Required | Unique   | External<br>ID | Description                         |
|----------------|----------|-----------|--------|----------|----------|----------------|-------------------------------------|
| VIN            | VIN_c    | Text      | 17     | <b>✓</b> | <b>✓</b> | <b>✓</b>       | Vehicle<br>Identification<br>Number |
| Make           | Makec    | Picklist  | -      | <b>✓</b> | ×        | ×              | Vehicle<br>manufacturer             |
| Model          | Modelc   | Text      | 50     | <b>✓</b> | ×        | ×              | Vehicle model<br>name               |
| Year           | Yearc    | Number    | 4,0    | <b>✓</b> | ×        | ×              | Manufacturing year                  |

| Field<br>Label          | API Name           | Data Type       | Length | Required | Unique   | External<br>ID | Description                    |
|-------------------------|--------------------|-----------------|--------|----------|----------|----------------|--------------------------------|
| Current<br>Mileage      | Mileagec           | Number          | 10,0   | ×        | ×        | ×              | Current<br>odometer<br>reading |
| Owner                   | Ownerc             | Lookup(Contact) | -      | ×        | ×        | ×              | Vehicle owner                  |
| Last<br>Service<br>Date | Last_Service_Datec | : Date          | -      | ×        | ×        | ×              | Most recent service date       |
| Service<br>Status       | Service_Statusc    | Picklist        | -      | <b>✓</b> | ×        | ×              | Current service status         |
| Color                   | Colorc             | Text            | 30     | ×        | ×        | ×              | Vehicle color                  |
| License<br>Plate        | License_Platec     | Text            | 15     | ×        | <b>✓</b> | ×              | License plate number           |

#### **Make Picklist Values:**

Ford, Toyota, Honda, Chevrolet, BMW, Mercedes-Benz, Audi, Volkswagen, Hyundai, Nissan, Subaru, Mazda, Kia, Other

#### **Service Status Picklist Values:**

Active, Inactive, In Service, Retired Default: Active

### **Service History Object Fields**

| Field Label  | API Name      | Data Type         | Length | Required | Relationship<br>Type | Description               |
|--------------|---------------|-------------------|--------|----------|----------------------|---------------------------|
| Vehicle      | Vehiclec      | Master-<br>Detail | -      | <b>✓</b> | → Vehiclec           | Associated vehicle        |
| Service Type | Service_Typec | Picklist          | -      | <b>✓</b> | -                    | Type of service performed |
| Service Date | Service_Datec | Date              | -      | <b>✓</b> | -                    | Date of service           |

| Field Label           | API Name            | Data Type | Length | Required | Relationship<br>Type | Description              |
|-----------------------|---------------------|-----------|--------|----------|----------------------|--------------------------|
| Mileage at<br>Service | Mileage_at_Servicec | Number    | 10,0   | ×        | -                    | Odometer at service time |
| Technician            | Technicianc         | Lookup    | -      | ×        | → User               | Assigned technician      |
| Total Cost            | Costc               | Currency  | 16,2   | ×        | -                    | Total service cost       |
| Labor Hours           | Labor_Hoursc        | Number    | 5,2    | ×        | -                    | Hours of labor           |
| Service Notes         | Notesc              | Long Text | 32768  | ×        | -                    | Detailed service notes   |
| Work Order            | Work_Orderc         | Lookup    | -      | ×        | → WorkOrder          | Related work order       |

### **Service Type Picklist Values:**

Oil Change, Brake Repair, Engine Repair, Transmission Service, Tire Replacement, Battery Replacement, Air Conditioning Service, Electrical Repair, Suspension Repair, Annual Inspection, Preventive Maintenance, Emergency Repair

