

WEB PROGRAMMING

ASSIGNMENT 1

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Question 3:

Study and explore the applications ‘KASB KTrade’ and ‘Investify’. Write about their system design, API architecture, approaches to scalability, and software architecture. Additionally, evaluate the strengths and weaknesses of their software system designs. Give proper references of facts and figures in your document. Sharing your personal experience when using the application is a bonus point [40]

Software Architecture Overview:

KASB KTrade:

As identified through the Wappalyzer Chrome extension, KTrade has integrated the following tools:

- Content Management: WordPress
- Website Hosting & Proxy: Nginx
- Backend Development: PHP
- Content Distribution: Cloudflare, Google Hosted Libraries, and cdnjs
- Data Management: MySQL
- Frontend Design: Bootstrap and jQuery
- Security Protocols: reCAPTCHA and HSTS
- User Analytics: Google Analytics and TikTok Pixel
- User Engagement: WebEngage
- Messaging Platform: WhatsApp Business Chat
- Online Visibility: RankMath SEO.

KTrade has integrated a suite of software tools to enhance its platform, as revealed by the Wappalyzer Chrome extension. The platform utilizes WordPress for content management and is hosted on Nginx. The backend operations are driven by PHP, while content distribution is managed through Cloudflare, Google Hosted Libraries, and cdnjs. Data is stored in MySQL, and the frontend design is anchored by Bootstrap and jQuery. For security, KTrade incorporates reCAPTCHA and HSTS. Analytical insights are gleaned from Google Analytics and TikTok Pixel, while user engagement is boosted by WebEngage. WhatsApp Business Chat serves as the primary messaging platform, and online visibility is optimized using RankMath SEO.

Investify:

Based on the technologies identified for Investify.pk, the platform has integrated the following tools:

- Font Scripts: Google Font API
- Web Servers: LiteSpeed
- JavaScript Libraries: AOS, Slick, jQuery (version 3.3.1)
- UI Frameworks: Bootstrap (version 4.1.1)
- Email and Marketing Automation: MailChimp
- Live Chat: WhatsApp Business Chat
- Maps: Google Maps
- Miscellaneous: Open Graph, Popper, HTTP/3

Investify.pk has chosen a combination of technologies to enhance its platform. The website is served by LiteSpeed, a high performance web server known for its speed and security. The frontend design is primarily anchored by Bootstrap, a popular framework for building responsive and mobile first websites. jQuery, a widely used JavaScript library, is employed for scripting. For typography, the platform relies on Google Font API. Additionally, the site integrates MailChimp for email marketing and automation, and WhatsApp Business Chat for real time user interactions.

System Design Insights:

While both KTrade and Investify might not explicitly state their use of a microservices architecture, there are several reasons to infer their inclination towards it:

KASB KTrade:

Microservices Assessment:

- Headless WordPress Potential - Even though WordPress is traditionally monolithic, the platform's potential to function as a headless CMS can allow frontend and backend separation, which is a hallmark of microservices.
- Module Federation - The use of Module Federation indicates a modular approach, allowing different frontend components to be loaded independently. This suggests a move towards a microservices setup, especially for frontend operations.
- Nginx Flexibility - Nginx's capability to act as a reverse proxy signifies that it can route requests to different microservices, a necessary feature in a microservices environment.
- Tool Integration - The integration of various analytics and marketing tools in a modular manner suggests an underlying microservices methodology, where each tool might be treated as a separate service or module.

Investify:

Microservices Assessment:

- LiteSpeed's Scalability - LiteSpeed's ability to handle different instances in a microservices setting suggests it can serve different microservices, even if not exclusively indicative of it.
- HTTP/3 Adoption - The reduced latency and performance improvement of HTTP/3 is conducive for microservices, especially when services need to communicate frequently.
- Frontend Modularity - The use of tools like Bootstrap and jQuery suggests that frontend components can interact with various backend services, which is typical in a microservices setup where each frontend module might interact with different microservices.
- Industry Trend - Stock trading platforms, given their need for high scalability, reliability, and modular upgrades, tend to favor microservices. This industry inclination provides an overarching reason to believe Investify might be using microservices.

Inference: While direct evidence might be lacking, the technological choices and integration methods of both platforms give strong reasons to believe they are leaning towards or have already adopted a microservices architecture.

