REPORT NO. 5.1: DATA FLOW DIAGRAM (DFD)

FOR
LIVSMART A SMART LIVING COMMUNITY

COURSE CODE: CSE 404
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Contents

1. Introduction

This lab report analyzes the **Data Flow Diagrams (DFDs)** for the LivSmart **Smart Living Community System**, focusing on both **Level 0** and **Level 1** DFDs. The objective is to understand the flow of information between the external entities (e.g., residents, managers, security guards) and the central system, LivSmart, which handles key community operations such as managing bookings, security, events, and complaints.

We will explore the Level 0 (context diagram) and Level 1 DFDs in detail, evaluating how each level helps stakeholders gain insights into the system's processes.

2. Objectives

1. Analyze the DFD Level 0 (Context Diagram) to understand how external actors interact with the system.
2. Explore the DFD Level 1 to break down the internal processes of the LivSmart system.
3. Evaluate the system's efficiency in managing services like bookings, events, security, billing, and complaints.
4. Identify areas for improvement in the system based on the DFDs.

3. Methodology

The analysis involves reviewing the DFDs created using both manual and software-based tools. The following steps were taken:

1. **System Understanding**: A high-level view of the LivSmart system was developed by studying how external entities interact with the system.
2. **Level 0 DFD Creation**: A context diagram was created, representing the system as a single process interacting with external entities.
3. **Level 1 DFD Creation**: The context diagram was decomposed into smaller, detailed processes to show how the internal system operations work.
4. **Data Flow Identification**: Key data flows between the actors and the system were identified.
5. **Detailed Documentation**: Each interaction and process was described in detail, highlighting key data stores and flow paths.

