1. API Format Analysis & Calling Pattern Differences

A. URL and Authentication Methods

Bigin Systems (ColourCoats & Metalia):

Bigin

https://www.zohoapis.in//bigin/v1/{module_name}?page=1&per_page=200

header

{

"Authorization": "Zoho-oauthtoken your_token" "Content-Type": "application/json"

}

Rolodex

https://api.rolodexcrm.com/user-api/v1/{module}?limit=100&offset=0

headers

{

"Content-Type": "application/json",

"x-rolodex-api-key": "bcdfb94a7e1c331bc201f0059011cfc31e0288af6b57434654f350986174694a"

}

1. Data Structure Analysis

ColourCoats Bigin	Metalia Bigin	Rolodex
Accounts	Accounts	companies
Contacts	Contacts	contacts
Deals	Deals	tasks
Tasks	Tasks	notes
Events	Events	tags
Calls	Calls	lists
Notes	Notes	custom-fields
Products	Products	workspace-users
Pipelines	Pipelines	–
Associated_Products	Associated_Products	–
Attachments	Attachments	–
Social	Social	–
–	–	–

Different table names in rolodexcrm and Bigin

B. ID Systems & Data Types

Bigin Systems (Both ColourCoats & Metalia):

- **Structure**: Heavily nested objects with relationship references

Rolodex:

- **Structure**: Flatter JSON with direct field access
- **Relationships**: Direct references or separate relationship endpoints

A. Field Naming Conventions

Category	ColourCoats Bigin	Metalia Bigin	Rolodex
Company Name	Account_Name	Account_Name	name
Contact Name	First_Name, Last_Name, Full_Name	First_Name, Last_Name, Full_Name	first_name, last_name, full_name
Phone/Mobile	Phone, Mobile	Mobile, Phone	phone_number
Email	Email	Email	email
Website	Website	Website	website_url
Address Fields	Billing_Street, Billing_City, Billing_State, Billing_Country, Billing_Code	Address_Line_1, Address_Line_2, City, State, PIN_Code	headquarters_location
Location Context	City embedded in deals	City (separate field)	location (contacts)
Contact Role	Contact_type	Contact_Type, Designation	title
Social Media	Instagram	Not present	linkedin_slug, facebook_slug, x_slug, instagram_slug
Integration IDs	Rolodex_Company_ID, Rolodex_Contact_ID, Integration_Source	Rolodex_Company_ID, Interakt_Lead_ID, Interakt_Contact_ID, Interakt_Notes, Integration_Source, Last_Sync_Date	Not applicable (source system)
Lead Tracking	Lead_Source, Lead_ID	Lead_Source	Not present
Pipeline/Opportunity	Stage, Deal_Name	Stage, Deal_Name, Opportunity_Id	Opportunity_Id1
Workspace/Tenant	Not present	Not present	workspace_id
Hierarchy	Not present	Not present	manager_id

Integration ID Fields Discovered:

ColourCoats Bigin:

- Rolodex_Company_ID: null (prepared for Rolodex company linking)
- Rolodex_Contact_ID: null (prepared for Rolodex contact linking)
- Integration_Source: null (tracks data origin system)

Metalia Bigin:

- Rolodex_Company_ID: null (prepared for Rolodex company linking)
- Interakt_Lead_ID: null (WhatsApp/chat platform integration)
- Interakt_Contact_ID: null (WhatsApp contact linking)
- Interakt_Notes: null (chat interaction history)
- Integration_Source: null (tracks data origin system)

Challenges issues

1. Null Values

- Across **Bigin (ColourCoats & Metalia)** and **Rolodex**, many fields are null or empty.
- Most fields in contacts and companies are either null or not meaningful for mapping.

2. Lack of Contact-to-Company Mapping in Rolodex

- In **Rolodex contacts**, there is no company name field in Contacts. Only available fields are: `first_name`, `last_name`, `workspace_id`, and `id`.
- Attempting to use `workspace_id` as a link fails:
    - Multiple workspace users share the same `workspace_id`.
    - Multiple companies share the same `workspace_id`.
- Cannot reliably link a contact to a company in Rolodex.

3. Integration IDs Are Null

- In **Bigin (both ColourCoats and Metalia)**, the integration fields (`Rolodex_Company_ID`, `Rolodex_Contact_ID`) are mostly null.
- This prevents mapping between Bigin and Rolodex datasets.
- Without valid IDs, it is not possible to:
    - Identify common companies across datasets.
    - Identify employees working in multiple companies.
    - **Email & Phone Are Unreliable**
- Emails and phone numbers are not always consistent in one company. Cannot be used as a reliable key to link contacts.