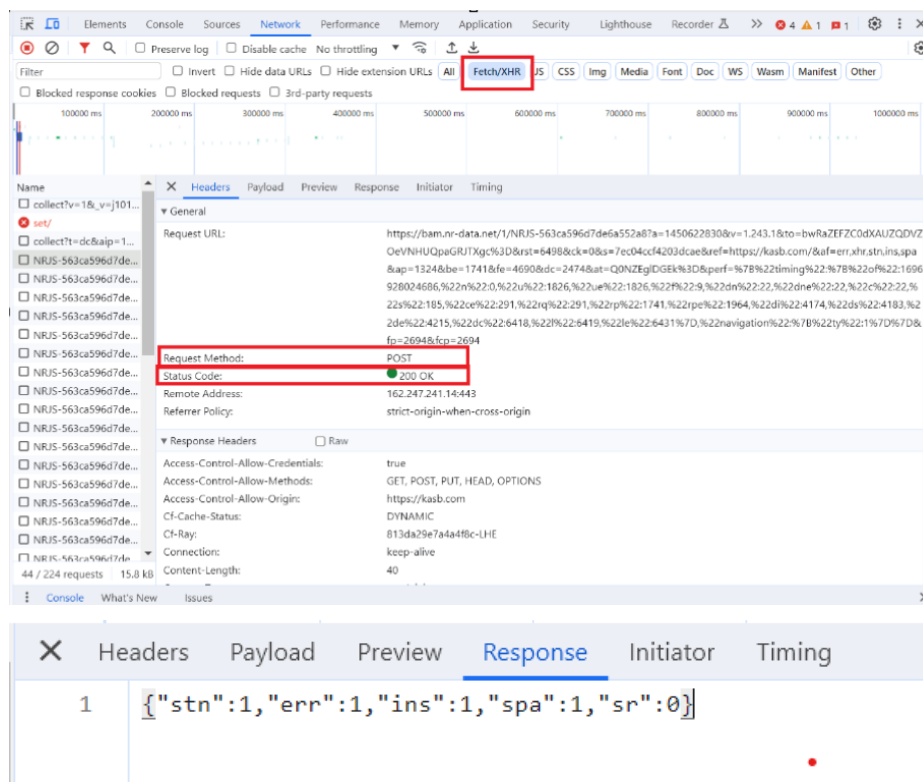
API Architecture:

There is no direct indication that both applications use RESTful API. However, stock trading platforms like KTrade and investify usually deploy RESTful APIs for real time stock data updates, the attached screenshots from inspecting their API calls give proofs for this hypothesis.

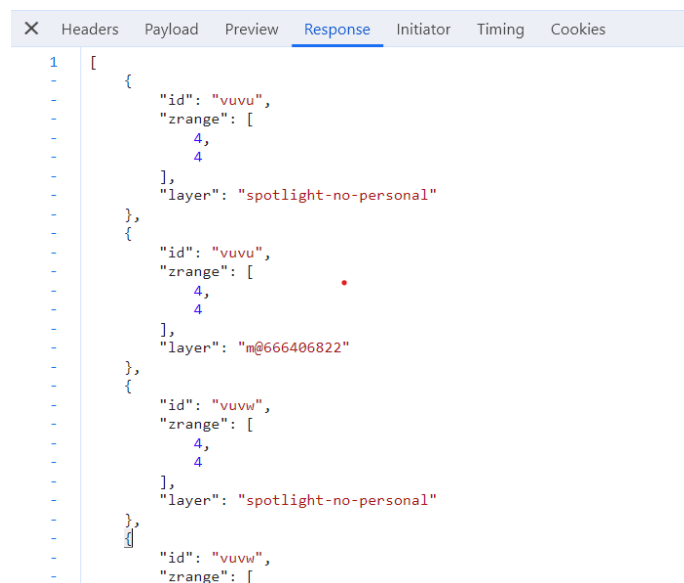
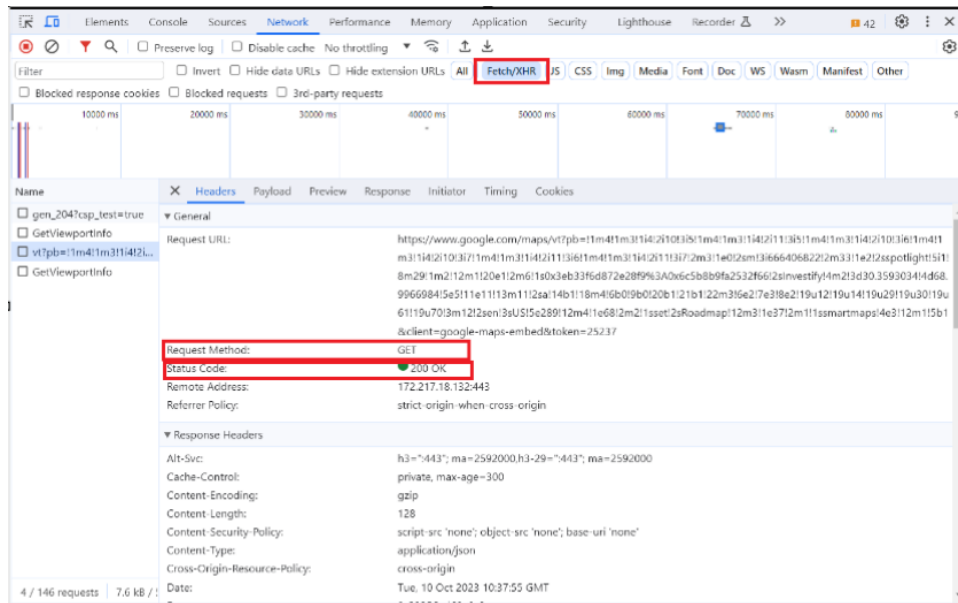
Some key aspects of RESTful APIs include:

