

True Caller Application System Design

↳ online phone Directory.

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Functional Requirements

- ① Display Caller Id for incoming call.
- ② Search with phone number to retrieve user details.
- ③ Identify SPAM callers
- ④ Add user profile
- ⑤ Add name for any contact number or Report SPAM.
- ⑥ who viewed your profile - PI
- ⑦ Unlist your phone Number - remove phone number from Truecaller database and is not searchable.
- ⑧ Authenticate with Truecaller for any other app - PI
- ⑨ Block contact numbers.
- ⑩ wifi calling - PI

Non Functional Requirements

- ① Achieve high accuracy on caller identification - both actual and SPAM.
- ② System Availability.

③ Latency - < 1 sec. Contact name should be displayed along with receiving call.

Capacity Estimations →

2021 stats (Data source - Internet, not official)

300M monthly active users

180M phone calls / day

3B - Searchable number in Truecaller

4.2B - search / month

Phone call TPS - 2084 calls / sec

Search TPS - 1620 requests / sec

Data Persistence

Primary Data store - DynamoDB

Caching capability - DDB Accelerator (DAX) / Elastic Cache with Redis Support

why DynamoDB?

- ① Fully managed NoSQL store.
- ② We don't have requirements for capabilities provided by relational stores such as
 - a) A.C.I.D
 - b) Complex queries (join support)

- ③ Since we can establish relationship between contacts
 [A is contact of B, B is contact of C]
 Should Graph database be considered?
 → We don't have any requirement to answer any queries basis relationships b/w contacts.

DB Tables

① User Details Table

- userId
- Phone No
- FirstName
- LastName
- Email
- Blocked Contacts { }
- Is Verified User
- User Contacts { }
- Entity Type {Business, Person}
- Country Code

② Phone Number Details Table

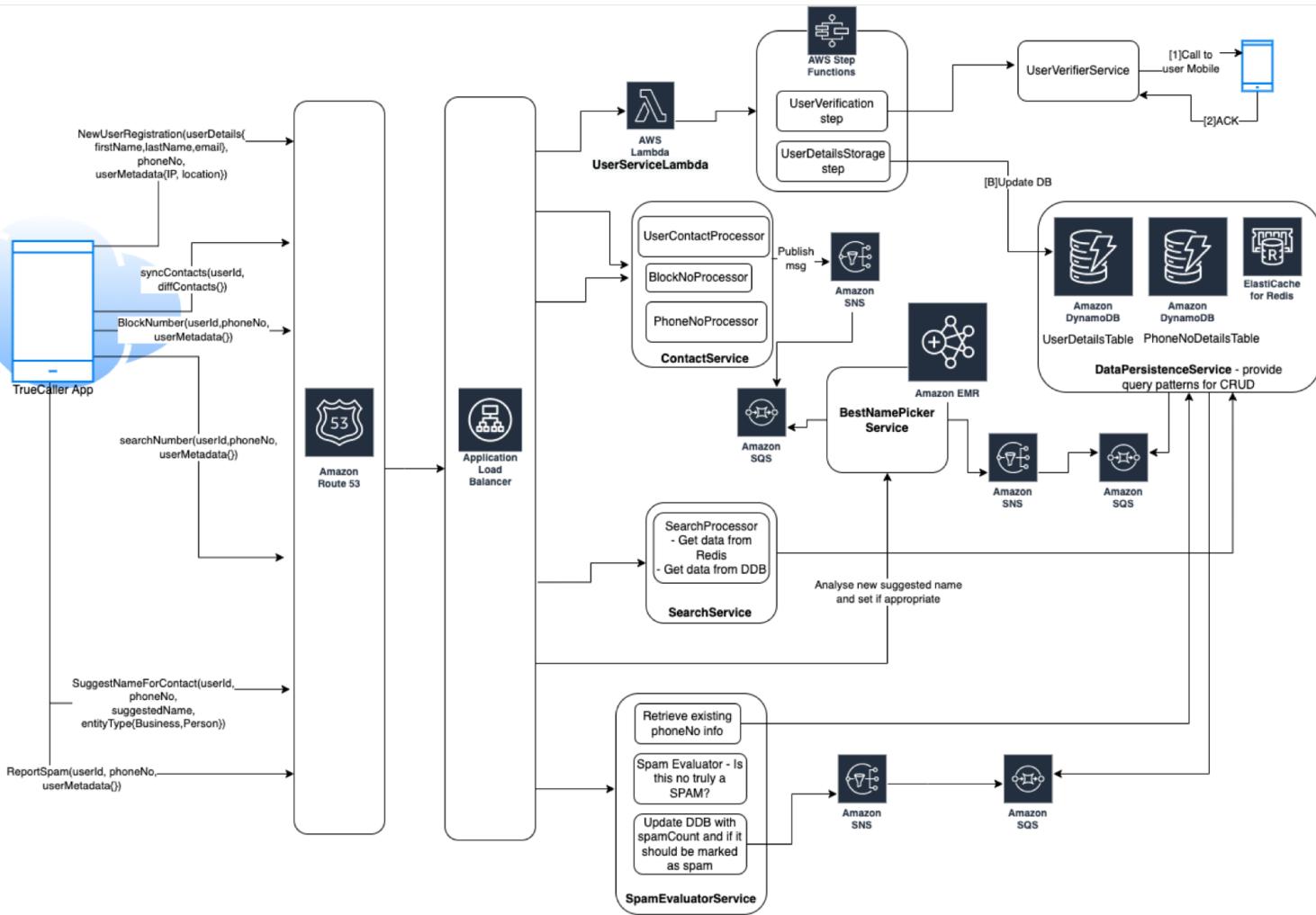
- PhoneNumber
- potential UserName
- isMarkedAsSpam
- Spam Count
- isUser Registered
- entityType
- countryCode