4. Analysis of DFD

4.1 Analysis of Level 0 DFD

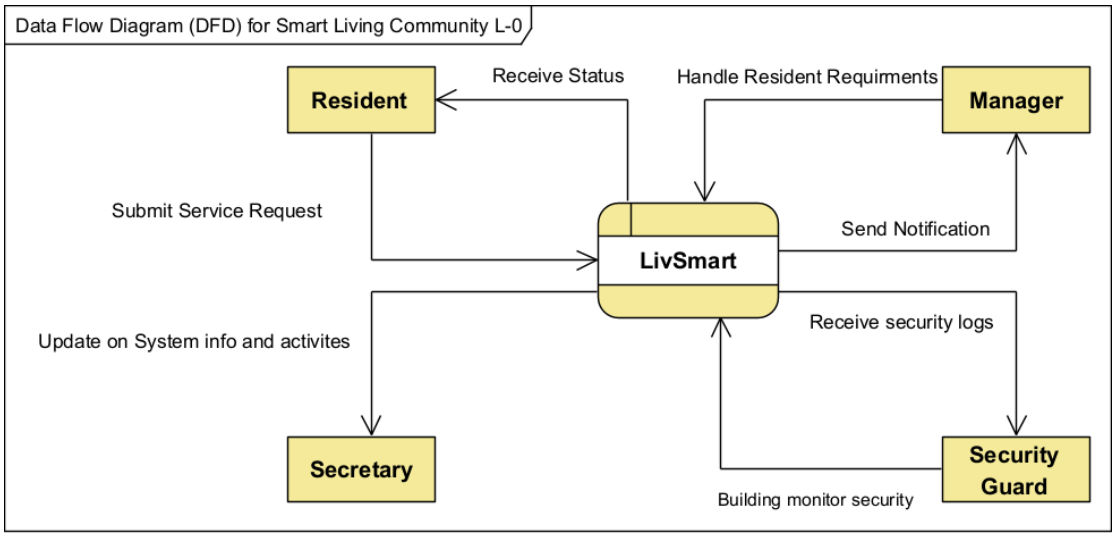

Figure 4.1: Level 0 DFD for LivSmart Using Visual Paradigm

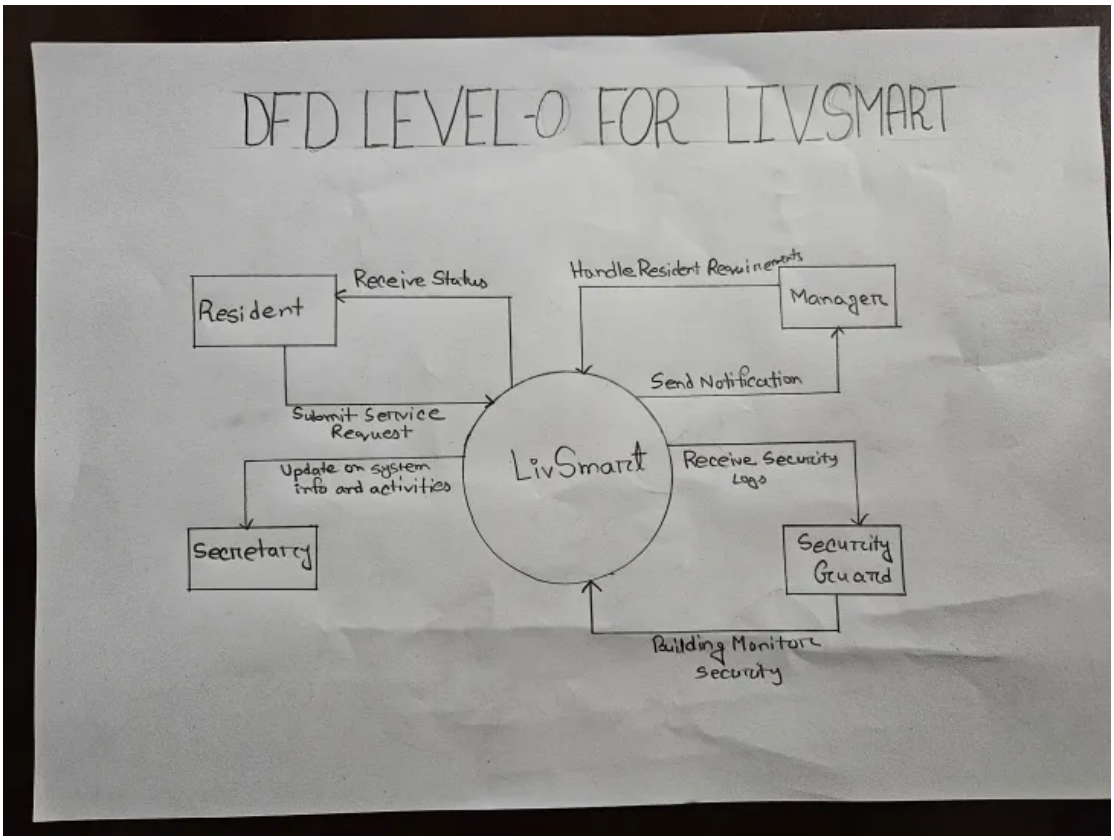

Figure 4.2: Level 0 DFD for LivSmart Hand Drawn

Components:

- **LivSmart**: The central process representing the community management system.
- **External Actors**:
  - **Residents**: Submit service requests and receive status updates.
  - **Managers**: Handle resident requirements and send notifications.
  - **Security Guards**: Submit security logs and monitor building security.
  - **Secretary**: Updates the system with information and activities.

Data Flows:

- **Residents** → **LivSmart**: Residents submit service requests (e.g., booking amenities, filing complaints).
- **LivSmart** → **Residents**: The system provides status updates on service requests.
- **Managers** → **LivSmart**: Managers interact with the system to handle resident requirements and manage events.
- **Security Guards** → **LivSmart**: Security logs are submitted by security personnel for monitoring and verification.
- **Secretary** → **LivSmart**: The secretary updates system data, such as community information and records.

Summary: The **Level 0 DFD** provides a high-level overview of how **external actors** interact with LivSmart. This diagram is useful for non-technical stakeholders as it simplifies the complex interactions into a single process. It focuses on the flow of data between external entities and the system, without delving into the internal mechanics of how the system processes the information.

