**Requirement Gathering:**

1. **Functional Requirements**

* Designing a fare card system to calculate travel for a journey.
* When users start a journey check for sufficient balance and then user can start a journey.
* Mode of transportation can be selected by user.
* Balance will be calculated based on Zones and mode of transportation.
* At the end of trip appropriate balance will be updated.

1. **Non-Functional Requirements**

* The system should be highly available. This is required because, if our service is down, users will not be able to stat the trip.
* Balance should be updated real time with minimal latency.

1. **Extended Requirements**

* Analytics; e.g., how many trips a user made?
* Our service should also be accessible through REST APIs by other services. (In case external entities want to integrate).
* User can see available balance at any time.

**Traffic Estimation**

Our system will be heavily read-write. Let’s assume a 50:50 ratio between read and write.

Since we are provided with 4 station so we are assuming an everyday traffic of 5k users and average trip a user will make is 2 (up/down) so average trip for a single day will be 10k.

Since we are not using any other form of data and assuming it will be text based so we will use Relational Database for this system.

**Storage Estimation**

Assuming 100k users registered with our system we need 150mb storage for user information which contains card and user details. Data contains user contact, address and card balance.

Since every day we have assumed 10k trips per day we need 5mb data for one day:

So for 1 year: 365\*5 = 1.8GB.

**High-level estimations**

If we are adding 10 times user in next 5 years our database will be storing 18 GB – 20 GB data for a year.

Note: This prediction with existing dataset.

**Assumptions**

1. If user travel from zone 1 to zone 3, the train will pass from zone 2.
2. Since it’s not mentioned, we are not clubbing the trip for a specific time period (If user punch out and punch in within the same zone it will be consider as a new trip).
3. There will be scheduler running at every specific time period (in this case 10 minutes), it will apply max fare $3.20 by considering user did not swipe out.

**HDD Diagram**