How does Application works on an incoming call?

for caller phone no -

- ① Check phone locally if contact is stored. If yes, display the contact name
- ② If caller is not receiver's contact, we fire caller API to get potential Name associated to contact name.

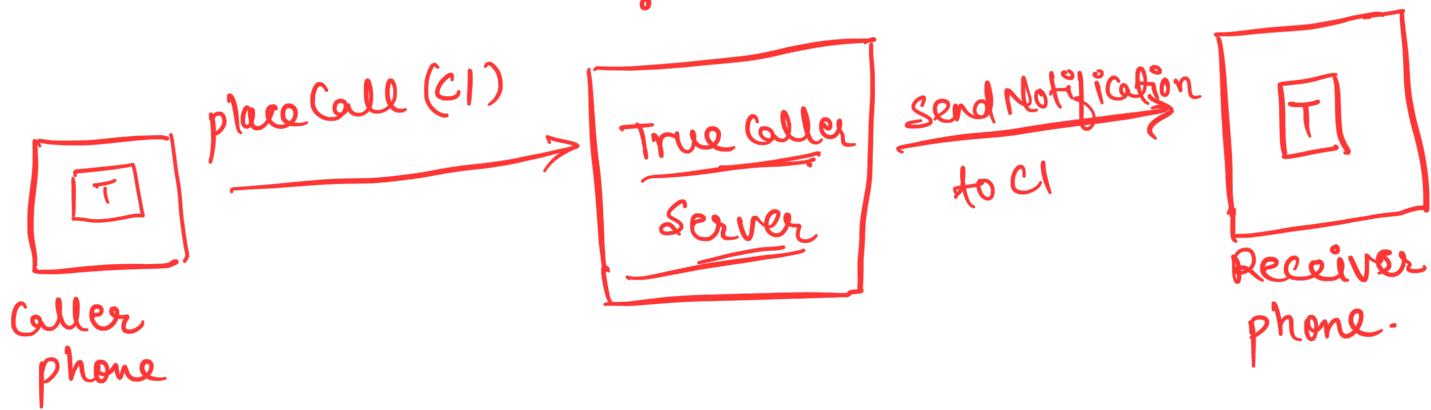
High Level view of System :



key points :

- ① System is more inclined towards Reactive System Manifesto.
- ② Use local cache wherever possible like user contacts, blocked contacts.
- ③ Sync contacts API will trigger automatically after fixed time with user functionality for hard refresh.

- ④ The current stack design is with usage of AWS services, Truecaller use Google Cloud as cloud provider platform.
- ⑤ Best NamePicker service should filter stored contacts such as papa, mummy and choose more appropriate contact name as per availability
- ⑥ Unlist Contact API → remove entry from database such that it is not searchable.
- ⑦ WiFi Calling option → You might have experienced that you get a Truecaller notification before actual call, how does it work?



- ⑧ You can also see availability status of users in Truecaller App.
You can design such functionality by maintaining a persistent connection with mobile application.
You can read more about SSE (Server Sent Events)

and web sockets.

⑨ There are other functionalities such as sign on for other app , messaging application, which we skipped in this document → STAY TUNED

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Channel - Ms Deep Singh

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