

Overview

This document is going to cover the architecture design of sending push notification. Apart from including mobile push notification, different push notification like SMS or email can be easily pluggable.

Functional Requirements

- System should support different type of push notification including SMS, mobile and email etc.
- System should be soft real time. We want to deliver the notification as fast and Realtime as possible.
- Supported system. IOS, Android, Laptop/Desktop etc.
- Users will be able to opt-out of notification.

Non-Functional Requirement

- Fault Tolerant: Able to recover from any fault happening in the system.
- Reliable: At least once notification delivery should be guaranteed.
- Performant: Low latency notification delivery
- Scalable: Scalable to millions of notifications per hour.

Capacity Estimation

- Number of users in the system = 1 billion.
Considering the user metadata is going to take 1 KB
device_metadata is going to take 1KB
and user preference is going to take 1KB
- Total size will of user table will be 1billion* 1KB.
- Considering each user uses 2 devices -> device table will be of 1billion*2
- Considering each user opted for 3 notification type, Pref size will be 1billion*3.
- Total size will be 6billion KB which will be 6GB.

Choice of database

- Notification system will be read heavy.
- Data is structured and normalised hence reduce data redundancy and maintaining integrity.
- Data size is also 6B.
- We can use relational database to store all the details. Only drawback will be to use Mutiple joins.

Database Tables

- `user_metadata`
user_id : Integer
created_at : date
user_name : varchar (255)
email varchar (255)
phone_number varchar (10)
- `device_metadata`
device_id Integer
user_id varchar (255)
created_at Date
logged_in_at Date
device_token varchar (255)
- `user_prefrence`
user_id varchar (255)
notification_type ENUM (SMS, OTP)
frequency ENUM (DAILY, HOURLY_WEEKLY, NA)
enabled Boolean
created_at Date

API

- `/api/v1/notification`
Type : POST

```
{
  "to" : {
    "user_id" : "abc"
  },
  "content" : {
    "title" : "abc",
    "body" : "abc",
    "attributes" : {
      "attribute_a" : "abc",
      "attribute_b" : "ab"
    },
    "type" : "SMS",
    "priority" : "P0"
  }
}
```

- Response
Status : 202 Accepted

```
{  
  "status" : 202,  
  "notification_id" : "abc"  
}
```

Architecture

