URL Shortener Service

I have been much into problem-solving (Data Structures and Algorithms), so the first thing that hits my mind after reading the question is hashing but this is a very initial thought and I have to go deep and make various addition to my basic approach because this is service used by a company like Narvar and should be scalable, encrypted (secure), logic should be fast to provide the real time result (less latency for redirecting to original URL), etc.

(For this purpose, I have elaborated points which I could think of as problem and provided my approach) short URL – new URL, original-long URL

1. URL permutation and length

As short URL has to be unique because I am thinking of a hashing approach and needs to return long URL back and this needs to be stored also as key value pair.

Purposing we can use alphabets to prepare different permutations:

Consider we use only small alphabets (a-z)

One each

>We can prepare 26 unique URLs

>URL example (www.narvar.com/a,www.narvar.com/c...)

>Given we have few hundred clients for NARVAR

>We can prepare 2 letter unique combination

>URL example (www.narvar.com/ab,www.narvar.com/ce...)

>With this we prepare 262 that is = 676 unique URLS.

> So I decide to use 2 letter unique URL (which can scaled by using >Uppercase and numbers up to 62 letters and very large number of unique URLS).

1. Handling Requests

Second thing comes to mind before making any logic is that if users make request at the same time how I will be handling because both of them cannot be allocated same short url and hash or database needs to be updated before running for next request:

For this I will be using id solution explained in next point it will solve problem for always creating unique value and same time registration too.

1. Unique key in hash

I am thinking to use long url as key and generate permutation of short than check if it already used this process on each request is very costly and many times we may get repeated permute and need to generate next permute

For this I purpose using id (int) this provide easy access, unique key and database management and retrieval easy also.

Here a logic will there to convert int id to short url and back.

Logic is there will be id to each long url (unique) and that will be only used to generate the short url.

>I will convert the id to a base 26 number and get characters from the map of 26 lower case letters.

> This short url will be returned and also id , long url pair will be stored in the database.

1. There should be also encoding in real-time when used but at present I am not good with encryption methods so implementing without it.
2. Language I am good at C++, did project in python Django as backend, have good understanding of oops

Here I am preparing my code in C++ as this problem consists major considerations in backend , logic and handlings and frontend part is just putting a request to server and display short url to copy.

1. Please find attached logic in c++ file.

(More considerations should be there definitely, database management, proper development framework, a frontend and a backend, If I did would prefer python and Django for backend.)

(I much involved in coding , DSA and pursing this intern to learn development and more industry skills at Narvar) --Ishan Sethi