### **Parts Inventory Object Fields**

| Field Label      | API Name       | Data Type | Length | Required | Unique   | Description            |
|------------------|----------------|-----------|--------|----------|----------|------------------------|
| Part Number      | Name           | Text      | 20     | <b>✓</b> | <b>✓</b> | Unique part identifier |
| Part Name        | Part_Namec     | Text      | 80     | <b>✓</b> | ×        | Descriptive part name  |
| Current Stock    | Current_Stockc | Number    | 8,0    | <b>✓</b> | ×        | Available quantity     |
| Minimum Stock    | Minimum_Stockc | Number    | 6,0    | <b>✓</b> | ×        | Reorder threshold      |
| Unit Cost        | Unit_Costc     | Currency  | 16,2   | ×        | ×        | Cost per unit          |
| Supplier         | Supplierc      | Text      | 50     | ×        | ×        | Parts supplier         |
| Storage Location | Locationc      | Text      | 30     | ×        | ×        | Warehouse location     |
| Category         | Categoryc      | Picklist  | -      | ×        | ×        | Part category          |

#### **Category Picklist Values:**

Engine Parts, Brake Parts, Electrical, Filters, Fluids, Belts & Hoses, Tires, Body Parts, Tools, Other

#### **Parts Used Junction Object Fields**

| Field Label      | API Name       | Data Type      | Relationship Type  | Required | Description           |
|------------------|----------------|----------------|--------------------|----------|-----------------------|
| Work Order       | Work_Orderc    | Master-Detail  | → WorkOrder        | <b>✓</b> | Associated work order |
| Part             | Partc          | Master-Detail  | → Parts_Inventoryc | <b>~</b> | Used part             |
| Quantity<br>Used | Quantity_Usedo | c Number(6,2)  | -                  | <b>✓</b> | Quantity consumed     |
| Unit Price       | Unit_Pricec    | Currency(16,2) | ) <b>-</b>         | ×        | Price per unit        |
| Total Price      | Total_Pricec   | Currency(16,2) | -                  | ×        | Total line cost       |
|                  |                |                |                    |          |                       |

## **@** Relationship Architecture

### **Entity Relationship Diagram**

```
Account (1) \longleftrightarrow (M) Contact
   \downarrow
Contact (1) \leftarrow \rightarrow (M) Vehicle_c
Vehicle_c (1) \leftarrow \rightarrow (M) Service_History_c
Vehicle_c (1) \longleftrightarrow (M) WorkOrder
WorkOrder (M) \longleftrightarrow (M) Parts_Inventory_c
   Parts_Used_c ---
       (Junction Object)
```

### **Relationship Details**

#### Master-Detail Relationships

| Child Object    | Parent Object   | Field Name  | Cascade Delete | e Sharing Control |
|-----------------|-----------------|-------------|----------------|-------------------|
| Service_History | c Vehiclec      | Vehiclec    | ✓ Yes          | Parent Controls   |
| Parts_Usedc     | WorkOrder       | Work_Orderc | Yes            | Parent Controls   |
| Parts_Usedc     | Parts_Inventory | c Partc     | ✓ Yes          | Parent Controls   |

#### **Master-Detail Benefits:**

- Automatic sharing inheritance
- Roll-up summary field capability
- Cascade delete protection
- Enhanced data integrity

#### Lookup Relationships

| Child Object    | Parent Object | t Field Name | Optiona | l Description          |
|-----------------|---------------|--------------|---------|------------------------|
| Vehiclec        | Contact       | Ownerc       | ✓ Yes   | Vehicle ownership      |
| Service_History | c User        | Technicianc  | ✓ Yes   | Service technician     |
| Service_History | c WorkOrder   | Work_Orderc  | Yes     | Related work order     |
| WorkOrder       | Vehiclec      | Vehiclec     | ✓ Yes   | Vehicle being serviced |

#### **Lookup Benefits:**

- Flexible relationships
- Independent record existence
- No cascade delete
- Optional associations

#### Junction Object Implementation

#### Parts\_Used\_\_c Junction Object:

- **Purpose:** Many-to-Many relationship between WorkOrder and Parts\_Inventory\_\_c
- Functionality:
  - o One Work Order can use multiple parts
  - o One Part can be used in multiple Work Orders
  - o Track quantity and pricing per usage
  - o Maintain inventory consumption history

### **③** User Interface Configuration

### **Record Types**

WorkOrder Record Types

| Record Type              | API Name              | Description                  | Active   | Use Cases                 |
|--------------------------|-----------------------|------------------------------|----------|---------------------------|
| Scheduled<br>Maintenance | Scheduled_Maintenance | Routine maintenance services | ✓<br>Yes | Oil changes, tune-<br>ups |
| Emergency Repair         | Emergency_Repair      | Urgent repair work           | ✓<br>Yes | Breakdown repairs         |
| Warranty Work            | Warranty_Work         | Warranty-covered services    | ✓<br>Yes | Manufacturer<br>warranty  |

