State-wise Call Director using Amazon Connect and Num Verify API

Intelligent Call Routing Based on Caller's Location

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Introduction

- In modern customer service environments, efficient call routing plays a critical role in reducing wait times and improving user experience.
- Traditionally, customers are directed to general queues, regardless of their location.
- This project introduces an automated, state-based call routing system using Amazon Connect, powered by NumVerify API and AWS Lambda.
- The goal is to connect callers directly to their regional support team, enhancing communication and reducing transfers.

Project Objective

Primary Goal: Automatically detect the caller's location (state) using their phone number and route them to the appropriate customer service queue in Amazon Connect.

Sub-Objectives:

- Reduce call handling time by eliminating manual redirection.
- Improve user satisfaction by connecting them with localized agents.
- Leverage serverless architecture for scalable and cost-efficient deployment.

Key Features

Location-Based Routing

Detects caller's state using NumVerify API

Serverless Infrastructure

Uses AWS Lambda for processing without managing servers

Custom Queues

Six custom queues defined for specific Indian states.

Fallback Support

Default routing for unrecognized states or API errors.

Scalable

Easily extendable to more states or regions.

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High-Level Architecture

Step 1

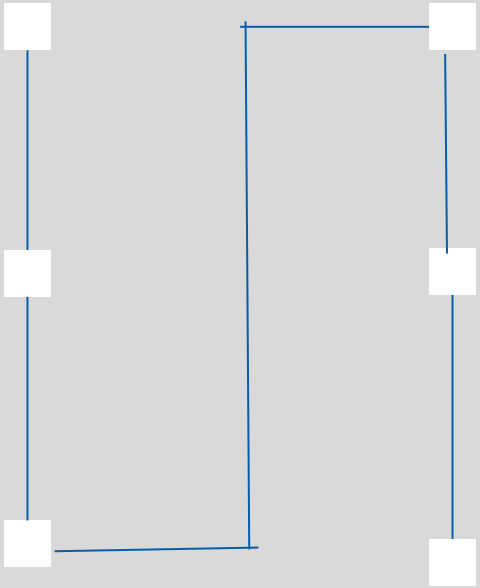
Customer dials Amazon Connect number

Step 2

Contact flow triggers Lambda function

Step 3

Lambda extracts phone no from call attributes



Step 4

Lambda calls NumVerify API to get the location

Step 5

Based on state, a customer service queue is selected

Step 6

Amazon Connect routes the call to the right queue

Tools & Technologies

Tool	Purpose
Amazon Connect	Cloud-based contact center for managing calls and workflows.
AWS Lambda	Executes call routing logic without requiring server management.
NumVerify API	Validates and determines phone number locations for accurate routing.
Python	Backend scripting language used in Lambda for processing data.
IAM Roles	Ensures secure access between Lambda and Amazon Connect.
Environment Variables	Securely stores API keys (e.g., NUMVERIFY_API_KEY) to enhance security.

Lambda Function Overview

Trigger

Invoked during the Amazon Connect call via a contact flow

Input

Receives call context with contact attributes (eg. Phone number)

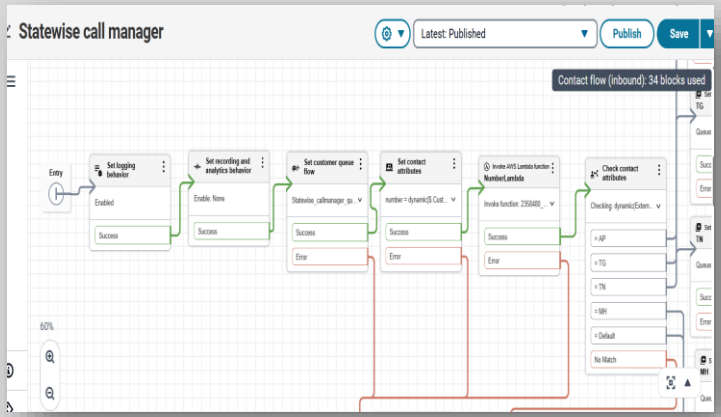
Processing

Validates phone no using NumVerify. Extracts location and then matches state with predefined CS teams