4.2 Analysis of Level 1 DFD (Detailed Processes)

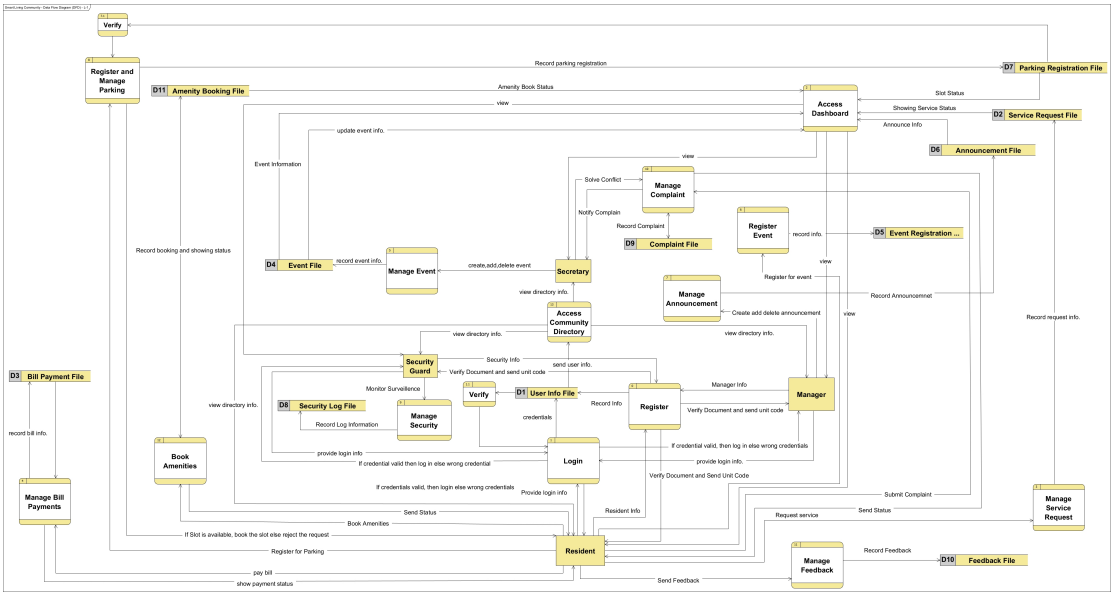

Figure 4.3: Level 1 DFD for LivSmart Using Visual Paradigm

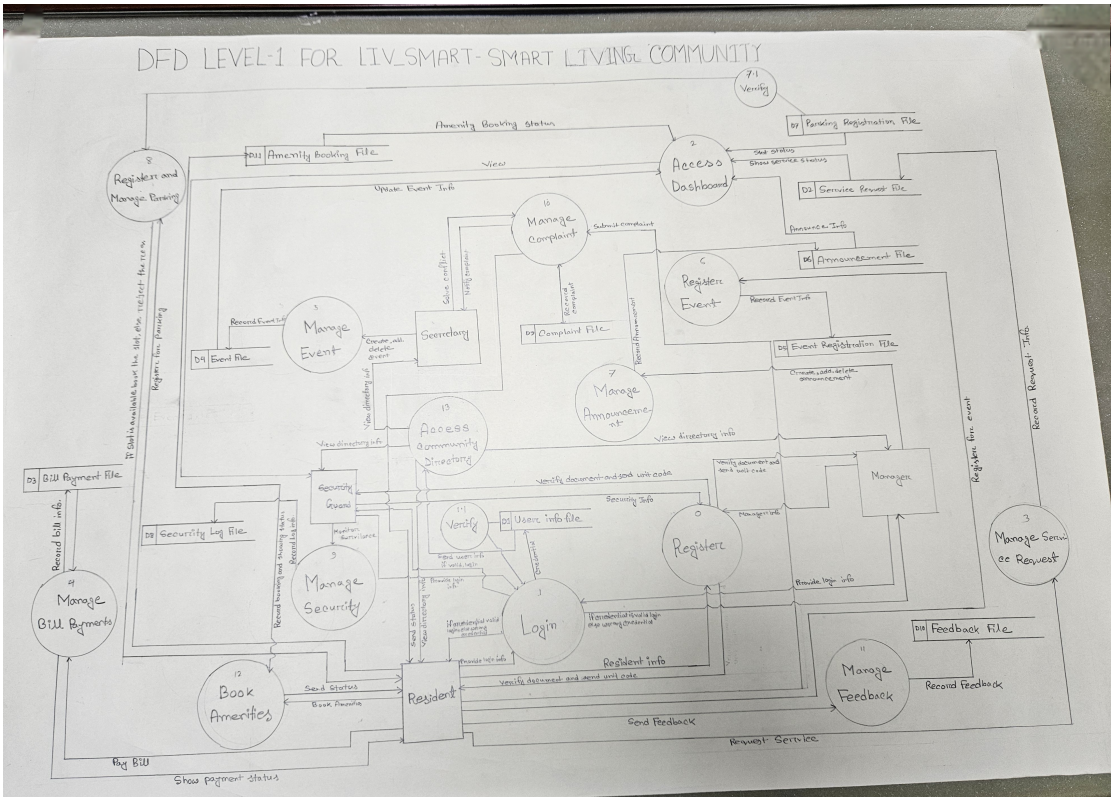

Figure 4.4: Level 1 DFD for LivSmart Hand Drawn

The **Level 1 DFD** breaks down the internal processes of LivSmart into smaller, detailed components. Here's an overview of the key processes:

Processes in Level 1 DFD:

- **Manage Bookings**: Residents book amenities, and the system checks availability and records the booking status in the **Amenity Booking File**.
- **Manage Complaints**: Residents submit complaints, which are recorded in the **Complaint File**. Managers handle the resolution of these complaints.
- **Manage Events**: Managers create and manage events, which are recorded in the **Event File**. Residents receive notifications and updates regarding community events.
- **Manage Security**: Security guards monitor building security by submitting **Security Logs**, which are recorded in the **Security Log File** for verification and monitoring.
- **Manage Payments**: Residents make payments for services. These transactions are recorded in the **Bill Payment File**, and the system updates payment statuses.
- **Manage Feedback**: Residents provide feedback, which is stored in the **Feedback File** and can be reviewed by managers for system improvements.

Data Stores in Level 1 DFD:

- **Amenity Booking File**: Stores records of resident bookings for community amenities.
- **Complaint File**: Contains all complaints submitted by residents.
- **Event File**: Holds information on community events.
- **Security Log File**: Stores logs related to building security and resident verification.
- **Bill Payment File**: Tracks all bill payments made by residents.
- **Feedback File**: Keeps records of resident feedback for future improvements.