4. Address Field Differences Between ColourCoats Bigin and Metalia Bigin

- **ColourCoats Bigin:**
  Accounts table contains detailed billing address fields:
    - `Billing_Street`, `Billing_City`, `Billing_State`, `Billing_Code`, `Billing_Country`.
    - These are mostly complete and usable as company addresses.
- **Metalia Bigin:**
    - Accounts table has different address fields:
        - `Address_Line_1`, `Address_Line_2` (mostly null), `City`, `State`, `PIN_Code`.
    - City and state are usable, but street-level address information is often missing.

Implication: Fields are inconsistent between the two Bigin systems, requiring normalization to a common format for mapping or analysis.

5. Interakt IDs

- `Interakt_Part_ID` exists in **Metalia Bigin** but not consistently in **ColourCoats Bigin**.

6. Rolodex Location Field

- Rolodex only has a single `location` field.
- The value often combines **city, state, country** into one string.
- **Challenge:** Requires **normalization** to separate and standardize into usable fields (city, state, country) for mapping or comparison.

7. Name initials and inferred title

- Some contacts in ColourCoats Bigin and Metalia Bigin had **initials embedded in the name** that indicate roles (e.g., “Ar. shruti” → “Ar.” = Architect, “Id” = Interior Designer, “Cl” = Client).
  These initials were **not part of the actual name**, I implemented a logic to **filter out or interpret them**.

Solution Overview

I created 2 dedicated mapper files to standardize and unify heterogeneous data from three different CRM systems into consistent schemas. These mappers serve as the translation layer between disparate source formats and a unified data model.

Mapper Files Created

1. Unified_Companies_mapper.json

Maps company/account data from all three CRM sources to a standardized company schema.

2. unified_Personnel_mapper.json

Maps contact/personnel data from all three CRM sources to a standardized personnel schema.

For example

ColourCoats Bigin Address Handling

Maps structured billing address fields to unified schema:

- `Accounts.Billing_Street` → `address_street`
- `Accounts.Billing_City` → `address_city`
- `Accounts.Billing_State` → `address_state`
- `Accounts.Billing_Code` → `address_postal_code`
- `Accounts.Billing_Country` → `address_country`

Metalia Bigin Address Handling

Maps different address field structure to same unified fields:

- No street-level mapping (mostly null in source)
- `Accounts.City` → `address_city`
- `Accounts.State` → `address_state`
- `Accounts.PIN_Code` → `address_postal_code`

Rolodex Location Field Decomposition

Handles compound location strings through string splitting operations:

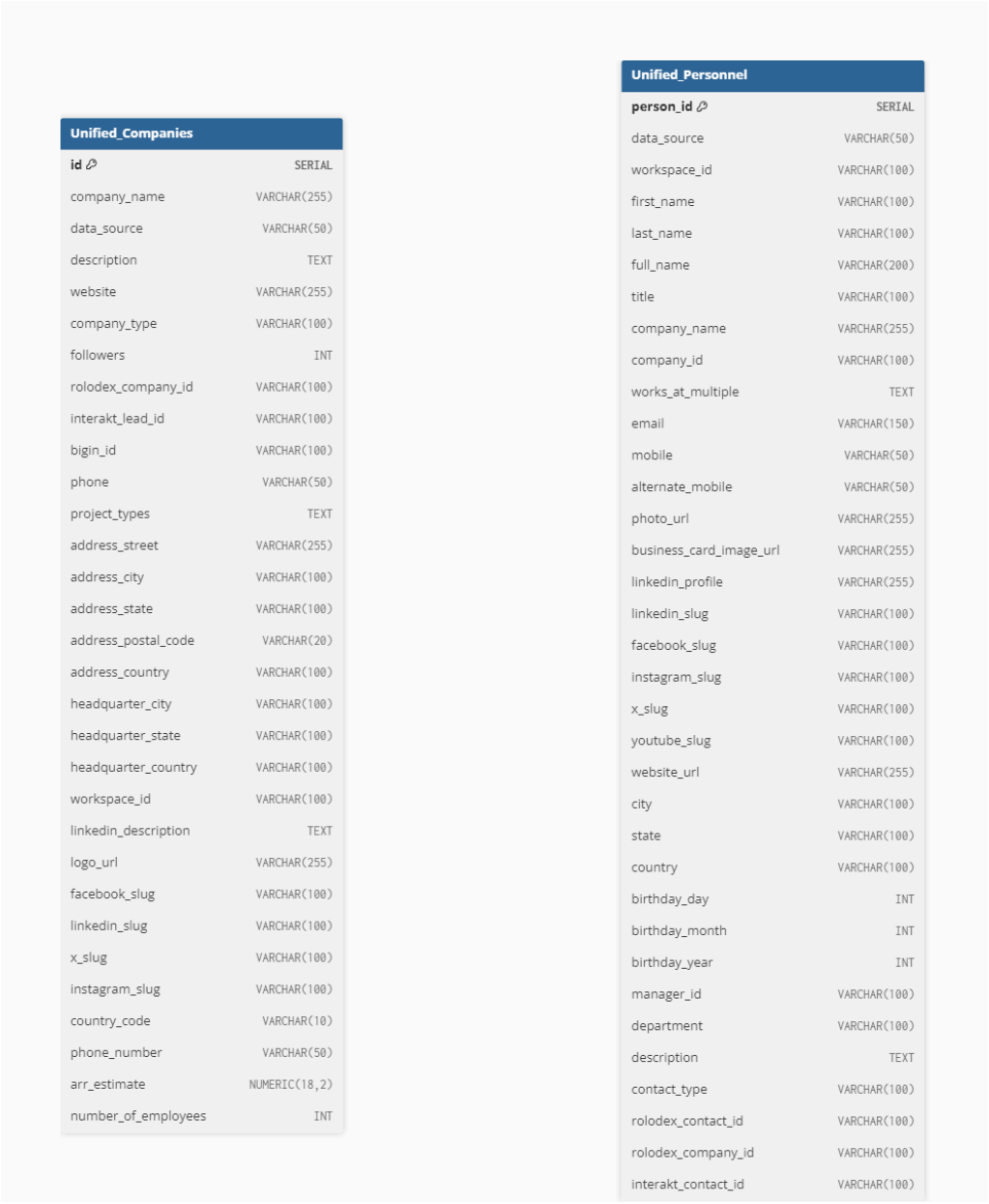
- `companies.headquarters_location.split(', ')[0]` → `headquarter_city`
- `companies.headquarters_location.split(', ')[1]` → `headquarter_state`
- `companies.headquarters_location.split(', ')[2]` → `headquarter_country`