Case Record Types (Standard Object Customization)

| Record Type     | API Name        | Description                | Support Process     |
|-----------------|-----------------|----------------------------|---------------------|
| Service Request | Service_Request | Customer service inquiries | AutoService Support |
| Complaint       | Complaint       | Customer complaints        | AutoService Support |
| Warranty Claim  | Warranty_Claim  | Warranty-related cases     | AutoService Support |

#### **Page Layouts**

Vehicle Detail Layout

**Location:** Setup → Object Manager → Vehicle → Page Layouts

#### **Layout Structure:**

#### **Section 1: Vehicle Information (2-Column)**

- VIN (Required)
- Make (Required)
- Model (Required)
- Year (Required)
- Color
- License Plate

#### **Section 2: Ownership Details (2-Column)**

- Owner (Lookup to Contact)
- Service Status (Required)

#### **Section 3: Service Information (2-Column)**

- Current Mileage
- Last Service Date

#### **Section 4: System Information (2-Column)**

- Created By (Read-Only)
- Created Date (Read-Only)
- Last Modified By (Read-Only)
- Last Modified Date (Read-Only)

#### **Profile Assignments:**

- Manager Profile: Full Access
- Service Advisor Profile: Full Access
- Technician Profile: Limited Edit Access

Service History Detail Layout

**Location:** Setup → Object Manager → Service History → Page Layouts

#### **Layout Structure:**

#### **Section 1: Service Details (2-Column)**

- Vehicle (Required, Master-Detail)
- Service Type (Required)
- Service Date (Required)
- Work Order (Lookup)

#### **Section 2: Technical Information (2-Column)**

- Mileage at Service
- Technician (Lookup to User)
- Labor Hours

#### **Section 3: Cost Information (2-Column)**

Total Cost

#### **Section 4: Notes (1-Column)**

• Service Notes (Full Width)

Parts Management Layout

**Location:** Setup → Object Manager → Parts\_Inventory → Page Layouts

#### **Layout Structure:**

#### **Section 1: Part Information (2-Column)**

- Part Number (Required)
- Part Name (Required)
- Category

#### **Section 2: Inventory Details (2-Column)**

- Current Stock (Required)
- Minimum Stock Level (Required)
- Storage Location

#### **Section 3: Supplier Information (2-Column)**

- Supplier
- Unit Cost

#### **Compact Layouts (Mobile Optimization)**

Vehicle Summary Compact Layout

# Primary Field: VIN Selected Fields (Order):

- 1. VIN
- 2. Make
- 3. Model
- 4. Year
- 5. Owner
- 6. Service Status

Service Summary Compact Layout

**Primary Field:** Service Record Number **Selected Fields (Order):** 

- 1. Service Type
- 2. Service Date
- 3. Technician
- 4. Total Cost

### Security Configuration

#### **Field-Level Security Matrix**

| Profile | Vehicle Fields | Service History | / Fields Part | ts Inventory | Fields | Financial Fields |
|---------|----------------|-----------------|---------------|--------------|--------|------------------|
|---------|----------------|-----------------|---------------|--------------|--------|------------------|

Manager Full Access Full Access Full Access **Full Access** 

Service Advisor Full Access Limited Cost Access Read-Only Cost **Limited Access** 

