

Test Assignment: Real-Time Notification System for a Fintech Application

Description

You need to develop a real-time notification system based on event-driven architecture using WebSockets. The system will use currency exchange rates as event triggers. The backend will fetch exchange rates periodically, detect changes, and notify connected clients (web browsers) in real-time.

Requirements

1. Backend (Node.js + WebSockets + Event-driven Architecture)

- Use **Node.js** with **NestJS** or **Express + ws/socket.io**.
- Implement a service that:
 - Periodically fetches currency exchange rates (from a public API such as exchangeratesapi.io, openexchangerates.org, or randomly generated values).
 - Detects changes in exchange rates (e.g., when the rate changes by more than 0.1%).
 - Generates events upon rate changes and broadcasts them to clients via WebSockets.
- Implement an **Event Bus** (using `EventEmitter` or a library like `redis-pubsub`, `Kafka`, `NATS`, etc.).
- Ensure proper event logging.

2. Frontend (React/Vue + WebSockets)

- Develop a simple SPA (React/Vue) with minimal UI:
 - Establish a WebSocket connection to receive updates.
 - Display real-time exchange rates and their changes.
 - Highlight changes (e.g., green for an increase, red for a decrease).

3. Technical Requirements

- The code should be clean and well-structured.
- Use TypeScript.
- Document core modules and architecture.
- Provide setup instructions in a **README** file.

Bonus Points

- **Authentication** via JWT/WebSockets.
- Using **Redis/NATS/Kafka** for scalable event-driven architecture.
- Providing a **Dockerfile** for easy deployment.

Submission Format

The candidate should submit:

- A repository on GitHub/GitLab/Bitbucket with the source code.
- Instructions on how to run the project.
- An architecture description (can be in the README file).

Evaluation Criteria

- Compliance with requirements.
- Code quality and architectural approach.
- Stability and reliability of the system.
- Understanding of WebSockets and event-driven architecture.
- Use of optimal technical solutions.