Personnel Location Handling

Similar approach for personnel location data:

- Bigin: `Contacts.Mailing_City` → `city`
- Rolodex: `Rolodex_contacts.location.split(', ')[0]` → `city`
- Rolodex: `Rolodex_contacts.location.split(', ')[1]` → `state`
- Rolodex: `Rolodex_contacts.location.split(', ')[2]` → `country`

Unified schema/tables For firms and personnel



Unified_Companies

id	SERIAL
company_name	VARCHAR(255)
data_source	VARCHAR(50)
description	TEXT
website	VARCHAR(255)
company_type	VARCHAR(100)
followers	INT
rolodex_company_id	VARCHAR(100)
interakt_lead_id	VARCHAR(100)
bigin_id	VARCHAR(100)
phone	VARCHAR(50)
project_types	TEXT
address_street	VARCHAR(255)
address_city	VARCHAR(100)
address_state	VARCHAR(100)
address_postal_code	VARCHAR(20)
address_country	VARCHAR(100)
headquarter_city	VARCHAR(100)
headquarter_state	VARCHAR(100)
headquarter_country	VARCHAR(100)
workspace_id	VARCHAR(100)
linkedin_description	TEXT
logo_url	VARCHAR(255)
facebook_slug	VARCHAR(100)
linkedin_slug	VARCHAR(100)
x_slug	VARCHAR(100)
instagram_slug	VARCHAR(100)
country_code	VARCHAR(10)
phone_number	VARCHAR(50)
arr_estimate	NUMERIC(18,2)
number_of_employees	INT