Technician Read-Only Some Basic Access No Cost Access No Access

#### **Permission Sets Configuration**

Parts\_Inventory\_Access

**Location:** Setup  $\rightarrow$  Users  $\rightarrow$  Permission Sets  $\rightarrow$  Parts Inventory Access

#### **Object Permissions:**

- Parts\_Inventory\_\_c: CRUD + View All + Modify All
- Parts\_Used\_\_c: CRUD

#### **Field Permissions:**

- All Parts\_Inventory\_\_c fields: Read/Edit
- Cost-related fields: Read/Edit

Customer\_Data\_Access

#### **Object Permissions:**

Vehicle\_c: Read/Edit

Account: Read Contact: Read

#### **Field Permissions:**

Vehicle sensitive fields: Read/EditOwner information: Read/Edit

Financial\_Reports\_Access

#### **Field Permissions:**

• Cost\_c: Read

• Unit\_Cost\_\_c: Read

• Total\_Price\_\_c: Read

• Unit\_Price\_\_c: Read

#### **Organization-Wide Defaults (OWD) Impact**

| Object           | OWD Setting          | Reason                | Sharing Method            |
|------------------|----------------------|-----------------------|---------------------------|
| Vehiclec         | Public Read/Write    | Service accessibility | Role hierarchy            |
| Service_Historyc | Controlled by Parent | Data security         | Master-detail inheritance |
| Parts_Inventoryc | Public Read Only     | Inventory visibility  | Manual sharing            |
| Parts_Usedc      | Controlled by Parent | Transaction security  | Master-detail inheritance |

### Schema Builder & ERD

#### **Data Model Visualization**

**Location:** Setup → Schema Builder

Saved View: "AutoService Data Model"

#### **Objects Included:**

- Account (Standard)
- Contact (Standard)
- Vehicle\_c (Custom)
- Service\_History\_\_c (Custom)
- WorkOrder (Standard)
- Parts\_Inventory\_\_c (Custom)
- Parts\_Used\_\_c (Custom)
- Case (Standard)

#### **Relationship Visualization:**

- Clear parent-child relationships
- Junction object connections
- Lookup relationship indicators
- Field details on hover

### ☐ Testing & Validation

#### **Test Data Creation Results**

Test Records Created

#### **Account Record:**

Name: Test Customer Auto Type: Customer - Direct Customer Type: Individual Phone: (555) 123-4567

Status: Created Successfully

#### **Contact Record:**

First Name: John Last Name: Smith

Account: Test Customer Auto Email: john.smith@test.com Phone: (555) 123-4567

Status: Created Successfully

#### **Vehicle Record:**

VIN: 1HGBH41JXMN109186

Make: Honda Model: Civic Year: 2021

Owner: John Smith

Current Mileage: 45,000 Service Status: Active

Color: Blue

License Plate: TEST123

Status: <a href="#">Created Successfully</a>

#### **Parts Inventory Record:**

Part Number: OF001

Part Name: Oil Filter - Honda Civic

Current Stock: 50 Minimum Stock: 10 Unit Cost: \$12.99 Category: Filters

Storage Location: A-15-3

Status: Created Successfully

#### **Work Order Record:**

Subject: Oil Change Service - Honda Civic

Vehicle: TEST123 Honda Civic

Status: New

Priority: Medium

#### **Parts Used Record:**

Work Order: Oil Change Service

Part: Oil Filter - Honda Civic

Quantity Used: 1 Unit Price: \$12.99 Total Price: \$12.99

#### **Service History Record:**

Vehicle: TEST123 Honda Civic

Service Type: Oil Change

Service Date: [Today's Date]

Work Order: Oil Change Service

Mileage at Service: 45,000 Technician: [Test User]

Total Cost: \$45.99 Labor Hours: 0.5

#### **Validation Test Results**

| Test Scenario            | Expected Result                          | <b>Actual Result</b> | Status |
|--------------------------|--|----------------------|--------|
| Vehicle-Owner Lookup     | Contact appears in Owner field           | ✓ Working            | ✓ Pass |
| Service History Creation | Links to Vehicle successfully            | ✓ Working            | ✓ Pass |
| Master-Detail Cascade    | Service History inherits Vehicle sharing | ✓ Working            | ✓ Pass |
| Junction Object          | Parts Used links Work Order & Part       | ✓ Working            | ✓ Pass |
| Related Lists Display    | All related lists show properly          | ✓ Working            | ✓ Pass |
| Field Validation         | Required fields enforce validation       | ✓ Working            | ✓ Pass |
| Unique Constraints       | VIN and License Plate enforce uniqueness | ✓ Working            | ✓ Pass |
| Picklist Functionality   | All picklist values selectable           | ✓ Working            | ✓ Pass |

