Beaconnet

High Level Design

Initial design

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Group D1 - CIBAY

Lam Kin Ho 1155158095

Lin Sze Po 1155176854

Cheng Ka Chi 1155175548

Chiu Wing Tung Crystal 1155174499

Wong Hoi Yin 1155176263

Dept. of Computer Science and Engineering of The Chinese University of Hong Kong

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1 Introduction

1.1 Project Overview

1.1.1 Introduction

Beaconnect is a social media platform that allows users to share their thoughts, ideas, and daily activities with others by sending and receiving short frequent messages, called Bits. Therefore users can stay up-to-date with the people they follow or discover more content creators based on currently developed interests via the recommending system.

Users can write Bits and post them on their profile, this enables other users to read their Bits. Additionally, all Bits are sent to the followers' main page, allowing them to see the latest updates on who they follow.

The Bits are also searchable, meaning that users can find Bits that include specific keywords or hashtags. This feature makes it convenient for users to discover new content and connect with individuals who share similar values/points of view on the platform. Besides, the hashtags function can also work as a trend indicator.

Overall, Beaconnect provides an efficient and hands-on way for users to keep in touch with each other, and explore new and interesting content created by other users on the platform.

1.1.2 Expected Customers

Beaconnect targets various users, from individuals looking to stay connected with their friends and family, to businesses and entities wanting to connect with their customers and promote their brands.

1.1.3 Objective

The main objective of Beaconnect is to provide a simple and efficient way for users to stay connected and communicate with each other by allowing them to share Bits. The platform aims to construct a community for users to share and discuss their interests. Additionally, the platform also targeted to provide service for businesses and entities so they can get in touch with more potential customers. We would like to provide a trend analysis as well for both regular users and commercial users to have a quick summary of the current economy and society.

1.2 System Features

Beaconnect is a social media platform that lets users share updates with their followers by posting short and frequent messages (Bits). Features include:

1. User Interaction
2. User Management
3. Messaging

4. Content Management

1.2.1 Basic function

- User Interaction Features:
  Beaconnect provides several features to enhance user interaction on the platform.

  1. Following and Searching: allows users to follow other users and see their Bits. A user can be searched by username, account id, or other public information on the profile, such as interest, and career (optional information/can be hidden in settings).
  2. Posting, Liking, Commenting, and Reposting Bits: allows users to share their thoughts, interact with others' Bits, and spread hot/funny information.
  3. Displaying Followed Users' Bits: allows users to easily see the latest updates from people they care about and save them in their bookmarks.

- User Management Features:
  Beaconnect also provides tools for user account management.

  1. User Account Management: allows users to log in or register for an account, block other users, and protect their privacy through an auto-logout feature.
  2. Admin Operations: allows administrators to manage content and user behavior by banning users, and deleting Bits. Besides, the admin can create special banners for events and seasons. These features help ensure a safe, user-friendly, and more leisurely environment for all users on the platform.

1.2.2 Advanced features

Beaconnect has some planned advanced features, including direct messaging, message status (sent, received, read), media support (video, picture, audio), view count, "not interested" option, filtered search results, and Bits analytics. These features will be added throughout after the first release of Beaconnect released.

- Messaging Features:
  Beaconnect provides advanced messaging features to enhance user experience and let users communicate effectively.

  1. Direct Messaging: allows users to send private messages to other users.
  2. Message Status: allows users to check the status of the messages (sent, received, read).
  3. Media Support: allows users to include different types of media, likes, videos, pictures, and audio in the Bits.

- Content Management Features:
  Beaconnect provides features helping users navigate the platform more easily and manage their content effectively.