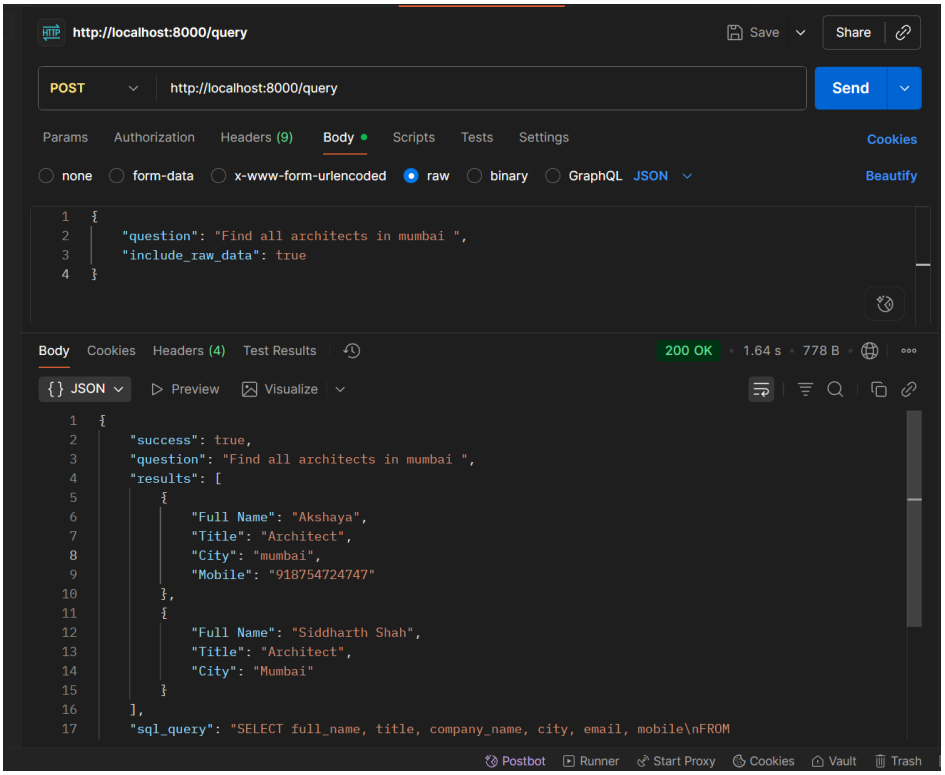
Unified_Personnel

person_id	SERIAL
data_source	VARCHAR(50)
workspace_id	VARCHAR(100)
first_name	VARCHAR(100)
last_name	VARCHAR(100)
full_name	VARCHAR(200)
title	VARCHAR(100)
company_name	VARCHAR(255)
company_id	VARCHAR(100)
works_at_multiple	TEXT
email	VARCHAR(150)
mobile	VARCHAR(50)
alternate_mobile	VARCHAR(50)
photo_url	VARCHAR(255)
business_card_image_url	VARCHAR(255)
linkedin_profile	VARCHAR(255)
linkedin_slug	VARCHAR(100)
facebook_slug	VARCHAR(100)
instagram_slug	VARCHAR(100)
x_slug	VARCHAR(100)
youtube_slug	VARCHAR(100)
website_url	VARCHAR(255)
city	VARCHAR(100)
state	VARCHAR(100)
country	VARCHAR(100)
birthday_day	INT
birthday_month	INT
birthday_year	INT
manager_id	VARCHAR(100)
department	VARCHAR(100)
description	TEXT
contact_type	VARCHAR(100)
rolodex_contact_id	VARCHAR(100)
rolodex_company_id	VARCHAR(100)
interakt_contact_id	VARCHAR(100)

Task 3.

Implemented and integrated a FastAPI backend with natural language processing (NLP) capabilities, enabling efficient query handling and scalable API services.
The system converts plain English queries into SQL queries using **Google Gemini AI** and returns structured JSON responses. This serves as the backend API that could be integrated with WhatsApp or any chat interface.

Backend: http://localhost:8000/query
Front end : http://localhost:5173/



Postman API endpoint

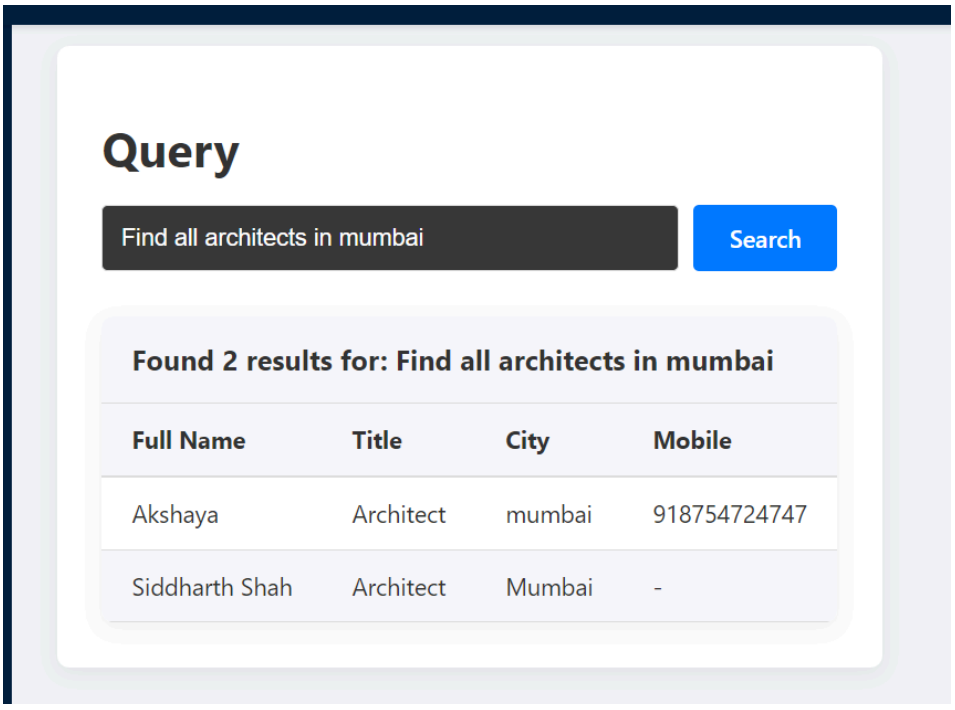


Fig1 Frontend UI 1

Fig Frontend UI 2