- Resources: Represent key entities or objects like users or products, each identified by a unique URL.
- HTTP Methods: Standard methods like GET, POST, PUT, DELETE, and PATCH facilitate operations on resources.
- Stateless Nature: Every client request carries all necessary data, ensuring the server doesn't maintain session details.
- Data Formats: Typically, these APIs relay data in JSON or XML.
- Status Codes: HTTP status codes, like 200 (OK) or 404 (Not Found), offer feedback on API request outcomes.

KASB Ktrade Screenshots



Investify Screenshots:



Approaches to Scalability:

Both websites don't explicitly outline their scalability methods. However, platforms of this nature often turn to cloud-based solutions for enhanced adaptability and scalability. They may employ load balancers, like Application Load Balancers (ALB) for application layer traffic and Network Load Balancers (NLB) for transport layer traffic, to effectively distribute incoming traffic to various targets, including Amazon EC2 instances, containers, and multiple IP addresses across different Availability Zones. Another prevalent strategy is the use of distributed systems, which spread data and tasks over several servers, ensuring consistent platform performance, even during high-demand periods. Together, these techniques are designed to manage a significant influx of user interactions and data processes efficiently.

Strengths and Weaknesses

KASB KTrade

Strengths:

- User-Friendly Design with clear presentation of core offerings
- Responsive Design optimized for various devices
- Comprehensive Integration of analytics, marketing, and engagement tools
- Emphasis on Security with reCAPTCHA and HSTS
- Performance Optimization using CDNs like Cloudflare
- Clear Navigation with easily accessible links to services and other sections

Weaknesses:

- Dependence on WordPress with potential vulnerabilities
- Possible Overhead due to multiple JavaScript libraries and plugins
- Limited Detailed Information on services
- SEO concerns despite integration of tools like RankMath SEO
- Potential Monolithic Architecture due to heavy reliance on WordPress
- Predominantly Informational with limited interactivity features

Investify:

Strengths:

- Performance optimized with LiteSpeed web server for handling high traffic efficiently
- User Engagement through WhatsApp Business Chat and MailChimp integration
- Responsive Design using Bootstrap for a consistent user experience across devices
- Typography enhanced with Google Font API for visually appealing content
- Interactivity with various JavaScript libraries for a dynamic interface

Weaknesses:

- Potential Overhead from Bootstrap and jQuery if not optimized can affect page load times
- Dependence on Third Party Services such as MailChimp and WhatsApp Business Chat may lead to external dependencies and potential downtimes

Personal Experience:

KASB KTrade

On my initial visit to the KTrade platform, I was impressed by its clear layout and engaging design. The platform's color scheme and typography enhanced readability, while the user-friendly interface made navigation simple. Icons and visual cues were well-placed, guiding users smoothly through various features. The site loaded quickly, was responsive across devices, and had interactive elements that functioned efficiently. KTrade offers valuable resources like blogs and tutorials in an easily digestible format. The inclusion of security features like reCAPTCHA and the site's overall performance highlighted its reliability and user-centric approach. Overall, KTrade showcased a well-thought-out design, offering users a commendable experience.

Investify:

When I first visited Investify.pk, I was immediately drawn to its modern and user-friendly design. The harmonious color scheme and the use of Google Fonts made the content easy to read. The platform's interactive features, like buttons and links, worked seamlessly, indicating a strong backend. A unique touch was the inclusion of WhatsApp Business Chat, allowing for instant communication. The site also provided dynamic graphs and in-depth stock insights, valuable for users. In essence, Investify.pk seamlessly blended aesthetics and functionality, offering users a top-tier experience.