  1. View Count: allows users to see how many views their Bits have received.

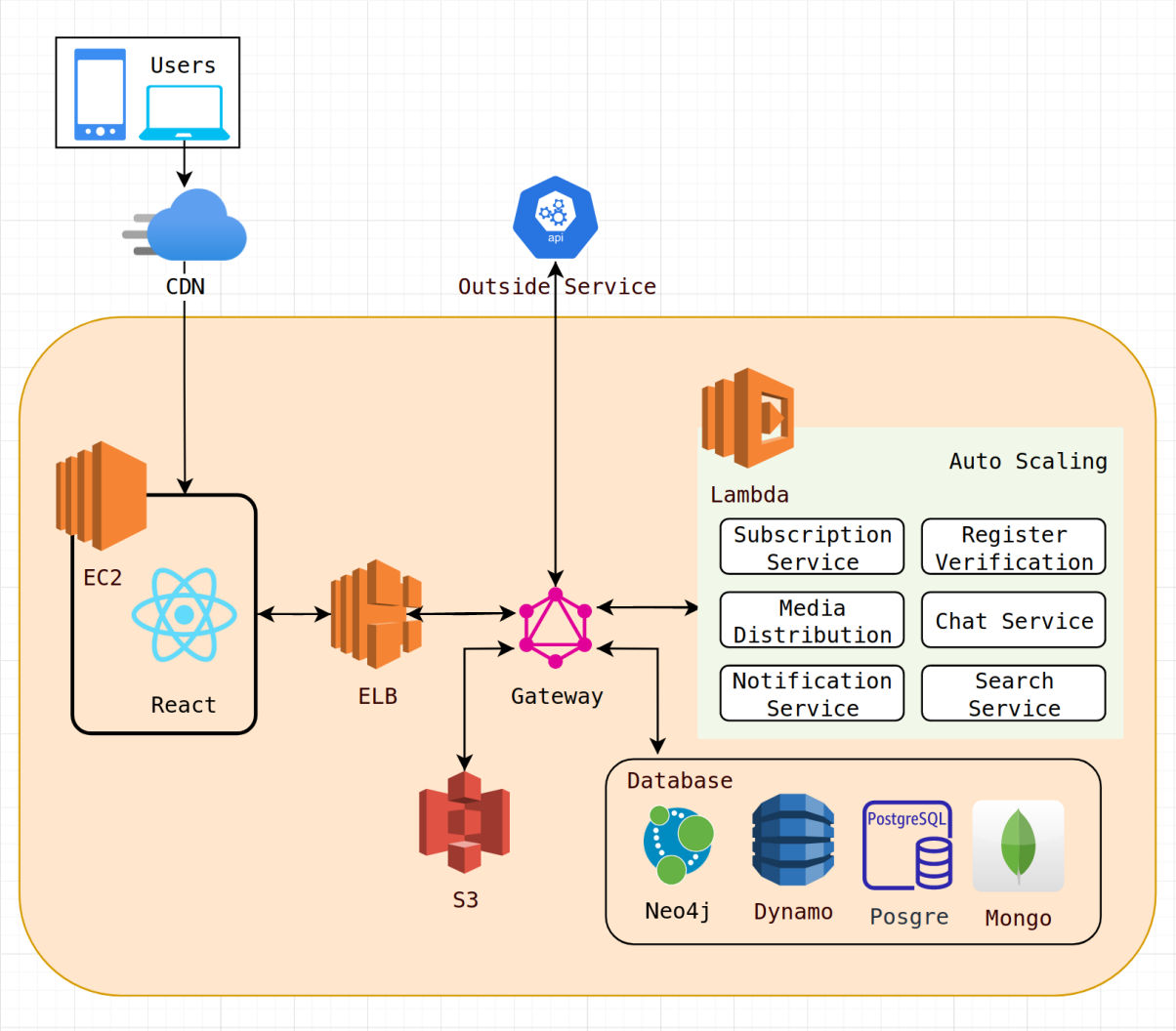
2. Not Interested: allows users to indicate that they are not interested in certain types of content.
3. Filtered Search Results: provides users with a more organized and tailored search experience.
4. Bits Analytics: provides detailed information about users' Bits, such as reach rate.

2 System Architecture

2.1 Technologies

Beaconnect will be developed mainly using Typescript. For the front-end part, React will be the major library. While the back-end will be a GraphQL gateway integrating all back-end services. There are many database options and the major one should be Neo4j. The whole project will be deployed on the cloud service, AWS.

2.2 Architecture Diagram



We use a typical 3-tier architecture. Where EC2 act as presentation-tier, ELB, GraphQL Gateway, and Lambda Microservice act as logical-tier, Database and S3 act as data-tier.

2.3 System Components

Front-end: The front-end of Beaconnect is built using React, a popular front-end library developed by Meta. This component helps present the data with a user-friendly graphical interface to the user and receive user input.

Middleware: There is a load balancer between the front-end and back-end to distribute the request and make the back-end services easier to scale. This component is accountable for connecting the front-end and back end like a bridge does.

Back-end: The back-end of Beaconnect is first connected to a GraphQL gateway, which acts as a single entry point for all back-end services. The back-end services will be micro-services for scalability and maintainability. And will serve the functionality of Beaconnet, like user authentication, chat service, etc... This component is responsible for handling incoming requests from the front-end, processing the requests, retrieving/modifying data from the database/storage, and returning the response to the front-end.

Database: The Beaconnect system stores its text data mainly in a Neo4j database, a powerful and scalable graph database. This component is responsible for storing, retrieving, and processing the data needed by the system.

Storage: Beaconnect will use a storage service, S3 to store most of its media. Files like video, audio, photo, and avatar will be saved in the S3 bucket, while the Neo4j database saves the URL to retrieve these media files.

Infrastructure: Beaconnect will be deployed on the cloud platform, Amazon Web Services (AWS). This provides the system with scalable and secure infrastructure, allowing for easy deployment and management of the system components. Also, its fine-grained access control can help us manage different roles of developer and strict inbound rules for higher safety.