Summary: The **Level 1 DFD** provides a detailed breakdown of the internal processes of LivSmart. It highlights the system's modular structure, showing how each function operates independently while interacting with other processes. This diagram is crucial for system developers and technical stakeholders who need to understand the inner workings of the system, as it reveals potential bottlenecks, inefficiencies, and areas for improvement.

5. Discussion

Objectives Met Through Level 0 and Level 1 DFDs:

- **High-Level Understanding (Level 0 DFD)**: The context diagram offers a simplified view of how residents, managers, security guards, and the secretary interact with the system. It effectively showcases external interactions without overwhelming non-technical stakeholders with details.
- **Detailed System Breakdown (Level 1 DFD)**: The Level 1 diagram breaks down the internal workings of LivSmart, illustrating how bookings, events, complaints, and payments are managed. It also identifies the key data stores and their interactions with the system.

Key Insights from the DFD Analysis:

- **Modular System**: LivSmart operates as a modular system, with each function (e.g., booking amenities, managing events, handling complaints) having its own process and data store.
- **Data Flow and Efficiency**: The diagrams highlight how data flows efficiently through the system, ensuring that requests are processed and responses are provided in a timely manner.
- **Security Management**: The system places a significant emphasis on building security by allowing security personnel to monitor activities and submit logs. The integration of the **Security Log File** ensures that the community remains safe and secure.

Areas for System Improvement:

- **Automation**: Some processes, like complaint management and feedback handling, could benefit from greater automation to reduce manual intervention and speed up resolution times.
- **Scalability**: As the community grows, the system will need to be scalable to handle an increasing number of requests, bookings, and complaints. Future upgrades should focus on improving database performance and load handling.