**Section 4.4: Solution Architecture**

**4.4.1 Introduction**

A well-designed solution architecture forms the foundation of any enterprise-grade Salesforce implementation. For the RTC Public Transport Management System, a layered, modular, and scalable architecture was developed to ensure maintainability, reusability, and long-term extensibility.

This architecture effectively mapped RTC’s operational workflows onto Salesforce’s object model, automation tools, user access configurations, and data processing logic—ensuring high availability, low latency, and consistent data integrity.

**4.4.2 Architectural Objectives**

The solution architecture was built with the following objectives:

* **Modularity**: Decouple key functional areas (HR, Trips, Fares, Scheduling) for independent updates and scaling.
* **Reusability**: Use flows, templates, and reports across departments with minimal customization.
* **Security**: Apply role-based access controls and field-level permissions to enforce data confidentiality.
* **Real-Time Data Flow**: Ensure immediate processing of user inputs, fare logs, and trip completions.
* **Auditability**: Maintain historical tracking and approval trails for compliance.

**4.4.3 High-Level Architecture Layers**

The architecture is divided into five core layers, each of which maps to different Salesforce capabilities:

**1. Presentation Layer**

* Salesforce Lightning App: Custom-branded UI
* Mobile Accessibility: Salesforce Mobile App for drivers and field staff
* Tab-based navigation customized by profile

**2. Application Logic Layer**

* Flows (Record-Triggered, Scheduled): Automates shift assignment, fare tallying, and leave approvals
* Apex Triggers: Handles complex logic such as cascading trip rescheduling or fare recalculations
* Validation Rules: Ensures data accuracy and process consistency

**3. Data Layer**

* Custom Objects: Trips, Employees, Buses, Bus Stations, Ticket Fares, Routes
* Standard Objects: Users, Profiles, Roles, Approvals
* Lookup/Master-Detail Relationships for record dependency management

**4. Analytics Layer**

* Reports: Fare summaries, Employee attendance, Route profitability
* Dashboards: Real-time visualizations of key metrics, tailored per department
* Report Types: Custom report types created for joined trip-bus-driver data

**5. Security & Compliance Layer**

* Profiles & Permission Sets: Access control for modules and records
* Field-Level Security (FLS): Protect sensitive data like salary, contact details
* Login History & Audit Trails: Monitors user activity for compliance

A diagram of a solution

AI-generated content may be incorrect.

**4.4.4 Solution Flow Overview**

**A diagram of a solution

AI-generated content may be incorrect.**

A proposed visual breakdown:

1. **User Interaction (Drivers/Admins)** via Lightning App or Mobile
2. Inputs stored in **Objects**
3. **Validation & Automation** via Flows/Triggers
4. Data processed and pushed to **Reports & Dashboards**
5. **Access** controlled via Profiles/Roles

**4.4.5 Component-Level Description**

| **Module** | **Object(s) Involved** | **Key Features** |
| --- | --- | --- |
| Trip Management | Trips, Routes, Buses | Assignments, logs, schedules |
| Employee Module | Employees, Roles | Shift plans, leave tracking |
| Finance Module | Ticket Fares, Fare Reports | Revenue summaries, validations |
| Monitoring Module | Reports, Dashboards | Real-time KPIs, trends |
| Admin Controls | Users, Approvals | Profile setup, security management |

**4.4.6 Extensibility Considerations**

* The architecture supports future **integration** with IoT systems (for real-time bus GPS tracking), **Gov APIs** (for tax/audit compliance), and external fare payment platforms.
* **Platform Events** and **External Objects** are reserved in the model for asynchronous data flow and federated search expansion.

**4.4.7 Conclusion**

The solution architecture for RTC’s Salesforce CRM is future-proof, scalable, and aligned with enterprise-grade design principles. It ensures a tightly coupled alignment between operational requirements and technical implementation, enabling the RTC to serve its stakeholders with speed, precision, and transparency.