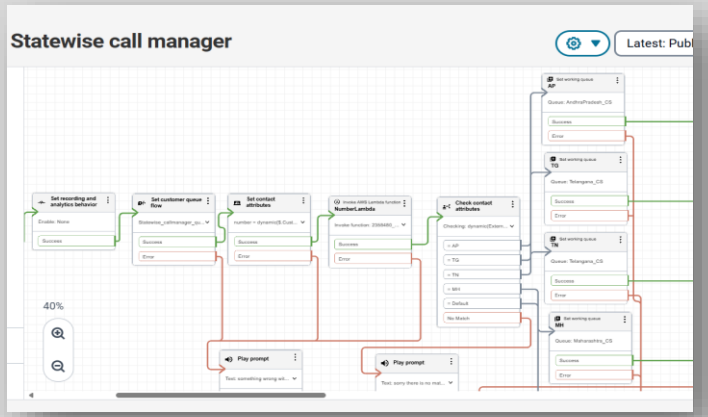
Output

Returns cs_team and location back to Amazon Conect for routing

Demo



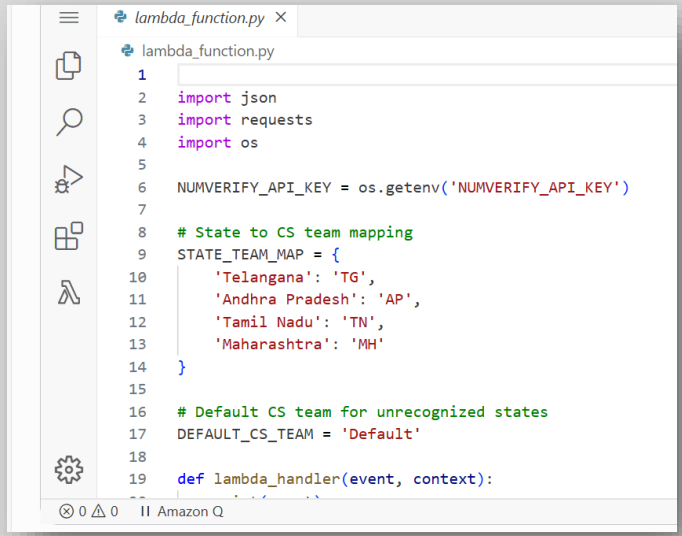
Amazon Connect contact flow with Lambda and routing



State wise CS Queues

```
{
  "valid":true,
  "number":"919130116632",
  "local_format":"09130116632",
  "international_format":"+919130116632",
  "country_prefix":"+91",
  "country_code":"IN",
  "country_name":"India (Republic of)",
  "location":"Maharashtra",
  "carrier":"Vodafone Idea Ltd (formerly Idea Cellular Ltd)",
  "line_type":"mobile"
}
```


Sample NumVerify API JSON response



Lambda configuration

Challenges and Solutions

Challenges	Solutions
1) **API rate limits or slow response**	Add Caching or upgrade to a higher plan
2) **API Failure during call**	Fallback to the default queue routing
3) **Hardcoded State Mappings**	Make the mapping dynamic using a config file or database
4) **Location returned as city instead of state**	Add Mapping logic to citites and states

Future Enhancements

Support more states

Add all 28 Indian states with queue mapping.

IVR Input Option

Allow user to confirm state using DTMF input if location is unclear.

Caching Mechanism

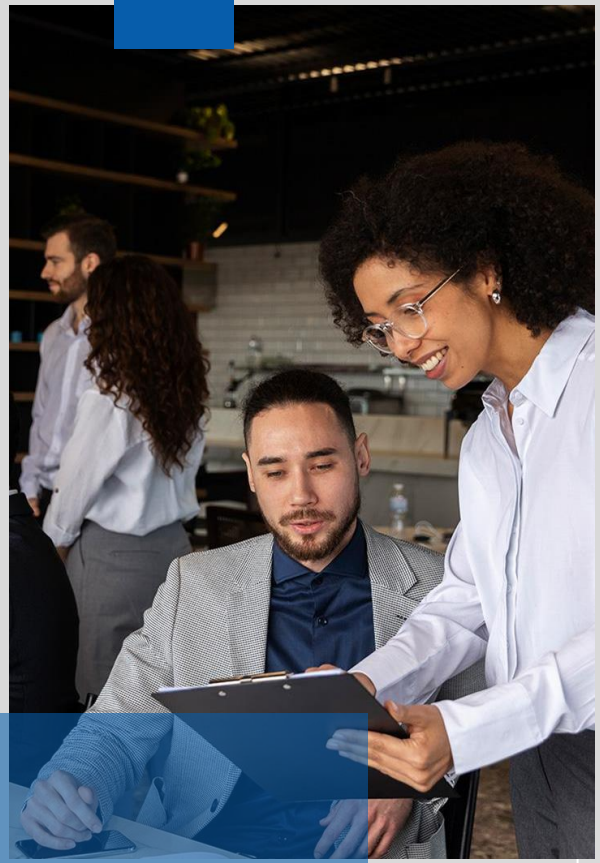
Avoid repeated API calls for same number.

Advanced Analytics

Log caller locations and routing metrics for business reports.

Conclusion

- Implemented a smart and automated location-based call routing system using Amazon Connect.
- Lambda function integrates with NumVerify API to detect caller location.
- Efficiently directs calls to one of six regional queues, improving customer satisfaction.
- The architecture is modular, scalable, and easy to extend.



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Resources

Did you like the resources used in this our project? Get them on these websites:

Amazon Connect -

- Amazon Connect – Official Documentation
- Invoke Lambda from Amazon Connect

AWS Lambda and Python -

- Invoke Lambda from Amazon Connect
- Lambda Environment Variables

NumVerify API -

- NumVerify API Documentation

Python Libraries -

- Requests Library (HTTP)

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Thanks!

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