#### **Relationship Validation**

- ✓ Account → Contact: One-to-Many working
- **Contact** → **Vehicle:** One-to-Many via Owner lookup
- **Vehicle** → **Service History:** One-to-Many via Master-Detail
- ✓ Vehicle → Work Order: One-to-Many via lookup
- **Work Order** ↔ **Parts Inventory:** Many-to-Many via Parts Used junction
- ✓ Service History → Work Order: Many-to-One via lookup
- ✓ Service History → User (Technician): Many-to-One via lookup

### **III** Implementation Metrics

#### **Development Timeline**

Phase 3 Start Date: [Start Date]

**Phase 3 Completion Date:** [End Date] **Total Implementation Time:** [X] hours

**Team Size:** 1 Developer

### **Scope Coverage Analysis**

| Component | Planned | <b>Implemented</b> | Coverage % |
|-----------|---------|--------------------|------------|
|-----------|---------|--------------------|------------|

| Custom Objects  | 4   | 4  | 100% |
|-----------------|-----|----|------|
| Custom Fields   | 25+ | 28 | 112% |
| Relationships   | 7   | 7  | 100% |
| Record Types    | 5   | 5  | 100% |
| Page Layouts    | 3   | 3  | 100% |
| Compact Layouts | 2   | 2  | 100% |
| Permission Sets | 3   | 3  | 100% |
| Test Records    | 7   | 7  | 100% |

**Overall Phase 3 Completion:** 100%

### **Object Statistics**

| Object              | Fields Created | d Relationship | s Record Type | s Page Layouts |
|---------------------|----------------|----------------|---------------|----------------|
| Vehiclec            | 10             | 3              | 0             | 1              |
| Service_Historyc    | 9              | 3              | 0             | 1              |
| Parts_Inventoryc    | 8              | 1              | 0             | 1              |
| Parts_Usedc         | 5              | 2              | 0             | 0              |
| WorkOrder (Enhanced | ) 3            | 2              | 3             | 0              |
| Case (Enhanced)     | 0              | 0              | 3             | 0              |
| Totals              | 35             | 11             | 6             | 3              |



**Issue 1: Case Record Type Creation** 

**Problem:** Cannot create Case record types without Support Process

**Resolution:** Created AutoService Support Process first

**Status:** ✓ Resolved

**Time Impact:** +30 minutes

#### **Issue 2: Master-Detail Relationship Constraints**

**Problem:** Cannot create Master-Detail when child records exist

**Resolution:** Created relationships before test data

**Status:** ✓ Resolved

**Time Impact:** +15 minutes

#### **Issue 3: Junction Object Complexity**

**Problem:** Understanding two Master-Detail relationships in one object

Resolution: Documented clear examples and use cases

**Status:** ✓ Resolved **Time Impact:** +45 minutes

#### **Issue 4: Field-Level Security Planning**

**Problem:** Complex permission requirements across profiles **Resolution:** Created detailed security matrix and permission sets

**Status:** ✓ Resolved

**Time Impact:** +60 minutes



### Phase 3 Completion Checklist

### **Core Implementation**

- ✓ Custom Objects Created (4/4)
- Custom Fields Implemented (28/25+)
- ✓ Relationships Established (7/7)
- Data Types Configured
- ✓ Field Properties Set
- ✓ Validation Requirements Met

#### **User Interface**

- ✓ Record Types Configured (5/5)
- ✓ Page Layouts Designed (3/3)

- Compact Layouts Created (2/2)
- Profile Assignments Complete
- Mobile Optimization Done

#### **Data Architecture**

- Master-Detail Relationships (3/3)
- Lookup Relationships (4/4)
- Junction Object Implementation (1/1)
- Schema Builder ERD Created
- Relationship Validation Complete

#### **Security & Access**

- Field-Level Security Applied
- Permission Sets Updated (3/3)
- Profile Permissions Configured
- OWD Settings Reviewed
- Sharing Rules Prepared

#### **Testing & Validation**

- Test Data Created (7/7 record types)
- Relationship Testing Complete
- CRUD Operations Validated
- UI Functionality Verified
- Security Testing Done

#### **Documentation**

- Schema Builder Saved
- Field Reference Created
- Relationship Diagram Documented
- Testing Results Recorded