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1. (Part 1) SPA and MPA

   Single Page Application, or SPA, is a web application that dynamically rewrites the existing web page with data from the server. It essentially functions like an application instead of a website where the page is constantly refreshed.

   Multi-Page Application, or MPA, is the common approach for websites that host a *lot* of content. Multiple web pages are downloaded when the user opens the site.

   A good aspect of SPA is an excellent progressive web application conversion [1]. As the page is not reloaded, users can work offline, allowing for a faster user experience. However, a lot of the advantages differ according to the developer and their requirements. Development is more difficult in MPA, though its scalability is limitless compared to SPA, which is severely limited due to the single page. SPA is also less Search Engine Optimization (SEO) friendly. Although recent development in technology has improved performance, there are still issues with indexing SPAs compared to MPAs [2].

1. (Part 2) SSR and CSR

   Server-Side Rendering means that the web pages are rendered on the server, sending the completed HTML to the browser instead. This improves initial loading speed and SEO performance, though of course, the load is heavier on the server.

   Client-Side Rendering, on the other hand, uses JavaScript to render the web page on the browser. Server load is lighter, but the initial loading is longer and SEO problems may occur [3].

Advantages and disadvantages, once again, depend on the user. For minimal/static sites, SSR is a much more enticing option. Faster initial load speeds, and better SEO. Minimalism is preferred due to slow page rendering, especially with larger elements and higher latency whenever there is an influx of traffic. It also needs a bigger server to perform well in contrast to CSR.

CSR is a better option for general websites, especially if expectations of high traffic and performance exists. Rendering will be slower for the first upload, but since there is no waiting time for every page to render, the next page will be fast. Server load is much lower, enhancing the user experience. The disadvantages are slower initial loading, and it requires more browser resources. This means that older devices may not be compatible, like outdated school laptops [4].

2. CDN, otherwise known as Content Delivery Network, is a server network optimized best to deliver content to users as fast as possible [5]. Speed and security are two major aspects it specializes in improving by caching content on geographically distributed servers.

   The most common algorithms include:

   - Request Routing: The algorithm uses network latency and user preferences to decide the best CDN server to complete a user request [6]. Here, DNS-based algorithms are the most common.
   - Content Placement: The algorithm here uses content popularity, network topology, and cost to decide the location and method to storing content on CDN servers. Static, dynamic, and hybrid algorithms are used.
   - Content Replication: Determining when and how to replicate content throughout all the CDN server using content freshness and server load.

3. Load balancing is when client requests are distributed throughout several servers to help with resource optimization [7], ultimately preventing server overloading while performance and reliability of applications are significantly enhanced.

   Some commonly implemented algorithms include the following:

   - Round Robin: (I found this one the funniest, because I understood it immediately as it was a very popular video game format) In video games, the round robin format is when all teams play against one another, and the teams that wins the most would move forward to a playoff format, or would win the tournament immediately. The same logic can be applied here to load balancing, where requests are allocated to servers sequentially. Each server handles the request in a rotational manner. While this is the simplest method, in video games, this means that even the most experienced team may face off against a very weak team. In load balancing, the load or capacity of the server is not taken into account.

   - Weighted Round Robin: Unlike the Round Robin format, requests are assigned using predefined weights per server. While it can handle differing servers, real-time load is still not taken into account.

   - Least Response Time: Requests are allocated to servers with the lowest response time, calculated by adding server connection time and average response time. While user experience is greatly increased, monitoring is extremely necessary for this type of algorithm [8].

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