

Q3

Introduction:

KASB KTrade and Investify are two popular financial applications that provide users with a platform to trade and invest in stocks, bonds, ETFs, and other financial instruments. Both applications have gained significant traction among retail investors and traders due to their user-friendly interfaces, robust features, and reliable performance. This report will delve into the system design, API architecture, approaches to scalability, and software architecture of both applications, highlighting their strengths and weaknesses.

System Design:

KASB KTrade:

- KASB KTrade uses a multi-tiered architecture, consisting of a presentation layer, application layer, and data access layer.
- The presentation layer is built using HTML, CSS, and JavaScript, providing a responsive web interface for users.
- The application layer is developed using Java and Spring Boot, handling business logic and workflows.
- The data access layer utilizes Hibernate as an ORM tool, connecting to MySQL and MongoDB databases for storing user data and market information.

Investify:

- Investify employs a microservices architecture, divided into several discrete services, each responsible for a specific functional area, such as user authentication, portfolio management, and order execution.
- Each service is built using Node.js, Express.js, and GraphQL, allowing for efficient data retrieval and manipulation.
- The frontend is designed using React, providing a sleek and intuitive user interface.
- Investify leverages Apache Cassandra for its distributed database needs, ensuring low latency and high availability.

API Architecture:

KASB KTrade:

- KASB KTrade exposes a RESTful API, enabling developers to build custom integrations and automate tasks.
- The API supports JSON data format and uses OAuth 2.0 for authentication and authorization.
- API endpoints cover various functionality, such as fetching real-time market data, placing orders, and managing user accounts.

Investify:

- Investify provides a GraphQL API, offering a flexible schema for querying and mutating data.
- The API utilizes AWS AppSync for offline caching and optimization, improving overall performance.
- Developers can leverage the API to create custom frontends, integrate third-party services, and streamline workflows.

Approaches to Scalability:

KASB KTrade:

- KASB KTrade horizontally scales its application servers to handle increased traffic and load.
- The application uses caching mechanisms, such as Redis and Memcached, to reduce database queries and improve response times.
- KASB KTrade also implements load balancing techniques, distributing incoming requests across multiple instances for optimal resource utilization.

Investify:

- Investify follows a cloud-native approach, deploying its microservices on Amazon Web Services (AWS).
- Each service is designed to handle a specific volume of traffic, auto-scaling up or down based on demand.
- Investify uses Kubernetes for container orchestration and service discovery, simplifying deployment and management of its microservices.

Software Architecture:

KASB KTrade:

- KASB KTrade's software architecture emphasizes modularity and maintainability, separating concerns into distinct layers and modules.
- The application adopts a Service-Oriented Architecture (SOA) philosophy, exposing APIs for inter-module communication.
- KASB KTrade relies on dependency injection and unit testing, promoting flexibility and code reuse.

Investify:

- Investify's software architecture prioritizes scalability and resilience, employing a microservices structure and containerization.
- Each service communicates via lightweight protocols and APIs, minimizing coupling and maximizing independence.
- Investify incorporates Domain-Driven Design (DDD) principles, focusing on domain models and business logic to drive software development.

Strengths and Weaknesses:

KASB KTrade:

- Strengths: User-friendly interface, robust trading features, reliable performance, and extensive market data coverage.
- Weaknesses: Limited scalability, monolithic architecture may lead to complexity, and dependence on a single database.

Investify:

- Strengths: Scalable architecture, modern technology stack, seamless integration with external services, and support for advanced trading strategies.
- Weaknesses: Steep learning curve, limited customizability, and higher transaction fees compared to competitors.