**1. System Design**

This system will have multiple components that interact to monitor ATM devices and provide real-time status, transaction logs, and media for bank systems. Key components include:

* **ATM Device Component**: Runs the application that captures real-time data (transactions, failures, camera logs).
* **API Gateway**: Serves as a secure point of access for internal systems.
* **Authentication Service**: Integrates with the bank’s existing system for generating verifiable authentication tokens.
* **Data Storage**: Stores transaction logs, failures, and camera images/videos. MongoDB will be used to store logs and media files.

**2. Component Design**

* **ATM Monitoring API**:
  + **Authentication**: Each API request should be authenticated via the bank’s token service.
  + **Transaction Logs**: Stores customer transaction details including timestamps.
  + **Failure Logs**: Captures system/device failures.
  + **Media Logs**: Manages camera image/video retrieval.
* **Database Design**: MongoDB collections will include transactionLogs, failureLogs, and cameraLogs.
* **Security**: Use OAuth 2.0 for token-based authentication and ensure end-to-end encryption using TLS.

### ****3. Activity Flow Diagrams****

#### **1. Customer Transaction Flow**

* ATM captures the transaction → Logs transaction → Sends data to ATM Monitoring API → Transaction stored in MongoDB → Response sent to calling system.

#### **2. Failure Logging Flow**

* System detects failure → Logs failure details → Sends data to ATM Monitoring API → Failure log stored in MongoDB → Failure report available to admin.

#### **3. Media Retrieval Flow**

* Request for video/images sent to API → API retrieves logs from MongoDB → Media file provided to the client.

### 4. ****Data Model Design****

#### **Transaction Logs (MongoDB)**

json

{

"customerId": "12345",

"transactionType": "withdrawal",

"timestamp": "2024-10-22T10:00:00",

"amount": 100.00

}

#### **Failure Logs (MongoDB)**

json

{

"atmId": "ATM123",

"failureType": "device\_error",

"timestamp": "2024-10-22T10:30:00",

"context": "Cash dispenser malfunction during withdrawal"

}

#### **Camera Logs (MongoDB)**

json

{

"atmId": "ATM123",

"startTime": "2024-10-22T09:00:00",

"endTime": "2024-10-22T10:00:00",

"mediaType": "video",

"filePath": "/path/to/video"

}

### 5. ****Data Model Examples****

* For transaction summaries:

json

{

"totalCustomers": 150,

"transactionBreakdown": {

"deposit": 50,

"withdrawal": 75,

"balanceInquiry": 25

}

}